APPENDIX B - HYDRAULIC MODEL (HEC-RAS) RESULTS

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                    HEC-RAS Version 3.1.3 May 2005
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX


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PROJECT DATA
Project Title: Blue River Hydraulics
Project File : BR_toHDR.prj
Run Date and Time: 8/8/2008 2:21:08 PM

Project in English units

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PLAN DATA

Plan Title: HDR_DESIGN_OP1_ W/ NB_LESS_BLUFF_REMOVED
Plan File : C:\Current_Projects\BLUE RIVER\HEC RAS\BR_toHDR.p07

           Geometry Title: HDR_DESIGN_OP1_ W/ NB_LESS_BLUFF_REMOVED
           Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS\BR_toHDR.g06

           Flow Title    : 1990 SWMM Existing Conditions Flows
           Flow File     : C:\Current_Projects\BLUE RIVER\HEC RAS\BR_toHDR.f03

Plan Description:
Base model from USACE (KC) and geometry file modified to reflect the propsoed
channel and overbank cross-sections, Blue Parkway Bridge, reach lengths and 'n'
values for  current channel design-build contract (ESI-HDR 2008) from Brush
Creek to 53rd St


Plan Summary Information:
Number of:  Cross Sections =  359    Multiple Openings  =    1
            Culverts       =    0    Inline Structures  =    0
            Bridges        =   50    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


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FLOW DATA

Flow Title: 1990 SWMM Existing Conditions Flows
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS\BR_toHDR.f03

Flow Data (cfs)
*****************************************************************************************************************************************************************************************
* River           Reach           RS      *           2-yr           5-yr          10-yr          20-yr          50-yr          100-yr          200-yr          500-yr *
* Blue River      Main            33.310  *           5870          10900          12600          19100          27300           32830           38750           46700 *
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* Blue River      Main            24.326  *            6725           12150           13500           19700           27700           33260           39100           47000 *
* Blue River      Main            20.087  *           13200           20300           26320           34000           44500           53690           62000           74720 *
* Blue River      Main            12.743  *           13200           20300           26320           34000           44500           53690           62000           74720 *
* Blue River      Main            10.287  *           12800           20500           27100           34500           45500           54400           63000           75900 *
* Blue River      Main            5.732   *           12500           19500           26600           34200           45500           54400           63000           75900 *
*****************************************************************************************************************************************************************************************
*************************************************************
* River           Reach           RS      *Design Discharge *
* Blue River      Main            33.310  *           20100 *
* Blue River      Main            24.326  *           20700 *
* Blue River      Main            20.087  *           38000 *
* Blue River      Main            12.743  *           38000 *
* Blue River      Main            10.287  *           38700 *
* Blue River      Main            5.732   *           38300 *
*************************************************************

Boundary Conditions
*****************************************************************************************************************
* River           Reach           Profile          *            Upstream                 Downstream    *
*****************************************************************************************************************
* Blue River      Main            2-yr             *                                 Normal S = 0.0006 *
* Blue River      Main            5-yr             *                                 Normal S = 0.0006 *
* Blue River      Main            10-yr            *                                 Normal S = 0.0006 *
* Blue River      Main            20-yr            *                                 Normal S = 0.0006 *
* Blue River      Main            50-yr            *                                 Normal S = 0.0006 *
* Blue River      Main            100-yr           *                                 Normal S = 0.0006 *
* Blue River      Main            200-yr           *                                 Normal S = 0.0006 *
*****************************************************************************************************************
Changes in WS and EG
*******************************************************************************
* River           Reach           RS      Profile         Type       Value *
* Blue River      Main            8.786   500-yr  Known WS    765.27 *
* Blue River      Main            8.786   100-yr  Known WS    761.26 *
* Blue River      Main            8.786   50-yr  Known WS    758.81 *
* Blue River      Main            8.786   10-yr  Known WS    749.92 *
* Blue River      Main            8.221   500-yr  Known WS    764.28 *
* Blue River      Main            8.221   100-yr  Known WS    760.22 *
* Blue River      Main            8.221   50-yr  Known WS    757.72 *
* Blue River      Main            8.221   10-yr  Known WS    748.82 *
* Blue River      Main            3.114   500-yr  Known WS    755.84 *
* Blue River      Main            3.114   100-yr  Known WS    751.34 *
* Blue River      Main            3.114   50-yr  Known WS    747.44 *
* Blue River      Main            3.114   10-yr  Known WS     739.9 *
* Blue River      Main            2.802   500-yr  Known WS    755.01 *
* Blue River      Main            2.802   100-yr  Known WS    749.55 *
* Blue River      Main            2.802   50-yr  Known WS    746.13 *
* Blue River      Main            2.802   10-yr  Known WS       739 *
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GEOMETRY DATA

Geometry Title: HDR_DESIGN_OP1_ W/ NB_LESS_BLUFF_REMOVED
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS\BR_toHDR.g06

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 33.310

INPUT
Description: Copy of 33.307.  Added for Unsteady Flow
Station Elevation Data    num=     426
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  900.66   38.73  898.68   84.31  898.84   97.24  899.15  103.41  896.43
  116.59  891.43   130.5  891.84   156.3  892.54  163.09  892.73  166.36  892.82
  168.02  893.08  178.53  894.75  179.64  894.23  191.43  888.65  195.41  889.18
  198.77  889.64  201.35  890.68  219.05  894.75  226.64     893  239.62  889.78
  246.14  891.06  252.95  889.44  271.84  889.65  277.06  890.01   282.9  889.44
  295.54  888.25   329.9  886.36  370.65  884.88  373.92  884.54  383.11  884.75
  399.48  883.93  419.08  883.81  465.92   882.3  502.54  881.38  526.39  880.85
  541.24  880.44  603.64  878.97  612.08  878.82  618.36  878.87  684.59  879.38
  724.93  880.31   727.4  880.36  731.27  880.11  743.51  879.38   764.7  878.13
```

768.17	877.9	771.78	878.24	779.51	878.93	784.7	879.39	789.5	879.02
789.78	879	790.52	879.15	805.54	882.14	808.86	881.85	810.19	881.74
813.35	881.74	814.9	881.75	816.18	881.85	823.25	882.38	828.79	882.32
829.61	882.3	830.53	882.29	836.1	882.2	842.24	880.61	842.36	880.58
862.91	874.95	877.4	874.71	881.32	874.99	882.82	875.05	893.94	874.97
896.29	874.91	898.46	874.84	898.93	873.65	902.93	873.41	912.13	873.72
917.03	873.86	923.79	873.98	930.28	874	937.48	873.94	947.66	873.77
949.83	873.7	959.73	873.51	963.5	873.41	970.15	873.76	972.52	873.89
981.54	874.42	987.23	874.8	1003.65	875.49	1008.51	875.79	1017.22	876.09
1038.35	876.26	1054.21	876.49	1067.93	876.04	1099.08	875.97	1118.24	876.75
1132.09	876.77	1157.47	876.73	1159.72	876.7	1161.59	876.72	1188.31	876.61
1202.67	876.54	1217.12	876.1	1219.68	876.07	1221.39	876.09	1222.42	876.09
1223.19	876.15	1234.65	875.2	1253.8	874.43	1275.34	874.99	1280.03	874.63
1289.44	874.32	1305.89	874.4	1306.53	874.4	1308.62	874.39	1320.15	874.16
1325.11	874.15	1341.51	874.15	1346.5	874.15	1351.32	874.88	1359.31	874.61
1360.42	874.71	1363.98	874.07	1364.58	874.11	1368.05	874.35	1368.43	874.29
1375.77	874.95	1388.8	874.04	1397.21	874	1403.69	874.03	1420.07	874.36
1432.38	874.5	1432.81	874.51	1433.14	874.52	1449.48	875.18	1461.56	875.49
1466.64	875.64	1474.33	876.4	1475.72	876.5	1483.62	875.93	1484.79	875.91
1486.07	875.91	1493.95	875.97	1494.19	875.85	1496.58	874.01	1506.25	874.05
1515.06	874.09	1515.19	874.19	1523.31	879.09	1530.8	879.47	1539.58	879.97
1542.03	878.94	1543.22	878.4	1545.47	878.23	1555.06	877.5	1558.77	877.62
1564.09	877.85	1566.44	877.85	1569.94	878.04	1576.37	878.45	1584.19	878.57
1587.27	878.61	1589.29	878.72	1591.96	878.86	1595.41	878.59	1602.89	878.24
1613.32	877.65	1621.61	877.17	1623.48	877.09	1634.03	877.29	1634.22	877.29
1656.73	877.66	1665.84	877.76	1687.91	877.69	1688.64	877.7	1689.74	877.71
1707.11	877.97	1732.37	878.12	1741.63	878.16	1745.7	878.23	1761.59	878.39
1766.01	878.22	1771.03	878.43	1775.62	878.45	1777.51	878.31	1785.21	878.25
1787.8	878.47	1792.78	878.8	1799.26	879.17	1805.23	878.89	1809.56	878.88
1815.16	879.25	1818.03	879.09	1829.14	878.72	1838.62	878.17	1843.06	878.23
1853.88	878.17	1857.14	878.15	1862.03	877.98	1876.66	877.37	1878.2	877.31
1880.03	877.26	1902.63	876.62	1908.29	876.36	1923.11	875.82	1932.05	875.58
1936.33	875.45	1941.35	875.41	1947.36	875.37	1953.66	874.97	1959.89	874.57
1977.04	874.52	1981.43	874.52	1982.33	874.48	1989.1	874.66	1997.31	874.77
1999.1	874.83	2004.26	874.65	2005.56	874.6	2006.24	874.58	2012.27	874.35
2017.34	874.38	2025.68	874.44	2031.04	874.74	2032.99	874.84	2040.13	874.84
2051.82	874.7	2070.42	875.41	2077.35	875.63	2080.67	876.17	2091.02	876.8
2096.28	876.28	2110.05	877.4	2113.36	877.67	2116.49	877.9	2130.41	878.92
2133.48	878.88	2148.56	878.78	2158.32	878.76	2162.43	878.76	2164.57	878.73
2177.12	878.49	2183.07	878.36	2191.97	878.2	2201.86	877.98	2208.74	878.09
2216.03	878.19	2220.69	877.97	2225.28	877.99	2233.54	877.87	2240.48	877.83
2246.44	877.78	2255.3	878.25	2257.06	878.3	2261.55	877.84	2275.47	877.42
2277.27	877.38	2278.6	877.5	2288.76	878.19	2293.01	877.81	2298.59	877.24
2309.58	877.3	2313.84	877.3	2316.59	877.3	2320.19	877.3	2329.6	877.3
2340.88	877.05	2341.22	877.04	2341.4	877.03	2341.51	877.04	2341.69	877.06
2354.03	877.71	2359.45	878.01	2375.48	878.41	2375.71	878.42	2377.44	878.58
2378.88	878.71	2390.96	876.04	2394.18	875.32	2394.64	875.36	2398.95	875.75
2405.65	878.02	2415.96	881.13	2417.94	881.7	2418.4	881.71	2425.91	881.73
2434.43	881.73	2452.84	881.34	2468.07	881.35	2469.56	881.16	2478.67	880.92
2483.29	880.87	2486.47	880.62	2493.08	880.2	2502.84	880.05	2507.31	879.93
2512.97	880.1	2525.06	880.26	2531.5	880.33	2538.97	880.41	2547.89	880.42
2555.15	880.49	2567.53	880.72	2576.16	880.5	2588.71	880.31	2608.4	880.18
2614.01	880.09	2626.71	880.05	2633.84	880.95	2638.08	882.17	2640.08	882.17
2652.75	878.4	2654.31	877.92	2668.23	873.32	2669.77	873.3	2672.52	872.98
2677.98	872.42	2681.02	871.87	2694.79	872.37	2698.56	872.6	2700.52	872.55
2714.15	869.08	2717.66	868.18	2727.82	865.62	2733	863.2	2760	862.21
2787	863.2	2790.01	865.03	2798.67	869.78	2801.87	872.29	2805.75	873.75
2814.31	876.38	2814.87	876.55	2821.23	879.41	2823.11	881.56	2825.56	882.31
2826.15	882.44	2829.45	882.61	2830.17	882.59	2833.66	882.71	2840.4	883.76
2843.15	883.74	2846.02	883.66	2848.03	883.75	2865.38	885.1	2868.76	885.21
2869.57	885.21	2877.16	886.54	2888.37	886.68	2893.91	886.78	2899.76	886.88
2912.63	888.4	2919.65	888.48	2926.35	888.33	2932.27	887.97	2937.74	889.17
2942.09	889.11	2951.65	888.17	2953.62	890.85	2955.36	890.97	2962.79	893.45
2974.17	898.59	2975.58	899.73	2978.9	900.82	2982.94	899.37	2989.82	894.93
3014.11	898.5	3025.76	901.52	3037.27	905.16	3059.87	910.2	3075.13	915.18
3079.39	915.86	3090.44	917.49	3110.07	920.67	3115.12	921.65	3128.89	923.05
3129.66	923.13	3129.98	923.3	3136.39	928.9	3155.91	931.86	3158.89	932.43
3176.12	938.48	3182.02	940.49	3186.22	941.56	3188.49	941.54	3197.81	941.48
3208.67	941.07	3213.95	940.99	3218.12	940.97	3227.94	940.64	3230.16	940.62
3234.42	940.48	3241.62	941.83	3249.18	943.53	3253.52	943.92	3258.44	946.65
3261.76	946.21	3264.01	946.21	3283.32	948.33	3295.77	949.5	3296.97	949.61
3297.89	949.71	3304.78	950.34	3311.14	954.92	3314.58	957.79	3319.87	960.95
3327.7	960.14	3335.09	960.62	3338.52	960.93	3350.12	962.39	3356.34	962.59
3364.04	963.41	3373.7	968.42	3378.09	970.2	3380.1	971.24	3393.68	972.8
3409.04	972.06	3414.35	972.7	3420.35	972.83	3427.24	973.19	3445.88	975.1
3447.32	975.11	3462.99	975.24	3469.52	975.26	3471.08	975.24	3473.85	975.19

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 3477.94  975.13

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .06  2608.4      .1 2700.52     .04 2801.87      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2640.08 2823.11               16      16      16             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  115.74 2137.26  896.38       F
 2407.94 2631.94  896.93       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  876.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.060  *   0.063  *          *
* W.S. Elev (ft)         *  875.67  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  869.41  * Flow Area (sq ft)      *    0.94  * 1188.25  *          *
* E.G. Slope (ft/ft)     *0.002887  * Area (sq ft)           *  620.28  * 1188.25  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    0.39  * 5869.61  *          *
* Top Width (ft)         *  712.34  * Top Width (ft)         *  561.48  *  150.86  *          *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *    0.41  *    4.94  *          *
* Max Chl Dpth (ft)      *   13.46  * Hydr. Depth (ft)       *    0.17  *    7.88  *          *
* Conv. Total (cfs)      *109244.2  * Conv. (cfs)            *     7.2  *109237.0  *          *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *    5.46  *  155.94  *          *
* Min Ch El (ft)         *  862.21  * Shear (lb/sq ft)       *    0.03  *    1.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.01  *    6.78  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 1220.13  * 7645.65  * 1069.73  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  380.21  *  618.76  *  376.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  879.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.060  *   0.068  *          *
* W.S. Elev (ft)         *  879.29  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  872.79  * Flow Area (sq ft)      *  394.32  * 1772.50  *          *
* E.G. Slope (ft/ft)     *0.003191  * Area (sq ft)           * 4505.39  * 1772.50  *          *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  707.07  *10192.93  *          *
* Top Width (ft)         * 1846.70  * Top Width (ft)         * 1675.49  *  171.21  *          *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *    1.79  *    5.75  *          *
* Max Chl Dpth (ft)      *   17.08  * Hydr. Depth (ft)       *    1.46  *   10.35  *          *
* Conv. Total (cfs)      *192958.2  * Conv. (cfs)            * 12516.9  *180441.3  *          *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  271.73  *  177.57  *          *
* Min Ch El (ft)         *  862.21  * Shear (lb/sq ft)       *    0.29  *    1.99  *          *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *    0.52  *   11.44  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 3652.68  *10255.13  * 3328.27  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  935.73  *  665.19  *  789.20  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  880.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.060  *   0.068  *          *
* W.S. Elev (ft)         *  880.13  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  873.51  * Flow Area (sq ft)      *  621.04  * 1917.51  *          *
* E.G. Slope (ft/ft)     *0.003087  * Area (sq ft)           * 5966.34  * 1917.51  *          *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1482.61  *11117.39  *          *
* Top Width (ft)         * 2003.46  * Top Width (ft)         * 1828.55  *  174.91  *          *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    2.39  *    5.80  *          *
* Max Chl Dpth (ft)      *   17.92  * Hydr. Depth (ft)       *    2.29  *   10.96  *          *
* Conv. Total (cfs)      *226790.0  * Conv. (cfs)            * 26685.8  *200104.1  *          *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  271.73  *  181.75  *          *
* Min Ch El (ft)         *  862.21  * Shear (lb/sq ft)       *    0.44  *    2.03  *          *
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* Alpha                  *    1.23  * Stream Power (lb/ft s) *    1.05  *   11.79  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 5072.82  *12037.33  * 4778.69  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1072.95  *  693.65  *  968.01  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  882.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.              *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  882.46  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  875.75  * Flow Area (sq ft)      * 1261.06  * 2337.29  *    1.36  *
* E.G. Slope (ft/ft)     *0.002991  * Area (sq ft)           *10741.08  * 2337.29  *    1.36  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 4710.47  *14388.96  *    0.57  *
* Top Width (ft)         * 2365.80  * Top Width (ft)         * 2179.26  *  183.03  *    3.51  *
* Vel Total (ft/s)       *    5.31  * Avg. Vel. (ft/s)       *    3.74  *    6.16  *    0.42  *
* Max Chl Dpth (ft)      *   20.25  * Hydr. Depth (ft)       *    4.52  *   12.77  *    0.39  *
* Conv. Total (cfs)      *349251.6  * Conv. (cfs)            * 86133.0  *263108.2  *    10.4  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  280.06  *  190.82  *    3.64  *
* Min Ch El (ft)         *  862.21  * Shear (lb/sq ft)       *    0.84  *    2.29  *    0.07  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    3.14  *   14.08  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 8551.41  *14229.28  * 8056.91  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1342.20  *  716.93  * 1210.08  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  885.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.              *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  884.94  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  879.67  * Flow Area (sq ft)      * 1950.84  * 2790.09  *   56.36  *
* E.G. Slope (ft/ft)     *0.002644  * Area (sq ft)           *16241.83  * 2790.09  *   56.36  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 9074.09  *18172.19  *   53.71  *
* Top Width (ft)         * 2494.26  * Top Width (ft)         * 2271.04  *  183.03  *   40.19  *
* Vel Total (ft/s)       *    5.69  * Avg. Vel. (ft/s)       *    4.65  *    6.51  *    0.95  *
* Max Chl Dpth (ft)      *   22.73  * Hydr. Depth (ft)       *    7.00  *   15.24  *    1.40  *
* Conv. Total (cfs)      *530966.6  * Conv. (cfs)            *176485.0  *353436.9  *  1044.6  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  280.06  *  190.82  *   40.46  *
* Min Ch El (ft)         *  862.21  * Shear (lb/sq ft)       *    1.15  *    2.41  *    0.23  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    5.35  *   15.72  *    0.22  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *13812.27  *17369.41  *13238.80  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1824.92  *  745.21  * 1697.29  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  886.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.              *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  886.20  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  880.53  * Flow Area (sq ft)      * 2302.04  * 3020.63  *  116.55  *
* E.G. Slope (ft/ft)     *0.002645  * Area (sq ft)           *19124.24  * 3020.63  *  116.55  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *11930.99  *20747.37  *  151.64  *
* Top Width (ft)         * 2540.85  * Top Width (ft)         * 2305.72  *  183.03  *   52.10  *
* Vel Total (ft/s)       *    6.04  * Avg. Vel. (ft/s)       *    5.18  *    6.87  *    1.30  *
* Max Chl Dpth (ft)      *   23.99  * Hydr. Depth (ft)       *    8.26  *   16.50  *    2.24  *
* Conv. Total (cfs)      *638389.3  * Conv. (cfs)            *232001.6  *403438.9  *  2948.7  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  280.06  *  190.82  *   52.46  *
* Min Ch El (ft)         *  862.21  * Shear (lb/sq ft)       *    1.36  *    2.61  *    0.37  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    7.03  *   17.95  *    0.48  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *18277.59  *19279.27  *17775.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 2154.97  *  752.50  * 2151.58  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	888.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.060	0.070	0.100
W.S. Elev (ft)	887.61	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	881.29	Flow Area (sq ft)	2694.72	3278.41	215.13
E.G. Slope (ft/ft)	0.002536	Area (sq ft)	22391.61	3278.41	215.13
Q Total (cfs)	38750.00	Flow (cfs)	15161.28	23285.55	303.16
Top Width (ft)	2598.67	Top Width (ft)	2332.84	183.03	82.80
Vel Total (ft/s)	6.26	Avg. Vel. (ft/s)	5.63	7.10	1.41
Max Chl Dpth (ft)	25.40	Hydr. Depth (ft)	9.66	17.91	2.60
Conv. Total (cfs)	769553.1	Conv. (cfs)	301094.5	462437.9	6020.7
Length Wtd. (ft)	16.00	Wetted Per. (ft)	280.06	190.82	83.23
Min Ch El (ft)	862.21	Shear (lb/sq ft)	1.52	2.72	0.41
Alpha	1.09	Stream Power (lb/ft s)	8.57	19.32	0.58
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	22667.10	20657.54	22365.72
C & E Loss (ft)	0.00	Cum SA (acres)	2382.35	753.51	2600.01

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	890.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.060	0.070	0.100
W.S. Elev (ft)	889.30	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	882.13	Flow Area (sq ft)	3167.26	3588.60	394.53
E.G. Slope (ft/ft)	0.002450	Area (sq ft)	26369.20	3588.60	394.53
Q Total (cfs)	46700.00	Flow (cfs)	19480.43	26613.18	606.39
Top Width (ft)	2674.35	Top Width (ft)	2361.95	183.03	129.37
Vel Total (ft/s)	6.53	Avg. Vel. (ft/s)	6.15	7.42	1.54
Max Chl Dpth (ft)	27.09	Hydr. Depth (ft)	11.36	19.61	3.05
Conv. Total (cfs)	943431.4	Conv. (cfs)	393542.8	537638.3	12250.3
Length Wtd. (ft)	16.00	Wetted Per. (ft)	280.06	190.82	130.61
Min Ch El (ft)	862.21	Shear (lb/sq ft)	1.73	2.88	0.46
Alpha	1.11	Stream Power (lb/ft s)	10.64	21.33	0.71
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	29977.01	22663.66	29891.61
C & E Loss (ft)	0.00	Cum SA (acres)	2721.80	755.95	3031.16

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	883.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.060	0.070	0.100
W.S. Elev (ft)	882.77	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	876.09	Flow Area (sq ft)	1347.06	2393.75	3.67
E.G. Slope (ft/ft)	0.002955	Area (sq ft)	11414.79	2393.75	3.67
Q Total (cfs)	20100.00	Flow (cfs)	5216.11	14882.47	1.42
Top Width (ft)	2382.81	Top Width (ft)	2188.83	183.03	10.95
Vel Total (ft/s)	5.37	Avg. Vel. (ft/s)	3.87	6.22	0.39
Max Chl Dpth (ft)	20.56	Hydr. Depth (ft)	4.83	13.08	0.34
Conv. Total (cfs)	369770.6	Conv. (cfs)	95958.4	273786.1	26.1
Length Wtd. (ft)	16.00	Wetted Per. (ft)	280.06	190.82	11.09
Min Ch El (ft)	862.21	Shear (lb/sq ft)	0.89	2.31	0.06
Alpha	1.13	Stream Power (lb/ft s)	3.44	14.39	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	9641.81	15202.38	9207.87
C & E Loss (ft)	0.00	Cum SA (acres)	1452.08	727.24	1293.07

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 33.307

INPUT
Description: U/S of Kenneth Rd Bridge @ 159th ST. XS Copied from D/S side.
Station Elevation Data num= 426

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	900.66	38.73	898.68	84.31	898.84	97.24	899.15	103.41	896.43
116.59	891.43	130.5	891.84	156.3	892.54	163.09	892.73	166.36	892.82
168.02	893.08	178.53	894.75	179.64	894.23	191.43	888.65	195.41	889.18
198.77	889.64	201.35	890.68	219.05	894.75	226.64	893	239.62	889.78
246.14	891.06	252.95	889.44	271.84	889.65	277.06	890.01	282.9	889.44
295.54	888.25	329.9	886.36	370.65	884.88	373.92	884.54	383.11	884.75
399.48	883.93	419.08	883.81	465.92	882.3	502.54	881.38	526.39	880.85
541.24	880.44	603.64	878.97	612.08	878.82	618.36	878.87	684.59	879.38
724.93	880.31	727.4	880.36	731.27	880.11	743.51	879.38	764.7	878.13
768.17	877.9	771.78	878.24	779.51	878.93	784.7	879.39	789.5	879.02
789.78	879	790.52	879.15	805.54	882.14	808.86	881.85	810.19	881.74
813.35	881.74	814.9	881.75	816.18	881.85	823.25	882.38	828.79	882.32
829.61	882.3	830.53	882.29	836.1	882.2	842.24	880.61	842.36	880.58
862.91	874.95	877.4	874.71	881.32	874.99	882.82	875.05	893.94	874.97
896.29	874.91	898.46	874.84	898.93	873.65	902.93	873.41	912.13	873.72
917.03	873.86	923.79	873.98	930.28	874	937.48	873.94	947.66	873.77
949.83	873.7	959.73	873.51	963.5	873.41	970.15	873.76	972.52	873.89
981.54	874.42	987.23	874.8	1003.65	875.49	1008.51	875.79	1017.22	876.09
1038.35	876.26	1054.21	876.49	1067.93	876.04	1099.08	875.97	1118.24	876.75
1132.09	876.77	1157.47	876.73	1159.72	876.7	1161.59	876.72	1188.31	876.61
1202.67	876.54	1217.12	876.1	1219.68	876.07	1221.39	876.09	1222.42	876.09
1223.19	876.15	1234.65	875.2	1253.8	874.43	1275.34	874.99	1280.03	874.63
1289.44	874.32	1305.89	874.4	1306.53	874.4	1308.62	874.39	1320.15	874.16
1325.11	874.15	1341.51	874.15	1346.5	874.15	1351.32	874.88	1359.31	874.61
1360.42	874.71	1363.98	874.07	1364.58	874.11	1368.05	874.35	1368.43	874.29
1375.77	874.95	1388.8	874.04	1397.21	874	1403.69	874.03	1420.07	874.36
1432.38	874.5	1432.81	874.51	1433.14	874.52	1449.48	875.18	1461.56	875.49
1466.64	875.64	1474.33	876.4	1475.72	876.5	1483.62	875.93	1484.79	875.91
1486.07	875.91	1493.95	875.97	1494.19	875.85	1496.58	874.01	1506.25	874.05
1515.06	874.09	1515.19	874.19	1523.31	879.09	1530.8	879.47	1539.58	879.97
1542.03	878.94	1543.22	878.4	1545.47	878.23	1555.06	877.5	1558.77	877.62
1564.09	877.85	1566.44	877.85	1569.94	878.04	1576.37	878.45	1584.19	878.57
1587.27	878.61	1589.29	878.72	1591.96	878.86	1595.41	878.59	1602.89	878.24
1613.32	877.65	1621.61	877.17	1623.48	877.09	1634.03	877.29	1634.22	877.29
1656.73	877.66	1665.84	877.76	1687.91	877.69	1688.64	877.7	1689.74	877.71
1707.11	877.97	1732.37	878.12	1741.63	878.16	1745.7	878.23	1761.59	878.39
1766.01	878.22	1771.03	878.43	1775.62	878.45	1777.51	878.31	1785.21	878.25
1787.8	878.47	1792.78	878.8	1799.26	879.17	1805.23	878.89	1809.56	878.88
1815.16	879.25	1818.03	879.09	1829.14	878.72	1838.62	878.17	1843.06	878.23
1853.88	878.17	1857.14	878.15	1862.03	877.98	1876.66	877.37	1878.2	877.31
1880.03	877.26	1902.63	876.62	1908.29	876.36	1923.11	875.82	1932.05	875.58
1936.33	875.45	1941.35	875.41	1947.36	875.37	1953.66	874.97	1959.89	874.57
1977.04	874.52	1981.43	874.52	1982.33	874.48	1989.1	874.66	1997.31	874.77
1999.1	874.83	2004.26	874.65	2005.56	874.6	2006.24	874.58	2012.27	874.35
2017.34	874.38	2025.68	874.44	2031.04	874.74	2032.99	874.84	2040.13	874.84
2051.82	874.7	2070.42	875.41	2077.35	875.63	2080.67	876.17	2091.02	876.8
2096.28	876.28	2110.05	877.4	2113.36	877.67	2116.49	877.9	2130.41	878.92
2133.48	878.88	2148.56	878.78	2158.32	878.76	2162.43	878.76	2164.57	878.73
2177.12	878.49	2183.07	878.36	2191.97	878.2	2201.86	877.98	2208.74	878.09
2216.03	878.19	2220.69	877.97	2225.28	877.99	2233.54	877.87	2240.48	877.83
2246.44	877.78	2255.3	878.25	2257.06	878.3	2261.55	877.84	2275.47	877.42
2277.27	877.38	2278.6	877.5	2288.76	878.19	2293.01	877.81	2298.59	877.24
2309.58	877.3	2313.84	877.3	2316.59	877.3	2320.19	877.3	2329.6	877.3
2340.88	877.05	2341.22	877.04	2341.4	877.03	2341.51	877.04	2341.69	877.06
2354.03	877.71	2359.45	878.01	2375.48	878.41	2375.71	878.42	2377.44	878.58
2378.88	878.71	2390.96	876.04	2394.18	875.32	2394.64	875.36	2398.95	875.75
2405.65	878.02	2415.96	881.13	2417.94	881.7	2418.4	881.71	2425.91	881.73
2434.43	881.73	2452.84	881.34	2468.07	881.35	2469.56	881.16	2478.67	880.92
2483.29	880.87	2486.47	880.62	2493.08	880.2	2502.84	880.05	2507.31	879.93
2512.97	880.1	2525.06	880.26	2531.5	880.33	2538.97	880.41	2547.89	880.42
2555.15	880.49	2567.53	880.72	2576.16	880.5	2588.71	880.31	2608.4	880.18
2614.01	880.09	2626.71	880.05	2633.84	880.95	2638.08	882.17	2640.08	882.17
2652.75	878.4	2654.31	877.92	2668.23	873.32	2669.77	873.3	2672.52	872.98
2677.98	872.42	2681.02	871.87	2694.79	872.37	2698.56	872.6	2700.52	872.55
2714.15	869.08	2717.66	868.18	2727.82	865.62	2733	863.2	2760	862.2
2787	863.2	2790.01	865.03	2798.67	869.78	2801.87	872.29	2805.75	873.75
2814.31	876.38	2814.87	876.55	2821.23	879.41	2823.11	881.56	2825.56	882.31
2826.15	882.44	2829.45	882.61	2830.17	882.59	2833.66	882.71	2840.4	883.76

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 2843.15  883.74 2846.02  883.66 2848.03  883.75 2865.38   885.1 2868.76  885.21
 2869.57  885.21 2877.16  886.54 2888.37  886.68 2893.91  886.78 2899.76  886.88
 2912.63   888.4 2919.65  888.48 2926.35  888.33 2932.27  887.97 2937.74  889.17
 2942.09  889.11 2951.65  888.17 2953.62  890.85 2955.36  890.97 2962.79  893.45
 2974.17  898.59 2975.58  899.73  2978.9  900.82 2982.94  899.37 2989.82  894.93
 3014.11   898.5 3025.76  901.52 3037.27  905.16 3059.87   910.2 3075.13  915.18
 3079.39  915.86 3090.44  917.49 3110.07  920.67 3115.12  921.65 3128.89  923.05
 3129.66  923.13 3129.98   923.3 3136.39   928.9 3155.91  931.86 3158.89  932.43
 3176.12  938.48 3182.02  940.49 3186.22  941.56 3188.49  941.54 3197.81  941.48
 3208.67  941.07 3213.95  940.99 3218.12  940.97 3227.94  940.64 3230.16  940.62
 3234.42  940.48 3241.62  941.83 3249.18  943.53 3253.52  943.92 3258.44  946.65
 3261.76  946.21 3264.01  946.21 3283.32  948.33 3295.77   949.5 3296.97  949.61
 3297.89  949.71 3304.78  950.34 3311.14  954.92 3314.58  957.79 3319.87  960.95
  3327.7  960.14 3335.09  960.62 3338.52  960.93 3350.12  962.39 3356.34  962.59
 3364.04  963.41  3373.7  968.42 3378.09   970.2  3380.1  971.24 3393.68   972.8
 3409.04  972.06 3414.35   972.7 3420.35  972.83 3427.24  973.19 3445.88   975.1
 3447.32  975.11 3462.99  975.24 3469.52  975.26 3471.08  975.24 3473.85  975.19
 3477.94  975.13

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06  2608.4      .1 2700.52     .04 2801.87      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2640.08 2823.11              60      60      60              .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
   85.14 2147.72  900.29       F
 2416.01 2640.02  898.63       F

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  876.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.060  *   0.062  *          *
* W.S. Elev (ft)         *  875.62  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  869.42  * Flow Area (sq ft)      *    0.68  * 1180.72  *          *
* E.G. Slope (ft/ft)     *0.002932  * Area (sq ft)           *  591.37  * 1180.72  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    0.25  * 5864.15  *          *
* Top Width (ft)         *  705.67  * Top Width (ft)         *  555.13  *  150.54  *          *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    0.37  *    4.97  *          *
* Max Chl Dpth (ft)      *   13.42  * Hydr. Depth (ft)       *    0.15  *    7.84  *          *
* Conv. Total (cfs)      *108409.7  * Conv. (cfs)            *     4.7  *108405.1  *          *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *    4.64  *  155.60  *          *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.03  *    1.39  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.01  *    6.90  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1219.91  * 7645.22  * 1069.73  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  380.01  *  618.71  *  376.73  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  879.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.060  *   0.068  *          *
* W.S. Elev (ft)         *  879.23  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  872.78  * Flow Area (sq ft)      *  373.37  * 1761.95  *          *
* E.G. Slope (ft/ft)     *0.003264  * Area (sq ft)           * 4399.84  * 1761.95  *          *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  552.11  * 8467.45  *          *
* Top Width (ft)         * 1829.91  * Top Width (ft)         * 1659.06  *  170.85  *          *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)       *    1.48  *    4.81  *          *
* Max Chl Dpth (ft)      *   17.03  * Hydr. Depth (ft)       *    1.43  *   10.31  *          *
* Conv. Total (cfs)      *190787.1  * Conv. (cfs)            * 11678.5  *179108.7  *          *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  263.06  *  177.19  *          *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.29  *    2.03  *          *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.43  *    9.74  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 3651.05  *10254.49  * 3328.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  935.11  *  665.13  *  789.20  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
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        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Manning's n values were composited to a single value in the main channel.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  880.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.060  *   0.068  *          *
* W.S. Elev (ft)         *  880.06  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  873.52  * Flow Area (sq ft)      *  593.96  * 1906.74  *          *
* E.G. Slope (ft/ft)     *0.003171  * Area (sq ft)           * 5851.54  * 1906.74  *          *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1060.34  * 8380.14  *          *
* Top Width (ft)         * 1977.67  * Top Width (ft)         * 1803.02  *  174.65  *          *
* Vel Total (ft/s)       *    3.78  * Avg. Vel. (ft/s)       *    1.79  *    4.40  *          *
* Max Chl Dpth (ft)      *   17.86  * Hydr. Depth (ft)       *    2.24  *   10.92  *          *
* Conv. Total (cfs)      *223758.7  * Conv. (cfs)            * 25132.2  *198626.5  *          *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  265.96  *  181.45  *          *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.44  *    2.08  *          *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *    0.79  *    9.14  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 5070.65  *12036.62  * 4778.69  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1072.29  *  693.58  *  968.01  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Manning's n values were composited to a single value in the main channel.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  882.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  882.40  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  875.74  * Flow Area (sq ft)      * 1218.53  * 2325.71  *    1.16  *
* E.G. Slope (ft/ft)     *0.003093  * Area (sq ft)           *10600.15  * 2325.71  *    1.16  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2698.60  * 8538.21  *    0.30  *
* Top Width (ft)         * 2363.14  * Top Width (ft)         * 2177.25  *  183.03  *    2.86  *
* Vel Total (ft/s)       *    3.17  * Avg. Vel. (ft/s)       *    2.21  *    3.67  *    0.26  *
* Max Chl Dpth (ft)      *   20.20  * Hydr. Depth (ft)       *    4.54  *   12.71  *    0.40  *
* Conv. Total (cfs)      *343422.9  * Conv. (cfs)            * 82473.3  *260940.5  *     9.1  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  269.76  *  190.82  *    2.98  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.87  *    2.35  *    0.07  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    1.93  *    8.64  *    0.02  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 8547.49  *14228.42  * 8056.91  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1341.40  *  716.87  * 1210.08  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Manning's n values were composited to a single value in the main channel.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*************************************************************************************************
* E.G. Elev (ft)         *  885.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  884.88  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  879.63  * Flow Area (sq ft)      * 1883.05  * 2778.96  *   53.88  *
* E.G. Slope (ft/ft)     *0.002731  * Area (sq ft)           *16100.37  * 2778.96  *   53.88  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 8901.52  *18347.15  *   51.33  *
* Top Width (ft)         * 2491.81  * Top Width (ft)         * 2269.39  *  183.03  *   39.39  *
* Vel Total (ft/s)       *    5.79  * Avg. Vel. (ft/s)       *    4.73  *    6.60  *    0.95  *
* Max Chl Dpth (ft)      *   22.68  * Hydr. Depth (ft)       *    7.02  *   15.18  *    1.37  *
* Conv. Total (cfs)      *522409.3  * Conv. (cfs)            *170338.4  *351088.7  *   982.2  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  269.76  *  190.82  *   39.65  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    1.19  *    2.48  *    0.23  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    5.63  *   16.39  *    0.22  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *13806.33  *17368.39  *13238.78  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1824.08  *  745.15  * 1697.27  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
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         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  886.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  886.13  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  880.49  * Flow Area (sq ft)      * 2220.28  * 3008.96  *  113.16  *
* E.G. Slope (ft/ft)     *0.002734  * Area (sq ft)           *18973.86  * 3008.96  *  113.16  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *11721.45  *20961.05  *  147.51  *
* Top Width (ft)         * 2538.68  * Top Width (ft)         * 2303.92  *  183.03  *   51.73  *
* Vel Total (ft/s)       *    6.15  * Avg. Vel. (ft/s)       *    5.28  *    6.97  *    1.30  *
* Max Chl Dpth (ft)      *   23.93  * Hydr. Depth (ft)       *    8.27  *   16.44  *    2.19  *
* Conv. Total (cfs)      *627816.8  * Conv. (cfs)            *224152.3  *400843.7  *  2820.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  269.76  *  190.82  *   52.08  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    1.41  *    2.69  *    0.37  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    7.42  *   18.75  *    0.48  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *18270.59  *19278.16  *17775.77  *
* C & E Loss (ft)        *          * Cum SA (acres)         * 2154.13  *  752.43  * 2151.56  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  888.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  887.54  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  881.30  * Flow Area (sq ft)      * 2597.65  * 3266.35  *  209.57  *
* E.G. Slope (ft/ft)     *0.002623  * Area (sq ft)           *22234.47  * 3266.35  *  209.57  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *14913.45  *23539.98  *  296.56  *
* Top Width (ft)         * 2596.87  * Top Width (ft)         * 2331.61  *  183.03  *   82.23  *
* Vel Total (ft/s)       *    6.38  * Avg. Vel. (ft/s)       *    5.74  *    7.21  *    1.42  *
* Max Chl Dpth (ft)      *   25.34  * Hydr. Depth (ft)       *    9.68  *   17.85  *    2.55  *
* Conv. Total (cfs)      *756571.8  * Conv. (cfs)            *291176.8  *459604.8  *  5790.3  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  269.76  *  190.82  *   82.66  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    1.58  *    2.80  *    0.42  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    9.05  *   20.20  *    0.59  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *22658.91  *20656.34  *22365.64  *
* C & E Loss (ft)        *          * Cum SA (acres)         * 2381.50  *  753.45  * 2599.98  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  889.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  889.23  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  882.13  * Flow Area (sq ft)      * 3051.86  * 3576.15  *  385.54  *
* E.G. Slope (ft/ft)     *0.002537  * Area (sq ft)           *26205.04  * 3576.15  *  385.54  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *19183.66  *26922.34  *  594.00  *
* Top Width (ft)         * 2672.90  * Top Width (ft)         * 2360.55  *  183.03  *  129.32  *
* Vel Total (ft/s)       *    6.66  * Avg. Vel. (ft/s)       *    6.29  *    7.53  *    1.54  *
* Max Chl Dpth (ft)      *   27.03  * Hydr. Depth (ft)       *   11.37  *   19.54  *    2.98  *
* Conv. Total (cfs)      *927208.8  * Conv. (cfs)            *380883.4  *534531.6  * 11793.7  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  269.76  *  190.82  *  130.53  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    1.79  *    2.97  *    0.47  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *   11.26  *   22.34  *    0.72  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *29967.35  *22662.34  *29891.46  *
* C & E Loss (ft)        *          * Cum SA (acres)         * 2720.93  *  755.88  * 3031.11  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
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* E.G. Elev (ft)         *  883.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.060  *   0.070  *   0.100  *
* W.S. Elev (ft)         *  882.71  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  876.09  * Flow Area (sq ft)      * 1301.35  * 2382.20  *    2.98  *
* E.G. Slope (ft/ft)     *0.003055  * Area (sq ft)           *11273.51  * 2382.20  *    2.98  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2913.10  * 8597.44  *    0.60  *
* Top Width (ft)         * 2380.36  * Top Width (ft)         * 2186.83  *  183.03  *   10.50  *
* Vel Total (ft/s)       *    3.12  * Avg. Vel. (ft/s)       *    2.24  *    3.61  *    0.20  *
* Max Chl Dpth (ft)      *   20.51  * Hydr. Depth (ft)       *    4.85  *   13.02  *    0.28  *
* Conv. Total (cfs)      *363629.7  * Conv. (cfs)            * 92022.9  *271587.8  *    18.9  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  269.76  *  190.82  *   10.63  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.92  *    2.38  *    0.05  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *    2.06  *    8.59  *    0.01  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 9637.65  *15201.50  * 9207.87  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1451.27  *  727.18  * 1293.07  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 33.302

INPUT
Description: Kenneth Rd Bridge at 159th
Distance from Upstream XS =       10
Deck/Roadway Width        =       34
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    2434  881.73     875  2639.9   883.6     875    2640   883.6   880.6
    2838  887.75  884.75  2838.1  887.75     875    2915   888.4     875

Upstream Bridge Cross Section Data
Station Elevation Data    num=     426
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  900.66   38.73  898.68   84.31  898.84   97.24  899.15  103.41  896.43
  116.59  891.43   130.5  891.84   156.3  892.54  163.09  892.73  166.36  892.82
  168.02  893.08  178.53  894.75  179.64  894.23  191.43  888.65  195.41  889.18
  198.77  889.64  201.35  890.68  219.05  894.75  226.64     893  239.62  889.78
  246.14  891.06  252.95  889.44  271.84  889.65  277.06  890.01   282.9  889.44
  295.54  888.25   329.9  886.36  370.65  884.88  373.92  884.54  383.11  884.75
  399.48  883.93  419.08  883.81  465.92   882.3  502.54  881.38  526.39  880.85
  541.24  880.44  603.64  878.97  612.08  878.82  618.36  878.87  684.59  879.38
  724.93  880.31   727.4  880.36  731.27  880.11  743.51  879.38   764.7  878.13
  768.17   877.9  771.78  878.24  779.51  878.93   784.7  879.39   789.5  879.02
  789.78     879  790.52  879.15  805.54  882.14  808.86  881.85  810.19  881.74
  813.35  881.74   814.9  881.75  816.18  881.85  823.25  882.38  828.79  882.32
  829.61   882.3  830.53  882.29   836.1   882.2  842.24  880.61  842.36  880.58
  862.91  874.95   877.4  874.71  881.32  874.99  882.82  875.05  893.94  874.97
  896.29  874.91  898.46  874.84  898.93  873.65  902.93  873.41  912.13  873.72
  917.03  873.86  923.79  873.98  930.28     874  937.48  873.94  947.66  873.77
  949.83   873.7  959.73  873.51   963.5  873.41  970.15  873.76  972.52  873.89
  981.54  874.42  987.23   874.8 1003.65  875.49 1008.51  875.79 1017.22  876.09
 1038.35  876.26 1054.21  876.49 1067.93  876.04 1099.08  875.97 1118.24  876.75
 1132.09  876.77 1157.47  876.73 1159.72   876.7 1161.59  876.72 1188.31  876.61
 1202.67  876.54 1217.12   876.1 1219.68  876.07 1221.39  876.09 1222.42  876.09
 1223.19  876.15 1234.65   875.2  1253.8  874.43 1275.34  874.99 1280.03  874.63
 1289.44  874.32 1305.89   874.4 1306.53   874.4 1308.62  874.39 1320.15  874.16
 1325.11  874.15 1341.51  874.15  1346.5  874.15 1351.32  874.88 1359.31  874.61
 1360.42  874.71 1363.98  874.07 1364.58  874.11 1368.05  874.35 1368.43  874.29
 1375.77  874.95  1388.8  874.04 1397.21     874 1403.69  874.03 1420.07  874.36
 1432.38   874.5 1432.81  874.51 1433.14  874.52 1449.48  875.18 1461.56  875.49
 1466.64  875.64 1474.33   876.4 1475.72   876.5 1483.62  875.93 1484.79  875.91
 1486.07  875.91 1493.95  875.97 1494.19  875.85 1496.58  874.01 1506.25  874.05
 1515.06  874.09 1515.19  874.19 1523.31  879.09  1530.8  879.47 1539.58  879.97
 1542.03  878.94 1543.22   878.4 1545.47  878.23 1555.06   877.5 1558.77  877.62
```

1564.09	877.85	1566.44	877.85	1569.94	878.04	1576.37	878.45	1584.19	878.57
1587.27	878.61	1589.29	878.72	1591.96	878.86	1595.41	878.59	1602.89	878.24
1613.32	877.65	1621.61	877.17	1623.48	877.09	1634.03	877.29	1634.22	877.29
1656.73	877.66	1665.84	877.76	1687.91	877.69	1688.64	877.7	1689.74	877.71
1707.11	877.97	1732.37	878.12	1741.63	878.16	1745.7	878.23	1761.59	878.39
1766.01	878.22	1771.03	878.43	1775.62	878.45	1777.51	878.31	1785.21	878.25
1787.8	878.47	1792.78	878.8	1799.26	879.17	1805.23	878.89	1809.56	878.88
1815.16	879.25	1818.03	879.09	1829.14	878.72	1838.62	878.17	1843.06	878.23
1853.88	878.17	1857.14	878.15	1862.03	877.98	1876.66	877.37	1878.2	877.31
1880.03	877.26	1902.63	876.62	1908.29	876.36	1923.11	875.82	1932.05	875.58
1936.33	875.45	1941.35	875.41	1947.36	875.37	1953.66	874.97	1959.89	874.57
1977.04	874.52	1981.43	874.52	1982.33	874.48	1989.1	874.66	1997.31	874.77
1999.1	874.83	2004.26	874.65	2005.56	874.6	2006.24	874.58	2012.27	874.35
2017.34	874.38	2025.68	874.44	2031.04	874.74	2032.99	874.84	2040.13	874.84
2051.82	874.7	2070.42	875.41	2077.35	875.63	2080.67	876.17	2091.02	876.8
2096.28	876.28	2110.05	877.4	2113.36	877.67	2116.49	877.9	2130.41	878.92
2133.48	878.88	2148.56	878.78	2158.32	878.76	2162.43	878.76	2164.57	878.73
2177.12	878.49	2183.07	878.36	2191.97	878.2	2201.86	877.98	2208.74	878.09
2216.03	878.19	2220.69	877.97	2225.28	877.99	2233.54	877.87	2240.48	877.83
2246.44	877.78	2255.3	878.25	2257.06	878.3	2261.55	877.84	2275.47	877.42
2277.27	877.38	2278.6	877.5	2288.76	878.19	2293.01	877.81	2298.59	877.24
2309.58	877.3	2313.84	877.3	2316.59	877.3	2320.19	877.3	2329.6	877.3
2340.88	877.05	2341.22	877.04	2341.4	877.03	2341.51	877.04	2341.69	877.06
2354.03	877.71	2359.45	878.01	2375.48	878.41	2375.71	878.42	2377.44	878.58
2378.88	878.71	2390.96	876.04	2394.18	875.32	2394.64	875.36	2398.95	875.75
2405.65	878.02	2415.96	881.13	2417.94	881.7	2418.4	881.71	2425.91	881.73
2434.43	881.73	2452.84	881.34	2468.07	881.35	2469.56	881.16	2478.67	880.92
2483.29	880.87	2486.47	880.62	2493.08	880.2	2502.84	880.05	2507.31	879.93
2512.97	880.1	2525.06	880.26	2531.5	880.33	2538.97	880.41	2547.89	880.42
2555.15	880.49	2567.53	880.72	2576.16	880.5	2588.71	880.31	2608.4	880.18
2614.01	880.09	2626.71	880.05	2633.84	880.95	2638.08	882.17	2640.08	882.17
2652.75	878.4	2654.31	877.92	2668.23	873.32	2669.77	873.3	2672.52	872.98
2677.98	872.42	2681.02	871.87	2694.79	872.37	2698.56	872.6	2700.52	872.55
2714.15	869.08	2717.66	868.18	2727.82	865.62	2733	863.2	2760	862.2
2787	863.2	2790.01	865.03	2798.67	869.78	2801.87	872.29	2805.75	873.75
2814.31	876.38	2814.87	876.55	2821.23	879.41	2823.11	881.56	2825.56	882.31
2826.15	882.44	2829.45	882.61	2830.17	882.59	2833.66	882.71	2840.4	883.76
2843.15	883.74	2846.02	883.66	2848.03	883.75	2865.38	885.1	2868.76	885.21
2869.57	885.21	2877.16	886.54	2888.37	886.68	2893.91	886.78	2899.76	886.88
2912.63	888.4	2919.65	888.48	2926.35	888.33	2932.27	887.97	2937.74	889.17
2942.09	889.11	2951.65	888.17	2953.62	890.85	2955.36	890.97	2962.79	893.45
2974.17	898.59	2975.58	899.73	2978.9	900.82	2982.94	899.37	2989.82	894.93
3014.11	898.5	3025.76	901.52	3037.27	905.16	3059.87	910.2	3075.13	915.18
3079.39	915.86	3090.44	917.49	3110.07	920.67	3115.12	921.65	3128.89	923.05
3129.66	923.13	3129.98	923.3	3136.39	928.9	3155.91	931.86	3158.89	932.43
3176.12	938.48	3182.02	940.49	3186.22	941.56	3188.49	941.54	3197.81	941.48
3208.67	941.07	3213.95	940.99	3218.12	940.97	3227.94	940.64	3230.16	940.62
3234.42	940.48	3241.62	941.83	3249.18	943.53	3253.52	943.92	3258.44	946.65
3261.76	946.21	3264.01	946.21	3283.32	948.33	3295.77	949.5	3296.97	949.61
3297.89	949.71	3304.78	950.34	3311.14	954.92	3314.58	957.79	3319.87	960.95
3327.7	960.14	3335.09	960.62	3338.52	960.93	3350.12	962.39	3356.34	962.59
3364.04	963.41	3373.7	968.42	3378.09	970.2	3380.1	971.24	3393.68	972.8
3409.04	972.06	3414.35	972.7	3420.35	972.83	3427.24	973.19	3445.88	975.1
3447.32	975.11	3462.99	975.24	3469.52	975.26	3471.08	975.24	3473.85	975.19
3477.94	975.13								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2608.4	.1	2700.52	.04	2801.87	.1

Bank Sta: Left Right Coeff Contr. Expan.

2640.08	2823.11	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
85.14	2147.72	900.29	F
2416.01	2640.02	898.63	F

Downstream Deck/Roadway Coordinates

num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2434	881.73	875	2639.9	883.6	875	2640	883.6	880.6
2838	887.75	884.75	2838.1	887.75	875	2915	888.4	875

Downstream Bridge Cross Section Data

Station Elevation Data num= 426

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	900.66	38.73	898.68	84.31	898.84	97.24	899.15	103.41	896.43
116.59	891.43	130.5	891.84	156.3	892.54	163.09	892.73	166.36	892.82
168.02	893.08	178.53	894.75	179.64	894.23	191.43	888.65	195.41	889.18
198.77	889.64	201.35	890.68	219.05	894.75	226.64	893	239.62	889.78
246.14	891.06	252.95	889.44	271.84	889.65	277.06	890.01	282.9	889.44
295.54	888.25	329.9	886.36	370.65	884.88	373.92	884.54	383.11	884.75
399.48	883.93	419.08	883.81	465.92	882.3	502.54	881.38	526.39	880.85
541.24	880.44	603.64	878.97	612.08	878.82	618.36	878.87	684.59	879.38
724.93	880.31	727.4	880.36	731.27	880.11	743.51	879.38	764.7	878.13
768.17	877.9	771.78	878.24	779.51	878.93	784.7	879.39	789.5	879.02
789.78	879	790.52	879.15	805.54	882.14	808.86	881.85	810.19	881.74
813.35	881.74	814.9	881.75	816.18	881.85	823.25	882.38	828.79	882.32
829.61	882.3	830.53	882.29	836.1	882.2	842.24	880.61	842.36	880.58
862.91	874.95	877.4	874.71	881.32	874.99	882.82	875.05	893.94	874.97
896.29	874.91	898.46	874.84	898.93	873.65	902.93	873.41	912.13	873.72
917.03	873.86	923.79	873.98	930.28	874	937.48	873.94	947.66	873.77
949.83	873.7	959.73	873.51	963.5	873.41	970.15	873.76	972.52	873.89
981.54	874.42	987.23	874.8	1003.65	875.49	1008.51	875.79	1017.22	876.09
1038.35	876.26	1054.21	876.49	1067.93	876.04	1099.08	875.97	1118.24	876.75
1132.09	876.77	1157.47	876.73	1159.72	876.7	1161.59	876.72	1188.31	876.61
1202.67	876.54	1217.12	876.1	1219.68	876.07	1221.39	876.09	1222.42	876.09
1223.19	876.15	1234.65	875.2	1253.8	874.43	1275.34	874.99	1280.03	874.63
1289.44	874.32	1305.89	874.4	1306.53	874.4	1308.62	874.39	1320.15	874.16
1325.11	874.15	1341.51	874.15	1346.5	874.15	1351.32	874.88	1359.31	874.61
1360.42	874.71	1363.98	874.07	1364.58	874.11	1368.05	874.35	1368.43	874.29
1375.77	874.95	1388.8	874.04	1397.21	874	1403.69	874.03	1420.07	874.36
1432.38	874.5	1432.81	874.51	1433.14	874.52	1449.48	875.18	1461.56	875.49
1466.64	875.64	1474.33	876.4	1475.72	876.5	1483.62	875.93	1484.79	875.91
1486.07	875.91	1493.95	875.97	1494.19	875.85	1496.58	874.01	1506.25	874.05
1515.06	874.09	1515.19	874.19	1523.31	879.09	1530.8	879.47	1539.58	879.97
1542.03	878.94	1543.22	878.4	1545.47	878.23	1555.06	877.5	1558.77	877.62
1564.09	877.85	1566.44	877.85	1569.94	878.04	1576.37	878.45	1584.19	878.57
1587.27	878.61	1589.29	878.72	1591.96	878.86	1595.41	878.59	1602.89	878.24
1613.32	877.65	1621.61	877.17	1623.48	877.09	1634.03	877.29	1634.22	877.29
1656.73	877.66	1665.84	877.76	1687.91	877.69	1688.64	877.7	1689.74	877.71
1707.11	877.97	1732.37	878.12	1741.63	878.16	1745.7	878.23	1761.59	878.39
1766.01	878.22	1771.03	878.43	1775.62	878.45	1777.51	878.31	1785.21	878.25
1787.8	878.47	1792.78	878.8	1799.26	879.17	1805.23	878.89	1809.56	878.88
1815.16	879.25	1818.03	879.09	1829.14	878.72	1838.62	878.17	1843.06	878.23
1853.88	878.17	1857.14	878.15	1862.03	877.98	1876.66	877.37	1878.2	877.31
1880.03	877.26	1902.63	876.62	1908.29	876.36	1923.11	875.82	1932.05	875.58
1936.33	875.45	1941.35	875.41	1947.36	875.37	1953.66	874.97	1959.89	874.57
1977.04	874.52	1981.43	874.52	1982.33	874.48	1989.1	874.66	1997.31	874.77
1999.1	874.83	2004.26	874.65	2005.56	874.6	2006.24	874.58	2012.27	874.35
2017.34	874.38	2025.68	874.44	2031.04	874.74	2032.99	874.84	2040.13	874.84
2051.82	874.7	2070.42	875.41	2077.35	875.63	2080.67	876.17	2091.02	876.8
2096.28	876.28	2110.05	877.4	2113.36	877.67	2116.49	877.9	2130.41	878.92
2133.48	878.88	2148.56	878.78	2158.32	878.76	2162.43	878.76	2164.57	878.73
2177.12	878.49	2183.07	878.36	2191.97	878.2	2201.86	877.98	2208.74	878.09
2216.03	878.19	2220.69	877.97	2225.28	877.99	2233.54	877.87	2240.48	877.83
2246.44	877.78	2255.3	878.25	2257.06	878.3	2261.55	877.84	2275.47	877.42
2277.27	877.38	2278.6	877.5	2288.76	878.19	2293.01	877.81	2298.59	877.24
2309.58	877.3	2313.84	877.3	2316.59	877.3	2320.19	877.3	2329.6	877.3
2340.88	877.05	2341.22	877.04	2341.4	877.03	2341.51	877.04	2341.69	877.06
2354.03	877.71	2359.45	878.01	2375.48	878.41	2375.71	878.42	2377.44	878.58
2378.88	878.71	2390.96	876.04	2394.18	875.32	2394.64	875.36	2398.95	875.75
2405.65	878.02	2415.96	881.13	2417.94	881.7	2418.4	881.71	2425.91	881.73
2434.43	881.73	2452.84	881.34	2468.07	881.35	2469.56	881.16	2478.67	880.92
2483.29	880.87	2486.47	880.62	2493.08	880.2	2502.84	880.05	2507.31	879.93
2512.97	880.1	2525.06	880.26	2531.5	880.33	2538.97	880.41	2547.89	880.42
2555.15	880.49	2567.53	880.72	2576.16	880.5	2588.71	880.31	2608.4	880.18
2614.01	880.09	2626.71	880.05	2633.84	880.95	2638.08	882.17	2640.08	882.17
2652.75	878.4	2654.31	877.92	2668.23	873.32	2669.77	873.3	2672.52	872.98
2677.98	872.42	2681.02	871.87	2694.79	872.37	2698.56	872.6	2700.52	872.55
2714.15	869.08	2717.66	868.18	2727.82	865.62	2733	863.2	2760	862.2
2787	863.2	2790.01	865.03	2798.67	869.78	2801.87	872.29	2805.75	873.75
2814.31	876.38	2814.87	876.55	2821.23	879.41	2823.11	881.56	2825.56	882.31
2826.15	882.44	2829.45	882.61	2830.17	882.59	2833.66	882.71	2840.4	883.76
2843.15	883.74	2846.02	883.66	2848.03	883.75	2865.38	885.1	2868.76	885.21
2869.57	885.21	2877.16	886.54	2888.37	886.68	2893.91	886.78	2899.76	886.88
2912.63	888.4	2919.65	888.48	2926.35	888.33	2932.27	887.97	2937.74	889.17
2942.09	889.11	2951.65	888.17	2953.62	890.85	2955.36	890.97	2962.79	893.45
2974.17	898.59	2975.58	899.73	2978.9	900.82	2982.94	899.37	2989.82	894.93

```
 3014.11   898.5 3025.76  901.52 3037.27  905.16 3059.87   910.2 3075.13  915.18
 3079.39  915.86 3090.44  917.49 3110.07  920.67 3115.12  921.65 3128.89  923.05
 3129.66  923.13 3129.98   923.3 3136.39   928.9 3155.91  931.86 3158.89  932.43
 3176.12  938.48 3182.02  940.49 3186.22  941.56 3188.49  941.54 3197.81  941.48
 3208.67  941.07 3213.95  940.99 3218.12  940.97 3227.94  940.64 3230.16  940.62
 3234.42  940.48 3241.62  941.83 3249.18  943.53 3253.52  943.92 3258.44  946.65
 3261.76  946.21 3264.01  946.21 3283.32  948.33 3295.77   949.5 3296.97  949.61
 3297.89  949.71 3304.78  950.34 3311.14  954.92 3314.58  957.79 3319.87  960.95
  3327.7  960.14 3335.09  960.62 3338.52  960.93 3350.12  962.39 3356.34  962.59
 3364.04  963.41  3373.7  968.42 3378.09   970.2  3380.1  971.24 3393.68   972.8
 3409.04  972.06 3414.35   972.7 3420.35  972.83 3427.24  973.19 3445.88   975.1
 3447.32  975.11 3462.99  975.24 3469.52  975.26 3471.08  975.24 3473.85  975.19
 3477.94  975.13

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06  2608.4      .1 2700.52     .04 2801.87      .1

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2640.08 2823.11            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   82.68 2142.06  900.11       F
 2420.05 2644.05  897.17       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=    2689    Downstream=    2689
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     850       2     883
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     850       2     883

Pier Data
Pier Station     Upstream=    2739    Downstream=    2739
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     850       2     884
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     850       2     884

Pier Data
Pier Station     Upstream=    2789    Downstream=    2789
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     850       2     885
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     850       2     885

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
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```
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     876.00  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     875.62  * E.G. Elev (ft)          *     875.96  *     875.84  *
* Q Total (cfs)          *    5870.00  * W.S. Elev (ft)          *     875.53  *     875.40  *
* Q Bridge (cfs)         *    5864.40  * Crit W.S. (ft)          *     869.64  *     869.64  *
* Q Weir (cfs)           *       5.60  * Max Chl Dpth (ft)       *      13.33  *      13.20  *
* Weir Sta Lft (ft)      *    2391.14  * Vel Total (ft/s)        *       5.26  *       5.35  *
* Weir Sta Rgt (ft)      *    2399.68  * Flow Area (sq ft)       *    1114.24  *    1095.13  *
* Weir Submerg           *       0.01  * Froude # Chl            *       0.33  *       0.34  *
* Weir Max Depth (ft)    *       0.68  * Specif Force (cu ft)    *    6762.28  *    6632.02  *
* Min El Weir Flow (ft)  *     875.33  * Hydr Depth (ft)         *       7.74  *       7.65  *
* Min El Prs (ft)        *     884.75  * W.P. Total (ft)         *     202.80  *     201.13  *
* Delta EG (ft)          *       0.22  * Conv. Total (cfs)       *   100990.0  *    98870.5  *
* Delta WS (ft)          *       0.24  * Top Width (ft)          *     144.02  *     143.18  *
* BR Open Area (sq ft)   *    2284.19  * Frctn Loss (ft)         *       0.12  *       0.05  *
* BR Open Vel (ft/s)     *       5.35  * C & E Loss (ft)         *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       1.16  *       1.20  *
* Br Sel Method          *Energy/Weir  * Power Total (lb/ft s)   *       6.10  *       6.42  *
*********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Notes(60):  This is an inside cross section of a perched bridge that has energy, low flow inside
         of the bridge and weir flow over the embankment.  The reported hydraulics are based on the
         flow and area inside of the bridge.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Notes(60):  This is an inside cross section of a perched bridge that has energy, low flow inside
         of the bridge and weir flow over the embankment.  The reported hydraulics are based on the
         flow and area inside of the bridge.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     879.72  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     879.23  * E.G. Elev (ft)          *     879.67  *     879.52  *
* Q Total (cfs)          *   10900.00  * W.S. Elev (ft)          *     879.23  *     879.06  *
* Q Bridge (cfs)         *    9019.56  * Crit W.S. (ft)          *     873.04  *     873.04  *
* Q Weir (cfs)           *    1880.44  * Max Chl Dpth (ft)       *      17.03  *      16.86  *
* Weir Sta Lft (ft)      *    2147.72  * Vel Total (ft/s)        *       5.35  *       5.44  *
* Weir Sta Rgt (ft)      *    2411.29  * Flow Area (sq ft)       *    1685.39  *    1657.79  *
* Weir Submerg           *       0.58  * Froude # Chl            *       0.29  *       0.30  *
* Weir Max Depth (ft)    *       4.40  * Specif Force (cu ft)    *   12448.35  *   12192.63  *
* Min El Weir Flow (ft)  *     875.33  * Hydr Depth (ft)         *      10.22  *      10.11  *
* Min El Prs (ft)        *     884.75  * W.P. Total (ft)         *     247.08  *     245.08  *
* Delta EG (ft)          *       0.28  * Conv. Total (cfs)       *   136041.1  *   133354.7  *
* Delta WS (ft)          *       0.35  * Top Width (ft)          *     164.84  *     163.90  *
* BR Open Area (sq ft)   *    2284.19  * Frctn Loss (ft)         *       0.15  *       0.07  *
* BR Open Vel (ft/s)     *       5.44  * C & E Loss (ft)         *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       2.73  *       2.82  *
* Br Sel Method          *Energy/Weir  * Power Total (lb/ft s)   *      14.63  *      15.35  *
*********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Notes(60):  This is an inside cross section of a perched bridge that has energy, low flow inside
         of the bridge and weir flow over the embankment.  The reported hydraulics are based on the
         flow and area inside of the bridge.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	880.55	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	880.06	E.G. Elev (ft)	880.49	880.36
Q Total (cfs)	12600.00	W.S. Elev (ft)	880.08	879.93
Q Bridge (cfs)	9440.48	Crit W.S. (ft)	873.77	873.77
Q Weir (cfs)	3159.52	Max Chl Dpth (ft)	17.88	17.73
Weir Sta Lft (ft)	2147.72	Vel Total (ft/s)	5.16	5.24
Weir Sta Rgt (ft)	2414.03	Flow Area (sq ft)	1827.88	1802.92
Weir Submerg	0.71	Froude # Chl	0.28	0.28
Weir Max Depth (ft)	5.23	Specif Force (cu ft)	13963.24	13715.07
Min El Weir Flow (ft)	875.33	Hydr Depth (ft)	10.83	10.73
Min El Prs (ft)	884.75	W.P. Total (ft)	256.54	254.93
Delta EG (ft)	0.26	Conv. Total (cfs)	150581.8	147990.5
Delta WS (ft)	0.33	Top Width (ft)	168.71	168.08
BR Open Area (sq ft)	2284.19	Frctn Loss (ft)	0.14	0.06
BR Open Vel (ft/s)	5.24	C & E Loss (ft)	0.00	0.01
Coef of Q		Shear Total (lb/sq ft)	3.11	3.20
Br Sel Method	Energy/Weir	Power Total (lb/ft s)	16.09	16.76

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	882.91	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	882.40	E.G. Elev (ft)	882.85	882.68
Q Total (cfs)	19100.00	W.S. Elev (ft)	882.43	882.25
Q Bridge (cfs)	11237.10	Crit W.S. (ft)	876.09	876.09
Q Weir (cfs)	7862.90	Max Chl Dpth (ft)	20.23	20.05
Weir Sta Lft (ft)	2147.72	Vel Total (ft/s)	5.20	5.24
Weir Sta Rgt (ft)	2416.01	Flow Area (sq ft)	2162.59	2145.40
Weir Submerg	0.83	Froude # Chl	0.27	0.27
Weir Max Depth (ft)	7.59	Specif Force (cu ft)	18989.76	18628.65
Min El Weir Flow (ft)	875.33	Hydr Depth (ft)	22.80	20.94
Min El Prs (ft)	884.75	W.P. Total (ft)	356.56	346.80
Delta EG (ft)	0.31	Conv. Total (cfs)	160006.3	160631.0
Delta WS (ft)	0.37	Top Width (ft)	94.86	102.46
BR Open Area (sq ft)	2284.19	Frctn Loss (ft)	0.17	0.06
BR Open Vel (ft/s)	5.24	C & E Loss (ft)	0.00	0.01
Coef of Q		Shear Total (lb/sq ft)	5.40	5.46
Br Sel Method	Energy/Weir	Power Total (lb/ft s)	28.04	28.60

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.

BRIDGE OUTPUT Profile #50-yr

```
* E.G. US. (ft)          *     885.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     884.88  * E.G. Elev (ft)         *     885.38  *     885.09  *
* Q Total (cfs)          *   27300.00  * W.S. Elev (ft)         *     884.62  *     884.34  *
* Q Bridge (cfs)         *   13049.28  * Crit W.S. (ft)         *     879.88  *     879.91  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      22.42  *      22.14  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.62  *       6.71  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4123.61  *    4071.57  *
* Weir Submerg           *             * Froude # Chl           *       0.31  *       0.32  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   34143.50  *   33095.56  *
* Min El Weir Flow (ft)  *     875.33  * Hydr Depth (ft)        *      12.76  *      12.38  *
* Min El Prs (ft)        *     884.75  * W.P. Total (ft)        *     792.04  *     770.41  *
* Delta EG (ft)          *       0.46  * Conv. Total (cfs)      *   299911.3  *   294146.9  *
* Delta WS (ft)          *       0.54  * Top Width (ft)         *    2313.62  *    2303.55  *
* BR Open Area (sq ft)   *    2284.19  * Frctn Loss (ft)        *       0.29  *       0.08  *
* BR Open Vel (ft/s)     *       5.72  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.69  *       2.84  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      17.83  *      19.06  *
*******************************************************************************************

Warning: The sluice gate calculations did not converge during pressure/weir flow calculations.
Note:    The downstream water surface is below the minimum elevation for pressure flow.  The sluice
         gate equations were used for pressure flow.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*******************************************************************************************
* E.G. US. (ft)          *     886.77  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     886.13  * E.G. Elev (ft)         *     886.77  *     886.42  *
* Q Total (cfs)          *   32830.00  * W.S. Elev (ft)         *     886.13  *     885.74  *
* Q Bridge (cfs)         *   14865.47  * Crit W.S. (ft)         *     880.79  *     880.80  *
* Q Weir (cfs)           *   17964.53  * Max Chl Dpth (ft)      *      23.93  *      23.54  *
* Weir Sta Lft (ft)      *    2147.72  * Vel Total (ft/s)       *       7.05  *       7.21  *
* Weir Sta Rgt (ft)      *    2791.17  * Flow Area (sq ft)      *    4657.20  *    4556.04  *
* Weir Submerg           *       0.88  * Froude # Chl           *       0.31  *       0.33  *
* Weir Max Depth (ft)    *      11.45  * Specif Force (cu ft)   *   42690.72  *   41136.48  *
* Min El Weir Flow (ft)  *     875.33  * Hydr Depth (ft)        *      11.97  *      12.11  *
* Min El Prs (ft)        *     884.75  * W.P. Total (ft)        *     870.31  *     857.36  *
* Delta EG (ft)          *       0.34  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       0.39  * Top Width (ft)         *    2424.68  *    2395.20  *
* BR Open Area (sq ft)   *    2284.19  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.51  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*******************************************************************************************

Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*******************************************************************************************
* E.G. US. (ft)          *     888.23  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     887.54  * E.G. Elev (ft)         *     888.23  *     887.85  *
* Q Total (cfs)          *   38750.00  * W.S. Elev (ft)         *     887.54  *     887.11  *
* Q Bridge (cfs)         *   15474.11  * Crit W.S. (ft)         *     881.33  *     881.33  *
* Q Weir (cfs)           *   23275.89  * Max Chl Dpth (ft)      *      25.34  *      24.91  *
```

```
* Weir Sta Lft (ft)      *    2147.72  * Vel Total (ft/s)       *       7.38  *       7.57  *
* Weir Sta Rgt (ft)      *    2951.69  * Flow Area (sq ft)      *    5251.56  *    5116.85  *
* Weir Submerg           *       0.88  * Froude # Chl           *       0.32  *       0.33  *
* Weir Max Depth (ft)    *      12.91  * Specif Force (cu ft)   *   51741.98  *   49945.60  *
* Min El Weir Flow (ft)  *     875.33  * Hydr Depth (ft)        *      11.51  *      11.59  *
* Min El Prs (ft)        *     884.75  * W.P. Total (ft)        *     937.42  *     922.82  *
* Delta EG (ft)          *       0.38  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       0.43  * Top Width (ft)         *    2519.46  *    2491.38  *
* BR Open Area (sq ft)   *    2284.19  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.77  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*****************************************************************************************

Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     889.99  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     889.23  * E.G. Elev (ft)         *     889.99  *     889.61  *
* Q Total (cfs)          *   46700.00  * W.S. Elev (ft)         *     889.23  *     888.81  *
* Q Bridge (cfs)         *   15958.04  * Crit W.S. (ft)         *     881.91  *     881.94  *
* Q Weir (cfs)           *   30741.96  * Max Chl Dpth (ft)      *      27.03  *      26.61  *
* Weir Sta Lft (ft)      *    2147.72  * Vel Total (ft/s)       *       7.59  *       7.82  *
* Weir Sta Rgt (ft)      *    2952.99  * Flow Area (sq ft)      *    6154.40  *    5975.30  *
* Weir Submerg           *       0.88  * Froude # Chl           *       0.31  *       0.32  *
* Weir Max Depth (ft)    *      14.67  * Specif Force (cu ft)   *   63996.42  *   62035.07  *
* Min El Weir Flow (ft)  *     875.33  * Hydr Depth (ft)        *      10.60  *      10.36  *
* Min El Prs (ft)        *     884.75  * W.P. Total (ft)        *    1062.65  *    1058.74  *
* Delta EG (ft)          *       0.38  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       0.42  * Top Width (ft)         *    2672.90  *    2654.93  *
* BR Open Area (sq ft)   *    2284.19  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.99  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*****************************************************************************************

Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     883.23  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     882.71  * E.G. Elev (ft)         *     883.17  *     882.99  *
* Q Total (cfs)          *   20100.00  * W.S. Elev (ft)         *     882.74  *     882.55  *
* Q Bridge (cfs)         *   11511.13  * Crit W.S. (ft)         *     876.44  *     876.44  *
* Q Weir (cfs)           *    8588.87  * Max Chl Dpth (ft)      *      20.54  *      20.35  *
* Weir Sta Lft (ft)      *    2147.72  * Vel Total (ft/s)       *       5.25  *       5.29  *
* Weir Sta Rgt (ft)      *    2416.01  * Flow Area (sq ft)      *    2190.68  *    2174.00  *
* Weir Submerg           *       0.83  * Froude # Chl           *       0.26  *       0.27  *
* Weir Max Depth (ft)    *       7.91  * Specif Force (cu ft)   *   19724.37  *   19335.85  *
* Min El Weir Flow (ft)  *     875.33  * Hydr Depth (ft)        *      24.36  *      23.83  *
* Min El Prs (ft)        *     884.75  * W.P. Total (ft)        *     378.04  *     365.12  *
* Delta EG (ft)          *       0.32  * Conv. Total (cfs)      *   159216.4  *   159492.5  *
* Delta WS (ft)          *       0.38  * Top Width (ft)         *      89.95  *      91.22  *
```

```
* BR Open Area (sq ft)   *    2284.19  * Frctn Loss (ft)        *       0.18  *       0.06  *
* BR Open Vel (ft/s)     *       5.29  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       5.77  *       5.90  *
* Br Sel Method          *Energy/Weir  * Power Total (lb/ft s)  *      30.30  *      31.26  *
*********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Notes(60):  This is an inside cross section of a perched bridge that has energy, low flow inside
         of the bridge and weir flow over the embankment.  The reported hydraulics are based on the
         flow and area inside of the bridge.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Notes(60):  This is an inside cross section of a perched bridge that has energy, low flow inside
         of the bridge and weir flow over the embankment.  The reported hydraulics are based on the
         flow and area inside of the bridge.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 33.296

INPUT
Description: D/S of Kenneth Rd Bridge @ 159th ST
Station Elevation Data    num=     426
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  900.66   38.73  898.68   84.31  898.84   97.24  899.15  103.41  896.43
  116.59  891.43   130.5  891.84   156.3  892.54  163.09  892.73  166.36  892.82
  168.02  893.08  178.53  894.75  179.64  894.23  191.43  888.65  195.41  889.18
  198.77  889.64  201.35  890.68  219.05  894.75  226.64     893  239.62  889.78
  246.14  891.06  252.95  889.44  271.84  889.65  277.06  890.01   282.9  889.44
  295.54  888.25   329.9  886.36  370.65  884.88  373.92  884.54  383.11  884.75
  399.48  883.93  419.08  883.81  465.92   882.3  502.54  881.38  526.39  880.85
  541.24  880.44  603.64  878.97  612.08  878.82  618.36  878.87  684.59  879.38
  724.93  880.31   727.4  880.36  731.27  880.11  743.51  879.38   764.7  878.13
  768.17   877.9  771.78  878.24  779.51  878.93   784.7  879.39   789.5  879.02
  789.78     879  790.52  879.15  805.54  882.14  808.86  881.85  810.19  881.74
  813.35  881.74   814.9  881.75  816.18  881.85  823.25  882.38  828.79  882.32
  829.61   882.3  830.53  882.29   836.1   882.2  842.24  880.61  842.36  880.58
  862.91  874.95   877.4  874.71  881.32  874.99  882.82  875.05  893.94  874.97
  896.29  874.91  898.46  874.84  898.93  873.65  902.93  873.41  912.13  873.72
  917.03  873.86  923.79  873.98  930.28     874  937.48  873.94  947.66  873.77
  949.83   873.7  959.73  873.51   963.5  873.41  970.15  873.76  972.52  873.89
  981.54  874.42  987.23   874.8 1003.65  875.49 1008.51  875.79 1017.22  876.09
 1038.35  876.26 1054.21  876.49 1067.93  876.04 1099.08  875.97 1118.24  876.75
 1132.09  876.77 1157.47  876.73 1159.72   876.7 1161.59  876.72 1188.31  876.61
 1202.67  876.54 1217.12   876.1 1219.68  876.07 1221.39  876.09 1222.42  876.09
 1223.19  876.15 1234.65   875.2  1253.8  874.43 1275.34  874.99 1280.03  874.63
 1289.44  874.32 1305.89   874.4 1306.53   874.4 1308.62  874.39 1320.15  874.16
 1325.11  874.15 1341.51  874.15  1346.5  874.15 1351.32  874.88 1359.31  874.61
 1360.42  874.71 1363.98  874.07 1364.58  874.11 1368.05  874.35 1368.43  874.29
 1375.77  874.95  1388.8  874.04 1397.21     874 1403.69  874.03 1420.07  874.36
 1432.38   874.5 1432.81  874.51 1433.14  874.52 1449.48  875.18 1461.56  875.49
 1466.64  875.64 1474.33   876.4 1475.72   876.5 1483.62  875.93 1484.79  875.91
 1486.07  875.91 1493.95  875.97 1494.19  875.85 1496.58  874.01 1506.25  874.05
 1515.06  874.09 1515.19  874.19 1523.31  879.09  1530.8  879.47 1539.58  879.97
 1542.03  878.94 1543.22   878.4 1545.47  878.23 1555.06   877.5 1558.77  877.62
 1564.09  877.85 1566.44  877.85 1569.94  878.04 1576.37  878.45 1584.19  878.57
 1587.27  878.61 1589.29  878.72 1591.96  878.86 1595.41  878.59 1602.89  878.24
 1613.32  877.65 1621.61  877.17 1623.48  877.09 1634.03  877.29 1634.22  877.29
 1656.73  877.66 1665.84  877.76 1687.91  877.69 1688.64   877.7 1689.74  877.71
 1707.11  877.97 1732.37  878.12 1741.63  878.16  1745.7  878.23 1761.59  878.39
 1766.01  878.22 1771.03  878.43 1775.62  878.45 1777.51  878.31 1785.21  878.25
  1787.8  878.47 1792.78   878.8 1799.26  879.17 1805.23  878.89 1809.56  878.88
 1815.16  879.25 1818.03  879.09 1829.14  878.72 1838.62  878.17 1843.06  878.23
 1853.88  878.17 1857.14  878.15 1862.03  877.98 1876.66  877.37  1878.2  877.31
 1880.03  877.26 1902.63  876.62 1908.29  876.36 1923.11  875.82 1932.05  875.58
 1936.33  875.45 1941.35  875.41 1947.36  875.37 1953.66  874.97 1959.89  874.57
 1977.04  874.52 1981.43  874.52 1982.33  874.48  1989.1  874.66 1997.31  874.77
  1999.1  874.83 2004.26  874.65 2005.56   874.6 2006.24  874.58 2012.27  874.35
```

```
 2017.34  874.38 2025.68  874.44 2031.04  874.74 2032.99  874.84 2040.13  874.84
 2051.82   874.7 2070.42  875.41 2077.35  875.63 2080.67  876.17 2091.02   876.8
 2096.28  876.28 2110.05   877.4 2113.36  877.67 2116.49   877.9 2130.41  878.92
 2133.48  878.88 2148.56  878.78 2158.32  878.76 2162.43  878.76 2164.57  878.73
 2177.12  878.49 2183.07  878.36 2191.97   878.2 2201.86  877.98 2208.74  878.09
 2216.03  878.19 2220.69  877.97 2225.28  877.99 2233.54  877.87 2240.48  877.83
 2246.44  877.78  2255.3  878.25 2257.06   878.3 2261.55  877.84 2275.47  877.42
 2277.27  877.38  2278.6   877.5 2288.76  878.19 2293.01  877.81 2298.59  877.24
 2309.58   877.3 2313.84   877.3 2316.59   877.3 2320.19   877.3  2329.6   877.3
 2340.88  877.05 2341.22  877.04  2341.4  877.03 2341.51  877.04 2341.69  877.06
 2354.03  877.71 2359.45  878.01 2375.48  878.41 2375.71  878.42 2377.44  878.58
 2378.88  878.71 2390.96  876.04 2394.18  875.32 2394.64  875.36 2398.95  875.75
 2405.65  878.02 2415.96  881.13 2417.94   881.7  2418.4  881.71 2425.91  881.73
 2434.43  881.73 2452.84  881.34 2468.07  881.35 2469.56  881.16 2478.67  880.92
 2483.29  880.87 2486.47  880.62 2493.08   880.2 2502.84  880.05 2507.31  879.93
 2512.97   880.1 2525.06  880.26  2531.5  880.33 2538.97  880.41 2547.89  880.42
 2555.15  880.49 2567.53  880.72 2576.16   880.5 2588.71  880.31  2608.4  880.18
 2614.01  880.09 2626.71  880.05 2633.84  880.95 2638.08  882.17 2640.08  882.17
 2652.75   878.4 2654.31  877.92 2668.23  873.32 2669.77   873.3 2672.52  872.98
 2677.98  872.42 2681.02  871.87 2694.79  872.37 2698.56   872.6 2700.52  872.55
 2714.15  869.08 2717.66  868.18 2727.82  865.62    2733   863.2    2760   862.2
    2787   863.2 2790.01  865.03 2798.67  869.78 2801.87  872.29 2805.75  873.75
 2814.31  876.38 2814.87  876.55 2821.23  879.41 2823.11  881.56 2825.56  882.31
 2826.15  882.44 2829.45  882.61 2830.17  882.59 2833.66  882.71  2840.4  883.76
 2843.15  883.74 2846.02  883.66 2848.03  883.75 2865.38   885.1 2868.76  885.21
 2869.57  885.21 2877.16  886.54 2888.37  886.68 2893.91  886.78 2899.76  886.88
 2912.63   888.4 2919.65  888.48 2926.35  888.33 2932.27  887.97 2937.74  889.17
 2942.09  889.11 2951.65  888.17 2953.62  890.85 2955.36  890.97 2962.79  893.45
 2974.17  898.59 2975.58  899.73  2978.9  900.82 2982.94  899.37 2989.82  894.93
 3014.11   898.5 3025.76  901.52 3037.27  905.16 3059.87   910.2 3075.13  915.18
 3079.39  915.86 3090.44  917.49 3110.07  920.67 3115.12  921.65 3128.89  923.05
 3129.66  923.13 3129.98   923.3 3136.39   928.9 3155.91  931.86 3158.89  932.43
 3176.12  938.48 3182.02  940.49 3186.22  941.56 3188.49  941.54 3197.81  941.48
 3208.67  941.07 3213.95  940.99 3218.12  940.97 3227.94  940.64 3230.16  940.62
 3234.42  940.48 3241.62  941.83 3249.18  943.53 3253.52  943.92 3258.44  946.65
 3261.76  946.21 3264.01  946.21 3283.32  948.33 3295.77   949.5 3296.97  949.61
 3297.89  949.71 3304.78  950.34 3311.14  954.92 3314.58  957.79 3319.87  960.95
  3327.7  960.14 3335.09  960.62 3338.52  960.93 3350.12  962.39 3356.34  962.59
 3364.04  963.41  3373.7  968.42 3378.09   970.2  3380.1  971.24 3393.68   972.8
 3409.04  972.06 3414.35   972.7 3420.35  972.83 3427.24  973.19 3445.88   975.1
 3447.32  975.11 3462.99  975.24 3469.52  975.26 3471.08  975.24 3473.85  975.19
 3477.94  975.13

Manning's n Values         num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06  2608.4      .1 2700.52     .04 2801.87      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2640.08 2823.11          566.895  685.93808.8675             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   82.68 2142.06  900.11       F
 2420.05 2644.05  897.17       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  875.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.41  * Wt. n-Val.             *   0.060  *   0.062  *          *
* W.S. Elev (ft)          *  875.37  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)          *  869.41  * Flow Area (sq ft)      *    0.02  * 1144.21  *          *
* E.G. Slope (ft/ft)      *0.003165  * Area (sq ft)           *  460.88  * 1144.21  *          *
* Q Total (cfs)           * 5870.00  * Flow (cfs)              *    0.00  * 5870.00  *          *
* Top Width (ft)          *  658.20  * Top Width (ft)         *  509.19  *  149.00  *          *
* Vel Total (ft/s)        *    5.13  * Avg. Vel. (ft/s)       *    0.12  *    5.13  *          *
* Max Chl Dpth (ft)       *   13.17  * Hydr. Depth (ft)       *    0.03  *    7.68  *          *
* Conv. Total (cfs)       *104335.3  * Conv. (cfs)             *     0.0  *104335.2  *          *
* Length Wtd. (ft)        *  688.32  * Wetted Per. (ft)       *    0.82  *  153.99  *          *
* Min Ch El (ft)          *  862.20  * Shear (lb/sq ft)       *    0.01  *    1.47  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *    0.00  *    7.53  *          *
* Frctn Loss (ft)         *    1.97  * Cum Volume (acre-ft)   * 1219.75  * 7643.68  * 1069.73  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *  379.85  *  618.51  *  376.73  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
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         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  879.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.060  *   0.067  *          *
* W.S. Elev (ft)         *  878.88  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  872.77  * Flow Area (sq ft)      *  282.37  * 1702.52  *          *
* E.G. Slope (ft/ft)     *0.003715  * Area (sq ft)           * 3838.26  * 1702.52  *          *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  441.88  *10458.12  *          *
* Top Width (ft)         * 1712.50  * Top Width (ft)         * 1543.61  *  168.90  *          *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *    1.56  *    6.14  *          *
* Max Chl Dpth (ft)      *   16.68  * Hydr. Depth (ft)       *    1.06  *   10.08  *          *
* Conv. Total (cfs)      *178828.6  * Conv. (cfs)            *  7249.6  *171579.0  *          *
* Length Wtd. (ft)       *  695.45  * Wetted Per. (ft)       *  267.51  *  175.12  *          *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.24  *    2.25  *          *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *    0.38  *   13.85  *          *
* Frctn Loss (ft)        *    1.78  * Cum Volume (acre-ft)   * 3649.84  *10252.17  * 3328.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  934.64  *  664.90  *  789.20  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  880.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.060  *   0.068  *          *
* W.S. Elev (ft)         *  879.74  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  873.52  * Flow Area (sq ft)      *  513.03  * 1849.97  *          *
* E.G. Slope (ft/ft)     *0.003590  * Area (sq ft)           * 5273.85  * 1849.97  *          *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1166.44  *11433.56  *          *
* Top Width (ft)         * 1919.63  * Top Width (ft)         * 1746.36  *  173.26  *          *
* Vel Total (ft/s)       *    5.33  * Avg. Vel. (ft/s)       *    2.27  *    6.18  *          *
* Max Chl Dpth (ft)      *   17.54  * Hydr. Depth (ft)       *    1.91  *   10.68  *          *
* Conv. Total (cfs)      *210295.5  * Conv. (cfs)            * 19468.0  *190827.5  *          *
* Length Wtd. (ft)       *  693.69  * Wetted Per. (ft)       *  270.49  *  179.87  *          *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.43  *    2.31  *          *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    0.97  *   14.25  *          *
* Frctn Loss (ft)        *    1.68  * Cum Volume (acre-ft)   * 5069.00  *12034.11  * 4778.69  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1071.76  *  693.35  *  968.01  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  882.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.060  *   0.069  *   0.100  *
* W.S. Elev (ft)         *  882.03  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  875.74  * Flow Area (sq ft)      * 1139.34  * 2256.20  *    0.36  *
* E.G. Slope (ft/ft)     *0.003425  * Area (sq ft)           * 9801.63  * 2258.02  *    0.36  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 4213.78  *14886.10  *    0.12  *
* Top Width (ft)         * 2325.01  * Top Width (ft)         * 2140.91  *  182.56  *    1.53  *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *    3.70  *    6.60  *    0.32  *
* Max Chl Dpth (ft)      *   19.83  * Hydr. Depth (ft)       *    4.10  *   12.60  *    0.23  *
* Conv. Total (cfs)      *326384.2  * Conv. (cfs)            * 72005.8  *254376.4  *     2.0  *
* Length Wtd. (ft)       *  682.28  * Wetted Per. (ft)       *  279.48  *  186.68  *    1.60  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    0.87  *    2.58  *    0.05  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    3.22  *   17.05  *    0.02  *
* Frctn Loss (ft)        *    1.40  * Cum Volume (acre-ft)   * 8544.47  *14225.42  * 8056.91  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1340.76  *  716.71  * 1210.08  *
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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  884.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.060  *   0.069  *   0.100  *
* W.S. Elev (ft)         *  884.34  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  879.65  * Flow Area (sq ft)      * 1781.83  * 2670.04  *   34.64  *
* E.G. Slope (ft/ft)     *0.003116  * Area (sq ft)           *14891.54  * 2681.01  *   34.64  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 8469.43  *18800.74  *   29.83  *
* Top Width (ft)         * 2464.35  * Top Width (ft)         * 2248.80  *  183.03  *   32.51  *
* Vel Total (ft/s)       *    6.08  * Avg. Vel. (ft/s)       *    4.75  *    7.04  *    0.86  *
* Max Chl Dpth (ft)      *   22.14  * Hydr. Depth (ft)       *    6.41  *   14.91  *    1.07  *
* Conv. Total (cfs)      *489065.2  * Conv. (cfs)            *151725.4  *336805.4  *   534.3  *
* Length Wtd. (ft)       *  672.58  * Wetted Per. (ft)       *  279.48  *  186.68  *   32.75  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    1.24  *    2.78  *    0.21  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    5.90  *   19.59  *    0.18  *
* Frctn Loss (ft)        *    1.23  * Cum Volume (acre-ft)   *13785.82  *17365.13  *13238.73  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1820.98  *  745.05  * 1697.25  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  886.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.060  *   0.069  *   0.100  *
* W.S. Elev (ft)         *  885.74  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  880.53  * Flow Area (sq ft)      * 2171.01  * 2920.72  *   93.33  *
* E.G. Slope (ft/ft)     *0.002953  * Area (sq ft)           *18073.18  * 2937.24  *   93.33  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *11460.05  *21255.41  *  114.54  *
* Top Width (ft)         * 2525.65  * Top Width (ft)         * 2293.13  *  183.03  *   49.49  *
* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *    5.28  *    7.28  *    1.23  *
* Max Chl Dpth (ft)      *   23.54  * Hydr. Depth (ft)       *    7.81  *   16.31  *    1.89  *
* Conv. Total (cfs)      *604134.4  * Conv. (cfs)            *210886.7  *391139.9  *  2107.8  *
* Length Wtd. (ft)       *  668.31  * Wetted Per. (ft)       *  279.48  *  186.68  *   49.81  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)       *    1.43  *    2.88  *    0.35  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    7.56  *   20.99  *    0.42  *
* Frctn Loss (ft)        *    1.16  * Cum Volume (acre-ft)   *18245.60  *19274.71  *17775.71  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 2150.96  *  752.26  * 2151.55  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  887.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.060  *   0.069  *   0.100  *
* W.S. Elev (ft)         *  887.11  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  881.22  * Flow Area (sq ft)      * 2552.36  * 3166.36  *  175.29  *
* E.G. Slope (ft/ft)     *0.002832  * Area (sq ft)           *21242.23  * 3188.33  *  175.29  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *14698.34  *23815.88  *  235.78  *
* Top Width (ft)         * 2585.51  * Top Width (ft)         * 2323.86  *  183.03  *   78.62  *
* Vel Total (ft/s)       *    6.57  * Avg. Vel. (ft/s)       *    5.76  *    7.52  *    1.35  *
* Max Chl Dpth (ft)      *   24.91  * Hydr. Depth (ft)       *    9.18  *   17.68  *    2.23  *
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* Conv. Total (cfs)      *728094.1  * Conv. (cfs)            *276174.8  *447489.2  *  4430.2  *
* Length Wtd. (ft)       *  665.08  * Wetted Per. (ft)        *  279.48  *  186.68  *   79.02  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)        *    1.61  *    3.00  *    0.39  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    9.30  *   22.56  *    0.53  *
* Frctn Loss (ft)        *    1.11  * Cum Volume (acre-ft)   *22629.49  *20652.59  *22365.55  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 2378.29  *  753.20  * 2599.95  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  889.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.060  *   0.069  *   0.100  *
* W.S. Elev (ft)         *  888.81  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  882.10  * Flow Area (sq ft)      * 3023.44  * 3469.79  *  332.95  *
* E.G. Slope (ft/ft)     *0.002707  * Area (sq ft)           *25205.25  * 3498.49  *  332.95  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *19057.20  *27120.53  *  522.27  *
* Top Width (ft)         * 2654.93  * Top Width (ft)         * 2351.97  *  183.03  *  119.93  *
* Vel Total (ft/s)       *    6.84  * Avg. Vel. (ft/s)       *    6.30  *    7.82  *    1.57  *
* Max Chl Dpth (ft)      *   26.61  * Hydr. Depth (ft)       *   10.88  *   19.38  *    2.78  *
* Conv. Total (cfs)      *897511.1  * Conv. (cfs)            *366253.7  *521220.0  * 10037.4  *
* Length Wtd. (ft)       *  662.11  * Wetted Per. (ft)        *  279.48  *  186.68  *  120.86  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)        *    1.83  *    3.14  *    0.47  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *   11.53  *   24.56  *    0.73  *
* Frctn Loss (ft)        *    1.06  * Cum Volume (acre-ft)   *29932.47  *22658.17  *29891.21  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 2717.69  *  755.63  * 3030.94  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  882.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.060  *   0.069  *   0.100  *
* W.S. Elev (ft)         *  882.33  * Reach Len. (ft)        *  566.90  *  685.93  *  808.87  *
* Crit W.S. (ft)         *  876.09  * Flow Area (sq ft)      * 1222.24  * 2309.59  *    0.96  *
* E.G. Slope (ft/ft)     *0.003386  * Area (sq ft)           *10443.97  * 2312.57  *    0.96  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 4710.04  *15389.54  *    0.42  *
* Top Width (ft)         * 2355.08  * Top Width (ft)         * 2169.52  *  183.03  *    2.53  *
* Vel Total (ft/s)       *    5.69  * Avg. Vel. (ft/s)       *    3.85  *    6.66  *    0.44  *
* Max Chl Dpth (ft)      *   20.13  * Hydr. Depth (ft)       *    4.40  *   12.90  *    0.38  *
* Conv. Total (cfs)      *345445.0  * Conv. (cfs)            * 80948.2  *264489.5  *     7.3  *
* Length Wtd. (ft)       *  680.83  * Wetted Per. (ft)        *  279.48  *  186.68  *    2.65  *
* Min Ch El (ft)         *  862.20  * Shear (lb/sq ft)        *    0.92  *    2.62  *    0.08  *
* Alpha                  *    1.16  * Stream Power (lb/ft s) *    3.56  *   17.42  *    0.03  *
* Frctn Loss (ft)        *    1.38  * Cum Volume (acre-ft)   * 9634.43  *15198.45  * 9207.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1450.63  *  727.03  * 1293.06  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
```

REACH: Main RS: 33.166

INPUT
Description:
Station Elevation Data num= 385

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	905.87	.71	905.97	18.31	908.53	57.62	905.16	67	903.95
68.86	903.98	80.17	904.71	84.86	905.04	130.08	902.06	148.59	901.04
154.53	900.7	156.57	900.43	161.68	900.64	171.41	901.19	183.24	900.52
197.22	899.49	209.61	898.74	229.61	897.57	234.63	897.15	276.1	898.8
292.98	899.49	295.5	898.87	297.81	898.09	322.53	889.78	327.14	891.3
337.27	894.15	342.02	892.94	351.21	890.37	367.28	890.82	381.84	891.27
387	890.46	398.2	888.86	412.12	889.7	416.8	890.01	419.39	889.78
438.17	888.25	459.42	886.56	460.64	886.44	461.99	886.39	482.23	885.43
498.39	885.47	503.55	885.48	506.08	885.24	519.49	883.92	526.2	883.46
566.61	882.17	609.13	881.49	618.78	880.92	645.28	879.47	696.21	880.34
696.95	880.36	710.74	879.5	732.96	878.12	735.26	878.01	735.67	878.01
738	877.96	784.41	877.44	803.8	882.02	804.26	882.14	804.51	882.13
805.81	882.1	820.57	881.75	823	881.91	823.31	881.93	830.21	882.38
838.61	882.31	838.85	882.3	841.34	882.26	844.42	882.2	844.51	882.2
847.74	881.14	867.76	874.63	868.99	874.87	879.83	876.75	897.12	874.66
909.92	873	917.69	874.07	931.9	876.08	1022.62	875.65	1027.07	875.64
1028.33	875.61	1032.78	875.53	1048.51	875.23	1056.64	875.18	1089.79	875.5
1127.32	875.68	1137.52	875.56	1195.51	874.78	1210.47	874.88	1231.1	874.77
1232.28	874.77	1236.01	874.7	1269.99	874.07	1275.42	874.3	1284.03	874.63
1291.78	874.31	1293.3	874.3	1300.17	874.57	1310.09	873.88	1312.25	873.73
1316.12	874.06	1322.6	874.63	1323.97	874.48	1332.35	874.25	1342.26	874.47
1355.79	874.45	1367.4	874.5	1379.65	874.96	1380.08	874.97	1380.61	874.96
1388	874.88	1391.37	874.83	1393.4	874.8	1394.53	874.72	1403.56	874.86
1405.13	875.03	1424.56	875.98	1424.77	875.97	1434.36	875.75	1443.81	874.97
1453.46	875.55	1457.89	875.03	1462.5	875.49	1475.47	876.87	1478.21	877.17
1482.7	877.26	1497.81	877.42	1509.42	877.79	1536.49	877.94	1548.6	878.03
1559.77	878.15	1575.34	878.24	1593.77	877.65	1593.82	877.65	1594	877.65
1606.72	877.78	1610.8	877.04	1619.88	875.4	1629.72	876.05	1635.44	876.4
1641.44	876.4	1650.1	876.4	1654.35	877.58	1654.38	878.28	1659.29	878.32
1662.29	877.53	1671.07	875.4	1676.06	876.52	1681.64	877.75	1689.05	878.13
1694.15	878.25	1705.23	877.15	1714.84	876.33	1725.03	875.86	1741.9	875.46
1750.73	875.29	1754.03	875.24	1758.68	875.21	1794.05	874.63	1805.26	875.11
1806.85	875.09	1807.66	875.1	1821.39	874.82	1824.54	874.76	1831.14	874.84
1834.05	874.86	1843.3	874.92	1849.09	874.96	1859.08	874.97	1862.04	874.96
1865.19	875.03	1886.87	875.03	1901.17	874.92	1911.94	874.89	1914.61	874.87
1920.76	874.84	1925.73	874.81	1933.87	874.76	1942.05	874.88	1959.88	875.1
1959.91	875.1	1959.94	875.1	1980.27	875.2	1995.94	875.79	2001.56	875.9
2003.63	875.88	2029.53	875.97	2039.73	875.96	2040.61	875.98	2042.19	876.06
2042.41	876.06	2042.76	876.07	2043.57	876.09	2052.1	876.34	2056.07	876.46
2056.44	876.45	2056.63	876.44	2057.11	876.43	2060.7	876.32	2067.61	876.1
2076.42	876.02	2082.43	875.96	2083.17	875.95	2083.53	875.95	2084.37	875.96
2085.21	875.97	2114.48	876.57	2124.52	877.13	2139.97	877.32	2145.6	877.38
2152.93	877.53	2164.87	877.86	2169.29	877.76	2174.21	877.84	2183.7	877.81
2192.21	877.69	2202.22	877.78	2207.83	877.87	2219.82	877.78	2221.35	877.77
2223.2	877.71	2231.1	877.55	2233.13	877.53	2234.52	877.52	2235.54	877.51
2236.55	877.51	2245.9	877.45	2260.5	877.52	2278.5	877.45	2295.23	877.45
2299.4	877.42	2317.88	877.45	2332.48	877.45	2340.14	877.48	2349.31	877.19
2363.99	876.97	2368.38	876.95	2371.77	877.08	2387.69	877.93	2393.48	877.66
2402.75	876.95	2411.89	876.35	2414.57	876.89	2416.23	877.23	2421.37	874.85
2421.91	874.6	2425.46	872.93	2426.16	873.08	2429.95	873.94	2433.57	874.75
2436.2	875.33	2436.78	875.46	2437.16	875.6	2444.48	878.36	2463.17	877.33
2477.69	876.55	2483.08	875.67	2486.03	875.36	2491.94	876.24	2504.61	877.36
2508.12	877.35	2518.63	877.47	2527.44	877.44	2529.14	877.29	2529.55	877.25
2531.03	877.12	2536.5	876.63	2539.41	876.64	2541.15	876.65	2547.58	871.48
2555.81	863.36	2560	861.5	2577.5	860.49	2595	861.5	2601.94	863.37
2605.9	864.45	2611.35	865.86	2618.03	867.84	2621.74	868.81	2627.64	871.67
2630.04	872.04	2630.34	872	2630.7	871.98	2631.01	871.96	2631.17	871.95
2632.02	871.85	2635.5	871.5	2641.28	870.35	2643.97	870.27	2645.46	870.59
2647.73	870.72	2653.2	871.05	2655.63	871.15	2663.23	871.66	2669.13	871.93
2676.85	872.58	2680.1	872.83	2682.55	873.09	2695.23	874.52	2714.23	873.74
2720.12	873.51	2723.38	873.29	2731.01	873.17	2747.74	872.79	2753.09	872.89
2774.59	873.12	2781.38	873.07	2795.5	873.03	2815.82	871.87	2827.65	871.28
2834.4	871.65	2846.78	872.56	2858.98	872.23	2864.94	871.99	2875.41	871.58
2875.69	871.52	2892.54	868.2	2902.47	867.94	2904.35	868	2910.19	869.97
2917.68	872.48	2925.97	872.68	2926.26	872.69	2926.39	872.67	2926.85	872.69
2945.97	872.62	2950.95	873.79	2958.3	875.6	2962.9	875.33	2969.14	875.32
2973.63	875.28	2994.34	877.35	2999.09	878.45	3005.92	880.72	3024.48	884.4
3027.92	884.5	3040.29	887.2	3056.29	891.49	3063.41	893.1	3077.66	896.02
3093.41	902.55	3119.16	910.78	3126.4	913.25	3146.88	918.61	3163.33	922.35

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 3183.02  928.71 3190.34  931.32 3202.82  932.71 3248.19  937.72 3259.01  939.44
 3261.27  939.99 3262.99  942.68 3263.66  943.73 3265.67  943.88 3269.51  944.17
 3270.34   945.4 3271.03  946.41  3273.5   946.4 3279.57  946.39 3292.11   949.3
 3335.82  957.75 3343.84   957.8  3347.9  957.85 3350.63  957.87 3351.38  958.73
 3353.25  960.42 3355.38  960.74 3355.92  960.74 3362.83  961.22 3365.03  961.25
 3366.42  961.28 3368.25  961.35 3369.61  961.41 3376.09  962.15 3380.86  963.01
 3385.43  962.16 3390.19  961.22  3403.4  961.33 3424.35  961.52 3428.82  961.16
 3435.26  961.14  3449.7  960.89  3456.9  960.73 3466.66  960.51 3471.22  960.32

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06 2541.15     .04 2627.64     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2541.15 2627.64         570.1185  660.83638.4525             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2200.12     895       F

CROSS SECTION OUTPUT  Profile #2-yr
**************************************************************************************************
* E.G. Elev (ft)         *  873.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *          *   0.040  *   0.120  *
* W.S. Elev (ft)         *  872.87  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  869.06  * Flow Area (sq ft)      *          *  727.59  *  286.99  *
* E.G. Slope (ft/ft)     *0.002594  * Area (sq ft)           *          *  727.59  *  286.99  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *          * 5642.23  *  227.77  *
* Top Width (ft)         *  290.56  * Top Width (ft)         *          *   81.78  *  208.78  *
* Vel Total (ft/s)       *    5.79  * Avg. Vel. (ft/s)       *          *    7.75  *    0.79  *
* Max Chl Dpth (ft)      *   12.38  * Hydr. Depth (ft)       *          *    8.90  *    1.37  *
* Conv. Total (cfs)      *115243.1  * Conv. (cfs)            *          *110771.4  *  4471.7  *
* Length Wtd. (ft)       *  660.05  * Wetted Per. (ft)       *          *   87.70  *  210.27  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *          *    1.34  *    0.22  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *          *   10.42  *    0.18  *
* Frctn Loss (ft)        *    1.04  * Cum Volume (acre-ft)   * 1216.75  * 7628.95  * 1067.06  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  376.54  *  616.69  *  374.79  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**************************************************************************************************
* E.G. Elev (ft)         *  877.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  876.83  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  872.45  * Flow Area (sq ft)      *   68.28  * 1061.25  * 1561.19  *
* E.G. Slope (ft/ft)     *0.001870  * Area (sq ft)           * 1717.74  * 1061.25  * 1561.19  *
* Q Total (cfs)          *10900.00  * Flow (cfs)              *   95.51  * 8595.65  * 2208.83  *
* Top Width (ft)         * 1589.75  * Top Width (ft)         * 1141.80  *   86.49  *  361.46  *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *    1.40  *    8.10  *    1.41  *
* Max Chl Dpth (ft)      *   16.34  * Hydr. Depth (ft)       *    1.04  *   12.27  *    4.32  *
* Conv. Total (cfs)      *252062.9  * Conv. (cfs)            *  2208.7  *198774.8  * 51079.4  *
* Length Wtd. (ft)       *  653.28  * Wetted Per. (ft)       *   67.44  *   93.73  *  363.49  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.12  *    1.32  *    0.50  *
* Alpha                  *    3.18  * Stream Power (lb/ft s) *    0.17  *   10.71  *    0.71  *
* Frctn Loss (ft)        *    0.85  * Cum Volume (acre-ft)   * 3613.68  *10230.41  * 3313.78  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  917.16  *  662.89  *  785.85  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**************************************************************************************************
* E.G. Elev (ft)         *  878.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
```

```
* W.S. Elev (ft)         *  877.79  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  874.00  * Flow Area (sq ft)      *  228.53  * 1144.27  * 1912.23  *
* E.G. Slope (ft/ft)     *0.001743  * Area (sq ft)           * 2966.15  * 1144.27  * 1912.23  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  238.91  * 9409.50  * 2951.60  *
* Top Width (ft)         * 2012.28  * Top Width (ft)         * 1557.20  *   86.49  *  368.58  *
* Vel Total (ft/s)       *    3.84  * Avg. Vel. (ft/s)       *    1.05  *    8.22  *    1.54  *
* Max Chl Dpth (ft)      *   17.30  * Hydr. Depth (ft)       *    0.74  *   13.23  *    5.19  *
* Conv. Total (cfs)      *301776.2  * Conv. (cfs)            *  5721.9  *225362.0  * 70692.2  *
* Length Wtd. (ft)       *  651.02  * Wetted Per. (ft)       *  308.99  *   93.73  *  370.69  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.08  *    1.33  *    0.56  *
* Alpha                  *    3.47  * Stream Power (lb/ft s) *    0.08  *   10.93  *    0.87  *
* Frctn Loss (ft)        *    0.82  * Cum Volume (acre-ft)   * 5015.39  *12010.53  * 4760.93  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         * 1050.26  *  691.30  *  964.59  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  881.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  880.53  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  876.28  * Flow Area (sq ft)      * 1160.13  * 1381.68  * 2937.42  *
* E.G. Slope (ft/ft)     *0.001373  * Area (sq ft)           * 7815.20  * 1381.68  * 2937.42  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2397.83  *11434.71  * 5267.47  *
* Top Width (ft)         * 2327.35  * Top Width (ft)         * 1863.15  *   86.49  *  377.71  *
* Vel Total (ft/s)       *    3.49  * Avg. Vel. (ft/s)       *    2.07  *    8.28  *    1.79  *
* Max Chl Dpth (ft)      *   20.04  * Hydr. Depth (ft)       *    3.40  *   15.98  *    7.78  *
* Conv. Total (cfs)      *515414.4  * Conv. (cfs)            * 64705.5  *308566.1  *142142.8  *
* Length Wtd. (ft)       *  642.28  * Wetted Per. (ft)       *  343.26  *   93.73  *  380.23  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.29  *    1.26  *    0.66  *
* Alpha                  *    3.49  * Stream Power (lb/ft s) *    0.60  *   10.46  *    1.19  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   * 8429.84  *14196.76  * 8029.63  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1314.70  *  714.59  * 1206.55  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  883.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  883.13  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  878.77  * Flow Area (sq ft)      * 2048.00  * 1606.86  * 3936.93  *
* E.G. Slope (ft/ft)     *0.001194  * Area (sq ft)           *12834.52  * 1606.86  * 3936.93  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 5764.62  *13711.52  * 7823.86  *
* Top Width (ft)         * 2481.70  * Top Width (ft)         * 2004.76  *   86.49  *  390.46  *
* Vel Total (ft/s)       *    3.60  * Avg. Vel. (ft/s)       *    2.81  *    8.53  *    1.99  *
* Max Chl Dpth (ft)      *   22.64  * Hydr. Depth (ft)       *    6.01  *   18.58  *   10.08  *
* Conv. Total (cfs)      *790147.9  * Conv. (cfs)            *166846.2  *396854.6  *226447.1  *
* Length Wtd. (ft)       *  635.85  * Wetted Per. (ft)       *  343.26  *   93.73  *  393.25  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.44  *    1.28  *    0.75  *
* Alpha                  *    3.05  * Stream Power (lb/ft s) *    1.25  *   10.90  *    1.48  *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   *13605.41  *17331.37  *13201.86  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1793.30  *  742.92  * 1693.32  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  885.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  884.64  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  879.59  * Flow Area (sq ft)      * 2560.01  * 1736.71  * 4529.36  *
* E.G. Slope (ft/ft)     *0.001134  * Area (sq ft)           *15866.94  * 1736.71  * 4529.36  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 8150.88  *15214.28  * 9464.85  *
* Top Width (ft)         * 2516.33  * Top Width (ft)         * 2028.93  *   86.49  *  400.90  *
* Vel Total (ft/s)       *    3.72  * Avg. Vel. (ft/s)       *    3.18  *    8.76  *    2.09  *
* Max Chl Dpth (ft)      *   24.15  * Hydr. Depth (ft)       *    7.51  *   20.08  *   11.30  *
* Conv. Total (cfs)      *974765.7  * Conv. (cfs)            *242010.2  *451731.8  *281023.7  *
```

```
* Length Wtd. (ft)       *  633.03  * Wetted Per. (ft)       *  343.26  *   93.73  *  403.83  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.53  *    1.31  *    0.79  *
* Alpha                  *    2.84  * Stream Power (lb/ft s) *    1.68  *   11.49  *    1.66  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   *18024.75  *19237.91  *17732.79  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 2122.84  *  750.13  * 2147.37  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  886.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  886.09  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  880.38  * Flow Area (sq ft)      * 3055.46  * 1862.37  * 5116.64  *
* E.G. Slope (ft/ft)     *0.001091  * Area (sq ft)           *18841.58  * 1862.37  * 5116.64  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *10736.26  *16764.97  *11248.76  *
* Top Width (ft)         * 2566.86  * Top Width (ft)         * 2072.81  *   86.49  *  407.56  *
* Vel Total (ft/s)       *    3.86  * Avg. Vel. (ft/s)       *    3.51  *    9.00  *    2.20  *
* Max Chl Dpth (ft)      *   25.60  * Hydr. Depth (ft)       *    8.96  *   21.53  *   12.55  *
* Conv. Total (cfs)      *1173037.0  * Conv. (cfs)           *325007.4  *507508.0  *340521.8  *
* Length Wtd. (ft)       *  630.77  * Wetted Per. (ft)       *  343.26  *   93.73  *  410.64  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.61  *    1.35  *    0.85  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    2.13  *   12.18  *    1.87  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   *22368.67  *20612.83  *22316.42  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 2349.68  *  751.08  * 2595.44  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  888.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  887.86  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  881.24  * Flow Area (sq ft)      * 3660.28  * 2015.76  * 5846.46  *
* E.G. Slope (ft/ft)     *0.001054  * Area (sq ft)           *22542.29  * 2015.76  * 5846.46  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *14259.86  *18802.90  *13637.24  *
* Top Width (ft)         * 2599.71  * Top Width (ft)         * 2098.10  *   86.49  *  415.12  *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *    3.90  *    9.33  *    2.33  *
* Max Chl Dpth (ft)      *   27.37  * Hydr. Depth (ft)       *   10.73  *   23.31  *   14.08  *
* Conv. Total (cfs)      *1438213.0  * Conv. (cfs)           *439158.9  *579070.1  *419984.1  *
* Length Wtd. (ft)       *  628.49  * Wetted Per. (ft)       *  343.26  *   93.73  *  418.41  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.70  *    1.42  *    0.92  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    2.73  *   13.20  *    2.15  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   *29621.78  *22614.75  *29833.83  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 2688.73  *  753.51  * 3025.97  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  881.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.060  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  880.88  * Reach Len. (ft)        *  570.12  *  660.83  *  638.45  *
* Crit W.S. (ft)         *  876.54  * Flow Area (sq ft)      * 1277.75  * 1411.51  * 3067.90  *
* E.G. Slope (ft/ft)     *0.001344  * Area (sq ft)           * 8459.33  * 1411.51  * 3067.90  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2786.75  *11723.73  * 5589.52  *
* Top Width (ft)         * 2337.53  * Top Width (ft)         * 1871.97  *   86.49  *  379.07  *
* Vel Total (ft/s)       *    3.49  * Avg. Vel. (ft/s)       *    2.18  *    8.31  *    1.82  *
* Max Chl Dpth (ft)      *   20.39  * Hydr. Depth (ft)       *    3.75  *   16.32  *    8.09  *
* Conv. Total (cfs)      *548201.2  * Conv. (cfs)           * 76005.0  *319749.3  *152446.9  *
* Length Wtd. (ft)       *  641.29  * Wetted Per. (ft)       *  343.26  *   93.73  *  381.63  *
* Min Ch El (ft)         *  860.49  * Shear (lb/sq ft)       *    0.31  *    1.26  *    0.67  *
* Alpha                  *    3.43  * Stream Power (lb/ft s) *    0.68  *   10.50  *    1.23  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   * 9511.43  *15169.13  * 9179.37  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1424.33  *  724.91  * 1289.51  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 33.041

INPUT
Description:
Station Elevation Data num= 330

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	913.15	58.44	913.15	71.64	912.92	75.44	912.71	81.18	912.38
133.27	909.12	136.12	909.52	143.57	910.58	150.55	909.99	161.52	909.12
200.88	907.52	222.35	906.64	230.1	905.65	236.85	904.5	247.39	905.83
249.43	906.07	253.63	905.75	297.99	902.06	314.81	900.74	319.15	900.43
321.19	900.51	335.68	901.19	349.89	899.91	353.51	899.49	376.24	898.66
416.88	896.88	439.38	895.54	460.84	890.3	462.8	889.78	466.4	890.82
478.47	894.15	483.4	893.63	491.11	892.99	500.49	891.9	507.46	891.27
521.81	889.43	525.04	889.04	526.3	888.86	539.99	889.62	546.87	890.01
547.35	889.9	557.2	888.25	572.24	888.11	592.19	886.61	596.42	886.44
614.87	885.74	620.89	885.43	626.37	885.45	634.26	885.48	647.34	884.89
667.62	883.92	682.91	883.18	709.89	881.66	712.08	881.49	736.33	881.39
766.06	880.73	779.12	880.36	788.01	880.31	797.7	880.28	829.94	880.13
840.41	878.21	844.11	877.54	851.11	878.86	858.02	880.13	866.25	879.92
873.54	879.73	874.98	880.31	878.43	881.75	888.3	880.92	888.67	880.89
888.91	880.89	892.91	880.75	895.32	881.32	896.07	881.49	899.85	882.38
905.15	882.32	926.61	877.45	928.91	877.02	932.98	876.26	935.19	876.26
935.94	876.26	936.28	876.26	941.38	875.45	956.62	873	960.9	871.49
961.71	871.31	975	876	975.21	876.08	975.39	876.08	977.07	876.05
1027.9	875.18	1050.95	874.82	1075.89	874.68	1151.86	874.72	1201.84	874.61
1224.27	874.6	1254.86	873.29	1256.49	873.18	1261.99	873.36	1282.2	874
1296.09	874.44	1335.23	873.59	1352.51	873.21	1358.89	873.39	1363.54	873.32
1391.86	873.49	1396.25	873.62	1406.74	874.31	1419.95	874.22	1429.9	874.1
1452.96	874.27	1454.98	874.29	1474.32	874.08	1480.03	874.11	1500.36	873.97
1502.22	873.97	1515.52	873.88	1515.93	873.89	1518.38	873.95	1522.81	874.08
1526.49	874.13	1547.33	874.39	1564.37	874.07	1576.02	873.77	1580.65	873.99
1588.11	874.42	1598.49	874.59	1613.43	874.84	1646.33	875.05	1650.6	875.08
1654.56	875.15	1668.29	875.19	1684.36	875.34	1689.18	875.35	1718.14	875.33
1730.43	875.34	1752.95	875.14	1770.94	874.38	1789.39	875.21	1793.62	875.32
1795.9	875.25	1806.46	874.92	1812.09	875.33	1821.64	875.98	1847.99	875.78
1850.42	875.78	1853.1	875.77	1869.62	875.65	1887.03	875.63	1897.79	875.48
1904.43	875.5	1916.15	875.28	1924.37	875.38	1941.73	875.6	1944	875.63
1944.63	875.65	1962.15	875.98	1963.46	875.99	1967.07	876.29	1972.51	876.76
1973.86	876.84	1974.99	876.92	1983.41	876.82	1988	876.36	1991.64	876.55
1994.22	876.73	1994.51	876.75	1994.83	876.77	1995.03	876.78	1995.16	876.78
1995.32	876.79	1995.61	876.78	1996.03	876.77	2009.74	876.34	2012.42	876.31
2021.47	876.11	2026.75	875.99	2030.3	875.91	2043.65	875.51	2060.13	875.61
2081.82	875.72	2091.33	875.64	2107.18	875.85	2111.74	875.86	2123.11	875.91
2145.14	875.87	2152.26	875.79	2157.08	875.76	2197.32	875.61	2198.46	875.61
2231.25	875.53	2239.35	875.55	2268.64	876.35	2275.41	876.73	2283.29	875.75
2292.73	875.29	2313.52	875.54	2316.35	875.78	2330.34	875.37	2333.58	875.27
2335.5	875.25	2337.23	875.24	2366.11	875.19	2384.92	875.84	2386.32	875.83
2387.82	875.87	2408.47	875.56	2425.1	875.73	2438.6	875.89	2443.69	875.84
2445.94	875.82	2451.7	875.78	2458.92	875.73	2471.68	875.98	2472.27	876.03
2476.85	876.15	2480.11	876.24	2485.49	876.18	2491.68	876.19	2512.07	876.83
2518.17	876.94	2537.3	877.25	2551.41	877.25	2554.64	877.23	2569.96	872.96
2570.06	872.93	2570.1	872.94	2570.29	872.97	2575.91	873.94	2579.13	874.86
2580.74	875.46	2608.07	875.63	2614.85	875.67	2616.93	875.69	2617.37	875.61
2635.26	872.76	2641.26	872.3	2645.91	872.32	2663.35	873.09	2666.84	873.42
2682	873.18	2683.93	873.15	2685.57	873.16	2695.24	873.04	2703.73	873.3
2712.29	873.63	2713.59	873.65	2714.75	873.66	2721.81	873.35	2724.1	873.07
2734.35	872.38	2736.72	872.17	2743.6	871.55	2746.37	871.5	2758.61	871.36
2765.24	871.38	2771.22	871.3	2775.14	871.24	2777.15	871.21	2785.01	871.73
2794.55	872.39	2800.83	872.14	2826.83	871.82	2828.75	871.94	2828.86	871.94
2832.14	871.52	2835.12	871.14	2835.32	871.11	2835.43	871.11	2838.05	871.05
2841.68	870.93	2842.57	870.89	2851.08	870.43	2852.34	870.37	2864.07	869.77
2865.53	869.71	2866.74	869.66	2874.11	868.32	2891.54	865.14	2892.16	865.14
2894.88	865.14	2901.96	865.14	2903.68	864.89	2911.63	863.69	2925.04	862.25
2929.02	861.67	2938	860	2959	858.97	2980	860	2983.56	862.14
2983.65	862.14	2985.36	863.42	2992.15	868.43	2995.62	870.98	3004.26	875.29
3005.45	875.85	3006.17	875.97	3010.79	876.76	3015.87	878.16	3019.37	879.01
3024.33	880.1	3031.09	881.24	3033.24	881.74	3036.22	882.95	3055.82	889.17
3061.84	891.23	3064.22	892.08	3077.86	897.44	3091.66	900.96	3093.62	901.4
3115.62	907.92	3130.95	912.45	3167	922.08	3168.81	922.48	3170.62	922.92
3182.28	925.58	3204.77	925.98	3206.12	926.05	3207.44	926.46	3221.26	930.73

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 3228.35  931.28  3244.5  941.39 3244.91  941.64 3245.36  941.68  3251.5  946.66
 3262.08  943.86 3272.74   950.3  3276.2  952.36 3287.68  951.55 3292.49  951.22

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .06 2608.07      .1 2901.96     .04 2995.62     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2866.74 2995.62         721.3185  738.97859.2255             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2547.29     895       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  872.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.100  *   0.043  *   0.120  *
* W.S. Elev (ft)         *  872.19  * Reach Len. (ft)        *  721.32  *  738.97  *  859.23  *
* Crit W.S. (ft)         *  866.50  * Flow Area (sq ft)      *  102.06  * 1174.74  *    1.46  *
* E.G. Slope (ft/ft)     *0.001059  * Area (sq ft)           *  104.48  * 1174.74  *    1.46  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *   44.58  * 5825.03  *    0.39  *
* Top Width (ft)         *  258.79  * Top Width (ft)         *  127.49  *  128.88  *    2.42  *
* Vel Total (ft/s)       *    4.59  * Avg. Vel. (ft/s)       *    0.44  *    4.96  *    0.27  *
* Max Chl Dpth (ft)      *   13.22  * Hydr. Depth (ft)       *    0.84  *    9.11  *    0.60  *
* Conv. Total (cfs)      *180356.7  * Conv. (cfs)            *  1369.8  *178974.9  *    12.0  *
* Length Wtd. (ft)       *  739.18  * Wetted Per. (ft)       *  122.37  *  133.22  *    2.71  *
* Min Ch El (ft)         *  858.97  * Shear (lb/sq ft)       *    0.06  *    0.58  *    0.04  *
* Alpha                  *    1.16  * Stream Power (lb/ft s) *    0.02  *    2.89  *    0.01  *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   * 1216.07  * 7614.52  * 1064.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  375.70  *  615.09  *  373.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  876.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.098  *   0.044  *   0.120  *
* W.S. Elev (ft)         *  876.23  * Reach Len. (ft)        *  721.32  *  738.97  *  859.23  *
* Crit W.S. (ft)         *  868.98  * Flow Area (sq ft)      * 1055.31  * 1695.29  *   27.91  *
* E.G. Slope (ft/ft)     *0.000951  * Area (sq ft)           * 2899.94  * 1695.29  *   27.91  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 1168.85  * 9713.61  *   17.54  *
* Top Width (ft)         * 1938.90  * Top Width (ft)         * 1797.97  *  128.88  *   12.05  *
* Vel Total (ft/s)       *    3.92  * Avg. Vel. (ft/s)       *    1.11  *    5.73  *    0.63  *
* Max Chl Dpth (ft)      *   17.26  * Hydr. Depth (ft)       *    3.42  *   13.15  *    2.32  *
* Conv. Total (cfs)      *353461.0  * Conv. (cfs)            * 37903.0  *314989.2  *   568.8  *
* Length Wtd. (ft)       *  739.42  * Wetted Per. (ft)       *  309.80  *  133.22  *   13.22  *
* Min Ch El (ft)         *  858.97  * Shear (lb/sq ft)       *    0.20  *    0.76  *    0.13  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.22  *    4.33  *    0.08  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   * 3583.46  *10209.50  * 3302.13  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  897.93  *  661.25  *  783.11  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  877.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.097  *   0.044  *   0.120  *
* W.S. Elev (ft)         *  877.19  * Reach Len. (ft)        *  721.32  *  738.97  *  859.23  *
* Crit W.S. (ft)         *  869.71  * Flow Area (sq ft)      * 1354.92  * 1819.75  *   42.07  *
* E.G. Slope (ft/ft)     *0.000945  * Area (sq ft)           * 4703.35  * 1819.75  *   42.07  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1752.49  *10819.33  *   28.18  *
* Top Width (ft)         * 2063.35  * Top Width (ft)         * 1917.73  *  128.88  *   16.74  *
* Vel Total (ft/s)       *    3.92  * Avg. Vel. (ft/s)       *    1.29  *    5.95  *    0.67  *
* Max Chl Dpth (ft)      *   18.22  * Hydr. Depth (ft)       *    4.34  *   14.12  *    2.51  *
* Conv. Total (cfs)      *409957.3  * Conv. (cfs)            * 57019.5  *352020.8  *   917.0  *
* Length Wtd. (ft)       *  738.95  * Wetted Per. (ft)       *  313.40  *  133.22  *   18.02  *
* Min Ch El (ft)         *  858.97  * Shear (lb/sq ft)       *    0.25  *    0.81  *    0.14  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    0.33  *    4.79  *    0.09  *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)   * 4965.20  *11988.05  * 4746.61  *
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* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1027.52  *  689.67  *  961.76  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  880.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.094  *   0.045  *   0.120  *
* W.S. Elev (ft)         *  879.81  * Reach Len. (ft)        *  721.32  *  738.97  *  859.23  *
* Crit W.S. (ft)         *  872.23  * Flow Area (sq ft)      * 2191.01  * 2157.23  *   99.15  *
* E.G. Slope (ft/ft)     *0.001049  * Area (sq ft)           * 9822.70  * 2157.23  *   99.15  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 4093.32  *14916.44  *   90.25  *
* Top Width (ft)         * 2134.72  * Top Width (ft)         * 1978.45  *  128.88  *   27.39  *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *    1.87  *    6.91  *    0.91  *
* Max Chl Dpth (ft)      *   20.84  * Hydr. Depth (ft)       *    6.86  *   16.74  *    3.62  *
* Conv. Total (cfs)      *589842.8  * Conv. (cfs)            *126409.1  *460646.7  *  2787.0  *
* Length Wtd. (ft)       *  739.01  * Wetted Per. (ft)       *  320.88  *  133.22  *   28.99  *
* Min Ch El (ft)         *  858.97  * Shear (lb/sq ft)       *    0.45  *    1.06  *    0.22  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.84  *    7.33  *    0.20  *
* Frctn Loss (ft)        *    0.85  * Cum Volume (acre-ft)   * 8314.42  *14169.92  * 8007.38  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1289.56  *  712.96  * 1203.59  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  882.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.093  *   0.045  *   0.120  *
* W.S. Elev (ft)         *  882.22  * Reach Len. (ft)        *  721.32  *  738.97  *  859.23  *
* Crit W.S. (ft)         *  875.15  * Flow Area (sq ft)      * 2960.35  * 2467.62  *  180.43  *
* E.G. Slope (ft/ft)     *0.001204  * Area (sq ft)           *14842.20  * 2467.62  *  180.43  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 7290.30  *19800.44  *  209.26  *
* Top Width (ft)         * 2328.03  * Top Width (ft)         * 2160.35  *  128.88  *   38.80  *
* Vel Total (ft/s)       *    4.87  * Avg. Vel. (ft/s)       *    2.46  *    8.02  *    1.16  *
* Max Chl Dpth (ft)      *   23.25  * Hydr. Depth (ft)       *    9.27  *   19.15  *    4.65  *
* Conv. Total (cfs)      *786893.3  * Conv. (cfs)            *210135.1  *570726.4  *  6031.7  *
* Length Wtd. (ft)       *  739.19  * Wetted Per. (ft)       *  320.88  *  133.22  *   40.67  *
* Min Ch El (ft)         *  858.97  * Shear (lb/sq ft)       *    0.69  *    1.39  *    0.33  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    1.71  *   11.17  *    0.39  *
* Frctn Loss (ft)        *    0.97  * Cum Volume (acre-ft)   *13424.29  *17300.46  *13171.69  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1766.05  *  741.29  * 1690.18  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  884.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.092  *   0.045  *   0.120  *
* W.S. Elev (ft)         *  883.60  * Reach Len. (ft)        *  721.32  *  738.97  *  859.23  *
* Crit W.S. (ft)         *  876.54  * Flow Area (sq ft)      * 3402.85  * 2646.14  *  236.68  *
* E.G. Slope (ft/ft)     *0.001293  * Area (sq ft)           *17860.13  * 2646.14  *  236.68  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 9561.27  *22949.00  *  319.73  *
* Top Width (ft)         * 2364.14  * Top Width (ft)         * 2192.60  *  128.88  *   42.66  *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *    2.81  *    8.67  *    1.35  *
* Max Chl Dpth (ft)      *   24.63  * Hydr. Depth (ft)       *   10.65  *   20.53  *    5.55  *
* Conv. Total (cfs)      *913107.0  * Conv. (cfs)            *265929.4  *638284.8  *  8892.8  *
* Length Wtd. (ft)       *  739.35  * Wetted Per. (ft)       *  320.88  *  133.22  *   44.78  *
* Min Ch El (ft)         *  858.97  * Shear (lb/sq ft)       *    0.86  *    1.60  *    0.43  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    2.40  *   13.90  *    0.58  *
* Frctn Loss (ft)        *    1.02  * Cum Volume (acre-ft)   *17804.04  *19204.66  *17697.86  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 2095.21  *  748.50  * 2144.11  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	885.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.	0.092	0.046	0.120
W.S. Elev (ft)	884.94	Reach Len. (ft)	721.32	738.97	859.23
Crit W.S. (ft)	877.64	Flow Area (sq ft)	3830.73	2818.76	296.65
E.G. Slope (ft/ft)	0.001379	Area (sq ft)	20815.59	2818.76	296.65
Q Total (cfs)	38750.00	Flow (cfs)	12063.48	26234.69	451.84
Top Width (ft)	2396.36	Top Width (ft)	2220.60	128.88	46.88
Vel Total (ft/s)	5.58	Avg. Vel. (ft/s)	3.15	9.31	1.52
Max Chl Dpth (ft)	25.97	Hydr. Depth (ft)	11.99	21.87	6.33
Conv. Total (cfs)	1043500.0	Conv. (cfs)	324857.8	706474.8	12167.6
Length Wtd. (ft)	739.46	Wetted Per. (ft)	320.88	133.22	49.21
Min Ch El (ft)	858.97	Shear (lb/sq ft)	1.03	1.82	0.52
Alpha	1.98	Stream Power (lb/ft s)	3.24	16.95	0.79
Frctn Loss (ft)	1.08	Cum Volume (acre-ft)	22109.15	20577.32	22276.75
C & E Loss (ft)	0.04	Cum SA (acres)	2321.58	749.45	2592.11

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	887.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.092	0.046	0.120
W.S. Elev (ft)	886.58	Reach Len. (ft)	721.32	738.97	859.23
Crit W.S. (ft)	878.88	Flow Area (sq ft)	4353.48	3029.67	377.59
E.G. Slope (ft/ft)	0.001481	Area (sq ft)	24496.00	3029.67	377.59
Q Total (cfs)	46700.00	Flow (cfs)	15514.31	30532.81	652.88
Top Width (ft)	2454.73	Top Width (ft)	2273.81	128.88	52.04
Vel Total (ft/s)	6.02	Avg. Vel. (ft/s)	3.56	10.08	1.73
Max Chl Dpth (ft)	27.61	Hydr. Depth (ft)	13.63	23.51	7.26
Conv. Total (cfs)	1213696.0	Conv. (cfs)	403204.5	793523.3	16967.9
Length Wtd. (ft)	739.63	Wetted Per. (ft)	320.88	133.22	54.62
Min Ch El (ft)	858.97	Shear (lb/sq ft)	1.25	2.10	0.64
Alpha	1.95	Stream Power (lb/ft s)	4.47	21.18	1.10
Frctn Loss (ft)	1.14	Cum Volume (acre-ft)	29313.95	22576.48	29788.22
C & E Loss (ft)	0.04	Cum SA (acres)	2660.12	751.87	3022.55

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	880.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.094	0.045	0.120
W.S. Elev (ft)	880.14	Reach Len. (ft)	721.32	738.97	859.23
Crit W.S. (ft)	872.74	Flow Area (sq ft)	2295.03	2199.20	108.31
E.G. Slope (ft/ft)	0.001069	Area (sq ft)	10469.92	2199.20	108.31
Q Total (cfs)	20100.00	Flow (cfs)	4469.14	15528.92	101.94
Top Width (ft)	2155.80	Top Width (ft)	1998.00	128.88	28.93
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)	1.95	7.06	0.94
Max Chl Dpth (ft)	21.17	Hydr. Depth (ft)	7.18	17.06	3.74
Conv. Total (cfs)	614783.2	Conv. (cfs)	136694.1	474971.2	3117.9
Length Wtd. (ft)	739.01	Wetted Per. (ft)	320.88	133.22	30.56
Min Ch El (ft)	858.97	Shear (lb/sq ft)	0.48	1.10	0.24
Alpha	2.06	Stream Power (lb/ft s)	0.93	7.78	0.22
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	9387.55	15141.74	9156.10
C & E Loss (ft)	0.04	Cum SA (acres)	1399.00	723.28	1286.52

Warning: Divided flow computed for this cross-section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 32.901

INPUT
Description:
Station Elevation Data num= 379

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	911.31	7.93	912.39	13.51	910.89	16.49	909.96	17.37	911.08
22.39	911.74	29.51	913	33.74	913.31	37.19	914.14	40.31	914.24
82.85	913.93	90.66	912.8	101.09	913.85	102.41	913.24	110.8	905.7
116.25	904.97	116.4	904.95	116.76	904.82	137.9	901.83	141.41	900.56
147.29	898.42	149.15	898.51	150.02	898.49	155.06	898.55	156.98	898.53
166.7	898.51	168.14	898.49	171.38	897.38	176.7	897.52	179.47	897.37
185.08	897.06	195.93	896.64	204.49	896.14	210.31	895.65	229.58	893.63
232.25	893.63	232.43	893.63	232.7	893.63	232.93	893.63	233.46	893.63
234.08	893.63	250.76	893.63	252.26	893.63	262.46	893.63	265.44	893.63
268.23	893.63	278.26	893.63	282.63	894.38	285.36	894.61	293.47	895.42
294.68	894.2	312.96	893.65	313.09	893.64	313.16	893.64	313.44	893.63
327.63	893.99	336.76	894.32	345.59	894.58	355.98	894.92	360.39	894.97
361.56	894.95	364.03	894.87	380.38	894.67	397.27	892.84	417.03	891.53
479.56	890.79	487.65	889.61	498.68	890.1	537.57	889.49	546.17	889.39
565.32	887.2	587.83	885.38	602.76	882.93	629.82	882.89	647.27	883.57
649.07	883.56	652.33	883.57	666.09	882.87	706.4	881.26	719.1	881.01
732.89	880.89	753.03	880.27	771.96	878.22	779.7	877.37	783.5	877.44
801.08	877.75	812.94	871.25	822.94	868.65	839.25	866.3	847.6	866.26
886.29	873.56	887.2	873.72	889.54	874.12	890.84	874.36	893.42	874.85
905.04	877.37	929.51	879.7	949.1	881.35	956.26	881.89	957.48	882.02
960.93	888.27	971.06	882.3	1037.17	880.51	1040.86	879.78	1041.88	879.6
1043.33	879.6	1046.33	879.6	1050.24	879.61	1135.87	879.16	1145.4	879.37
1164.82	879.81	1174.32	876.98	1175.49	876.34	1180.78	876.53	1187.11	876.77
1188.05	876.82	1190.07	876.92	1197.19	877.3	1199.75	877.55	1207.13	878.29
1208.11	878.39	1215.56	879.84	1216.16	879.95	1216.2	879.95	1223.66	879.96
1225.37	879.72	1228.76	879.23	1230.39	879.11	1231.62	879.02	1235.64	879.12
1239.47	879.22	1240.44	879.07	1241.92	878.83	1242.67	878.83	1246.51	878.82
1252.76	878.81	1261.34	876.2	1282.11	869.89	1284.2	869.78	1284.6	869.76
1287.43	869.82	1296.68	869.98	1306.32	873.51	1312.09	875.57	1321.88	875.48
1354.31	875.23	1359.83	875.21	1379.74	875.16	1410.25	874.94	1422.74	874.89
1435.69	874.73	1453.29	874.36	1473.22	873.99	1476.17	873.93	1478.13	873.9
1487.34	873.71	1492.76	873.6	1496.43	873.36	1497.19	873.31	1497.63	873.32
1515.2	873.58	1528.98	873.77	1548.58	873.76	1555.5	873.76	1568.47	873.39
1579.2	873.14	1582.61	873.07	1607.9	873.34	1621.22	873.45	1622.97	873.44
1625.53	873.4	1628.01	873.36	1635.7	873.55	1635.81	873.55	1644.68	873.59
1658.41	873.62	1682.12	873.46	1694.59	873.36	1696.74	873.38	1700.61	873.12
1702.76	872.98	1707.74	873.28	1710.55	873.45	1720.29	873.38	1757.67	873.74
1758.43	873.75	1758.62	873.75	1759.49	873.74	1787.05	873.53	1793.93	873.53
1827.66	873.32	1852.52	873.46	1865.34	873.51	1874.66	873.51	1885.95	873.35
1893.46	872.92	1894.55	872.85	1897.33	872.67	1898.88	872.57	1902.9	872.84
1904.42	872.95	1925.9	873.35	1926.18	873.36	1926.94	873.37	1969.97	873.78
1979.1	873.75	2012.53	873.38	2021.07	873.19	2036.74	873.02	2047.66	873.32
2058.05	873.61	2073.61	873.36	2079.96	873.26	2092.67	873.75	2093.4	873.75
2108.35	872.55	2109.64	872.62	2116.75	873.03	2119.86	872.97	2124.94	872.86
2164.71	873.76	2164.97	873.77	2165.17	873.77	2165.38	873.77	2195.11	873.84
2200.91	873.9	2232.05	874.13	2258.5	873.97	2263.31	873.94	2277.36	873.97
2293.87	873.99	2297.41	874.04	2318.87	874.18	2320.12	874.2	2331.37	874.43
2335.48	874.33	2349.27	874.39	2366.23	874.34	2383.45	874.48	2388.03	874.55
2391.06	875.61	2392.67	876.22	2396.64	876.36	2400.21	876.48	2401.92	875.96
2404.57	875.1	2415.44	874.89	2432.75	874.46	2457.51	874.67	2471.37	874.7
2478	874.67	2497.46	874.65	2513.21	874.76	2526.06	874.85	2546.76	874.77
2547.14	874.78	2547.44	874.79	2551.57	874.95	2569.98	875.13	2585.57	875.25
2618.17	875.42	2646.23	875.65	2661.46	875.55	2683.4	875.11	2686.23	875.1
2692.02	875.98	2695.21	876.48	2696.66	876.4	2702.06	876.05	2704.58	875.83
2706.93	875.62	2708.79	875.36	2712.31	874.87	2714.2	875.15	2717.61	875.66
2737.63	875.35	2739.96	875.32	2740.53	875.31	2740.8	875.3	2742.2	875.24
2746.26	875.08	2747.06	875.04	2750.6	876.21	2752.85	876.95	2755.31	876.74
2771.07	876.02	2772.84	875.97	2774.77	876.14	2777.92	876.4	2781.26	876.43
2785.38	876.25	2788.91	875.73	2798.17	873.6	2806.71	871.75	2811.25	871.39
2819.32	870.95	2834.38	871.17	2836.71	871.16	2840.46	871.14	2844.65	871.11
2851.48	871.07	2858.02	871.03	2861.81	871	2862.66	870.23	2864.9	868.37
2869.64	864.53	2874.2	860.68	2880	858	2907	857.26	2935	858
2940.42	859.97	2947.7	863.09	2952.78	864.99	2962.07	868.48	2964.18	869.28
2964.59	869.44	2965.29	869.66	2969.68	869.63	2978.68	869.73	2984.92	869.82
2986.7	869.83	2994.79	870.28	2997.79	870.47	3007.18	871.52	3015.02	873.28
3023.82	875.97	3037.86	875.5	3050.61	874.78	3059.88	875.33	3085.79	876.67
3098.47	877.72	3117.24	879.44	3124.61	880.98	3128.82	881.84	3157.02	885.11

```
 3157.99  885.15 3165.14   886.7 3181.14   890.1 3187.44  891.24 3199.07  891.98
 3204.14  892.26 3210.59  892.09 3218.93  894.58 3225.04  896.82 3227.11  897.69
 3231.39  899.51  3233.8  901.01 3235.22   901.8 3238.45  902.19 3247.99  903.45
 3248.85  903.58 3254.38  904.42 3259.82  907.96  3259.9  908.01 3260.06  908.05
 3271.22  910.63 3271.99  910.63 3272.19  910.63 3305.55  910.91 3307.94  910.92
 3321.45  911.11 3322.63  913.15 3324.04  915.69  3327.4  916.37 3329.95  916.92
 3335.94  916.44 3337.11  916.35  3337.7  916.45 3341.78  917.18 3342.54  918.26
 3343.21  919.04 3343.31  919.07 3346.19  917.72 3358.03  919.84 3359.64  919.39
 3364.75  921.84 3365.81  922.15 3368.65   922.6 3376.61  923.24

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .06 2702.06      .1 2861.81     .04 2965.29     .11

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2861.81 2965.29          743.946  618.61572.7645              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2535.18     892       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  871.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.100  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  871.44  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  864.14  * Flow Area (sq ft)      *   17.52  * 1127.70  *   55.59  *
* E.G. Slope (ft/ft)     *0.000872  * Area (sq ft)           *  241.11  * 1127.70  *   55.59  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    3.76  * 5839.18  *   27.06  *
* Top Width (ft)         *  281.96  * Top Width (ft)         *  137.31  *  103.48  *   41.17  *
* Vel Total (ft/s)       *    4.89  * Avg. Vel. (ft/s)       *    0.21  *    5.18  *    0.49  *
* Max Chl Dpth (ft)      *   14.18  * Hydr. Depth (ft)       *    0.34  *   10.90  *    1.35  *
* Conv. Total (cfs)      *198736.1  * Conv. (cfs)            *   127.3  *197692.5  *   916.2  *
* Length Wtd. (ft)       *  618.41  * Wetted Per. (ft)       *   51.21  *  110.00  *   41.25  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.02  *    0.56  *    0.07  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *    0.00  *    2.89  *    0.04  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   * 1213.21  * 7594.99  * 1064.39  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  373.51  *  613.12  *  372.81  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  875.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.099  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  875.26  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  867.13  * Flow Area (sq ft)      *  270.57  * 1522.86  *  248.31  *
* E.G. Slope (ft/ft)     *0.001004  * Area (sq ft)           * 2568.37  * 1522.86  *  248.31  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  285.77  *10336.79  *  277.44  *
* Top Width (ft)         * 1628.87  * Top Width (ft)         * 1452.64  *  103.48  *   72.75  *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)       *    1.06  *    6.79  *    1.12  *
* Max Chl Dpth (ft)      *   18.00  * Hydr. Depth (ft)       *    1.86  *   14.72  *    3.41  *
* Conv. Total (cfs)      *343937.6  * Conv. (cfs)            *  9017.3  *326166.1  *  8754.2  *
* Length Wtd. (ft)       *  619.56  * Wetted Per. (ft)       *  146.12  *  110.00  *   73.35  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.12  *    0.87  *    0.21  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    0.12  *    5.89  *    0.24  *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   * 3538.19  *10182.20  * 3299.41  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  871.01  *  659.28  *  782.28  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  876.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *   0.093  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  876.11  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  867.97  * Flow Area (sq ft)      *  478.21  * 1610.90  *  326.59  *
* E.G. Slope (ft/ft)     *0.001084  * Area (sq ft)           * 3921.21  * 1610.90  *  326.59  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  505.65  *11794.99  *  299.36  *
* Top Width (ft)         * 1860.40  * Top Width (ft)         * 1647.26  *  103.48  *  109.66  *
```

```
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *    1.06  *    7.32  *    0.92  *
* Max Chl Dpth (ft)      *   18.85  * Hydr. Depth (ft)       *    1.66  *   15.57  *    2.98  *
* Conv. Total (cfs)      *382640.9  * Conv. (cfs)            * 15355.7  *358194.2  *  9091.1  *
* Length Wtd. (ft)       *  621.96  * Wetted Per. (ft)       *  288.52  *  110.00  *  110.40  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.11  *    0.99  *    0.20  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.12  *    7.26  *    0.18  *
* Frctn Loss (ft)        *    0.69  * Cum Volume (acre-ft)   * 4893.79  *11958.95  * 4742.97  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  998.00  *  687.70  *  960.52  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  879.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.080  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  878.49  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  870.90  * Flow Area (sq ft)      * 1244.50  * 1857.27  *  630.10  *
* E.G. Slope (ft/ft)     *0.001280  * Area (sq ft)           * 8050.67  * 1857.27  *  630.10  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2035.70  *16243.70  *  820.60  *
* Top Width (ft)         * 2039.79  * Top Width (ft)         * 1794.72  *  103.48  *  141.59  *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *    1.64  *    8.75  *    1.30  *
* Max Chl Dpth (ft)      *   21.23  * Hydr. Depth (ft)       *    3.81  *   17.95  *    4.45  *
* Conv. Total (cfs)      *533919.3  * Conv. (cfs)            * 56905.7  *454074.6  * 22938.9  *
* Length Wtd. (ft)       *  631.41  * Wetted Per. (ft)       *  327.76  *  110.00  *  142.42  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.30  *    1.35  *    0.35  *
* Alpha                  *    2.50  * Stream Power (lb/ft s) *    0.50  *   11.80  *    0.46  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   * 8166.43  *14135.87  * 8000.19  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1258.32  *  710.99  * 1201.92  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  881.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.078  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  880.76  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  874.07  * Flow Area (sq ft)      * 1984.78  * 2091.80  *  973.71  *
* E.G. Slope (ft/ft)     *0.001423  * Area (sq ft)           *12416.49  * 2091.80  *  973.71  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4758.12  *20882.95  * 1658.94  *
* Top Width (ft)         * 2300.33  * Top Width (ft)         * 2038.59  *  103.48  *  158.25  *
* Vel Total (ft/s)       *    5.41  * Avg. Vel. (ft/s)       *    2.40  *    9.98  *    1.70  *
* Max Chl Dpth (ft)      *   23.50  * Hydr. Depth (ft)       *    6.08  *   20.21  *    6.15  *
* Conv. Total (cfs)      *723724.3  * Conv. (cfs)            *126137.9  *553607.8  * 43978.5  *
* Length Wtd. (ft)       *  640.05  * Wetted Per. (ft)       *  327.76  *  110.00  *  159.26  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.54  *    1.69  *    0.54  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *    1.29  *   16.86  *    0.93  *
* Frctn Loss (ft)        *    0.85  * Cum Volume (acre-ft)   *13198.60  *17261.79  *13160.30  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1731.28  *  739.32  * 1688.23  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  883.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *   0.078  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  882.09  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  875.77  * Flow Area (sq ft)      * 2419.37  * 2229.48  * 1188.68  *
* E.G. Slope (ft/ft)     *0.001486  * Area (sq ft)           *15214.15  * 2229.48  * 1188.68  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 6806.51  *23731.40  * 2292.09  *
* Top Width (ft)         * 2423.87  * Top Width (ft)         * 2154.72  *  103.48  *  165.66  *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *    2.81  *   10.64  *    1.93  *
* Max Chl Dpth (ft)      *   24.83  * Hydr. Depth (ft)       *    7.41  *   21.55  *    7.18  *
* Conv. Total (cfs)      *851704.9  * Conv. (cfs)            *176580.4  *615660.9  * 59463.5  *
* Length Wtd. (ft)       *  644.20  * Wetted Per. (ft)       *  327.76  *  110.00  *  166.80  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.68  *    1.88  *    0.66  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *    1.93  *   20.01  *    1.27  *
* Frctn Loss (ft)        *    0.88  * Cum Volume (acre-ft)   *17530.19  *19163.30  *17683.80  *
```

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* C & E Loss (ft)        *    0.11  * Cum SA (acres)         * 2059.22  *  746.53  * 2142.06  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  884.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *   0.077  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  883.38  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  878.68  * Flow Area (sq ft)      * 2840.31  * 2362.84  * 1409.34  *
* E.G. Slope (ft/ft)     *0.001546  * Area (sq ft)           *18038.14  * 2362.84  * 1409.34  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 9111.51  *26665.09  * 2973.40  *
* Top Width (ft)         * 2517.17  * Top Width (ft)         * 2236.91  *  103.48  *  176.78  *
* Vel Total (ft/s)       *    5.86  * Avg. Vel. (ft/s)       *    3.21  *   11.29  *    2.11  *
* Max Chl Dpth (ft)      *   26.12  * Hydr. Depth (ft)       *    8.70  *   22.83  *    7.97  *
* Conv. Total (cfs)      *985647.6  * Conv. (cfs)            *231760.9  *678255.1  * 75631.7  *
* Length Wtd. (ft)       *  647.65  * Wetted Per. (ft)       *  327.76  *  110.00  *  177.99  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.84  *    2.07  *    0.76  *
* Alpha                  *    2.63  * Stream Power (lb/ft s) *    2.68  *   23.39  *    1.61  *
* Frctn Loss (ft)        *    0.91  * Cum Volume (acre-ft)   *21787.45  *20533.37  *22259.92  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         * 2284.68  *  747.48  * 2589.90  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  886.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.             *   0.077  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  884.97  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  880.01  * Flow Area (sq ft)      * 3360.68  * 2527.69  * 1701.92  *
* E.G. Slope (ft/ft)     *0.001605  * Area (sq ft)           *21632.70  * 2527.69  * 1701.92  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *12343.46  *30408.70  * 3947.84  *
* Top Width (ft)         * 2558.05  * Top Width (ft)         * 2264.05  *  103.48  *  190.52  *
* Vel Total (ft/s)       *    6.15  * Avg. Vel. (ft/s)       *    3.67  *   12.03  *    2.32  *
* Max Chl Dpth (ft)      *   27.71  * Hydr. Depth (ft)       *   10.29  *   24.43  *    8.93  *
* Conv. Total (cfs)      *1165548.0  * Conv. (cfs)            *308070.7  *758946.6  * 98530.9  *
* Length Wtd. (ft)       *  651.25  * Wetted Per. (ft)       *  327.76  *  110.00  *  191.82  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    1.03  *    2.30  *    0.89  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    3.77  *   27.71  *    2.06  *
* Frctn Loss (ft)        *    0.94  * Cum Volume (acre-ft)   *28932.03  *22529.34  *29767.71  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         * 2622.55  *  749.90  * 3020.16  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  879.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.080  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  878.79  * Reach Len. (ft)        *  743.95  *  618.61  *  572.76  *
* Crit W.S. (ft)         *  871.44  * Flow Area (sq ft)      * 1342.89  * 1888.44  *  673.24  *
* E.G. Slope (ft/ft)     *0.001303  * Area (sq ft)           * 8592.68  * 1888.44  *  673.24  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2339.00  *16850.43  *  910.57  *
* Top Width (ft)         * 2052.57  * Top Width (ft)         * 1804.21  *  103.48  *  144.87  *
* Vel Total (ft/s)       *    5.15  * Avg. Vel. (ft/s)       *    1.74  *    8.92  *    1.35  *
* Max Chl Dpth (ft)      *   21.53  * Hydr. Depth (ft)       *    4.11  *   18.25  *    4.65  *
* Conv. Total (cfs)      *556876.5  * Conv. (cfs)            * 64802.8  *466846.2  * 25227.6  *
* Length Wtd. (ft)       *  632.67  * Wetted Per. (ft)       *  327.76  *  110.00  *  145.72  *
* Min Ch El (ft)         *  857.26  * Shear (lb/sq ft)       *    0.33  *    1.40  *    0.38  *
* Alpha                  *    2.54  * Stream Power (lb/ft s) *    0.58  *   12.46  *    0.51  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   * 9229.72  *15107.07  * 9148.39  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1367.52  *  721.31  * 1284.81  *
*****************************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 32.784

INPUT
Description:
Station Elevation Data num= 491

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	908.08	.07	908.08	18.65	908.58	21.89	909.52	31.42	906.96
39.24	902.5	39.8	902.28	46.57	903.59	51.02	902.82	57.56	901.57
59.8	901.57	69.15	901.68	72.51	901.71	84.22	901.24	87.25	901.3
92.48	901.73	93.15	901.71	94.07	902.09	98.73	902.63	103.09	903.14
110.34	901.4	113.18	900.69	116.39	900.08	117.65	899.99	120.13	899.9
136.01	898.16	141.95	898.71	142.94	898.59	147.51	898.83	148.72	898.91
156.41	899	160.62	899.19	163.64	898.95	169.67	898.21	173.96	897.85
178.34	897.16	189.49	894.54	198.7	894.56	202.91	894.65	227.25	894.03
228.82	893.99	229.15	893.98	229.72	893.92	244.97	893.01	267.61	897.25
272.66	896.17	279.07	898.32	290.92	891.57	296.6	887.03	300.84	883.66
305.28	883.22	317.2	882.26	318.2	882.43	319.79	882.75	329.73	884.74
336.42	885.89	341.63	886.77	353.27	888.75	369.18	891.42	370.51	891.26
389.4	886.23	391.13	886.18	399.62	885.84	424.42	884.87	429.38	884.8
449.05	884.42	472.6	884.64	486.31	884.51	491.5	884.14	492.71	884.29
494.01	884.47	501.79	881.93	501.91	881.89	501.98	881.89	502.21	881.88
522.36	880.97	528.35	880.71	537.62	882.21	538.65	882.32	539.35	882.32
542.53	882.32	546.1	882.32	561.14	882.32	561.53	882.32	563.57	882.32
570.43	882.3	572.31	882.29	575.48	882.28	580.61	882.28	581.91	882.27
585.12	882.26	587.05	882.26	589.42	882.24	591.6	882.22	592.19	882.22
594.9	881.72	600.37	880.61	614.1	878.19	614.69	878.19	617.75	877.62
619.79	877.6	622.91	877.56	629.17	877.49	632.33	877.47	640.94	877.34
642.69	877.34	646.48	877.53	650.94	877.74	663.76	876.37	666.69	876.14
667.29	876.13	682.45	875.96	686.66	875.83	717.16	875.09	740.57	874.8
765.19	874.68	772.37	874.76	774.69	874.77	778.62	874.76	792.1	874.33
819.82	874	841.19	874.16	859.96	873.98	874.7	873.84	891.66	873.74
907.82	873.61	923.82	873.76	937.46	873.76	965.27	873.73	1001.19	873.6
1011.69	873.54	1036.92	873.08	1051.96	872.96	1061.91	873.09	1111.98	873.44
1122.86	873.4	1131.55	873.36	1148.91	873.26	1197.42	873.49	1213.37	873.49
1234.2	873.64	1237.78	873.81	1250.2	873.93	1282.94	873.98	1315.94	874.17
1318.93	874.17	1319.63	874.09	1321.95	873.9	1323.64	873.75	1324.54	873.81
1329.82	874.11	1332.33	874.49	1339.72	875.57	1346.38	876.23	1350.68	876.65
1357.8	878.22	1358.3	878.33	1358.9	878.35	1366.1	878.6	1369.7	877.98
1370.96	877.76	1371.45	877.75	1371.62	877.75	1373.83	877.74	1379.85	877.74
1382.02	877.75	1383.19	877.56	1385	877.28	1388.3	877.12	1388.86	877.09
1389.29	877.11	1397.01	877.55	1398.47	876.94	1402.19	875.36	1408.58	874.43
1413.84	873.66	1422.42	869.92	1422.54	869.87	1422.61	869.87	1427.83	870.01
1436.14	870.21	1437.94	870.25	1445.81	874.45	1446.45	874.75	1447.01	874.66
1454.52	874.3	1466.3	873.62	1467	873.6	1469.09	873.57	1476.37	873.41
1479.33	873.31	1486.71	873.99	1487.37	874.08	1489.82	874.1	1492.37	874.12
1501.43	873.9	1510.01	873.53	1520.27	873.43	1525.2	873.65	1553.86	873.96
1554.63	873.94	1555.08	873.92	1565.48	873.44	1569.21	873.39	1571.39	873.36
1573.25	873.41	1579.03	873.55	1584.27	873.5	1598.72	873.5	1609.1	873.48
1622.13	873.38	1625.07	873.38	1630.79	872.92	1632.41	872.83	1637.32	872.88
1641.48	872.98	1645.5	873.37	1646.25	873.45	1647.31	873.42	1659.87	873.14
1672.32	873.08	1692.22	872.79	1696.1	872.8	1716.23	873.16	1722.92	873.27
1725.94	873.28	1760.14	873.17	1785.69	872.71	1787.28	872.68	1788.92	872.77
1799.14	873.34	1809.23	873.26	1809.63	873.26	1811.25	873.23	1830.21	872.95
1832.16	872.92	1834.3	872.76	1836.67	872.57	1837.79	872.69	1840.24	872.95
1859.88	872.7	1859.99	872.7	1860.03	872.7	1860.29	872.7	1909.96	872.49
1921.06	872.59	1947.13	872.41	1955.3	872.38	1957.96	872.4	1962.18	872.46
1968.3	872.6	1986.96	873.02	1992.28	873.02	2009.73	873.24	2011.23	873.26
2011.95	873.26	2012.24	873.26	2034.96	872.67	2038.02	872.55	2050.62	872.48
2056.46	872.47	2060.87	872.51	2065.45	872.54	2074.17	871.99	2074.7	871.96
2074.85	872	2077.95	872.86	2097.33	872.64	2108.73	872.51	2124.6	872.37
2158.57	872.58	2163	872.63	2167.01	872.53	2182.35	872.22	2200.31	872.62
2207	872.76	2211.56	872.84	2215.47	872.92	2220.29	872.66	2231.56	872.37
2241.24	872.32	2241.57	872.31	2241.9	872.32	2250.91	872.4	2257.82	872.55
2262.47	872.66	2270.89	872.8	2295.09	873.15	2306.6	873.1	2328.55	873.09
2345.08	873.22	2368.04	873.27	2392.17	873.52	2400.91	873.6	2412.17	873.66
2443.83	873.81	2490.97	874.08	2494.34	874.09	2496.34	874.11	2530.49	874.14
2539.45	874.12	2567.3	874.26	2569.53	874.28	2600.05	874.46	2605.46	874.46

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 2623.17  874.55 2623.53   874.7 2627.37  876.22 2632.25  875.97 2639.01  875.63
 2642.11  874.89 2643.12  874.64 2644.72  874.96 2647.13  875.44 2648.22  875.66
 2652.32  875.59 2670.28  875.31 2672.88  875.13 2674.12  875.04 2676.13  875.24
 2681.62  875.69 2690.24  875.19 2696.74  875.03 2709.62  875.05 2717.34  875.08
 2731.68  875.16 2741.47  869.23 2747.62  865.31 2752.36  862.28 2758.63  862.28
 2763.01  862.28 2764.13  862.28 2766.36  861.39 2771.09  859.54    2775   856.8
  2798.5  855.83    2822   856.8 2827.05  859.41 2828.38  860.96 2835.36  864.59
 2840.89  867.95  2844.5  870.04 2847.96  869.49 2848.79  869.36 2860.77  867.64
 2878.43  872.92 2878.99  873.07 2879.17  873.05  2894.5  871.04 2905.79  871.52
 2907.44  871.58 2916.18  871.86 2937.63  872.96 2946.65  873.33 2947.87  873.31
 2954.76  875.26 2957.97  875.97 2962.62  876.53 2963.23  876.52 2963.92  876.53
 2967.57  876.17 2968.55  876.04 2971.05  875.72  2973.2  875.26 2978.29  874.23
 2983.03  874.23 2989.43  874.28 3004.94  874.26 3020.38  874.11 3034.97  873.87
 3050.91  874.07 3065.57  874.27 3071.06  874.35  3073.3  874.36 3081.25  874.41
 3085.64  874.44 3089.68  874.47 3095.75  875.64 3099.65  876.17  3101.1  876.17
 3103.34  876.09 3105.54  876.11 3108.42  875.48  3109.9  875.48 3111.34  875.48
 3113.06  875.48 3115.68  875.48 3118.28  875.48 3119.48  875.48 3128.19  875.48
 3128.45  875.48 3128.91  875.48 3132.43  875.48 3136.04  875.63  3140.9  875.57
 3142.87  875.54 3145.16  875.48 3146.14  875.48 3146.22  875.48 3150.04  875.48
 3151.84  875.48 3156.14  875.48 3158.57  875.48 3159.96  875.48  3163.5  876.13
 3163.72  876.17 3173.44  877.91 3175.33  878.26 3177.28  878.63 3179.59  880.35
 3180.29  880.38  3181.3   880.4 3181.79  880.41 3192.49  882.91 3196.61  882.91
  3198.8  882.91  3212.1     883 3213.23     883 3215.05  883.02 3225.58   882.9
 3232.02  882.99 3238.24  884.87 3240.56  885.06 3250.51  884.22 3251.24  884.21
 3255.47   884.6 3273.07  888.15 3289.29  889.32 3291.08  889.38 3291.84   889.4
 3292.13  889.41 3307.67  889.72 3308.18  889.73  3309.2  889.77 3318.87  891.03
 3359.36  894.69 3366.16   895.8 3369.95  896.28 3373.14  896.69 3378.45  895.72
 3378.68  895.67 3384.21  896.27 3385.43  896.38 3387.08  896.49 3387.81  896.53
 3389.64  896.54 3395.78  898.68 3398.39  899.41 3400.88  899.36 3406.94  899.53
 3407.79  899.53  3415.7  899.69 3418.98  899.71 3420.83  899.72  3427.4  899.84
 3440.27  903.35 3451.72   906.3 3455.13  906.36 3464.42   906.5 3466.59  908.55
 3467.66  909.32 3469.78  911.15 3471.05  912.29 3473.31  912.29 3476.47  912.29
 3489.25  912.29 3502.12  912.29 3505.69  912.03 3508.37  911.87  3512.8  911.55
 3519.89   914.3 3524.04  915.72 3529.78  914.71 3529.93  914.68 3530.04   914.7
 3530.14  914.73  3537.4  915.85 3544.03  918.14 3545.03   918.2 3546.79  918.34
 3563.76  919.39 3569.66  919.28 3577.41  919.44 3590.88  919.77    3608  920.43
 3617.89  922.85 3625.31  927.22 3629.41  927.92 3629.96  926.69 3631.15  924.35
 3635.47  925.63

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .06 2652.32      .1 2731.68     .04  2844.5      .1 3150.04     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2731.68  2844.5        909.6255  703.25 549.528             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2343.71     890       F
 2967.62 3635.47     890       F

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  871.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.040  *   0.100  *
* W.S. Elev (ft)         *  870.90  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  863.72  * Flow Area (sq ft)      *          * 1132.26  *   51.57  *
* E.G. Slope (ft/ft)     *0.000896  * Area (sq ft)           *   14.40  * 1132.26  *   51.57  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *          * 5835.39  *   34.62  *
* Top Width (ft)         *  151.91  * Top Width (ft)          *   18.97  *  105.78  *   27.16  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)        *          *    5.15  *    0.67  *
* Max Chl Dpth (ft)      *   15.07  * Hydr. Depth (ft)        *          *   10.70  *    1.90  *
* Conv. Total (cfs)      *196147.2  * Conv. (cfs)             *          *194990.5  *  1156.7  *
* Length Wtd. (ft)       *  700.58  * Wetted Per. (ft)        *          *  113.44  *   27.81  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)        *          *    0.56  *    0.10  *
* Alpha                  *    1.07  * Stream Power (lb/ft s)   *          *    2.88  *    0.07  *
* Frctn Loss (ft)        *    0.64  * Cum Volume (acre-ft)    * 1211.03  * 7578.94  * 1063.68  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)           *  372.18  *  611.64  *  372.36  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
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* E.G. Elev (ft)         *  875.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.060  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  874.60  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  866.55  * Flow Area (sq ft)      *  183.79  * 1534.83  *  342.50  *
* E.G. Slope (ft/ft)     *0.001124  * Area (sq ft)           * 2264.61  * 1534.83  *  388.27  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  115.35  *10419.22  *  365.44  *
* Top Width (ft)         * 2096.50  * Top Width (ft)         * 1762.85  *  111.89  *  221.75  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *    0.63  *    6.79  *    1.07  *
* Max Chl Dpth (ft)      *   18.77  * Hydr. Depth (ft)       *    0.66  *   13.72  *    3.17  *
* Conv. Total (cfs)      *325178.4  * Conv. (cfs)            *  3441.1  *310835.3  * 10902.1  *
* Length Wtd. (ft)       *  689.62  * Wetted Per. (ft)       *  279.58  *  120.58  *  109.24  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.05  *    0.89  *    0.22  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *    0.03  *    6.06  *    0.23  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   * 3496.92  *10160.49  * 3295.22  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  843.56  *  657.75  *  780.34  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  876.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.060  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  875.46  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  867.41  * Flow Area (sq ft)      *  448.05  * 1631.98  *  437.01  *
* E.G. Slope (ft/ft)     *0.001145  * Area (sq ft)           * 3862.62  * 1631.98  *  584.84  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  476.10  *11581.25  *  542.65  *
* Top Width (ft)         * 2278.60  * Top Width (ft)         * 1932.08  *  112.82  *  233.69  *
* Vel Total (ft/s)       *    5.01  * Avg. Vel. (ft/s)       *    1.06  *    7.10  *    1.24  *
* Max Chl Dpth (ft)      *   19.63  * Hydr. Depth (ft)       *    1.27  *   14.47  *    3.93  *
* Conv. Total (cfs)      *372359.1  * Conv. (cfs)            * 14069.9  *342252.5  * 16036.7  *
* Length Wtd. (ft)       *  690.76  * Wetted Per. (ft)       *  353.74  *  121.67  *  112.60  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.09  *    0.96  *    0.28  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.10  *    6.80  *    0.34  *
* Frctn Loss (ft)        *    0.74  * Cum Volume (acre-ft)   * 4827.32  *11935.92  * 4736.98  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  967.44  *  686.16  *  958.26  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  878.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.063  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  877.85  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  870.35  * Flow Area (sq ft)      * 1366.85  * 1901.59  *  722.28  *
* E.G. Slope (ft/ft)     *0.001200  * Area (sq ft)           * 8690.96  * 1901.59  * 1334.50  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2603.81  *15296.93  * 1199.27  *
* Top Width (ft)         * 2542.23  * Top Width (ft)         * 2100.82  *  112.82  *  328.60  *
* Vel Total (ft/s)       *    4.79  * Avg. Vel. (ft/s)       *    1.90  *    8.04  *    1.66  *
* Max Chl Dpth (ft)      *   22.02  * Hydr. Depth (ft)       *    3.52  *   16.86  *    5.87  *
* Conv. Total (cfs)      *551372.4  * Conv. (cfs)            * 75165.8  *441586.6  * 34620.0  *
* Length Wtd. (ft)       *  700.80  * Wetted Per. (ft)       *  388.59  *  121.67  *  124.67  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.26  *    1.17  *    0.43  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    0.50  *    9.42  *    0.72  *
* Frctn Loss (ft)        *    0.83  * Cum Volume (acre-ft)   * 8023.47  *14109.18  * 7987.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1225.06  *  709.45  * 1198.83  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  881.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.064  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  880.12  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  875.34  * Flow Area (sq ft)      * 2247.53  * 2157.68  * 1001.76  *
* E.G. Slope (ft/ft)     *0.001245  * Area (sq ft)           *13500.84  * 2157.68  * 2089.76  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 5960.95  *19232.14  * 2106.91  *
* Top Width (ft)         * 2576.12  * Top Width (ft)         * 2128.52  *  112.82  *  334.78  *
```

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* Vel Total (ft/s)       *    5.05  * Avg. Vel. (ft/s)       *    2.65  *    8.91  *    2.10  *
* Max Chl Dpth (ft)      *   24.29  * Hydr. Depth (ft)       *    5.79  *   19.12  *    8.14  *
* Conv. Total (cfs)      *773755.1  * Conv. (cfs)            *168949.2  *545090.4  * 59715.6  *
* Length Wtd. (ft)       *  710.64  * Wetted Per. (ft)       *  388.59  *  121.67  *  124.67  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.45  *    1.38  *    0.62  *
* Alpha                  *    2.27  * Stream Power (lb/ft s) *    1.19  *   12.28  *    1.31  *
* Frctn Loss (ft)        *    0.93  * Cum Volume (acre-ft)   *12977.28  *17231.61  *13140.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1695.70  *  737.78  * 1684.99  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  882.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.              *   0.064  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  881.46  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  876.86  * Flow Area (sq ft)      * 2766.23  * 2308.52  * 1166.37  *
* E.G. Slope (ft/ft)     *0.001261  * Area (sq ft)           *16359.43  * 2308.52  * 2542.42  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 8435.94  *21661.79  * 2732.27  *
* Top Width (ft)         * 2611.40  * Top Width (ft)         * 2156.81  *  112.82  *  341.76  *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *    3.05  *    9.38  *    2.34  *
* Max Chl Dpth (ft)      *   25.63  * Hydr. Depth (ft)       *    7.13  *   20.46  *    9.47  *
* Conv. Total (cfs)      *924603.0  * Conv. (cfs)            *237584.5  *610068.7  * 76949.8  *
* Length Wtd. (ft)       *  715.62  * Wetted Per. (ft)       *  388.59  *  121.67  *  124.67  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.56  *    1.49  *    0.74  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    1.71  *   14.01  *    1.72  *
* Frctn Loss (ft)        *    0.97  * Cum Volume (acre-ft)   *17260.58  *19131.08  *17659.27  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 2022.40  *  744.99  * 2138.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  883.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.              *   0.064  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  882.75  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  877.81  * Flow Area (sq ft)      * 3268.65  * 2454.62  * 1325.81  *
* E.G. Slope (ft/ft)     *0.001278  * Area (sq ft)           *19198.84  * 2454.62  * 2988.59  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *11181.50  *24162.16  * 3406.34  *
* Top Width (ft)         * 2701.21  * Top Width (ft)         * 2241.08  *  112.82  *  347.31  *
* Vel Total (ft/s)       *    5.50  * Avg. Vel. (ft/s)       *    3.42  *    9.84  *    2.57  *
* Max Chl Dpth (ft)      *   26.92  * Hydr. Depth (ft)       *    8.43  *   21.76  *   10.77  *
* Conv. Total (cfs)      *1083759.0  * Conv. (cfs)            *312723.8  *675766.4  * 95268.3  *
* Length Wtd. (ft)       *  719.85  * Wetted Per. (ft)       *  388.59  *  121.67  *  124.67  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.67  *    1.61  *    0.85  *
* Alpha                  *    2.13  * Stream Power (lb/ft s) *    2.30  *   15.85  *    2.18  *
* Frctn Loss (ft)        *    1.01  * Cum Volume (acre-ft)   *21469.47  *20499.16  *22231.01  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 2246.44  *  745.94  * 2586.46  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  885.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.07  * Wt. n-Val.              *   0.064  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  884.35  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  878.88  * Flow Area (sq ft)      * 3890.41  * 2635.43  * 1523.12  *
* E.G. Slope (ft/ft)     *0.001295  * Area (sq ft)           *22813.57  * 2635.43  * 3605.01  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *15000.96  *27378.48  * 4320.55  *
* Top Width (ft)         * 2778.49  * Top Width (ft)         * 2269.79  *  112.82  *  395.88  *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)       *    3.86  *   10.39  *    2.84  *
* Max Chl Dpth (ft)      *   28.52  * Hydr. Depth (ft)       *   10.03  *   23.36  *   12.37  *
* Conv. Total (cfs)      *1297622.0  * Conv. (cfs)            *416821.8  *760747.9  *120052.4  *
* Length Wtd. (ft)       *  724.40  * Wetted Per. (ft)       *  388.59  *  121.67  *  124.67  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.81  *    1.75  *    0.99  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    3.12  *   18.20  *    2.80  *
```

```
* Frctn Loss (ft)        *    1.05  * Cum Volume (acre-ft)   *28552.48  *22492.68  *29732.82  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 2583.83  *  748.37  * 3016.30  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  878.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.063  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  878.15  * Reach Len. (ft)        *  909.63  *  703.25  *  549.53  *
* Crit W.S. (ft)         *  870.72  * Flow Area (sq ft)      * 1483.57  * 1935.53  *  759.32  *
* E.G. Slope (ft/ft)     *0.001208  * Area (sq ft)           * 9323.69  * 1935.53  * 1433.60  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2983.25  *15808.77  * 1307.98  *
* Top Width (ft)         * 2548.58  * Top Width (ft)         * 2105.53  *  112.82  *  330.23  *
* Vel Total (ft/s)       *    4.81  * Avg. Vel. (ft/s)       *    2.01  *    8.17  *    1.72  *
* Max Chl Dpth (ft)      *   22.32  * Hydr. Depth (ft)       *    3.82  *   17.16  *    6.17  *
* Conv. Total (cfs)      *578254.9  * Conv. (cfs)            * 85824.8  *454800.8  * 37629.2  *
* Length Wtd. (ft)       *  702.18  * Wetted Per. (ft)       *  388.59  *  121.67  *  124.67  *
* Min Ch El (ft)         *  855.83  * Shear (lb/sq ft)       *    0.29  *    1.20  *    0.46  *
* Alpha                  *    2.30  * Stream Power (lb/ft s) *    0.58  *    9.80  *    0.79  *
* Frctn Loss (ft)        *    0.85  * Cum Volume (acre-ft)   * 9076.73  *15079.92  * 9134.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1334.13  *  719.77  * 1281.68  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 32.650

INPUT
Description:
Station Elevation Data    num=     387
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0   904.9   11.72  903.84   14.26  903.62    28.3   902.1   36.12  901.26
   36.73  901.19   37.37  901.11   41.09  900.74   68.08  898.13   74.29  897.54
   78.51  897.11   91.78  895.86  105.14  894.21  127.24  891.75  141.55  890.01
  147.62  889.69  152.05  889.06  163.94  887.47   181.1  886.35  187.58  885.86
  193.36  885.37  216.88  883.43  243.55   881.3  248.32  880.88  253.21  880.49
  286.01  878.14  311.27  877.69  316.35  877.54  326.01  876.83  349.74  875.07
  358.54   876.1  376.58  878.16  377.72  878.15  401.46  877.77  410.06  876.89
  412.37  876.65  413.99  876.53  418.72  876.09  444.34  873.84  461.42  873.05
  461.94  873.02  463.13  872.99  499.77  872.82  522.48  872.59  535.47  872.58
  546.99  872.55  560.77  872.66  573.91  872.61  588.74  872.55  616.37  872.58
  624.66  872.59  631.57  872.57  658.96  872.58  682.23  872.62  685.26  872.63
  710.53  872.62  735.22  872.51  744.52  872.46  757.32  872.32  783.53  872.15
  794.15  872.07  804.34  872.02  826.29  872.07  836.93  872.07  846.26   872.2
  874.42  872.68  903.65  873.14  905.47  873.16  907.36  873.12  960.83  872.23
  961.96  872.39  967.71  873.43  971.31  873.13  983.27  872.14  988.27  873.14
  995.85  874.62 1001.97  874.92  1006.7  875.02 1008.29  875.12 1013.25  875.19
 1017.71  875.43 1021.09  875.78 1021.13  875.78 1023.83  875.58 1025.88  875.43
 1035.38  875.68 1036.15   875.7 1036.98  875.63 1039.73  875.37 1043.87  875.22
 1047.68  875.09  1051.1  874.96 1076.21  868.64 1080.57  867.53 1085.59  868.78
 1099.45  872.54 1103.55  872.77  1136.7  873.15  1147.7  873.09 1165.33  872.85
 1186.61  873.05 1199.51  873.14 1219.31  872.85 1231.97  872.67 1238.53   872.7
 1269.26  872.68 1282.31  872.46 1291.87  872.37 1313.01  872.23 1323.81  872.16
 1330.52  872.04 1365.46  871.76 1384.44  871.88 1395.18  871.85 1410.74   871.8
 1418.62  871.77 1424.87  871.76 1451.88  871.74    1474  871.83 1488.64  871.77
 1511.75   871.8 1523.78  871.74 1529.83  871.77 1561.86  871.71 1571.67   871.7
 1574.74  871.68 1588.53  871.66 1615.13  871.64 1622.58  871.65 1650.25  871.62
 1666.14  871.57 1673.67  871.55  1691.7  871.75 1706.63  871.85 1715.01  871.86
 1741.95  871.58 1764.04  871.74 1773.93  871.86  1786.8  871.44  1798.3   871.2
 1808.55  871.23 1832.02  871.72 1859.32  871.73  1867.5  871.77 1889.43  871.98
 1904.36  872.15 1911.68  872.36 1916.22  872.47 1941.26  873.06 1953.23  872.63
 1961.69  872.72 1995.83  873.08    1998  873.12  1998.4  873.12  1998.9  873.12
 1999.51   873.1  2019.5  873.57  2031.4  873.85  2031.7  873.85 2031.86  873.84
```

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 2034.95  873.76 2039.31  873.03 2044.07  872.01 2048.67  872.56 2050.77  872.81
 2061.91   872.8 2072.49  872.78 2078.35  871.74 2079.19  871.59 2080.34  871.89
 2084.08  872.86 2085.35  873.03 2110.14  873.49 2115.27  873.61 2120.51  873.81
 2123.09  873.84 2128.81   873.8  2155.5  873.79 2166.21  873.72  2180.7  873.86
 2191.07  873.88 2213.35  873.78  2215.2  873.78 2228.08  873.94 2256.76  873.96
 2260.97  873.98  2278.4  874.58 2285.75  874.51  2296.8  874.51 2308.28  874.15
 2331.23  874.29 2331.94  874.24 2334.45  874.22 2365.82  874.45 2368.65  874.23
 2371.65  874.02 2377.43   873.6 2378.81  873.65 2391.81  873.68 2397.25  873.69
 2400.44  873.54 2408.33  866.43 2411.93  861.24 2414.46  861.04 2419.95  859.08
    2425   855.2  2447.5  854.21    2470   855.2 2475.38  859.94 2493.25  867.96
  2493.3  867.98 2496.26  869.25 2499.87  869.68  2510.3   870.7 2516.33  870.36
 2536.35  869.19 2562.62  868.37 2566.19   868.3 2573.32  868.27 2584.75  868.22
 2604.14  868.33 2637.53  868.98 2647.87  868.89 2657.33  868.82  2699.5  869.42
  2702.5  869.45 2703.41  869.46 2705.28   869.4  2730.8  869.47 2744.86  868.78
 2754.61  867.82 2757.75  867.36 2771.85  867.67 2781.81  867.64 2798.74  867.73
 2809.39  867.65 2832.94  867.76 2848.91   868.2 2873.85  868.83 2892.65  869.46
 2906.84  869.75 2920.92  869.66 2936.21  869.44 2947.19  871.39  2957.1  872.92
 2963.02  873.12 2966.35   873.2 2969.67  873.26 2973.01  873.31 2981.63   873.6
 2990.97  874.04 2998.86  874.32 3000.62  874.39 3025.29  876.13 3029.59  876.44
 3031.72  876.55 3041.65  877.49 3060.66   879.3 3070.29  880.31 3072.66  880.47
 3081.26  881.29  3081.6  881.27 3083.63  881.36 3090.96   881.7 3094.77  882.14
 3096.36   882.4 3102.81   883.2 3105.55  883.52 3107.39  883.52 3110.93  883.34
 3120.12  883.09 3121.79  883.05 3122.88  883.03 3125.71  883.02 3129.59  883.06
 3140.77  881.56 3150.86  883.52 3159.69  886.79 3160.47  887.52 3174.52  887.52
 3191.83  888.78 3193.77  888.68  3196.3  888.61 3197.63  888.54 3199.74  888.34
 3205.39  887.52  3212.4  887.94 3215.13  888.01 3216.72  887.98 3226.73  885.18
 3227.21  885.26 3228.72   885.5 3240.74  887.52 3241.71  887.59 3242.97  887.52
 3249.59  887.52  3251.6  887.52 3253.93  888.29 3282.03  892.12 3294.13  892.84
 3310.32  892.56 3311.39  892.59 3311.73   892.7 3311.82  892.74 3322.59  894.18
 3327.94  897.18 3334.94  897.18 3336.51  897.18 3340.94  897.18 3353.93  897.18
 3363.66  897.18 3366.96  896.96 3370.49  897.18 3382.46  896.85 3385.92   896.9
 3387.66  897.03 3390.62  897.22 3395.32  897.59 3405.67   898.3 3419.54  900.09
 3424.19   900.5 3427.86   900.9 3450.53  903.97 3452.38  904.42 3453.33  904.31
 3455.98   904.8  3456.7  904.97 3462.41   906.1 3464.88   906.6 3467.68  907.15
 3470.93  907.76 3473.11  907.98 3475.07  908.25 3484.21  910.31 3486.63   910.4
 3501.81  909.71 3501.83  909.71 3501.85  909.71 3501.87  909.71 3502.02  909.73
  3502.4  909.77 3517.69  911.39 3518.14  911.14 3520.41  910.48 3521.55  910.79
 3534.35  914.85 3535.54  913.88 3538.38  912.98 3543.38  915.64  3548.6  917.76
 3549.49  917.98 3554.45  920.23 3554.77  920.26 3555.34  920.29 3556.55  920.55
 3558.38  920.26    3559  920.12 3559.85  920.27 3560.24  920.72 3561.32  921.33
  3562.4  921.56 3562.62  921.61 3562.88  921.82 3563.64  922.54 3566.51  922.49
 3569.35  921.66  3570.2  921.68 3576.64  923.94  3577.6  923.92 3579.96  926.49
 3580.71  926.54 3582.07  927.35 3584.25   928.9 3584.56  928.85  3584.8  928.84
 3589.84  928.36 3592.96  928.19 3594.63  928.05 3602.45  927.92 3604.95  928.06
 3605.55  928.09 3606.17  928.11 3607.26  928.15  3621.2  928.66 3623.29  928.71
 3625.89   928.9 3632.16  928.49

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .06 2191.07      .1 2400.44     .04 2496.26     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2400.44 2496.26           716.31 1002.02 828.114             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2131.49     890       F
  2730.8 3632.16     890       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  870.67  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.            *          *   0.040  *   0.090  *
* W.S. Elev (ft)         *  870.23  * Reach Len. (ft)       *  716.31  * 1002.02  *  828.11  *
* Crit W.S. (ft)         *  862.39  * Flow Area (sq ft)      *          * 1059.88  *  283.70  *
* E.G. Slope (ft/ft)     *0.000922  * Area (sq ft)           *   28.68  * 1059.88  *  647.52  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *          * 5700.50  *  169.50  *
* Top Width (ft)         *  544.55  * Top Width (ft)         *   21.05  *   92.15  *  431.36  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *          *    5.38  *    0.60  *
* Max Chl Dpth (ft)      *   16.02  * Hydr. Depth (ft)       *          *   11.50  *    1.28  *
* Conv. Total (cfs)      *193304.4  * Conv. (cfs)            *          *187722.7  *  5581.7  *
* Length Wtd. (ft)       *  999.51  * Wetted Per. (ft)       *          *  101.81  *  221.61  *
* Min Ch El (ft)         *  854.21  * Shear (lb/sq ft)       *          *    0.60  *    0.07  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *          *    3.22  *    0.04  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   * 1210.58  * 7561.24  * 1059.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  371.76  *  610.04  *  369.47  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  874.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.079  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  873.96  * Reach Len. (ft)        *  716.31  * 1002.02  *  828.11  *
* Crit W.S. (ft)         *  865.65  * Flow Area (sq ft)      *   22.61  * 1411.43  * 1156.00  *
* E.G. Slope (ft/ft)     *0.000978  * Area (sq ft)           * 2710.37  * 1411.43  * 2360.32  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *    4.24  * 9167.94  * 1727.83  *
* Top Width (ft)         * 2368.76  * Top Width (ft)         * 1779.87  *   95.82  *  493.08  *
* Vel Total (ft/s)       *    4.21  * Avg. Vel. (ft/s)       *    0.19  *    6.50  *    1.49  *
* Max Chl Dpth (ft)      *   19.75  * Hydr. Depth (ft)       *    0.15  *   14.73  *    4.93  *
* Conv. Total (cfs)      *348563.8  * Conv. (cfs)            *   135.5  *293175.2  * 55253.0  *
* Length Wtd. (ft)       *  982.02  * Wetted Per. (ft)       *  153.91  *  106.75  *  234.69  *
* Min Ch El (ft)         *  854.21  * Shear (lb/sq ft)       *    0.01  *    0.81  *    0.30  *
* Alpha                  *    2.02  * Stream Power (lb/ft s) *    0.00  *    5.24  *    0.45  *
* Frctn Loss (ft)        *    1.01  * Cum Volume (acre-ft)   * 3444.97  *10136.71  * 3277.88  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  806.57  *  656.08  *  775.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  875.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.082  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  874.80  * Reach Len. (ft)        *  716.31  * 1002.02  *  828.11  *
* Crit W.S. (ft)         *  866.60  * Flow Area (sq ft)      *  208.23  * 1491.86  * 1352.86  *
* E.G. Slope (ft/ft)     *0.001009  * Area (sq ft)           * 4268.23  * 1491.86  * 2782.40  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  102.83  *10215.71  * 2281.45  *
* Top Width (ft)         * 2520.93  * Top Width (ft)         * 1914.90  *   95.82  *  510.21  *
* Vel Total (ft/s)       *    4.13  * Avg. Vel. (ft/s)       *    0.49  *    6.85  *    1.69  *
* Max Chl Dpth (ft)      *   20.59  * Hydr. Depth (ft)       *    0.77  *   15.57  *    5.77  *
* Conv. Total (cfs)      *396590.3  * Conv. (cfs)            *  3236.8  *321543.8  * 71809.7  *
* Length Wtd. (ft)       *  974.14  * Wetted Per. (ft)       *  269.01  *  106.75  *  234.69  *
* Min Ch El (ft)         *  854.21  * Shear (lb/sq ft)       *    0.05  *    0.88  *    0.36  *
* Alpha                  *    2.26  * Stream Power (lb/ft s) *    0.02  *    6.03  *    0.61  *
* Frctn Loss (ft)        *    1.02  * Cum Volume (acre-ft)   * 4742.43  *11910.71  * 4715.74  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  927.27  *  684.48  *  953.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  877.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.086  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  877.06  * Reach Len. (ft)        *  716.31  * 1002.02  *  828.11  *
* Crit W.S. (ft)         *  871.18  * Flow Area (sq ft)      *  815.07  * 1708.06  * 1882.06  *
* E.G. Slope (ft/ft)     *0.001176  * Area (sq ft)           * 8752.40  * 1708.06  * 3969.47  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 1015.38  *13815.65  * 4268.97  *
* Top Width (ft)         * 2672.72  * Top Width (ft)         * 2036.06  *   95.82  *  540.83  *
* Vel Total (ft/s)       *    4.34  * Avg. Vel. (ft/s)       *    1.25  *    8.09  *    2.27  *
* Max Chl Dpth (ft)      *   22.85  * Hydr. Depth (ft)       *    3.03  *   17.83  *    8.02  *
* Conv. Total (cfs)      *557008.9  * Conv. (cfs)            * 29611.2  *402902.6  *124495.1  *
* Length Wtd. (ft)       *  949.97  * Wetted Per. (ft)       *  269.01  *  106.75  *  234.69  *
* Min Ch El (ft)         *  854.21  * Shear (lb/sq ft)       *    0.22  *    1.17  *    0.59  *
* Alpha                  *    2.58  * Stream Power (lb/ft s) *    0.28  *    9.50  *    1.34  *
* Frctn Loss (ft)        *    1.13  * Cum Volume (acre-ft)   * 7841.34  *14080.04  * 7953.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1181.86  *  707.77  * 1193.34  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  880.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *   0.086  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  879.15  * Reach Len. (ft)        *  716.31  * 1002.02  *  828.11  *
* Crit W.S. (ft)         *  873.45  * Flow Area (sq ft)      * 1377.55  * 1908.46  * 2372.57  *
* E.G. Slope (ft/ft)     *0.001367  * Area (sq ft)           *13125.10  * 1908.46  * 5123.57  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 2606.37  *17922.12  * 6771.51  *
* Top Width (ft)         * 2787.17  * Top Width (ft)         * 2128.53  *   95.82  *  562.83  *
* Vel Total (ft/s)       *    4.82  * Avg. Vel. (ft/s)       *    1.89  *    9.39  *    2.85  *
* Max Chl Dpth (ft)      *   24.94  * Hydr. Depth (ft)       *    5.12  *   19.92  *   10.12  *
* Conv. Total (cfs)      *738365.5  * Conv. (cfs)            * 70492.9  *484727.9  *183144.7  *
* Length Wtd. (ft)       *  931.77  * Wetted Per. (ft)       *  269.01  *  106.75  *  234.69  *
* Min Ch El (ft)         *  854.21  * Shear (lb/sq ft)       *    0.44  *    1.53  *    0.86  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    0.83  *   14.33  *    2.46  *
* Frctn Loss (ft)        *    1.27  * Cum Volume (acre-ft)   *12699.28  *17198.79  *13094.66  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1651.25  *  736.10  * 1679.33  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  881.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.086  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  880.38  * Reach Len. (ft)        *  716.31  * 1002.02  *  828.11  *
* Crit W.S. (ft)         *  875.17  * Flow Area (sq ft)      * 1708.12  * 2026.23  * 2660.85  *
* E.G. Slope (ft/ft)     *0.001464  * Area (sq ft)           *15751.87  * 2026.23  * 5822.73  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 3852.59  *20493.86  * 8483.55  *
* Top Width (ft)         * 2816.56  * Top Width (ft)         * 2145.68  *   95.82  *  575.05  *
* Vel Total (ft/s)       *    5.13  * Avg. Vel. (ft/s)       *    2.26  *   10.11  *    3.19  *
* Max Chl Dpth (ft)      *   26.17  * Hydr. Depth (ft)       *    6.35  *   21.15  *   11.34  *
* Conv. Total (cfs)      *858004.8  * Conv. (cfs)            *100686.6  *535602.4  *221715.6  *
* Length Wtd. (ft)       *  922.94  * Wetted Per. (ft)       *  269.01  *  106.75  *  234.69  *
* Min Ch El (ft)         *  854.21  * Shear (lb/sq ft)       *    0.58  *    1.73  *    1.04  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    1.31  *   17.55  *    3.30  *
* Frctn Loss (ft)        *    1.33  * Cum Volume (acre-ft)   *16925.30  *19096.09  *17606.51  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1977.48  *  743.31  * 2132.94  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  882.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.15  * Wt. n-Val.             *   0.087  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  881.57  * Reach Len. (ft)        *  716.31  * 1002.02  *  828.11  *
* Crit W.S. (ft)         *  876.31  * Flow Area (sq ft)      * 2029.40  * 2140.70  * 2941.03  *
* E.G. Slope (ft/ft)     *0.001554  * Area (sq ft)           *18323.95  * 2140.70  * 6518.31  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 5283.15  *23139.39  *10327.46  *
* Top Width (ft)         * 2848.29  * Top Width (ft)         * 2160.32  *   95.82  *  592.15  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    2.60  *   10.81  *    3.51  *
* Max Chl Dpth (ft)      *   27.36  * Hydr. Depth (ft)       *    7.55  *   22.34  *   12.54  *
* Conv. Total (cfs)      *982967.0  * Conv. (cfs)            *134017.1  *586974.4  *261975.5  *
* Length Wtd. (ft)       *  915.55  * Wetted Per. (ft)       *  269.01  *  106.75  *  234.69  *
* Min Ch El (ft)         *  854.21  * Shear (lb/sq ft)       *    0.73  *    1.95  *    1.22  *
* Alpha                  *    2.49  * Stream Power (lb/ft s) *    1.91  *   21.03  *    4.27  *
* Frctn Loss (ft)        *    1.38  * Cum Volume (acre-ft)   *21077.70  *20462.07  *22171.04  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 2200.48  *  744.26  * 2580.53  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	884.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.087	0.040	0.090
W.S. Elev (ft)	883.07	Reach Len. (ft)	716.31	1002.02	828.11
Crit W.S. (ft)	877.51	Flow Area (sq ft)	2431.30	2283.89	3291.51
E.G. Slope (ft/ft)	0.001647	Area (sq ft)	21566.14	2283.89	7428.85
Q Total (cfs)	46700.00	Flow (cfs)	7341.21	26533.56	12825.23
Top Width (ft)	2907.83	Top Width (ft)	2179.03	95.82	632.98
Vel Total (ft/s)	5.83	Avg. Vel. (ft/s)	3.02	11.62	3.90
Max Chl Dpth (ft)	28.86	Hydr. Depth (ft)	9.04	23.84	14.03
Conv. Total (cfs)	1150813.0	Conv. (cfs)	180907.1	653858.3	316048.1
Length Wtd. (ft)	907.63	Wetted Per. (ft)	269.01	106.75	234.69
Min Ch El (ft)	854.21	Shear (lb/sq ft)	0.93	2.20	1.44
Alpha	2.42	Stream Power (lb/ft s)	2.81	25.55	5.62
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	28089.11	22452.97	29663.22
C & E Loss (ft)	0.08	Cum SA (acres)	2537.38	746.68	3009.81

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	878.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.086	0.040	0.090
W.S. Elev (ft)	877.34	Reach Len. (ft)	716.31	1002.02	828.11
Crit W.S. (ft)	871.52	Flow Area (sq ft)	889.76	1734.67	1947.20
E.G. Slope (ft/ft)	0.001203	Area (sq ft)	9319.07	1734.67	4120.07
Q Total (cfs)	20100.00	Flow (cfs)	1187.08	14342.04	4570.88
Top Width (ft)	2684.58	Top Width (ft)	2044.99	95.82	543.77
Vel Total (ft/s)	4.40	Avg. Vel. (ft/s)	1.33	8.27	2.35
Max Chl Dpth (ft)	23.13	Hydr. Depth (ft)	3.31	18.10	8.30
Conv. Total (cfs)	579395.0	Conv. (cfs)	34218.3	413418.3	131758.4
Length Wtd. (ft)	947.32	Wetted Per. (ft)	269.01	106.75	234.69
Min Ch El (ft)	854.21	Shear (lb/sq ft)	0.25	1.22	0.62
Alpha	2.59	Stream Power (lb/ft s)	0.33	10.09	1.46
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)	8882.08	15050.29	9099.51
C & E Loss (ft)	0.01	Cum SA (acres)	1290.80	718.09	1276.17

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 32.461

INPUT
Description:
Station Elevation Data num= 339

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	914.38	7.43	913.12	25.5	910.51	43.92	908.34	70.24	904.34
71.97	904.03	73.42	903.84	75.78	903.47	105.48	899.55	127.65	896.85
132.37	896.43	134.5	896.18	166.09	891.04	172.72	889.69	176.61	888.94
192.63	886.2	198.42	885.32	204.71	884.49	223.97	881.8	242.45	879.43
263.18	872.74	267.86	869.88	276.81	871.72	293.48	875.07	299.06	875.69
304.98	876.5	322.43	878.13	325.64	878.16	342.6	878.5	350.07	878.64
371.51	875.83	384.11	874.2	402.02	872.55	410.78	871.87	416.34	871.96
432.66	872.16	440.04	872.43	442.61	872.28	448.82	872.36	454.86	872.37
472.14	872.24	501.61	872.32	508.2	872.34	512.76	872.31	547.49	872.09
564.38	872.19	582.46	872.19	595.95	872.1	611.29	872.04	631.88	871.93
659.76	872.01	669.37	872.03	674.55	872.08	707.29	871.99	718.8	872.02
720.46	871.98	724.21	871.98	753.86	871.96	754.84	871.8	755.41	871.68
761.29	870.3	763.34	871.05	764.81	871.91	773.09	871.9	789.15	871.99

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  798.74  871.81  815.49  871.69   838.9  872.13  839.76  872.13  839.96  872.14
  840.13  872.12  847.43  871.56  859.07  871.64  863.06  871.66  873.09  874.12
  873.48  874.22  874.85  874.25  884.26  874.48   891.7  874.95  891.87  874.96
  892.11  874.99   893.4  875.12  899.93  875.78  902.45  875.59  904.53  875.43
  912.04  875.63  914.73   875.7   915.4  875.63  917.74  875.37   922.6   875.2
  929.19  874.96  938.93  872.65  958.94  867.53  975.49  871.93  977.81  872.44
  982.94  872.44  987.33  872.34  989.35  872.32  994.59  872.15 1006.34   871.8
 1014.23  872.41 1019.22  872.37 1025.91  872.38 1031.83  872.44 1063.85  872.48
 1072.63  872.35 1099.86  872.14 1107.45  872.12 1111.35  872.03 1141.66  871.61
 1165.06  871.49 1177.22  871.48 1189.01  871.31 1195.62  871.23  1203.5  871.18
 1229.67  871.03 1257.33  870.58 1266.97  870.49 1280.53  870.39 1298.15   870.3
 1305.82  870.51 1323.44  871.01 1355.22   871.7 1359.77  871.79 1369.73  871.79
 1397.01  871.85 1408.17  871.79 1428.76  871.79 1447.86  871.77 1448.56  871.77
 1450.37  871.76 1483.35  871.59 1502.78  871.49 1517.59  871.46 1545.94     872
 1553.04  872.15 1555.85  872.18 1574.79   872.4 1604.26  872.12 1611.78  872.05
 1630.68  872.03 1649.93     872 1655.08  871.99 1679.17  872.02 1697.21  871.73
 1699.54   871.7 1704.87  871.71 1732.74  871.81 1748.63  871.86 1766.18  871.93
 1795.25  872.07 1799.48   872.1 1804.13  872.12 1816.35  872.19 1820.63  872.21
  1821.5  871.91 1824.17  870.95 1826.04  871.44 1831.26  872.81 1850.51  872.79
 1853.25  872.78 1854.01  872.65 1855.29  872.41 1859.84  871.59 1863.26  872.59
 1864.19  872.86 1867.73  872.84 1896.45  872.53 1920.83  872.47 1938.19  872.54
 1952.68  872.66 1964.43  872.61 1985.41  872.54  2019.2  872.66 2021.17  872.65
 2023.59  872.67 2069.14     873 2077.64  873.03 2098.29   873.1 2113.23  873.06
 2122.46  873.14 2150.68  873.12 2173.97  872.38 2181.91  872.23 2193.13  872.34
 2204.55  872.53 2215.18  872.47 2241.39  872.54 2269.52  872.65 2272.98  872.67
 2280.98  872.67 2306.98  872.66 2316.54   872.6 2333.65  872.42 2359.16  872.33
 2365.49  872.32 2369.03  872.26  2381.3  872.11 2404.15  871.89 2411.42  871.92
 2434.48   871.9 2453.96  871.66 2466.42  871.57 2492.04  871.78  2499.4  871.89
 2522.89  872.18 2534.17  872.27 2534.89  872.32 2552.03  871.85 2569.81  871.41
  2590.7  870.69 2595.86  870.53 2608.01   870.4 2620.75  870.31 2625.46  870.23
 2633.08  870.09 2636.45  870.27 2638.44  870.31 2643.31  870.42 2667.55  871.15
 2674.58   871.2 2688.58  871.36 2711.23  871.86 2717.68  871.88 2720.02  871.88
 2724.16  872.22 2743.14  873.05 2753.92  873.07 2763.27  872.73 2773.28  872.65
 2804.65  872.08 2823.87  871.74 2827.12  871.67 2837.51  871.45 2839.82  871.41
 2840.59  871.41 2841.21  871.41 2843.62  871.44 2861.93  871.55    2870  871.63
 2881.91  871.83 2905.76  872.23 2926.29  872.52 2944.17  872.56 2965.23   872.8
 2978.46  872.63 2983.69  872.82 2987.26  872.92  2991.4  872.57 3005.66  871.83
 3011.92  871.44 3019.89  871.41 3042.79  871.43 3056.55  871.32 3059.56  871.39
 3064.97  871.24 3069.43  872.29  3071.5  872.71 3073.06  873.02 3077.06  872.25
  3081.4  871.48 3084.94  871.48 3102.62  871.49 3139.01  870.95 3144.52   870.9
 3145.48  870.89 3145.94  870.88 3151.47  870.77 3190.99  869.77 3200.23  869.91
 3209.07  870.05 3213.69  870.09 3224.69  868.41 3231.47  867.69 3238.52  866.14
 3238.78  866.06 3242.27  865.02 3245.81  864.21 3249.06  860.98 3251.67  858.29
    3255   853.6    3283  852.59    3311   853.6 3313.58  858.65 3320.95   863.7
 3322.74  864.77 3326.77  867.32 3330.91  868.76 3335.94  871.86 3337.36  872.65
 3339.43  872.69  3348.9  872.86 3350.89  872.87 3355.42  872.86 3365.23  873.15
 3370.84  873.15 3372.36  873.15 3383.01   873.1 3384.79  873.14 3386.69  873.13
 3391.74  873.01 3416.48   872.8 3431.42  872.68 3461.17  872.29 3488.01  871.93
 3518.71   871.8 3557.49     872 3581.53  871.99 3602.06  871.98 3643.27  871.68
 3680.42  872.45 3720.46  872.12 3745.13  872.21 3777.25  872.76 3781.29  872.58
 3788.77  872.55 3799.64  872.43 3823.42  872.43 3825.94  872.45 3835.13  872.47
 3845.57  875.06 3857.51  877.99 3876.19  881.81 3895.65  888.11    3911  893.57
 3912.07  893.94 3922.99  897.42 3944.01  904.06 3945.27  904.39 3972.25  911.52
 3977.71  912.23 4009.99  916.67 4013.77  916.66  4018.6  916.93 4025.78  917.26
 4035.16  918.59  4043.4  919.66 4067.63  922.22 4068.36  922.25

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .07 3245.81     .04 3339.43      .1 3799.64      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3213.69 3339.43         336.672  762.211768.861             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2958.48     890       F
 3677.15 4068.36     890       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  869.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  869.46  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)         *  860.00  * Flow Area (sq ft)      *          * 1197.58  *          *
* E.G. Slope (ft/ft)     *0.000718  * Area (sq ft)           *   14.35  * 1197.58  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *          * 5870.00  *          *
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* Top Width (ft)          *  129.10  * Top Width (ft)          *   14.84  *  114.27  *          *
* Vel Total (ft/s)        *    4.90  * Avg. Vel. (ft/s)        *          *    4.90  *          *
* Max Chl Dpth (ft)       *   16.87  * Hydr. Depth (ft)        *          *   10.48  *          *
* Conv. Total (cfs)       *219005.9  * Conv. (cfs)             *          *219005.9  *          *
* Length Wtd. (ft)        *  781.39  * Wetted Per. (ft)        *          *  125.87  *          *
* Min Ch El (ft)          *  852.59  * Shear (lb/sq ft)        *          *    0.43  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    2.09  *          *
* Frctn Loss (ft)         *    0.56  * Cum Volume (acre-ft)   * 1210.22  * 7535.28  * 1053.12  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  371.46  *  607.66  *  365.37  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  873.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.62  * Wt. n-Val.              *   0.070  *   0.041  *   0.100  *
* W.S. Elev (ft)          *  872.89  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)          *  863.39  * Flow Area (sq ft)      *  399.05  * 1611.63  *  219.38  *
* E.G. Slope (ft/ft)      *0.001079  * Area (sq ft)           * 2719.71  * 1611.63  *  299.91  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             *  414.34  *10393.46  *   92.21  *
* Top Width (ft)          * 3212.49  * Top Width (ft)         * 2638.98  *  125.74  *  447.77  *
* Vel Total (ft/s)        *    4.89  * Avg. Vel. (ft/s)        *    1.04  *    6.45  *    0.42  *
* Max Chl Dpth (ft)       *   20.30  * Hydr. Depth (ft)        *    1.58  *   12.82  *    0.76  *
* Conv. Total (cfs)       *331808.6  * Conv. (cfs)             * 12613.0  *316388.8  *  2806.8  *
* Length Wtd. (ft)        *  847.69  * Wetted Per. (ft)        *  252.77  *  138.27  *  288.12  *
* Min Ch El (ft)          *  852.59  * Shear (lb/sq ft)        *    0.11  *    0.79  *    0.05  *
* Alpha                   *    1.66  * Stream Power (lb/ft s) *    0.11  *    5.06  *    0.02  *
* Frctn Loss (ft)         *    0.64  * Cum Volume (acre-ft)   * 3400.33  *10101.94  * 3252.60  *
* C & E Loss (ft)         *    0.10  * Cum SA (acres)         *  770.23  *  653.53  *  766.89  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  874.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.64  * Wt. n-Val.              *   0.070  *   0.041  *   0.100  *
* W.S. Elev (ft)          *  873.74  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)          *  864.38  * Flow Area (sq ft)      *  614.98  * 1718.07  *  497.07  *
* E.G. Slope (ft/ft)      *0.001094  * Area (sq ft)           * 5049.65  * 1718.07  *  714.20  *
* Q Total (cfs)           *12600.00  * Flow (cfs)             *  775.21  *11508.72  *  316.07  *
* Top Width (ft)          * 3414.99  * Top Width (ft)         * 2788.45  *  125.74  *  500.80  *
* Vel Total (ft/s)        *    4.45  * Avg. Vel. (ft/s)        *    1.26  *    6.70  *    0.64  *
* Max Chl Dpth (ft)       *   21.15  * Hydr. Depth (ft)        *    2.41  *   13.66  *    1.47  *
* Conv. Total (cfs)       *380961.7  * Conv. (cfs)             * 23438.5  *347966.7  *  9556.5  *
* Length Wtd. (ft)        *  863.39  * Wetted Per. (ft)        *  255.62  *  138.27  *  337.74  *
* Min Ch El (ft)          *  852.59  * Shear (lb/sq ft)        *    0.16  *    0.85  *    0.10  *
* Alpha                   *    2.07  * Stream Power (lb/ft s) *    0.21  *    5.68  *    0.06  *
* Frctn Loss (ft)         *    0.62  * Cum Volume (acre-ft)   * 4665.81  *11873.79  * 4682.51  *
* C & E Loss (ft)         *    0.12  * Cum SA (acres)         *  888.60  *  681.93  *  943.96  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  876.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.72  * Wt. n-Val.              *   0.070  *   0.042  *   0.100  *
* W.S. Elev (ft)          *  875.95  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)          *  868.07  * Flow Area (sq ft)      * 1180.70  * 1996.79  * 1245.68  *
* E.G. Slope (ft/ft)      *0.001204  * Area (sq ft)           *11333.21  * 1996.79  * 1834.24  *
* Q Total (cfs)           *19100.00  * Flow (cfs)             * 2411.99  *15154.81  * 1533.20  *
* Top Width (ft)          * 3526.37  * Top Width (ft)         * 2890.86  *  125.74  *  509.78  *
* Vel Total (ft/s)        *    4.32  * Avg. Vel. (ft/s)        *    2.04  *    7.59  *    1.23  *
* Max Chl Dpth (ft)       *   23.36  * Hydr. Depth (ft)        *    4.63  *   15.88  *    3.69  *
* Conv. Total (cfs)       *550450.9  * Conv. (cfs)             * 69512.2  *436752.8  * 44185.9  *
* Length Wtd. (ft)        *  892.03  * Wetted Per. (ft)        *  255.62  *  138.27  *  337.74  *
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* Min Ch El (ft)         *  852.59  * Shear (lb/sq ft)       *    0.35  *    1.09  *    0.28  *
* Alpha                  *    2.49  * Stream Power (lb/ft s) *    0.71  *    8.24  *    0.34  *
* Frctn Loss (ft)        *    0.63  * Cum Volume (acre-ft)   * 7676.20  *14037.43  * 7898.65  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         * 1141.35  *  705.22  * 1183.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  878.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.070  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  877.95  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)         *  873.68  * Flow Area (sq ft)      * 1691.44  * 2248.44  * 1921.56  *
* E.G. Slope (ft/ft)     *0.001355  * Area (sq ft)           *17158.34  * 2248.44  * 2862.60  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4657.77  *19293.01  * 3349.22  *
* Top Width (ft)         * 3575.56  * Top Width (ft)         * 2931.89  *  125.74  *  517.93  *
* Vel Total (ft/s)       *    4.66  * Avg. Vel. (ft/s)       *    2.75  *    8.58  *    1.74  *
* Max Chl Dpth (ft)      *   25.36  * Hydr. Depth (ft)       *    6.63  *   17.88  *    5.69  *
* Conv. Total (cfs)      *741727.8  * Conv. (cfs)            *126549.4  *524181.7  * 90996.7  *
* Length Wtd. (ft)       *  906.95  * Wetted Per. (ft)       *  255.62  *  138.27  *  337.74  *
* Min Ch El (ft)         *  852.59  * Shear (lb/sq ft)       *    0.56  *    1.38  *    0.48  *
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    1.54  *   11.80  *    0.84  *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   *12450.28  *17150.98  *13018.75  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         * 1609.64  *  733.55  * 1669.06  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  880.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.070  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  879.15  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)         *  874.78  * Flow Area (sq ft)      * 1997.76  * 2399.36  * 2326.91  *
* E.G. Slope (ft/ft)     *0.001417  * Area (sq ft)           *20707.76  * 2399.36  * 3487.74  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 6287.71  *21828.99  * 4713.30  *
* Top Width (ft)         * 3619.89  * Top Width (ft)         * 2970.38  *  125.74  *  523.77  *
* Vel Total (ft/s)       *    4.88  * Avg. Vel. (ft/s)       *    3.15  *    9.10  *    2.03  *
* Max Chl Dpth (ft)      *   26.56  * Hydr. Depth (ft)       *    7.83  *   19.08  *    6.89  *
* Conv. Total (cfs)      *871997.3  * Conv. (cfs)            *167007.8  *579799.6  *125189.8  *
* Length Wtd. (ft)       *  913.81  * Wetted Per. (ft)       *  255.62  *  138.27  *  337.74  *
* Min Ch El (ft)         *  852.59  * Shear (lb/sq ft)       *    0.69  *    1.54  *    0.61  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    2.18  *   13.97  *    1.23  *
* Frctn Loss (ft)        *    0.70  * Cum Volume (acre-ft)   *16625.53  *19045.19  *17518.01  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         * 1935.41  *  740.76  * 2122.50  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  881.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *   0.070  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  880.33  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)         *  875.67  * Flow Area (sq ft)      * 2296.96  * 2546.77  * 2722.84  *
* E.G. Slope (ft/ft)     *0.001473  * Area (sq ft)           *24194.14  * 2546.77  * 4105.15  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 8087.22  *24420.37  * 6242.41  *
* Top Width (ft)         * 3633.47  * Top Width (ft)         * 2978.23  *  125.74  *  529.50  *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *    3.52  *    9.59  *    2.29  *
* Max Chl Dpth (ft)      *   27.74  * Hydr. Depth (ft)       *    9.00  *   20.25  *    8.06  *
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* Conv. Total (cfs)      *1009778.0  * Conv. (cfs)            *210743.1  *636365.3  *162669.8  *
* Length Wtd. (ft)       *  919.38  * Wetted Per. (ft)       *  255.62  *  138.27  *  337.74  *
* Min Ch El (ft)         *  852.59  * Shear (lb/sq ft)       *    0.83  *    1.69  *    0.74  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    2.91  *   16.24  *    1.70  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   *20728.11  *20408.15  *22070.06  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         * 2158.23  *  741.71  * 2569.87  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  882.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.070  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  881.81  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)         *  876.68  * Flow Area (sq ft)      * 2676.88  * 2733.95  * 3225.58  *
* E.G. Slope (ft/ft)     *0.001517  * Area (sq ft)           *28636.31  * 2733.95  * 4898.81  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *10593.17  *27703.88  * 8402.95  *
* Top Width (ft)         * 3652.34  * Top Width (ft)         * 2989.82  *  125.74  *  536.77  *
* Vel Total (ft/s)       *    5.41  * Avg. Vel. (ft/s)       *    3.96  *   10.13  *    2.61  *
* Max Chl Dpth (ft)      *   29.22  * Hydr. Depth (ft)       *   10.49  *   21.74  *    9.55  *
* Conv. Total (cfs)      *1199047.0  * Conv. (cfs)            *271985.2  *711311.4  *215750.1  *
* Length Wtd. (ft)       *  925.19  * Wetted Per. (ft)       *  255.62  *  138.27  *  337.74  *
* Min Ch El (ft)         *  852.59  * Shear (lb/sq ft)       *    0.99  *    1.87  *    0.90  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    3.92  *   18.97  *    2.36  *
* Frctn Loss (ft)        *    0.74  * Cum Volume (acre-ft)   *27676.34  *22395.26  *29546.04  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         * 2494.88  *  744.14  * 2998.69  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  876.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.070  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  876.21  * Reach Len. (ft)        *  336.67  *  762.21  * 1768.86  *
* Crit W.S. (ft)         *  868.63  * Flow Area (sq ft)      * 1247.49  * 2029.70  * 1334.07  *
* E.G. Slope (ft/ft)     *0.001228  * Area (sq ft)           *12090.42  * 2029.70  * 1967.79  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2670.15  *15693.86  * 1735.99  *
* Top Width (ft)         * 3532.16  * Top Width (ft)         * 2895.58  *  125.74  *  510.84  *
* Vel Total (ft/s)       *    4.36  * Avg. Vel. (ft/s)       *    2.14  *    7.73  *    1.30  *
* Max Chl Dpth (ft)      *   23.62  * Hydr. Depth (ft)       *    4.89  *   16.14  *    3.95  *
* Conv. Total (cfs)      *573524.7  * Conv. (cfs)            * 76189.0  *447801.8  * 49533.9  *
* Length Wtd. (ft)       *  894.28  * Wetted Per. (ft)       *  255.62  *  138.27  *  337.74  *
* Min Ch El (ft)         *  852.59  * Shear (lb/sq ft)       *    0.37  *    1.13  *    0.30  *
* Alpha                  *    2.50  * Stream Power (lb/ft s) *    0.80  *    8.70  *    0.39  *
* Frctn Loss (ft)        *    0.64  * Cum Volume (acre-ft)   * 8706.05  *15006.99  * 9041.64  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         * 1250.18  *  715.54  * 1266.15  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 32.316

INPUT
Description:
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Station Elevation Data num= 404

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	908.96	27.32	908.49	39.92	907.91	64.27	906.29	89.28	904.48
100.81	903.62	107.78	903.04	129.92	901.04	157.16	899.78	163.31	898.77
171.25	897.21	196.23	892.38	208.84	889.69	222.16	886.1	230.81	883.62
259.25	875.81	281.24	869.88	301.06	874.12	304.93	875.07	315.48	872.44
323.79	870.07	336.4	876.39	340.18	878.16	349.89	878.34	366.01	878.64
368.19	878.24	371.88	877.78	391.16	874.94	409.45	871.87	418.19	871.89
435.74	871.9	445.67	871.9	458.55	871.88	466.86	871.87	475.38	872.71
495.58	874.96	500.61	875.02	517.47	873.59	533.7	872.1	536.43	872.12
540.56	872.13	574.56	872.27	599.9	872.28	602.74	872.23	623.52	871.65
650.73	871.58	656.03	871.59	661.27	871.57	693.98	871.57	711.19	871.84
714.25	871.8	726.88	871.98	736.88	871.96	739.62	871.1	742.06	870.3
743.73	870.76	746.14	871.42	747.86	871.91	758.83	871.92	772.01	871.94
786.32	871.92	796.04	871.81	806.43	871.71	819.51	871.6	822.58	871.56
835.99	871.66	836.02	871.66	836.1	871.68	850.38	874.22	861.3	874.43
863.64	874.48	867.09	874.68	872.08	874.96	879.84	875.77	879.9	875.78
879.94	875.78	880.06	875.77	884.94	875.43	889.83	875.56	895.17	875.7
896.35	875.58	898.3	875.37	904.35	875.16	910.29	874.96	915.65	873.62
940.54	867.53	944.51	868.28	957.66	870.86	967.28	871.29	974.01	871.47
1001.31	871.87	1022.02	871.66	1032.49	871.55	1050.55	871.55	1068.5	871.58
1075.98	871.63	1090.3	871.6	1120.33	871	1125.83	870.92	1134.44	870.75
1162.49	870.29	1173.3	870.3	1193.24	870.33	1212.3	870.48	1216.47	870.57
1226.92	870.6	1255.04	870.8	1271.04	870.81	1288.69	871.05	1316.68	870.72
1316.82	870.71	1316.99	870.71	1341.67	871.05	1364.61	871.29	1377.75	871.44
1407.93	871.42	1413.09	871.4	1415.81	871.38	1445.92	871.29	1465.77	871.6
1471.52	871.52	1491.13	871.59	1505.84	871.65	1515.87	871.73	1539.51	871.95
1569.81	871.86	1574.02	871.85	1592.46	871.89	1612.64	871.97	1634.91	872.06
1670.08	872.06	1671.09	872.06	1671.43	872.06	1674.61	872.07	1711.83	872.16
1716.54	872.21	1719.58	871.31	1720.76	870.95	1726.09	872.55	1726.39	872.64
1726.96	872.81	1728.48	872.81	1748.76	872.78	1749.06	872.7	1754.97	871.14
1760.09	871.97	1761.89	872.34	1764.74	872.3	1769.27	872.24	1774.81	872.2
1780.2	872.48	1782.59	872.57	1801.33	872.23	1802.39	872.22	1804.85	872.2
1823.54	872.25	1827.5	872.26	1838.27	872.34	1845.14	872.27	1863.89	872.3
1870.9	872.27	1878.78	872.28	1884.18	872.29	1913.35	872.3	1936.85	872.3
1972.32	872.65	1983.49	872.57	2006.54	872.1	2040.93	872.23	2046.25	872.19
2056.16	872.16	2086.12	872.13	2098.27	872.23	2127.93	872.38	2134.33	872.51
2146.76	872.38	2170.75	872.29	2185.02	872.14	2221.75	872.18	2233.37	871.44
2239.39	871.36	2248.23	873.31	2250.54	873.94	2257.46	873.08	2265.04	872.36
2273.54	871.19	2306.01	871.19	2326.27	871.19	2326.95	871.19	2327.19	871.19
2329.03	872.12	2332.97	873.94	2335.81	873.24	2342.83	871.36	2345.23	871.2
2371.44	871.15	2381.21	871.07	2386.15	870.98	2391.84	870.97	2400.54	870.93
2427.49	870.76	2437.37	870.72	2479.47	870.66	2481.11	870.66	2482.47	870.67
2512.39	871.02	2538.41	871.15	2550.61	871.2	2559.52	871.07	2569.66	870.87
2575.8	871.26	2587.2	871.59	2605.69	871.71	2644.5	871.83	2644.55	871.83
2644.57	871.83	2644.83	871.83	2679.14	871.7	2689.99	872.12	2702.57	872.77
2706.75	872.83	2739.21	873.16	2757.59	873.35	2761.45	873.37	2769.61	873.34
2793.41	873.28	2808.66	873.53	2836.77	873.97	2840.78	873.98	2844.86	874.06
2849.09	874.1	2868.15	874.27	2885.83	873.9	2927.21	872.67	2986.69	872.21
2996.92	872.09	3024.75	872.11	3037.21	871.68	3046.08	871.36	3063.43	871.03
3075.86	870.41	3088.93	870.74	3096.58	871.06	3133.73	871.26	3188.69	871.43
3213.4	870.39	3248.14	868.84	3251.92	868.66	3255.53	868.52	3263.67	868.23
3302.19	867.1	3318.79	866.4	3331.74	866.28	3333.36	866.26	3345.95	866.6
3358.25	867.04	3373.06	867.03	3380.58	867.51	3385.46	867.46	3392.56	867.76
3394.3	867.57	3397.46	866.93	3402.13	864.99	3406.37	861.18	3407.66	860.03
3411.91	856.88	3417	855.4	3445	854.44	3473	855.4	3478.61	856.94
3483.91	861.23	3489.88	864.15	3493.72	868.02	3506.4	868.49	3516.78	868.86
3519.13	868.91	3526.72	869.06	3530.75	869.09	3556.69	869.14	3584.62	869.18
3589.83	869.22	3633.54	866.65	3637.58	866.41	3639.04	866.33	3640.65	866.24
3654.44	865.47	3660.54	865.07	3685.01	866.32	3691.31	866.55	3705.58	867.3
3718.72	867.77	3778.25	868.27	3787.8	868.46	3806.75	869.09	3809.99	869.18
3814.01	869.29	3855.13	870.28	3861.44	870.46	3881.63	870.93	3892.88	871.53
3912.28	871.71	3920.94	871.72	3932.11	871.74	3946.24	871.88	3971.2	871.78
4018.71	871.67	4072.82	871.53	4096.42	871.44	4115.91	871.42	4181.28	871.29
4230.6	871.38	4248.76	871.4	4293.89	871.42	4352.29	871.3	4369.02	871.26
4432.05	871.26	4522.65	872.67	4531.14	872.76	4544.18	872.79	4613.58	873.62
4629.56	873.97	4645.5	874.39	4649.66	874.48	4654.54	874.59	4662.18	875.53
4666.82	876.17	4671.85	876.64	4677.47	877.12	4685.03	877.8	4688.62	878.12
4695.02	879.44	4709.02	882.22	4713.06	882.63	4716.72	882.99	4724.17	883.76
4730.65	884.57	4740.23	886.7	4745.94	887.67	4750.26	888.5	4753.71	889.09
4757.99	889.88	4765.37	891.06	4766.14	891.09	4767.84	891.28	4776.38	891.99
4779.42	892.17	4780.63	892.28	4785.43	892.71	4789.25	892.34	4790.69	892.16
4793.08	891.97	4795.62	891.97	4799.8	891.59	4800.43	891.59	4802.33	891.66
4802.53	891.67	4805.69	892.27	4806.77	892.33	4808.13	892.39	4809.19	892.29
4810.92	892.55	4811.89	892.47	4817.98	892.35	4818.8	892.33	4820.01	892.27

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 4828.82  892.28 4837.64  892.28 4842.35  892.28 4847.87  892.28 4863.37  892.39
 4871.91   892.4 4884.74  892.42 4892.31  892.43 4894.77  893.28 4897.18  893.94
 4901.03  894.13 4904.83  894.23  4913.2  894.75 4918.01  895.05 4920.81  895.09
 4928.61  895.29 4939.48  896.05 4948.85  897.18 4958.17  897.87 4967.88  898.78
 4970.11  898.88 4979.61  899.98  4986.3  901.01 5026.28  905.27 5046.61  907.53
 5076.24  909.04 5102.09  910.03 5108.85  910.57 5120.11  911.55 5123.54  911.49
  5127.2  911.27 5144.75  912.34 5148.86  912.59 5154.92  912.92 5197.45  914.76
  5211.3  915.36 5224.28  916.11 5242.41  917.38 5245.26  917.56

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .07  3394.3     .04 3493.72     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        3394.3 3493.72         160.7025  930.12  496.86             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2837.37     886       F
 3935.25 5245.26     886       F

CROSS SECTION OUTPUT  Profile #2-yr
**************************************************************************************************
* E.G. Elev (ft)         *  869.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  868.93  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  861.29  * Flow Area (sq ft)      *  246.44  * 1121.20  *  343.54  *
* E.G. Slope (ft/ft)     *0.000724  * Area (sq ft)           *  255.64  * 1121.20  *  343.54  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  197.48  * 5365.34  *  307.18  *
* Top Width (ft)         *  494.69  * Top Width (ft)         *  161.30  *   99.42  *  233.97  *
* Vel Total (ft/s)       *    3.43  * Avg. Vel. (ft/s)       *    0.80  *    4.79  *    0.89  *
* Max Chl Dpth (ft)      *   14.49  * Hydr. Depth (ft)       *    1.66  *   11.28  *    1.47  *
* Conv. Total (cfs)      *218109.1  * Conv. (cfs)            *  7337.7  *199357.5  * 11413.9  *
* Length Wtd. (ft)       *  894.83  * Wetted Per. (ft)       *  148.35  *  107.07  *  234.17  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.08  *    0.47  *    0.07  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.06  *    2.27  *    0.06  *
* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)   * 1209.18  * 7514.99  * 1046.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  370.78  *  605.79  *  360.62  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**************************************************************************************************
* E.G. Elev (ft)         *  872.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  872.48  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  864.32  * Flow Area (sq ft)      * 1130.78  * 1473.93  * 1672.00  *
* E.G. Slope (ft/ft)     *0.000562  * Area (sq ft)           * 3008.17  * 1473.93  * 2232.12  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 1062.67  * 7453.97  * 2383.37  *
* Top Width (ft)         * 3653.09  * Top Width (ft)         * 2536.84  *   99.42  * 1016.83  *
* Vel Total (ft/s)       *    2.55  * Avg. Vel. (ft/s)       *    0.94  *    5.06  *    1.43  *
* Max Chl Dpth (ft)      *   18.04  * Hydr. Depth (ft)       *    2.55  *   14.83  *    3.79  *
* Conv. Total (cfs)      *459900.1  * Conv. (cfs)            * 44836.7  *314502.9  *100560.5  *
* Length Wtd. (ft)       *  767.15  * Wetted Per. (ft)       *  442.93  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.09  *    0.48  *    0.13  *
* Alpha                  *    2.77  * Stream Power (lb/ft s) *    0.08  *    2.44  *    0.19  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   * 3378.19  *10074.94  * 3201.19  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  750.23  *  651.56  *  737.15  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**************************************************************************************************
* E.G. Elev (ft)         *  873.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  873.39  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  865.17  * Flow Area (sq ft)      * 1563.12  * 1564.57  * 2074.53  *
* E.G. Slope (ft/ft)     *0.000501  * Area (sq ft)           * 5455.54  * 1564.57  * 3198.08  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1605.08  * 7771.84  * 3223.08  *
* Top Width (ft)         * 4021.18  * Top Width (ft)         * 2820.85  *   99.42  * 1100.91  *
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* Vel Total (ft/s)       *    2.42  * Avg. Vel. (ft/s)       *    1.03  *    4.97  *    1.55  *
* Max Chl Dpth (ft)      *   18.95  * Hydr. Depth (ft)       *    3.18  *   15.74  *    4.70  *
* Conv. Total (cfs)      *563207.1  * Conv. (cfs)            * 71745.5  *347393.2  *144068.3  *
* Length Wtd. (ft)       *  732.55  * Wetted Per. (ft)       *  491.63  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.10  *    0.46  *    0.15  *
* Alpha                  *    2.72  * Stream Power (lb/ft s) *    0.10  *    2.27  *    0.23  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 4625.22  *11845.07  * 4603.07  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  866.92  *  679.96  *  911.44  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  875.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  875.66  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  869.93  * Flow Area (sq ft)      * 2787.23  * 1790.06  * 3075.98  *
* E.G. Slope (ft/ft)     *0.000465  * Area (sq ft)           *12211.35  * 1790.06  * 5804.62  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 3732.45  * 9377.06  * 5990.48  *
* Top Width (ft)         * 4347.35  * Top Width (ft)         * 3078.52  *   99.42  * 1169.41  *
* Vel Total (ft/s)       *    2.50  * Avg. Vel. (ft/s)       *    1.34  *    5.24  *    1.95  *
* Max Chl Dpth (ft)      *   21.22  * Hydr. Depth (ft)       *    5.00  *   18.01  *    6.97  *
* Conv. Total (cfs)      *885615.4  * Conv. (cfs)            *173063.7  *434789.2  *277762.5  *
* Length Wtd. (ft)       *  663.03  * Wetted Per. (ft)       *  557.15  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.15  *    0.49  *    0.20  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.19  *    2.54  *    0.39  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 7585.21  *14004.30  * 7743.55  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1118.29  *  703.25  * 1149.26  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  877.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  877.68  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  871.60  * Flow Area (sq ft)      * 3910.68  * 1990.62  * 3966.64  *
* E.G. Slope (ft/ft)     *0.000479  * Area (sq ft)           *18456.00  * 1990.62  * 8182.70  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 6658.92  *11355.58  * 9285.50  *
* Top Width (ft)         * 4397.82  * Top Width (ft)         * 3108.44  *   99.42  * 1189.96  *
* Vel Total (ft/s)       *    2.77  * Avg. Vel. (ft/s)       *    1.70  *    5.70  *    2.34  *
* Max Chl Dpth (ft)      *   23.24  * Hydr. Depth (ft)       *    7.02  *   20.02  *    8.98  *
* Conv. Total (cfs)      *1247661.0  * Conv. (cfs)            *304325.2  *518971.2  *424364.5  *
* Length Wtd. (ft)       *  618.67  * Wetted Per. (ft)       *  557.15  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.21  *    0.56  *    0.27  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    0.36  *    3.17  *    0.63  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *12312.65  *17113.89  *12794.49  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1586.30  *  731.58  * 1634.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  879.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  878.89  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  872.85  * Flow Area (sq ft)      * 4585.90  * 2111.15  * 4501.95  *
* E.G. Slope (ft/ft)     *0.000483  * Area (sq ft)           *22246.08  * 2111.15  * 9631.75  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 8724.73  *12584.13  *11521.14  *
* Top Width (ft)         * 4444.33  * Top Width (ft)         * 3146.27  *   99.42  * 1198.64  *
* Vel Total (ft/s)       *    2.93  * Avg. Vel. (ft/s)       *    1.90  *    5.96  *    2.56  *
* Max Chl Dpth (ft)      *   24.45  * Hydr. Depth (ft)       *    8.23  *   21.23  *   10.20  *
* Conv. Total (cfs)      *1493292.0  * Conv. (cfs)            *396849.3  *572396.4  *524045.9  *
* Length Wtd. (ft)       *  598.63  * Wetted Per. (ft)       *  557.15  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.25  *    0.59  *    0.31  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    0.47  *    3.55  *    0.79  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *16459.53  *19005.73  *17251.63  *
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* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1911.78  *  738.79  * 2087.52  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  880.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  880.08  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  873.45  * Flow Area (sq ft)      * 5245.66  * 2228.93  * 5025.00  *
* E.G. Slope (ft/ft)     *0.000489  * Area (sq ft)           *25975.81  * 2228.93  *11055.13  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *10978.20  *13854.93  *13916.87  *
* Top Width (ft)         * 4454.51  * Top Width (ft)         * 3150.58  *   99.42  * 1204.50  *
* Vel Total (ft/s)       *    3.10  * Avg. Vel. (ft/s)       *    2.09  *    6.22  *    2.77  *
* Max Chl Dpth (ft)      *   25.64  * Hydr. Depth (ft)       *    9.42  *   22.42  *   11.38  *
* Conv. Total (cfs)      *1752502.0  * Conv. (cfs)            *496498.4  *626601.1  *629402.3  *
* Length Wtd. (ft)       *  582.66  * Wetted Per. (ft)       *  557.15  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.29  *    0.64  *    0.35  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.60  *    3.95  *    0.96  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *20534.23  *20366.37  *21762.25  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 2134.55  *  739.74  * 2534.66  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  881.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  881.59  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  874.13  * Flow Area (sq ft)      * 6086.28  * 2378.99  * 5691.45  *
* E.G. Slope (ft/ft)     *0.000490  * Area (sq ft)           *30735.43  * 2378.99  *12878.95  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *14083.70  *15465.51  *17150.79  *
* Top Width (ft)         * 4467.60  * Top Width (ft)         * 3156.08  *   99.42  * 1212.10  *
* Vel Total (ft/s)       *    3.30  * Avg. Vel. (ft/s)       *    2.31  *    6.50  *    3.01  *
* Max Chl Dpth (ft)      *   27.15  * Hydr. Depth (ft)       *   10.93  *   23.93  *   12.89  *
* Conv. Total (cfs)      *2109140.0  * Conv. (cfs)            *636070.5  *698477.9  *774591.0  *
* Length Wtd. (ft)       *  565.61  * Wetted Per. (ft)       *  557.15  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.33  *    0.68  *    0.39  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.77  *    4.42  *    1.19  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *27446.90  *22350.53  *29185.09  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 2471.13  *  742.17  * 2963.18  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  876.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  875.92  * Reach Len. (ft)        *  160.70  *  930.12  *  496.86  *
* Crit W.S. (ft)         *  870.16  * Flow Area (sq ft)      * 2933.94  * 1816.25  * 3192.29  *
* E.G. Slope (ft/ft)     *0.000468  * Area (sq ft)           *13023.78  * 1816.25  * 6112.92  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 4076.72  * 9633.10  * 6390.18  *
* Top Width (ft)         * 4357.21  * Top Width (ft)         * 3086.47  *   99.42  * 1171.32  *
* Vel Total (ft/s)       *    2.53  * Avg. Vel. (ft/s)       *    1.39  *    5.30  *    2.00  *
* Max Chl Dpth (ft)      *   21.48  * Hydr. Depth (ft)       *    5.27  *   18.27  *    7.23  *
* Conv. Total (cfs)      *929441.3  * Conv. (cfs)            *188511.1  *445442.9  *295487.2  *
* Length Wtd. (ft)       *  656.28  * Wetted Per. (ft)       *  557.15  *  107.07  *  441.79  *
* Min Ch El (ft)         *  854.44  * Shear (lb/sq ft)       *    0.15  *    0.50  *    0.21  *
* Alpha                  *    2.37  * Stream Power (lb/ft s) *    0.21  *    2.63  *    0.42  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 8608.99  *14973.34  * 8877.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1227.06  *  713.57  * 1231.99  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION
```

RIVER: Blue River
REACH: Main RS: 32.140

INPUT
Description: Ineffective area - contraction due to road embankment downstream.
Station Elevation Data num= 423

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	901.78	16.52	901.15	32.14	901.58	42.44	901.51	54.29	901.72
75.66	901.23	91.7	901.22	105.35	901.39	118.49	901.41	136.79	900.74
154.44	900.41	167.35	900.03	170.71	899.78	185.03	897.85	208.64	893.2
224.49	889.69	226.65	889.12	261.14	878.54	275.34	872.11	277.48	869.88
285.28	870.89	297.09	875.51	310.69	875.17	314.19	875.07	316.31	874.46
329.43	870.07	343.65	870.07	350.8	870.07	355.97	870.07	360.18	870.07
372.69	870.79	381.35	871.23	417.63	873.1	417.81	873.18	422.42	875.17
426.54	875.32	452.42	873.02	463.73	872.09	467.52	872.1	477.34	872.13
486.42	872.04	512.36	871.82	538.09	871.59	550.69	871.55	559.52	871.49
595.18	871.43	599.79	871.43	606.04	871.44	641.16	871.45	644.22	871.43
650.02	871.79	653.43	871.96	665.38	871.68	667.79	871.67	671.35	871.63
673.7	871.62	721.8	871.93	724.99	871.89	730.34	871.94	748.48	871.96
750.32	871.09	752.11	870.3	755.2	871.22	756.81	871.7	757.52	871.91
765.88	871.78	793.91	871.24	809.25	871.37	848.32	871.56	858.17	871.66
858.56	871.66	860.26	871.92	869.67	873.34	876.02	874.22	883.31	874.4
886.11	874.48	891.71	874.82	894.08	874.96	898.54	875.44	901.68	875.78
904.33	875.58	906.15	875.43	910.48	875.34	917.33	875.18	925.48	874.96
958.99	868.35	963.46	867.53	965.15	867.87	980.06	870.86	983.09	870.85
1006.7	870.84	1035.95	870.86	1045.38	870.89	1064.49	871.12	1083.6	870.89
1100.02	870.71	1135.34	870.67	1136.66	870.66	1138.78	870.65	1167.42	870.45
1183.05	870.3	1190.38	870.2	1214.15	869.91	1229.19	869.75	1234.71	869.73
1261.68	869.99	1284.28	870.65	1298.01	870.66	1313.3	870.3	1330.27	870.44
1351.67	870.7	1383.71	870.63	1384.17	870.63	1384.47	870.64	1420.21	871.21
1430.99	871.36	1438.46	871.5	1457.76	871.57	1470.08	871.63	1477.79	871.61
1509.9	871.59	1535.68	871.7	1544.98	871.74	1558.33	871.79	1567.88	871.82
1576.15	871.84	1602.55	871.84	1627.85	871.95	1635.58	871.98	1640.99	871.97
1670.11	871.89	1679.62	872.04	1688.29	872.17	1691.01	872.21	1691.76	872.01
1695.49	870.95	1697	871.44	1701.26	872.81	1713.48	872.79	1722.79	872.78
1728.21	871.38	1729.13	871.14	1732.53	871.95	1734.22	872.34	1747.9	872.42
1756.47	872.46	1770.35	872.36	1792.79	872.21	1804.11	872.21	1818.7	872.23
1849.43	872.26	1849.46	872.26	1849.51	872.26	1882.98	872.25	1902.87	872.26
1920.33	872.27	1939.54	872.17	1944.1	872.16	1947.1	872.14	1977.72	872.12
1999.68	872.18	2009.69	872.21	2013.44	872.21	2031.39	872.29	2045.83	872.36
2052.77	872.37	2071.9	872.37	2098.21	872.62	2103.47	872.62	2105.89	872.61
2114.17	872.71	2138.05	872.76	2151.71	872.8	2157.41	872.59	2170.1	872.92
2189.34	872.91	2195.75	872.95	2201.21	872.92	2229.13	872.99	2250.05	872.93
2266.55	872.79	2290.73	872.35	2296.42	872.31	2299.62	872.19	2323.45	871.83
2346.85	871.25	2355.01	871.02	2374.04	870.89	2395.23	870.79	2403.69	870.74
2425.19	870.89	2444.09	870.94	2457.54	870.86	2477.97	870.59	2497.75	870.72
2521.73	870.74	2536.62	870.75	2540.73	870.76	2551.12	870.72	2553	870.72
2556.32	870.64	2573.29	870.52	2602.72	870.89	2613.12	870.86	2633.07	871.06
2653.85	871.17	2668.89	871.32	2678.94	871.35	2691.68	871.6	2715.19	871.95
2724.32	872.08	2755.04	872.27	2765.37	872.38	2777.7	872.57	2803.63	873.03
2818.6	873.22	2824.03	872.88	2838.6	873.09	2862.25	873.26	2865.29	873.27
2958.5	871.53	2966.81	871.4	2982.14	871.38	3006.36	871.04	3056.72	870.12
3063.85	870.13	3133.74	869.62	3137.14	869.53	3142.23	869.55	3202.89	869.73
3221.35	869.51	3243.2	868.96	3250.9	868.86	3254.59	868.85	3256.94	868.81
3272.76	868.52	3275.11	868.75	3277.55	868.97	3279.06	868.97	3283.23	868.89
3287.62	867.92	3296.55	865.09	3308.75	864.88	3316.89	864.85	3329.17	866.68
3341.01	868.43	3345.25	868.66	3351.93	869.14	3360.85	869	3362.57	868.98
3363.47	868.96	3466.68	869.64	3467.29	869.65	3467.56	869.65	3468.25	869.64
3470.66	869.65	3507.56	869.54	3509.68	869.55	3547.69	869.46	3578.24	868.81
3603.25	869.18	3616.52	869.34	3631.68	869.46	3646.23	869.43	3692.75	869.37
3711.22	869.37	3763.39	868.99	3778.2	868.62	3826.17	867.91	3938.69	866.53
3971.41	866.52	4002.47	866.66	4007.78	866.68	4011.83	866.99	4017.58	867.35
4018.02	867.38	4018.24	867.38	4067.96	868.51	4069.58	868.56	4083.99	861.04
4086.68	859.59	4092.65	856.37	4100	854.5	4130	853.83	4160	854.5
4168.17	856.37	4169.14	856.61	4171.81	856.88	4174.98	859.58	4175.19	859.71
4175.42	859.89	4183.41	866.7	4186.7	867.15	4191.83	867.86	4196.35	868.48
4199.07	869.15	4202.48	870.48	4215.05	871.8	4215.89	871.86	4216.85	871.65
4225.87	869.69	4235.19	868.82	4239.54	868.55	4241.07	868.21	4245.82	867.57
4250.02	868.52	4252.17	869.04	4261.63	869.14	4263.54	869.2	4271.55	869.44
4275.46	869.12	4278.95	868.86	4280.17	868.89	4285.97	869.29	4297	869.96
4301.83	870.24	4303.5	870.31	4304.66	870.36	4318.91	871.16	4319.37	871.21
4319.4	871.2	4319.45	871.2	4333.42	872.16	4336.63	872.1	4349.06	871.91
4364.51	872.04	4368.23	872.17	4371.86	872.2	4386.46	872.7	4392.05	872.55
4396.81	872.21	4397.96	872.17	4398.56	872.17	4400.37	872.34	4404.06	872.55
4406.51	872.71	4411.22	872.98	4417.46	873.07	4423.18	873.34	4425.12	872.97

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 4426.96  872.56  4429.6  873.05 4432.14  873.26 4432.82  873.26 4434.06  873.27
 4453.79     874 4455.32  874.06 4467.57  873.47 4469.16  873.13 4470.07  873.65
 4471.29   874.2 4471.76  874.43 4472.18   874.6 4477.56  874.84 4480.57  874.94
 4482.83  875.03 4485.04  875.08 4494.95  877.33 4497.19  877.82 4498.32  877.93
 4509.96  879.09 4515.14  878.84 4515.92  878.84 4517.63  879.01 4522.44  879.54
 4528.68  880.54 4537.56  881.92 4550.21  883.94  4556.9  884.89 4570.66  885.64
 4587.56  886.23 4601.54  886.22 4626.91   886.2 4647.31  886.74 4673.29  887.76
 4698.11   888.1 4708.62  888.46 4727.07  888.77 4728.21  888.78 4732.68  888.84
 4741.57   888.9 4765.12  889.17 4773.57  889.41 4791.39  889.71  4794.1  889.82
 4826.74  891.16 4854.87  892.39 4887.38  893.93  4897.7  894.45 4904.42  895.09
  4927.8  896.67 4928.86  896.71 4929.65  896.73 4930.97  896.81  4943.7  897.28
 4951.42  897.97 4963.44  898.83 4982.72  899.75 4983.91  899.81  4984.4  899.83
 4997.75  899.03 5000.73  898.76 5006.07  899.41 5006.63  899.48 5007.04  899.54
 5014.98  900.01 5023.64  900.52 5032.71  901.09 5044.21  901.73 5053.19  901.52
 5058.29  901.36  5063.4  902.99 5074.15  905.63 5087.94  906.65 5100.74  906.86
 5145.11  911.19 5146.92  911.34 5148.82   911.5 5169.42  913.46 5193.78  915.81
 5197.16  916.12 5205.17  916.76 5206.49  916.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0     .07 4069.58     .04  4186.7     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4069.58  4186.7         297.9375 1815.96 800.982             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 3702.42     885       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  868.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  868.38  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  860.09  * Flow Area (sq ft)      *  299.65  * 1313.39  *    9.34  *
* E.G. Slope (ft/ft)     *0.000586  * Area (sq ft)           *  432.66  * 1313.39  *    9.34  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  165.88  * 5700.46  *    3.65  *
* Top Width (ft)         *  466.84  * Top Width (ft)         *  332.02  *  116.78  *   18.04  *
* Vel Total (ft/s)       *    3.62  * Avg. Vel. (ft/s)       *    0.55  *    4.34  *    0.39  *
* Max Chl Dpth (ft)      *   14.55  * Hydr. Depth (ft)       *    1.12  *   11.25  *    0.52  *
* Conv. Total (cfs)      *242448.5  * Conv. (cfs)            *  6851.5  *235446.2  *   150.9  *
* Length Wtd. (ft)       * 1794.15  * Wetted Per. (ft)       *  268.04  *  123.89  *   18.28  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)       *    0.04  *    0.39  *    0.02  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.02  *    1.68  *    0.01  *
* Frctn Loss (ft)        *    1.97  * Cum Volume (acre-ft)   * 1207.91  * 7489.00  * 1044.13  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  369.87  *  603.49  *  359.18  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  872.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  872.05  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  862.79  * Flow Area (sq ft)      * 1587.27  * 1742.96  *  336.43  *
* E.G. Slope (ft/ft)     *0.000515  * Area (sq ft)           * 5152.76  * 1742.96  *  336.43  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 2028.78  * 8544.53  *  326.69  *
* Top Width (ft)         * 3056.20  * Top Width (ft)         * 2769.10  *  117.12  *  169.98  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.28  *    4.90  *    0.97  *
* Max Chl Dpth (ft)      *   18.22  * Hydr. Depth (ft)       *    4.32  *   14.88  *    1.98  *
* Conv. Total (cfs)      *480347.9  * Conv. (cfs)            * 89405.7  *376545.7  * 14396.6  *
* Length Wtd. (ft)       * 1609.93  * Wetted Per. (ft)       *  367.22  *  124.28  *  171.13  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)       *    0.14  *    0.45  *    0.06  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    0.18  *    2.21  *    0.06  *
* Frctn Loss (ft)        *    1.55  * Cum Volume (acre-ft)   * 3363.14  *10040.60  * 3186.54  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  740.44  *  649.25  *  730.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  873.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  872.97  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  863.59  * Flow Area (sq ft)      * 1924.98  * 1850.69  *  524.77  *
* E.G. Slope (ft/ft)     *0.000502  * Area (sq ft)           * 8121.85  * 1850.69  *  524.77  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 2763.57  * 9326.20  *  510.24  *
* Top Width (ft)         * 3916.25  * Top Width (ft)         * 3570.75  *  117.12  *  228.38  *
* Vel Total (ft/s)       *    2.93  * Avg. Vel. (ft/s)       *    1.44  *    5.04  *    0.97  *
* Max Chl Dpth (ft)      *   19.14  * Hydr. Depth (ft)       *    5.24  *   15.80  *    2.30  *
* Conv. Total (cfs)      *562202.6  * Conv. (cfs)            *123308.3  *416127.9  * 22766.4  *
* Length Wtd. (ft)       * 1569.38  * Wetted Per. (ft)       *  367.22  *  124.28  *  229.67  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)       *    0.16  *    0.47  *    0.07  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    0.24  *    2.35  *    0.07  *
* Frctn Loss (ft)        *    1.50  * Cum Volume (acre-ft)   * 4600.17  *11808.61  * 4581.84  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  855.13  *  677.65  *  903.85  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  875.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  875.19  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  866.26  * Flow Area (sq ft)      * 2741.12  * 2111.03  * 1132.63  *
* E.G. Slope (ft/ft)     *0.000558  * Area (sq ft)           *16342.79  * 2111.03  * 1132.63  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 5251.19  *12244.03  * 1604.77  *
* Top Width (ft)         * 4177.97  * Top Width (ft)         * 3762.01  *  117.12  *  298.83  *
* Vel Total (ft/s)       *    3.19  * Avg. Vel. (ft/s)       *    1.92  *    5.80  *    1.42  *
* Max Chl Dpth (ft)      *   21.36  * Hydr. Depth (ft)       *    7.47  *   18.02  *    3.79  *
* Conv. Total (cfs)      *808357.4  * Conv. (cfs)            *222243.0  *518196.5  * 67917.9  *
* Length Wtd. (ft)       * 1409.09  * Wetted Per. (ft)       *  367.22  *  124.28  *  300.62  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)       *    0.26  *    0.59  *    0.13  *
* Alpha                  *    2.23  * Stream Power (lb/ft s) *    0.50  *    3.43  *    0.19  *
* Frctn Loss (ft)        *    1.38  * Cum Volume (acre-ft)   * 7532.54  *13962.65  * 7703.98  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1105.67  *  700.94  * 1140.89  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  877.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  877.14  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  870.71  * Flow Area (sq ft)      * 3456.19  * 2339.13  * 1722.99  *
* E.G. Slope (ft/ft)     *0.000644  * Area (sq ft)           *23742.56  * 2339.13  * 1722.99  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 8298.21  *15600.36  * 3401.43  *
* Top Width (ft)         * 4229.88  * Top Width (ft)         * 3805.35  *  117.12  *  307.41  *
* Vel Total (ft/s)       *    3.63  * Avg. Vel. (ft/s)       *    2.40  *    6.67  *    1.97  *
* Max Chl Dpth (ft)      *   23.31  * Hydr. Depth (ft)       *    9.41  *   19.97  *    5.60  *
* Conv. Total (cfs)      *1075942.0  * Conv. (cfs)            *327047.3  *614838.5  *134056.6  *
* Length Wtd. (ft)       * 1273.19  * Wetted Per. (ft)       *  367.22  *  124.28  *  309.41  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)       *    0.38  *    0.76  *    0.22  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    0.91  *    5.05  *    0.44  *
```

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* Frctn Loss (ft)        *    1.28  * Cum Volume (acre-ft)   *12234.81  *17067.66  *12738.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1573.54  *  729.27  * 1625.84  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  878.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  878.32  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  871.70  * Flow Area (sq ft)      * 3888.74  * 2477.11  * 2088.98  *
* E.G. Slope (ft/ft)     *0.000683  * Area (sq ft)           *28227.18  * 2477.11  * 2088.98  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *10403.83  *17679.75  * 4746.41  *
* Top Width (ft)         * 4240.58  * Top Width (ft)         * 3807.95  *  117.12  *  315.51  *
* Vel Total (ft/s)       *    3.88  * Avg. Vel. (ft/s)       *    2.68  *    7.14  *    2.27  *
* Max Chl Dpth (ft)      *   24.49  * Hydr. Depth (ft)       *   10.59  *   21.15  *    6.62  *
* Conv. Total (cfs)      *1256147.0  * Conv. (cfs)            *398073.4  *676465.8  *181608.1  *
* Length Wtd. (ft)       * 1214.63  * Wetted Per. (ft)        *  367.22  *  124.28  *  317.61  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)        *    0.45  *    0.85  *    0.28  *
* Alpha                  *    2.02  * Stream Power (lb/ft s) *    1.21  *    6.07  *    0.64  *
* Frctn Loss (ft)        *    1.22  * Cum Volume (acre-ft)   *16366.43  *18956.74  *17184.79  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1898.95  *  736.48  * 2078.89  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  879.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  879.46  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  872.75  * Flow Area (sq ft)      * 4309.39  * 2611.29  * 2461.27  *
* E.G. Slope (ft/ft)     *0.000724  * Area (sq ft)           *32591.81  * 2611.29  * 2461.27  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *12708.74  *19871.20  * 6170.06  *
* Top Width (ft)         * 4263.62  * Top Width (ft)         * 3811.45  *  117.12  *  335.05  *
* Vel Total (ft/s)       *    4.13  * Avg. Vel. (ft/s)       *    2.95  *    7.61  *    2.51  *
* Max Chl Dpth (ft)      *   25.63  * Hydr. Depth (ft)       *   11.74  *   22.30  *    7.35  *
* Conv. Total (cfs)      *1440381.0  * Conv. (cfs)            *472398.1  *738634.6  *229348.2  *
* Length Wtd. (ft)       * 1169.95  * Wetted Per. (ft)        *  367.22  *  124.28  *  337.22  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)        *    0.53  *    0.95  *    0.33  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    1.56  *    7.22  *    0.83  *
* Frctn Loss (ft)        *    1.19  * Cum Volume (acre-ft)   *20426.19  *20314.69  *21685.16  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 2121.71  *  737.43  * 2525.88  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  881.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  880.95  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  873.75  * Flow Area (sq ft)      * 4853.41  * 2784.83  * 2964.88  *
* E.G. Slope (ft/ft)     *0.000750  * Area (sq ft)           *38242.78  * 2784.83  * 2964.88  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *15773.34  *22519.83  * 8406.83  *
* Top Width (ft)         * 4277.99  * Top Width (ft)         * 3816.28  *  117.12  *  344.59  *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)       *    3.25  *    8.09  *    2.84  *
* Max Chl Dpth (ft)      *   27.12  * Hydr. Depth (ft)       *   13.22  *   23.78  *    8.60  *
* Conv. Total (cfs)      *1705112.0  * Conv. (cfs)            *575916.6  *822244.9  *306950.5  *
* Length Wtd. (ft)       * 1122.75  * Wetted Per. (ft)        *  367.22  *  124.28  *  346.88  *
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* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)       *    0.62  *    1.05  *    0.40  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    2.01  *    8.49  *    1.13  *
* Frctn Loss (ft)        *    1.12  * Cum Volume (acre-ft)   *27319.67  *22295.39  *29094.73  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 2458.27  *  739.85  * 2954.31  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  875.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.070  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  875.44  * Reach Len. (ft)        *  297.94  * 1815.96  *  800.98  *
* Crit W.S. (ft)         *  867.38  * Flow Area (sq ft)      * 2833.90  * 2140.62  * 1208.29  *
* E.G. Slope (ft/ft)     *0.000572  * Area (sq ft)           *17297.45  * 2140.62  * 1208.29  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 5616.39  *12679.66  * 1803.94  *
* Top Width (ft)         * 4208.52  * Top Width (ft)         * 3791.45  *  117.12  *  299.95  *
* Vel Total (ft/s)       *    3.25  * Avg. Vel. (ft/s)       *    1.98  *    5.92  *    1.49  *
* Max Chl Dpth (ft)      *   21.61  * Hydr. Depth (ft)       *    7.72  *   18.28  *    4.03  *
* Conv. Total (cfs)      *840736.1  * Conv. (cfs)            *234920.6  *530360.7  * 75454.8  *
* Length Wtd. (ft)       * 1388.39  * Wetted Per. (ft)       *  367.22  *  124.28  *  301.76  *
* Min Ch El (ft)         *  853.83  * Shear (lb/sq ft)       *    0.28  *    0.61  *    0.14  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.55  *    3.64  *    0.21  *
* Frctn Loss (ft)        *    1.37  * Cum Volume (acre-ft)   * 8553.06  *14931.10  * 8835.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1214.37  *  711.26  * 1223.60  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 31.796

INPUT
Description: Ineffective area due to road embankment downstream.
Station Elevation Data    num=     452
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   904.27     3.51   904.16     8.41   903.96    13.67   903.68    28.34   902.94
    42.1   902.17    49.71   901.67    79.06   899.21   101.13   895.31   102.08   897.32
  122.65   895.02   122.99   894.33   139.18   893.93   159.61   893.25   164.66   893.12
  167.15    892.8   172.22   892.94   192.74   892.04   206.77   890.75   230.75   890.31
  232.02   889.91   248.13   888.93   257.96    888.2   259.71   887.85   261.66   887.91
  262.28   887.92    264.5   887.97    266.3      888   279.75   888.31   293.42   889.84
  294.25   889.94   295.22   890.04   299.22   890.27   312.05   889.77   314.77    887.3
  319.29   883.25   319.97   883.49   323.02   884.58   336.09   883.58    346.9   882.83
  363.02   882.33   398.14   881.35   408.85   880.99   410.52   880.81   440.58   879.72
   445.2   879.66   469.94   879.09    489.4   878.86   493.97   878.91   494.81   878.91
  496.63    878.3   502.15   878.22   523.26   877.42   542.63   877.25   553.13   877.03
  594.41   876.82    597.8   876.74   599.13    876.7   617.44   876.23   618.14   876.26
  677.86   878.09      678    878.1   678.37   878.11   779.58   879.54   781.41   879.57
  791.54   879.71   814.76   877.37   850.12   873.95   912.58   874.59   933.22   874.27
  935.42   873.76   945.85   873.76   963.99   873.39   970.96   873.39   976.27   873.42
  993.09   872.85  1002.45   873.76  1004.71   873.77  1008.58   873.64  1020.59   873.33
 1022.16   873.34  1023.51   873.38  1052.75   871.74  1057.25   871.65  1072.33   871.72
  1078.6   871.82  1091.69   871.89  1110.19   871.48  1142.18   871.21  1148.09   871.14
 1165.24   870.23  1181.27    870.1  1205.28   869.43  1213.55   869.26  1268.28   869.05
 1272.79   869.05  1282.86   869.14   1307.6   869.26  1318.88   869.24  1338.06   869.05
 1403.56   869.01   1413.1   869.07  1434.69   869.03     1437      869  1442.06   869.01
 1484.78   869.87  1490.59   870.02  1513.16   870.72  1529.26   871.04  1563.44   871.99
 1563.92   871.98  1565.17   872.06  1585.92   871.11  1589.58   870.81  1598.26   870.78
  1610.4   869.01  1610.75   869.02  1626.04   870.05  1629.47   867.12  1635.63   861.83
 1644.73   861.63  1645.51   861.61  1649.27   861.53  1654.35   861.45  1661.74    864.3
 1662.61    864.7   1663.3   865.05  1663.89   865.37  1664.37   865.68  1674.82   871.06
 1679.16   871.03  1704.65   871.04   1706.6   871.06  1716.55   870.41  1735.79   870.08
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 1745.15  870.37 1752.35  870.64 1764.11  870.51 1785.74   871.9 1808.08   873.1
 1811.92  873.81 1817.46  873.36 1824.65  872.32  1831.1  872.24 1847.97  875.56
  1851.8   875.4 1862.84  875.56 1879.88  875.56 1903.73  872.48 1904.52  872.41
 1905.62  872.29 1909.88  872.35 1926.85  872.84 1936.86  871.98  1949.5  871.42
  1964.8  871.27 1973.05  871.24 2065.24  871.28  2074.6  871.23 2098.67   870.7
 2112.69  870.48 2121.51   870.8 2124.66   870.3 2125.77  870.46 2132.09  871.22
 2135.26  871.21 2177.86  871.52 2181.49  871.56 2194.31  871.66 2201.73  873.56
 2204.18  874.22 2214.16  874.48 2221.23  874.96 2228.94  875.78 2232.67  875.43
 2236.21   875.3 2236.71  875.28 2243.82  874.96 2288.09  867.53 2305.15  870.86
 2309.24  870.75 2323.77  870.57 2337.19  870.61 2373.21  870.19 2375.65  870.14
 2413.89  869.53 2432.87  869.34 2497.39  869.56 2528.57  869.35 2533.66  869.35
  2561.9  868.93 2581.36  869.01 2581.96  869.01 2583.35  869.04 2656.41  870.12
 2685.99  870.74 2692.07  870.82  2708.7  870.95 2742.46  871.55 2745.74   871.6
 2748.09  871.59 2781.25  871.27 2808.03  871.77 2832.56  871.66 2907.42  872.35
 2911.71  872.37 2953.45  872.27 2958.63  872.21 2960.75  871.52 2962.47  870.95
 2966.65  872.21 2969.48  873.04 2991.02  872.78 2997.17  870.71 2998.66  871.27
 3002.05  872.51 3029.92  872.55 3055.94  872.21 3080.03  872.32 3086.76  872.31
 3111.24  872.07 3133.38  872.06 3145.43  872.14 3173.37  872.08 3178.28  872.03
 3182.09  872.06 3192.59   872.4 3277.32  872.48 3306.45  872.35 3363.23  872.39
 3397.44  872.26 3404.93  872.21 3457.92   872.2 3459.65  872.21 3487.03  872.46
 3513.93  872.42 3528.65  872.46 3552.76  872.69 3560.75  872.53 3583.89  871.96
  3618.9  872.03 3654.79  872.29 3680.43  872.15 3707.78  872.12  3743.9  871.55
 3776.42  871.44 3777.32  871.36 3780.09  871.43 3808.34  871.44 3822.13  871.52
 3830.12  871.28 3845.19   871.6 3861.11  871.54  3874.1  871.61 3898.53  871.56
  3901.4  872.03 3902.16  871.96 3908.97  871.19 3912.39  872.08 3913.14   872.3
 3923.32  874.81 3923.69  874.92 3923.93  874.16 3924.05  873.79 3924.23  873.81
 3926.93   874.1 3927.44  874.14 3929.03  874.62 3930.35  871.45 3933.11  870.75
 3941.36  862.14 3942.55  861.96 3950.44  860.79 3958.25  859.45 3958.54  859.54
 3960.81  860.09 3963.33  856.36 3964.78  855.87 3967.27  854.98 3970.72  855.07
    3975   851.5    3996  850.56    4017   851.5 4021.75  855.21 4030.45   859.6
 4034.83  861.81 4035.74  862.26 4036.21  862.35 4040.77  863.08 4045.29  863.77
 4053.23  864.99 4054.19  865.22 4063.73  865.97 4065.51  865.96 4068.07  866.15
 4089.88  866.22 4091.69  866.23 4096.48  866.21 4098.42  866.24 4108.62  866.33
 4144.53  866.52 4163.47  866.56 4213.61  867.34 4231.85  867.51  4239.6  867.79
 4267.44   869.7  4278.7  870.52 4282.72  870.68 4289.99  870.38 4296.01  870.23
 4328.51  870.34 4385.35  871.47 4387.23   871.4 4394.04  871.39    4423  871.01
 4445.29  870.83 4482.24  871.11 4507.69  870.86 4543.16  870.77 4578.31  870.91
 4594.13  870.82  4613.8  870.95 4652.79  870.57 4669.24  870.77 4677.16  871.01
 4694.04  871.24 4694.72  871.26 4695.18  871.27 4698.17  871.35 4748.78  873.03
  4760.2  872.93 4789.17  872.84 4798.25  872.87 4832.58  872.58 4843.86  872.54
 4886.71  873.33 4931.66  873.28 4961.48  873.58 5001.67  873.64 5002.52  873.66
 5003.17  873.64 5003.37  873.64 5004.27  873.66 5036.24  874.29 5058.64  874.06
 5090.59  874.37 5093.79  874.33 5102.71  873.82 5117.21  873.29 5138.21  872.32
 5147.13  872.12 5167.56  871.12 5208.22  870.48 5230.34  870.51 5252.03  870.66
  5295.9  870.54 5319.89  870.82 5344.81  871.26 5393.95  871.19 5395.16  871.21
 5396.09  871.21  5417.6  871.84 5499.65     873 5521.74  871.99 5536.29  871.74
 5547.13  871.13 5565.44  871.52 5579.56  871.63 5581.56   871.9 5611.13  872.57
 5611.38  872.57 5622.78  873.81 5625.75  874.15 5627.25  874.49 5627.36  874.53
 5627.46  874.58 5635.48  875.06 5638.58   874.9 5640.21  874.59 5642.42  874.65
 5650.58  875.34 5658.37  875.66 5665.64  875.53 5673.66  875.64 5680.86  875.25
 5696.43  876.27 5697.54  876.35  5698.2  876.36 5698.42  876.36 5732.98  876.92
 5753.75  877.46 5764.67   877.2 5771.86  876.95 5773.23  877.08 5774.19  877.16
 5785.68  878.15 5797.07   879.2 5800.34  879.49 5804.98  879.92 5808.56  879.84
 5815.72  879.73 5835.24   879.6 5847.37  879.98 5861.96     880 5904.01  880.23
 5906.09  880.27 5919.57  880.63 5922.15  881.04 5923.12  881.04 5926.69   880.6
 5936.74  880.48 5937.68  880.46 5938.09  880.47 5939.29  880.44 5956.32  880.28
 6004.45  881.62 6016.09  881.49 6021.31  881.55 6053.87  882.06 6055.93  882.22
 6065.87  882.46 6078.07  883.09 6080.23   883.5 6084.26  883.74 6108.47  886.41
 6112.69  886.77 6116.26  886.92 6137.12  888.25 6145.47  888.72 6153.29  888.83
 6163.65  889.03 6170.33  889.13 6187.83  889.76 6193.95  889.84 6205.58  890.23
 6207.45  890.31 6208.07  890.31 6213.52   890.5 6220.87  891.37 6229.62  892.34
 6248.33  893.24 6328.08  897.68 6337.45  898.26 6357.76  899.41 6409.86  901.97
 6437.15  903.73 6443.73  904.22 6465.79  905.58 6483.86  906.85 6519.57  909.17
 6562.61  911.76 6586.17  913.41

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075 1110.19      .1 1649.27    .075 3960.81     .04 4034.83      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3930.35 4063.73          678.573  593.84     630             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3555.04     885        F
 4759.48 6586.17     885        F
```

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	866.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.062	0.100
W.S. Elev (ft)	866.26	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	858.79	Flow Area (sq ft)		1132.39	3.19
E.G. Slope (ft/ft)	0.002758	Area (sq ft)	127.09	1132.39	3.19
Q Total (cfs)	5870.00	Flow (cfs)		5869.52	0.48
Top Width (ft)	198.80	Top Width (ft)	35.04	126.32	37.44
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)		5.18	0.15
Max Chl Dpth (ft)	15.70	Hydr. Depth (ft)		8.96	0.09
Conv. Total (cfs)	111770.9	Conv. (cfs)		111761.7	9.2
Length Wtd. (ft)	593.84	Wetted Per. (ft)		135.15	37.45
Min Ch El (ft)	850.56	Shear (lb/sq ft)		1.44	0.01
Alpha	1.01	Stream Power (lb/ft s)		7.48	0.00
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	1206.00	7438.02	1044.01
C & E Loss (ft)	0.00	Cum SA (acres)	368.62	598.42	358.67

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	870.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.063	0.100
W.S. Elev (ft)	870.28	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	862.41	Flow Area (sq ft)		1646.90	676.51
E.G. Slope (ft/ft)	0.002385	Area (sq ft)	910.41	1646.90	676.51
Q Total (cfs)	10900.00	Flow (cfs)		9835.85	1064.15
Top Width (ft)	1109.64	Top Width (ft)	752.33	130.17	227.14
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)		5.97	1.57
Max Chl Dpth (ft)	19.72	Hydr. Depth (ft)		12.65	2.98
Conv. Total (cfs)	223175.1	Conv. (cfs)		201386.8	21788.3
Length Wtd. (ft)	595.70	Wetted Per. (ft)		140.71	227.25
Min Ch El (ft)	850.56	Shear (lb/sq ft)		1.74	0.44
Alpha	1.47	Stream Power (lb/ft s)		10.41	0.70
Frctn Loss (ft)	0.95	Cum Volume (acre-ft)	3342.40	9969.94	3177.23
C & E Loss (ft)	0.01	Cum SA (acres)	728.40	644.09	726.73

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	871.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.063	0.100
W.S. Elev (ft)	871.19	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	863.31	Flow Area (sq ft)		1767.10	1021.00
E.G. Slope (ft/ft)	0.002486	Area (sq ft)	1759.58	1767.10	1108.29
Q Total (cfs)	12600.00	Flow (cfs)		11121.47	1478.53
Top Width (ft)	2002.46	Top Width (ft)	1098.15	132.37	771.94
Vel Total (ft/s)	4.52	Avg. Vel. (ft/s)		6.29	1.45
Max Chl Dpth (ft)	20.63	Hydr. Depth (ft)		13.35	1.73
Conv. Total (cfs)	252732.8	Conv. (cfs)		223076.2	29656.6
Length Wtd. (ft)	596.38	Wetted Per. (ft)		143.17	589.63
Min Ch El (ft)	850.56	Shear (lb/sq ft)		1.92	0.27
Alpha	1.72	Stream Power (lb/ft s)		12.05	0.39
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)	4566.38	11733.20	4566.83
C & E Loss (ft)	0.01	Cum SA (acres)	839.17	672.45	894.66

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	874.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.075	0.063	0.100
W.S. Elev (ft)	873.66	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	866.27	Flow Area (sq ft)	663.10	2095.75	2660.82
E.G. Slope (ft/ft)	0.002162	Area (sq ft)	7287.21	2095.75	3861.77
Q Total (cfs)	19100.00	Flow (cfs)	909.24	13695.96	4494.81
Top Width (ft)	4441.89	Top Width (ft)	2853.77	133.38	1454.75
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)	1.37	6.54	1.69
Max Chl Dpth (ft)	23.10	Hydr. Depth (ft)	1.82	15.71	3.82
Conv. Total (cfs)	410801.6	Conv. (cfs)	19555.8	294571.8	96674.0
Length Wtd. (ft)	602.77	Wetted Per. (ft)	366.43	144.21	695.93
Min Ch El (ft)	850.56	Shear (lb/sq ft)	0.24	1.96	0.52
Alpha	2.53	Stream Power (lb/ft s)	0.33	12.82	0.87
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	7451.73	13874.96	7658.07
C & E Loss (ft)	0.03	Cum SA (acres)	1083.04	695.71	1124.77

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	876.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.075	0.063	0.100
W.S. Elev (ft)	875.89	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	869.59	Flow Area (sq ft)	1493.80	2393.03	4211.48
E.G. Slope (ft/ft)	0.001769	Area (sq ft)	13968.80	2393.03	7336.26
Q Total (cfs)	27300.00	Flow (cfs)	3106.17	15453.88	8739.96
Top Width (ft)	4860.52	Top Width (ft)	3100.27	133.38	1626.87
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)	2.08	6.46	2.08
Max Chl Dpth (ft)	25.33	Hydr. Depth (ft)	3.98	17.94	6.05
Conv. Total (cfs)	649124.6	Conv. (cfs)	73856.7	367453.9	207814.0
Length Wtd. (ft)	610.99	Wetted Per. (ft)	378.92	144.21	695.93
Min Ch El (ft)	850.56	Shear (lb/sq ft)	0.44	1.83	0.67
Alpha	2.24	Stream Power (lb/ft s)	0.91	11.83	1.39
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	12105.85	16969.03	12654.70
C & E Loss (ft)	0.03	Cum SA (acres)	1549.93	724.05	1608.06

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	877.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.075	0.063	0.100
W.S. Elev (ft)	877.17	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	870.24	Flow Area (sq ft)	1975.60	2564.25	5104.65
E.G. Slope (ft/ft)	0.001617	Area (sq ft)	17997.05	2564.25	9453.38
Q Total (cfs)	32830.00	Flow (cfs)	4732.95	16581.39	11515.66
Top Width (ft)	5036.24	Top Width (ft)	3215.07	133.38	1687.78
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)	2.40	6.47	2.26
Max Chl Dpth (ft)	26.61	Hydr. Depth (ft)	5.26	19.23	7.34
Conv. Total (cfs)	816348.0	Conv. (cfs)	117689.2	412311.3	286347.5
Length Wtd. (ft)	615.01	Wetted Per. (ft)	378.92	144.21	695.93
Min Ch El (ft)	850.56	Shear (lb/sq ft)	0.53	1.80	0.74
Alpha	2.05	Stream Power (lb/ft s)	1.26	11.61	1.67
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	16208.35	18851.66	17078.66
C & E Loss (ft)	0.03	Cum SA (acres)	1874.93	731.26	2060.47

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	878.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.075	0.063	0.100
W.S. Elev (ft)	878.39	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	873.49	Flow Area (sq ft)	2433.03	2726.82	5952.64
E.G. Slope (ft/ft)	0.001522	Area (sq ft)	21986.41	2726.82	11543.54
Q Total (cfs)	38750.00	Flow (cfs)	6496.72	17820.78	14432.51
Top Width (ft)	5185.53	Top Width (ft)	3327.59	133.38	1724.56
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)	2.67	6.54	2.42
Max Chl Dpth (ft)	27.83	Hydr. Depth (ft)	6.48	20.44	8.56
Conv. Total (cfs)	993258.8	Conv. (cfs)	166527.0	456790.8	369941.0
Length Wtd. (ft)	618.81	Wetted Per. (ft)	378.92	144.21	695.93
Min Ch El (ft)	850.56	Shear (lb/sq ft)	0.61	1.80	0.81
Alpha	1.89	Stream Power (lb/ft s)	1.63	11.74	1.97
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	20239.54	20203.42	21556.40
C & E Loss (ft)	0.02	Cum SA (acres)	2097.29	732.20	2506.95

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	880.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.075	0.063	0.100
W.S. Elev (ft)	879.98	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	874.21	Flow Area (sq ft)	3028.30	2938.37	7056.14
E.G. Slope (ft/ft)	0.001399	Area (sq ft)	27407.30	2938.37	14302.56
Q Total (cfs)	46700.00	Flow (cfs)	8971.76	19354.23	18374.01
Top Width (ft)	5413.77	Top Width (ft)	3496.85	133.38	1783.54
Vel Total (ft/s)	3.59	Avg. Vel. (ft/s)	2.96	6.59	2.60
Max Chl Dpth (ft)	29.42	Hydr. Depth (ft)	8.07	22.03	10.14
Conv. Total (cfs)	1248365.0	Conv. (cfs)	239829.3	517369.0	491166.3
Length Wtd. (ft)	622.72	Wetted Per. (ft)	378.92	144.21	695.93
Min Ch El (ft)	850.56	Shear (lb/sq ft)	0.70	1.78	0.89
Alpha	1.74	Stream Power (lb/ft s)	2.07	11.73	2.31
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	27095.15	22176.10	28935.97
C & E Loss (ft)	0.01	Cum SA (acres)	2433.26	734.63	2934.74

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	874.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.075	0.063	0.100
W.S. Elev (ft)	873.95	Reach Len. (ft)	678.57	593.84	630.00
Crit W.S. (ft)	867.13	Flow Area (sq ft)	769.76	2134.67	2863.81
E.G. Slope (ft/ft)	0.002106	Area (sq ft)	8126.35	2134.67	4289.83
Q Total (cfs)	20100.00	Flow (cfs)	1147.54	13938.07	5014.39
Top Width (ft)	4501.03	Top Width (ft)	2888.75	133.38	1478.91
Vel Total (ft/s)	3.48	Avg. Vel. (ft/s)	1.49	6.53	1.75
Max Chl Dpth (ft)	23.39	Hydr. Depth (ft)	2.10	16.00	4.12
Conv. Total (cfs)	438026.9	Conv. (cfs)	25007.6	303743.8	109275.4
Length Wtd. (ft)	603.86	Wetted Per. (ft)	369.63	144.21	695.93
Min Ch El (ft)	850.56	Shear (lb/sq ft)	0.27	1.95	0.54
Alpha	2.51	Stream Power (lb/ft s)	0.41	12.71	0.95
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)	8466.12	14841.98	8785.27
C & E Loss (ft)	0.03	Cum SA (acres)	1191.53	706.03	1207.25

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 31.684

INPUT
Description: U/S of wooden bridge at 151st & Kenneth
Station Elevation Data num= 485

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	906.36	2.85	907.03	5.16	908.3	5.5	908.86	6.83	908.9
44.37	903.52	46.78	903.39	57.66	902.65	77.69	900.87	81.34	900.83
87.34	900.8	105.89	899.96	130.81	898.02	148.52	896.53	155.73	895.85
185.46	893.78	214.21	892.26	223.83	891.67	235.42	891.01	252.82	889.95
265.04	888.63	287.53	887.93	293.92	887.81	298.39	888.15	314.27	888.46
320.35	888.71	326.42	888.71	354.98	889.02	376.46	889.02	381.04	888.45
385.49	887.3	390.77	887.1	395.87	885.98	401.53	885.58	405.11	885.41
421.55	884.58	432.36	883.65	464.45	881.83	466.67	881.63	467.87	881.66
489.02	881.11	508.52	880.78	517.31	880.38	538.78	880.22	552.75	879.61
574.39	878.8	574.77	878.81	575.24	878.82	581.43	878.93	584.85	879.33
588.97	879.83	592.18	878.3	594.66	877.13	606.82	877.83	607.73	877.94
630.7	877.93	649.21	877.76	680.58	877.76	702.95	877.2	712.45	876.93
737.42	876.72	767.75	876.01	797.27	874.98	807.64	874.56	838.49	873.7
843.78	873.54	880.96	872.06	893.35	872.2	910.03	872.21	927.66	871.04
952.09	870.39	953.41	870.4	956.1	870.44	963.64	870.53	971.57	868.83
976.25	868.01	980.53	869.03	991.55	869.19	1011.53	868.76	1025.24	868.58
1055.29	868.34	1083.02	868	1102.46	868.05	1146.7	868.28	1176.59	867.84
1188.35	867.61	1202.95	867.71	1229.36	867.75	1254.33	868.38	1256.1	868.52
1266.37	869.1	1287.99	865.77	1292.53	866.38	1296.79	866.93	1300.38	862.64
1303.05	859.55	1306.93	859.57	1317.52	859.59	1320.87	862.13	1327.02	866.22
1340.11	866.77	1370.4	867.59	1372.43	867.64	1373.52	867.66	1420.51	869.01
1470.62	870.21	1476.85	870.04	1479.25	870.26	1498.23	870.18	1526.97	870.96
1528.36	871.01	1609.39	871.38	1622.73	871.39	1659.77	871.15	1702.84	871.13
1738.27	870.85	1779.98	870.78	1807.28	870.34	1808.2	870.34	1865.56	870.15
1893.21	870.22	1900.16	870.3	1902.79	870.3	1911.81	870.11	1938.96	869.8
1947.54	867.99	1949.23	867.72	1950.81	868.58	1953.74	869.21	1956.9	869.91
1962.94	870.89	1967.12	870.6	1970.8	870.74	1981.03	872.26	1986.62	873.87
1995.01	873.83	2003.34	873.59	2005.31	873.65	2010.49	873.84	2020.68	871.01
2032.5	868.7	2034.92	868.24	2056.86	868.68	2057.63	868.75	2058.22	868.74
2059.49	868.73	2059.76	868.73	2084.8	868.49	2086.04	868.49	2112.25	867.69
2116.01	867.69	2118.96	867.16	2124.67	866.75	2132.68	865.84	2145.23	863.9
2157.91	865.04	2166.68	865.6	2180.82	867.57	2181.15	868.19	2187.05	868.25
2230.38	869.23	2238.88	869.74	2245.04	869.69	2269.17	870.68	2289.28	870.86
2307.41	871.26	2329.67	871.86	2338.27	871.9	2360.78	871.93	2363.11	871.92
2364.99	871.92	2367.89	871.93	2419.58	871.57	2424.91	871.4	2427.04	871.4
2432.84	871.46	2474.68	871.7	2482.22	871.66	2486.02	871.74	2494.64	871.77
2521.65	871.71	2538.34	872.13	2557.3	872.15	2598.24	871.03	2599.75	871.01
2610.01	870.81	2627.48	869.58	2637.97	869.15	2641.34	869.87	2644.53	870.38
2647.99	870.47	2656.01	870.64	2660.09	871.99	2669.03	871.83	2692.41	871.58
2698.07	871.12	2701.05	871.65	2718.63	871.51	2724.53	871.52	2735.85	872.35
2753.35	871.93	2760.87	871.95	2814.78	872.73	2822.73	872.82	2879.43	873.32
2892.07	873.51	2901.43	873.53	2940.07	873.8	2946.32	873.91	2955.1	874.03
2980.54	874.56	3005.62	874.63	3023.49	874.77	3046.01	875.13	3066.02	875.02
3070.83	875.03	3075.9	875.1	3100.41	875.62	3140.51	875.5	3145.75	875.5
3165.91	875.56	3187.28	875.37	3191.96	875.34	3197.54	875.27	3227.75	875
3260.74	874.25	3261.34	874.24	3261.64	874.22	3261.88	874.24	3286.17	874.34
3316.95	873.56	3317.18	873.56	3349.36	873.24	3389.02	872.7	3390.98	872.65
3392.67	872.63	3394.86	872.62	3438.62	872.12	3441.34	872.08	3441.81	872.08
3442.28	872.07	3445.03	872.07	3473.25	871.99	3505.69	871.65	3510.3	872.08
3512.57	872.09	3513.3	872.09	3519.1	871.58	3543.1	871.59	3557.47	871.77
3570.36	871.79	3587.23	871.42	3603.8	871.28	3606.46	871.34	3624.93	871.37
3629.33	871.58	3638.48	871.94	3642.41	871.76	3649.19	871.38	3650.64	871.19
3653.2	870.92	3656.67	870.52	3659.02	870.3	3663.96	870.48	3665.58	870.53
3668.53	870.67	3672.09	870.7	3673.13	870.7	3685.87	870.81	3686.62	870.73
3701.21	870.79	3719.29	870.94	3723.15	870.87	3725.29	869.31	3727.06	868.02
3730.69	865.55	3742.39	857.99	3744.87	855.93	3746.55	855.14	3752	850.8
3777.5	849.8	3803	850.8	3808	854.96	3809.36	855.9	3813.16	856.59
3824.65	860.14	3827.17	862.44	3830.4	864.65	3830.85	864.67	3858.42	865.61
3867.62	866.02	3871.78	866.11	3872.57	866.13	3880.48	868.32	3885.43	869.55
3908.58	869.55	3935.37	868.42	3935.88	868.4	3936.27	868.41	3937.78	868.39
3939.05	868.38	3962.29	867.87	3966.8	867.74	3973.7	867.58	3977.27	867.67
3991.73	867.97	4004.62	868.04	4021.16	868.38	4039.71	868.38	4040.49	868.49
4047.81	868.94	4055.51	868.98	4060.33	869.04	4066.35	869.17	4074.5	868.91
4084.35	868.83	4094.34	868.63	4095.99	868.64	4102.07	869.1	4108.53	869.1
4112.41	869.12	4132.66	869.14	4134.06	869.15	4142.6	869.15	4146.45	869.22
4179.6	869.22	4181.14	869.23	4192.91	869.23	4217.77	869.43	4219.9	869.43
4234.02	869.54	4236.11	869.53	4250.28	869.64	4253.03	869.53	4293.97	869.48
4296.8	869.41	4299.39	869.44	4309.75	869.43	4309.86	869.42	4313.15	869.46

```
  4329.2  869.37 4331.44  869.39 4346.66  869.29 4348.84   869.3  4373.1  869.34
 4421.38  870.45 4468.95   870.6 4474.41  870.59 4481.63  870.63 4516.02  870.54
 4523.88  870.55 4527.99  870.54 4547.81  870.54    4548  870.53  4548.1  870.54
 4550.89  870.68  4558.9  870.69 4561.54   870.8 4570.45  870.77 4573.31  870.81
 4582.35  870.77 4585.04  870.82 4594.25  870.76 4595.96  870.62 4606.32   870.6
 4606.73  870.66 4614.76  870.91 4616.74  870.95 4624.04  871.18 4626.97  871.22
 4638.98  871.58  4648.2  871.54 4663.36  871.69 4666.46  871.68 4675.63  871.79
    4677  871.79 4684.12  871.89 4686.78  871.95 4687.29  871.95 4703.01  872.15
 4712.05  872.08 4726.14  872.15 4736.98  872.05 4745.57  872.09 4756.78  872.04
 4769.92  871.58 4778.06  871.41 4787.71  871.17 4793.07  870.91 4797.69  870.83
 4800.55  870.83 4806.56  870.77 4831.59  870.84 4833.11  870.83 4833.53  870.83
 4861.88  870.02 4887.59  869.68  4911.6  869.62  4949.6   868.8 4961.05  868.71
 4972.62  867.31 4975.83  866.56 4979.35  867.29  4982.9  867.33 4990.69  868.56
 5040.07  868.69  5043.3  868.69 5043.64   868.7 5048.36  868.75 5069.54  870.16
 5095.72  870.92 5097.51  870.93 5097.92  870.92 5102.53  870.82 5147.62  869.59
  5155.4  869.07 5163.28  869.01  5221.4   869.2 5250.46  869.48 5265.65  869.56
 5278.21  869.46 5318.77  866.57 5335.94   865.9 5336.42  865.87  5337.9   865.8
 5354.05  864.24 5357.22  863.98 5444.98  864.05 5465.34  865.07 5471.34  865.39
  5478.7  866.18 5513.98  869.74 5523.52  869.84 5567.16  869.49 5652.23  868.23
 5682.71   868.1  5723.6  868.43 5727.11  868.35 5735.32  868.39 5753.77  865.97
 5765.85  864.29  5817.8  864.01 5829.67  864.05 5878.44  864.45 5902.15  864.47
 5964.83  865.23 5985.82  865.69 6000.67  866.82 6014.12  869.72 6016.78  870.21
 6027.44  874.94 6038.96   879.7  6048.3  883.98 6054.67  887.77 6063.09  892.31
 6079.03   901.8 6087.66  902.03 6093.82  902.34 6099.39  902.68 6100.73  902.58
 6141.47  903.58 6147.94  903.82 6151.48  903.32 6156.01  902.71  6161.4  901.68
 6171.81  899.61 6188.43  896.43 6192.19   895.5 6199.64  894.16 6200.24  894.05
 6277.96  894.05  6281.4   895.1    6293  900.21 6299.98  903.04 6302.62  903.62
 6313.38  905.46 6345.23  911.99 6347.19  912.34 6348.79  912.71 6349.59  912.88
 6359.59  913.29  6375.2  914.23 6401.63  915.68 6423.09  917.06 6428.79  917.38

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  1146.7     .09 2627.48     .06 3723.15     .04  3830.4     .09
 5318.77     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3723.15 3885.43           40.425    38.5  40.425              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    3100     885       F
 4435.71 6428.79     885       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  865.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  865.43  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  857.50  * Flow Area (sq ft)      *          * 1137.29  *          *
* E.G. Slope (ft/ft)     *0.000859  * Area (sq ft)           *  143.77  * 1137.29  *  358.87  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *          * 5870.00  *          *
* Top Width (ft)         *  524.52  * Top Width (ft)         *   56.38  *  122.14  *  346.00  *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)       *          *    5.16  *          *
* Max Chl Dpth (ft)      *   15.63  * Hydr. Depth (ft)       *          *    9.31  *          *
* Conv. Total (cfs)      *200262.7  * Conv. (cfs)             *          *200262.7  *          *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)        *          *  130.80  *          *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *          *    0.47  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.41  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1203.89  * 7422.55  * 1041.40  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  367.91  *  596.73  *  355.90  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  869.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *          *   0.041  *   0.090  *
* W.S. Elev (ft)         *  869.18  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  860.68  * Flow Area (sq ft)      *          * 1688.42  *  141.66  *
* E.G. Slope (ft/ft)     *0.001150  * Area (sq ft)           * 1042.17  * 1688.42  * 2332.62  *
* Q Total (cfs)          *10900.00  * Flow (cfs)              *          *10842.02  *   57.98  *
* Top Width (ft)         * 1882.89  * Top Width (ft)         *  666.03  *  158.45  * 1058.41  *
* Vel Total (ft/s)       *    5.96  * Avg. Vel. (ft/s)       *          *    6.42  *    0.41  *
```

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* Max Chl Dpth (ft)      *   19.38  * Hydr. Depth (ft)       *          *   10.66  *    0.63  *
* Conv. Total (cfs)      *321479.4  * Conv. (cfs)            *          *319769.5  *  1709.9  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *          *  168.69  *  226.60  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *          *    0.72  *    0.04  *
* Alpha                  *    1.16  * Stream Power (lb/ft s) *          *    4.61  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 3327.20  * 9947.20  * 3155.46  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  717.35  *  642.12  *  717.43  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  870.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *          *   0.041  *   0.090  *
* W.S. Elev (ft)         *  870.03  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  861.56  * Flow Area (sq ft)      *          * 1824.82  *  509.00  *
* E.G. Slope (ft/ft)     *0.001227  * Area (sq ft)           * 1654.31  * 1824.82  * 3528.78  *
* Q Total (cfs)          *12600.00  * Flow (cfs)              *          *12308.95  *  291.05  *
* Top Width (ft)         * 2552.93  * Top Width (ft)         *  784.21  *  161.12  * 1607.60  *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *          *    6.75  *    0.57  *
* Max Chl Dpth (ft)      *   20.23  * Hydr. Depth (ft)       *          *   11.33  *    0.98  *
* Conv. Total (cfs)      *359740.1  * Conv. (cfs)            *          *351430.3  *  8309.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *          *  171.69  *  517.64  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *          *    0.81  *    0.08  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *          *    5.49  *    0.04  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 4539.79  *11708.71  * 4533.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  824.51  *  670.45  *  877.45  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  873.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.060  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  872.34  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  864.48  * Flow Area (sq ft)      *  251.82  * 2199.10  * 1769.52  *
* E.G. Slope (ft/ft)     *0.001350  * Area (sq ft)           * 4958.67  * 2199.10  * 7958.19  *
* Q Total (cfs)          *19100.00  * Flow (cfs)              *  202.26  *16559.82  * 2337.92  *
* Top Width (ft)         * 4480.01  * Top Width (ft)         * 2181.59  *  162.28  * 2136.14  *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)       *    0.80  *    7.53  *    1.32  *
* Max Chl Dpth (ft)      *   22.54  * Hydr. Depth (ft)       *    0.83  *   13.55  *    3.22  *
* Conv. Total (cfs)      *519917.5  * Conv. (cfs)            *  5505.5  *450771.8  * 63640.1  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  303.59  *  173.12  *  550.39  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.07  *    1.07  *    0.27  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.06  *    8.06  *    0.36  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 7356.34  *13845.68  * 7572.59  *
* C & E Loss (ft)        *          * Cum SA (acres)         * 1043.82  *  693.70  * 1098.80  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  875.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.060  *   0.043  *   0.090  *
* W.S. Elev (ft)         *  874.67  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  868.27  * Flow Area (sq ft)      * 1171.12  * 2578.02  * 3054.40  *
* E.G. Slope (ft/ft)     *0.001236  * Area (sq ft)           *10631.08  * 2578.02  *12952.14  *
* Q Total (cfs)          *27300.00  * Flow (cfs)              * 1845.32  *19896.91  * 5557.77  *
* Top Width (ft)         * 4990.57  * Top Width (ft)         * 2686.89  *  162.28  * 2141.40  *
```

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* Vel Total (ft/s)       *    4.01  * Avg. Vel. (ft/s)       *    1.58  *    7.72  *    1.82  *
* Max Chl Dpth (ft)      *   24.87  * Hydr. Depth (ft)       *    2.44  *   15.89  *    5.55  *
* Conv. Total (cfs)      *776445.9  * Conv. (cfs)            * 52483.1  *565892.8  *158070.0  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  481.11  *  173.12  *  550.39  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.19  *    1.15  *    0.43  *
* Alpha                  *    2.75  * Stream Power (lb/ft s) *    0.30  *    8.87  *    0.78  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *11914.24  *16935.14  *12507.99  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1504.85  *  722.03  * 1580.81  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  876.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.060  *   0.043  *   0.090  *
* W.S. Elev (ft)         *  876.05  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  871.39  * Flow Area (sq ft)      * 1934.91  * 2802.39  * 3815.23  *
* E.G. Slope (ft/ft)     *0.001145  * Area (sq ft)           *14558.85  * 2802.39  *15915.16  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 3450.09  *21631.59  * 7748.32  *
* Top Width (ft)         * 5264.25  * Top Width (ft)         * 2957.26  *  162.28  * 2144.71  *
* Vel Total (ft/s)       *    3.84  * Avg. Vel. (ft/s)       *    1.78  *    7.72  *    2.03  *
* Max Chl Dpth (ft)      *   26.25  * Hydr. Depth (ft)       *    3.11  *   17.27  *    6.93  *
* Conv. Total (cfs)      *970297.0  * Conv. (cfs)            *101967.9  *639325.9  *229003.1  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  623.33  *  173.12  *  550.39  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.22  *    1.16  *    0.50  *
* Alpha                  *    2.75  * Stream Power (lb/ft s) *    0.40  *    8.93  *    1.01  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *15954.77  *18815.08  *16895.21  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1826.85  *  729.24  * 2032.76  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  877.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.060  *   0.044  *   0.090  *
* W.S. Elev (ft)         *  877.40  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  872.70  * Flow Area (sq ft)      * 2776.79  * 3021.64  * 4558.67  *
* E.G. Slope (ft/ft)     *0.001027  * Area (sq ft)           *18602.40  * 3021.64  *18814.90  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 5967.26  *22907.63  * 9875.11  *
* Top Width (ft)         * 5343.98  * Top Width (ft)         * 3033.73  *  162.28  * 2147.98  *
* Vel Total (ft/s)       *    3.74  * Avg. Vel. (ft/s)       *    2.15  *    7.58  *    2.17  *
* Max Chl Dpth (ft)      *   27.60  * Hydr. Depth (ft)       *    4.46  *   18.62  *    8.28  *
* Conv. Total (cfs)      *1209017.0  * Conv. (cfs)            *186181.0  *714727.9  *308107.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  623.33  *  173.12  *  550.39  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.29  *    1.12  *    0.53  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    0.61  *    8.49  *    1.15  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *19923.40  *20164.24  *21336.87  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 2047.75  *  730.19  * 2478.94  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  879.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.060  *   0.044  *   0.090  *
* W.S. Elev (ft)         *  879.13  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  873.77  * Flow Area (sq ft)      * 3854.71  * 3302.35  * 5510.54  *
* E.G. Slope (ft/ft)     *0.000895  * Area (sq ft)           *23985.77  * 3302.35  *22534.08  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 9624.17  *24429.17  *12646.66  *
* Top Width (ft)         * 5464.89  * Top Width (ft)         * 3150.45  *  162.28  * 2152.16  *
```

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* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *    2.50  *    7.40  *    2.29  *
* Max Chl Dpth (ft)      *   29.33  * Hydr. Depth (ft)       *    6.19  *   20.35  *   10.01  *
* Conv. Total (cfs)      *1560646.0  * Conv. (cfs)            *321625.6  *816387.4  *422632.9  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  623.33  *  173.12  *  550.39  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.35  *    1.07  *    0.56  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.86  *    7.89  *    1.28  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *26694.85  *22133.56  *28669.59  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 2381.49  *  732.62  * 2906.28  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  873.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.060  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  872.62  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  865.79  * Flow Area (sq ft)      *  340.30  * 2244.59  * 1923.75  *
* E.G. Slope (ft/ft)     *0.001356  * Area (sq ft)           * 5577.74  * 2244.59  * 8556.98  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  318.02  *17087.93  * 2694.05  *
* Top Width (ft)         * 4534.34  * Top Width (ft)         * 2235.28  *  162.28  * 2136.77  *
* Vel Total (ft/s)       *    4.46  * Avg. Vel. (ft/s)       *    0.93  *    7.61  *    1.40  *
* Max Chl Dpth (ft)      *   22.82  * Hydr. Depth (ft)       *    1.04  *   13.83  *    3.50  *
* Conv. Total (cfs)      *545770.0  * Conv. (cfs)            *  8635.0  *463984.1  * 73150.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  328.12  *  173.12  *  550.39  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.09  *    1.10  *    0.30  *
* Alpha                  *    2.49  * Stream Power (lb/ft s) *    0.08  *    8.36  *    0.41  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 8359.38  *14812.13  * 8692.36  *
* C & E Loss (ft)        *          * Cum SA (acres)         * 1151.62  *  704.02  * 1181.10  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 31.680

INPUT
Description: Single-lane wooden bridge at 151st near Kenneth Rd Park
Distance from Upstream XS =      10
Deck/Roadway Width        =    18.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
     800     870     850    1500     870     850    2000     872     850
    2600     874     850    3200     874     850    3720     871     860
    3725  871.88   869.5    3740  873.25  871.08  3740.1     875  871.08
  3845.9     875  871.08    3846  873.47  871.08    3879  870.16   867.5
    3890   869.5     860

Upstream Bridge Cross Section Data
Station Elevation Data    num=     485
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  906.36    2.85  907.03    5.16   908.3     5.5  908.86    6.83   908.9
   44.37  903.52   46.78  903.39   57.66  902.65   77.69  900.87   81.34  900.83
   87.34   900.8  105.89  899.96  130.81  898.02  148.52  896.53  155.73  895.85
  185.46  893.78  214.21  892.26  223.83  891.67  235.42  891.01  252.82  889.95
  265.04  888.63  287.53  887.93  293.92  887.81  298.39  888.15  314.27  888.46
  320.35  888.71  326.42  888.71  354.98  889.02  376.46  889.02  381.04  888.45
  385.49   887.3  390.77   887.1  395.87  885.98  401.53  885.58  405.11  885.41
  421.55  884.58  432.36  883.65  464.45  881.83  466.67  881.63  467.87  881.66
```

489.02	881.11	508.52	880.78	517.31	880.38	538.78	880.22	552.75	879.61
574.39	878.8	574.77	878.81	575.24	878.82	581.43	878.93	584.85	879.33
588.97	879.83	592.18	878.3	594.66	877.13	606.82	877.83	607.73	877.94
630.7	877.93	649.21	877.76	680.58	877.76	702.95	877.2	712.45	876.93
737.42	876.72	767.75	876.01	797.27	874.98	807.64	874.56	838.49	873.7
843.78	873.54	880.96	872.06	893.35	872.2	910.03	872.21	927.66	871.04
952.09	870.39	953.41	870.4	956.1	870.44	963.64	870.53	971.57	868.83
976.25	868.01	980.53	869.03	991.55	869.19	1011.53	868.76	1025.24	868.58
1055.29	868.34	1083.02	868	1102.46	868.05	1146.7	868.28	1176.59	867.84
1188.35	867.61	1202.95	867.71	1229.36	867.75	1254.33	868.38	1256.1	868.52
1266.37	869.1	1287.99	865.77	1292.53	866.38	1296.79	866.93	1300.38	862.64
1303.05	859.55	1306.93	859.57	1317.52	859.59	1320.87	862.13	1327.02	866.22
1340.11	866.77	1370.4	867.59	1372.43	867.64	1373.52	867.66	1420.51	869.01
1470.62	870.21	1476.85	870.04	1479.25	870.26	1498.23	870.18	1526.97	870.96
1528.36	871.01	1609.39	871.38	1622.73	871.39	1659.77	871.15	1702.84	871.13
1738.27	870.85	1779.98	870.78	1807.28	870.34	1808.2	870.34	1865.56	870.15
1893.21	870.22	1900.16	870.3	1902.79	870.3	1911.81	870.11	1938.96	869.8
1947.54	867.99	1949.23	867.72	1950.81	868.58	1953.74	869.21	1956.9	869.91
1962.94	870.89	1967.12	870.6	1970.8	870.74	1981.03	872.26	1986.62	873.87
1995.01	873.83	2003.34	873.59	2005.31	873.65	2010.49	873.84	2020.68	871.01
2032.5	868.7	2034.92	868.24	2056.86	868.68	2057.63	868.75	2058.22	868.74
2059.49	868.73	2059.76	868.73	2084.8	868.49	2086.04	868.49	2112.25	867.69
2116.01	867.69	2118.96	867.16	2124.67	866.75	2132.68	865.84	2145.23	863.9
2157.91	865.04	2166.68	865.6	2180.82	867.57	2181.15	868.19	2187.05	868.25
2230.38	869.23	2238.88	869.74	2245.04	869.69	2269.17	870.68	2289.28	870.86
2307.41	871.26	2329.67	871.86	2338.27	871.9	2360.78	871.93	2363.11	871.92
2364.99	871.92	2367.89	871.93	2419.58	871.57	2424.91	871.4	2427.04	871.4
2432.84	871.46	2474.68	871.7	2482.22	871.66	2486.02	871.74	2494.64	871.77
2521.65	871.71	2538.34	872.13	2557.3	872.15	2598.24	871.03	2599.75	871.01
2610.01	870.81	2627.48	869.58	2637.97	869.15	2641.34	869.87	2644.53	870.38
2647.99	870.47	2656.01	870.64	2660.09	871.99	2669.03	871.83	2692.41	871.58
2698.07	871.12	2701.05	871.65	2718.63	871.51	2724.53	871.52	2735.85	872.35
2753.35	871.93	2760.87	871.95	2814.78	872.73	2822.73	872.82	2879.43	873.32
2892.07	873.51	2901.43	873.53	2940.07	873.8	2946.32	873.91	2955.1	874.03
2980.54	874.56	3005.62	874.63	3023.49	874.77	3046.01	875.13	3066.02	875.02
3070.83	875.03	3075.9	875.1	3100.41	875.62	3140.51	875.5	3145.75	875.5
3165.91	875.56	3187.28	875.37	3191.96	875.34	3197.54	875.27	3227.75	875
3260.74	874.25	3261.34	874.24	3261.64	874.22	3261.88	874.24	3286.17	874.34
3316.95	873.56	3317.18	873.56	3349.36	873.24	3389.02	872.7	3390.98	872.65
3392.67	872.63	3394.86	872.62	3438.62	872.12	3441.34	872.08	3441.81	872.08
3442.28	872.07	3445.03	872.07	3473.25	871.99	3505.69	871.65	3510.3	872.08
3512.57	872.09	3513.3	872.09	3519.1	871.58	3543.1	871.59	3557.47	871.77
3570.36	871.79	3587.23	871.42	3603.8	871.28	3606.46	871.34	3624.93	871.37
3629.33	871.58	3638.48	871.94	3642.41	871.76	3649.19	871.38	3650.64	871.19
3653.2	870.92	3656.67	870.52	3659.02	870.3	3663.96	870.48	3665.58	870.53
3668.53	870.67	3672.09	870.7	3673.13	870.7	3685.87	870.81	3686.62	870.73
3701.21	870.79	3719.29	870.94	3723.15	870.87	3725.29	869.31	3727.06	868.02
3730.69	865.55	3742.39	857.99	3744.87	855.93	3746.55	855.14	3752	850.8
3777.5	849.8	3803	850.8	3808	854.96	3809.36	855.9	3813.16	856.59
3824.65	860.14	3827.17	862.44	3830.4	864.65	3830.85	864.67	3858.42	865.61
3867.62	866.02	3871.78	866.11	3872.57	866.13	3880.48	868.32	3885.43	869.55
3908.58	869.55	3935.37	868.42	3935.88	868.4	3936.27	868.41	3937.78	868.39
3939.05	868.38	3962.29	867.87	3966.8	867.74	3973.7	867.58	3977.27	867.67
3991.73	867.97	4004.62	868.04	4021.16	868.38	4039.71	868.38	4040.49	868.49
4047.81	868.94	4055.51	868.98	4060.33	869.04	4066.35	869.17	4074.5	868.91
4084.35	868.83	4094.34	868.63	4095.99	868.64	4102.07	869.1	4108.53	869.1
4112.41	869.12	4132.66	869.14	4134.06	869.15	4142.6	869.15	4146.45	869.22
4179.6	869.22	4181.14	869.23	4192.91	869.23	4217.77	869.43	4219.9	869.43
4234.02	869.54	4236.11	869.53	4250.28	869.64	4253.03	869.53	4293.97	869.48
4296.8	869.41	4299.39	869.44	4309.75	869.43	4309.86	869.42	4313.15	869.46
4329.2	869.37	4331.44	869.39	4346.66	869.29	4348.84	869.3	4373.1	869.34
4421.38	870.45	4468.95	870.6	4474.41	870.59	4481.63	870.63	4516.02	870.54
4523.88	870.55	4527.99	870.54	4547.81	870.54	4548	870.53	4548.1	870.54
4550.89	870.68	4558.9	870.69	4561.54	870.8	4570.45	870.77	4573.31	870.81
4582.35	870.77	4585.04	870.82	4594.25	870.76	4595.96	870.62	4606.32	870.6
4606.73	870.66	4614.76	870.91	4616.74	870.95	4624.04	871.18	4626.97	871.22
4638.98	871.58	4648.2	871.54	4663.36	871.69	4666.46	871.68	4675.63	871.79
4677	871.79	4684.12	871.89	4686.78	871.95	4687.29	871.95	4703.01	872.15
4712.05	872.08	4726.14	872.15	4736.98	872.05	4745.57	872.09	4756.78	872.04
4769.92	871.58	4778.06	871.41	4787.71	871.17	4793.07	870.91	4797.69	870.83
4800.55	870.83	4806.56	870.77	4831.59	870.84	4833.11	870.83	4833.53	870.83
4861.88	870.02	4887.59	869.68	4911.6	869.62	4949.6	868.8	4961.05	868.71
4972.62	867.31	4975.83	866.56	4979.35	867.29	4982.9	867.33	4990.69	868.56
5040.07	868.69	5043.3	868.69	5043.64	868.7	5048.36	868.75	5069.54	870.16
5095.72	870.92	5097.51	870.93	5097.92	870.92	5102.53	870.82	5147.62	869.59
5155.4	869.07	5163.28	869.01	5221.4	869.2	5250.46	869.48	5265.65	869.56

5278.21	869.46	5318.77	866.57	5335.94	865.9	5336.42	865.87	5337.9	865.8
5354.05	864.24	5357.22	863.98	5444.98	864.05	5465.34	865.07	5471.34	865.39
5478.7	866.18	5513.98	869.74	5523.52	869.84	5567.16	869.49	5652.23	868.23
5682.71	868.1	5723.6	868.43	5727.11	868.35	5735.32	868.39	5753.77	865.97
5765.85	864.29	5817.8	864.01	5829.67	864.05	5878.44	864.45	5902.15	864.47
5964.83	865.23	5985.82	865.69	6000.67	866.82	6014.12	869.72	6016.78	870.21
6027.44	874.94	6038.96	879.7	6048.3	883.98	6054.67	887.77	6063.09	892.31
6079.03	901.8	6087.66	902.03	6093.82	902.34	6099.39	902.68	6100.73	902.58
6141.47	903.58	6147.94	903.82	6151.48	903.32	6156.01	902.71	6161.4	901.68
6171.81	899.61	6188.43	896.43	6192.19	895.5	6199.64	894.16	6200.24	894.05
6277.96	894.05	6281.4	895.1	6293	900.21	6299.98	903.04	6302.62	903.62
6313.38	905.46	6345.23	911.99	6347.19	912.34	6348.79	912.71	6349.59	912.88
6359.59	913.29	6375.2	914.23	6401.63	915.68	6423.09	917.06	6428.79	917.38

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1146.7	.09	2627.48	.06	3723.15	.04	3830.4	.09
5318.77	.06								

Bank Sta: Left Right Coeff Contr. Expan.

3723.15	3885.43	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	3100	885	F
4435.71	6428.79	885	F

Downstream Deck/Roadway Coordinates
num= 13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
800	870	850	1500	870	850	2000	872	850
2600	874	850	3200	874	850	3720	871	860
3725	871.88	869.5	3740	873.25	871.08	3740.1	875	871.08
3845.9	875	871.08	3846	873.47	871.08	3879	870.16	867.5
3890	869.5	860						

Downstream Bridge Cross Section Data
Station Elevation Data num= 485

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	906.36	2.85	907.03	5.16	908.3	5.5	908.86	6.83	908.9
44.37	903.52	46.78	903.39	57.66	902.65	77.69	900.87	81.34	900.83
87.34	900.8	105.89	899.96	130.81	898.02	148.52	896.53	155.73	895.85
185.46	893.78	214.21	892.26	223.83	891.67	235.42	891.01	252.82	889.95
265.04	888.63	287.53	887.93	293.92	887.81	298.39	888.15	314.27	888.46
320.35	888.71	326.42	888.71	354.98	889.02	376.46	889.02	381.04	888.45
385.49	887.3	390.77	887.1	395.87	885.98	401.53	885.58	405.11	885.41
421.55	884.58	432.36	883.65	464.45	881.83	466.67	881.63	467.87	881.66
489.02	881.11	508.52	880.78	517.31	880.38	538.78	880.22	552.75	879.61
574.39	878.8	574.77	878.81	575.24	878.82	581.43	878.93	584.85	879.33
588.97	879.83	592.18	878.3	594.66	877.13	606.82	877.83	607.73	877.94
630.7	877.93	649.21	877.76	680.58	877.76	702.95	877.2	712.45	876.93
737.42	876.72	767.75	876.01	797.27	874.98	807.64	874.56	838.49	873.7
843.78	873.54	880.96	872.06	893.35	872.2	910.03	872.21	927.66	871.04
952.09	870.39	953.41	870.4	956.1	870.44	963.64	870.53	971.57	868.83
976.25	868.01	980.53	869.03	991.55	869.19	1011.53	868.76	1025.24	868.58
1055.29	868.34	1083.02	868	1102.46	868.05	1146.7	868.28	1176.59	867.84
1188.35	867.61	1202.95	867.71	1229.36	867.75	1254.33	868.38	1256.1	868.52
1266.37	869.1	1287.99	865.77	1292.53	866.38	1296.79	866.93	1300.38	862.64
1303.05	859.55	1306.93	859.57	1317.52	859.59	1320.87	862.13	1327.02	866.22
1340.11	866.77	1370.4	867.59	1372.43	867.64	1373.52	867.66	1420.51	869.01
1470.62	870.21	1476.85	870.04	1479.25	870.26	1498.23	870.18	1526.97	870.96
1528.36	871.01	1609.39	871.38	1622.73	871.39	1659.77	871.15	1702.84	871.13
1738.27	870.85	1779.98	870.78	1807.28	870.34	1808.2	870.34	1865.56	870.15
1893.21	870.22	1900.16	870.3	1902.79	870.3	1911.81	870.11	1938.96	869.8
1947.54	867.99	1949.23	867.72	1950.81	868.58	1953.74	869.21	1956.9	869.91
1962.94	870.89	1967.12	870.6	1970.8	870.74	1981.03	872.26	1986.62	873.87
1995.01	873.83	2003.34	873.59	2005.31	873.65	2010.49	873.84	2020.68	871.01
2032.5	868.7	2034.92	868.24	2056.86	868.68	2057.63	868.75	2058.22	868.74
2059.49	868.73	2059.76	868.73	2084.8	868.49	2086.04	868.49	2112.25	867.69
2116.01	867.69	2118.96	867.16	2124.67	866.75	2132.68	865.84	2145.23	863.9
2157.91	865.04	2166.68	865.6	2180.82	867.57	2181.15	868.19	2187.05	868.25
2230.38	869.23	2238.88	869.74	2245.04	869.69	2269.17	870.68	2289.28	870.86
2307.41	871.26	2329.67	871.86	2338.27	871.9	2360.78	871.93	2363.11	871.92
2364.99	871.92	2367.89	871.93	2419.58	871.57	2424.91	871.4	2427.04	871.4

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 2432.84  871.46 2474.68   871.7 2482.22  871.66 2486.02  871.74 2494.64  871.77
 2521.65  871.71 2538.34  872.13  2557.3  872.15 2598.24  871.03 2599.75  871.01
 2610.01  870.81 2627.48  869.58 2637.97  869.15 2641.34  869.87 2644.53  870.38
 2647.99  870.47 2656.01  870.64 2660.09  871.99 2669.03  871.83 2692.41  871.58
 2698.07  871.12 2701.05  871.65 2718.63  871.51 2724.53  871.52 2735.85  872.35
 2753.35  871.93 2760.87  871.95 2814.78  872.73 2822.73  872.82 2879.43  873.32
 2892.07  873.51 2901.43  873.53 2940.07   873.8 2946.32  873.91  2955.1  874.03
 2980.54  874.56 3005.62  874.63 3023.49  874.77 3046.01  875.13 3066.02  875.02
 3070.83  875.03  3075.9   875.1 3100.41  875.62 3140.51   875.5 3145.75   875.5
 3165.91  875.56 3187.28  875.37 3191.96  875.34 3197.54  875.27 3227.75     875
 3260.74  874.25 3261.34  874.24 3261.64  874.22 3261.88  874.24 3286.17  874.34
 3316.95  873.56 3317.18  873.56 3349.36  873.24 3389.02   872.7 3390.98  872.65
 3392.67  872.63 3394.86  872.62 3438.62  872.12 3441.34  872.08 3441.81  872.08
 3442.28  872.07 3445.03  872.07 3473.25  871.99 3505.69  871.65  3510.3  872.08
 3512.57  872.09  3513.3  872.09  3519.1  871.58  3543.1  871.59 3557.47  871.77
 3570.36  871.79 3587.23  871.42  3603.8  871.28 3606.46  871.34 3624.93  871.37
 3629.33  871.58 3638.48  871.94 3642.41  871.76 3649.19  871.38 3650.64  871.19
  3653.2  870.92 3656.67  870.52 3659.02   870.3 3663.96  870.48 3665.58  870.53
 3668.53  870.67 3672.09   870.7 3673.13   870.7 3685.87  870.81 3686.62  870.73
 3701.21  870.79 3719.29  870.94 3723.15  870.87 3725.29  869.31 3727.06  868.02
 3730.69  865.55 3742.39  857.99 3744.87  855.93 3746.55  855.14    3752   850.8
  3777.5   849.8    3803   850.8    3808  854.96 3809.36   855.9 3813.16  856.59
 3824.65  860.14 3827.17  862.44  3830.4  864.65 3830.85  864.67 3858.42  865.61
 3867.62  866.02 3871.78  866.11 3872.57  866.13 3880.48  868.32 3885.43  869.55
 3908.58  869.55 3935.37  868.42 3935.88   868.4 3936.27  868.41 3937.78  868.39
 3939.05  868.38 3962.29  867.87  3966.8  867.74  3973.7  867.58 3977.27  867.67
 3991.73  867.97 4004.62  868.04 4021.16  868.38 4039.71  868.38 4040.49  868.49
 4047.81  868.94 4055.51  868.98 4060.33  869.04 4066.35  869.17  4074.5  868.91
 4084.35  868.83 4094.34  868.63 4095.99  868.64 4102.07   869.1 4108.53   869.1
 4112.41  869.12 4132.66  869.14 4134.06  869.15  4142.6  869.15 4146.45  869.22
  4179.6  869.22 4181.14  869.23 4192.91  869.23 4217.77  869.43  4219.9  869.43
 4234.02  869.54 4236.11  869.53 4250.28  869.64 4253.03  869.53 4293.97  869.48
  4296.8  869.41 4299.39  869.44 4309.75  869.43 4309.86  869.42 4313.15  869.46
  4329.2  869.37 4331.44  869.39 4346.66  869.29 4348.84   869.3  4373.1  869.34
 4421.38  870.45 4468.95   870.6 4474.41  870.59 4481.63  870.63 4516.02  870.54
 4523.88  870.55 4527.99  870.54 4547.81  870.54    4548  870.53  4548.1  870.54
 4550.89  870.68  4558.9  870.69 4561.54   870.8 4570.45  870.77 4573.31  870.81
 4582.35  870.77 4585.04  870.82 4594.25  870.76 4595.96  870.62 4606.32   870.6
 4606.73  870.66 4614.76  870.91 4616.74  870.95 4624.04  871.18 4626.97  871.22
 4638.98  871.58  4648.2  871.54 4663.36  871.69 4666.46  871.68 4675.63  871.79
    4677  871.79 4684.12  871.89 4686.78  871.95 4687.29  871.95 4703.01  872.15
 4712.05  872.08 4726.14  872.15 4736.98  872.05 4745.57  872.09 4756.78  872.04
 4769.92  871.58 4778.06  871.41 4787.71  871.17 4793.07  870.91 4797.69  870.83
 4800.55  870.83 4806.56  870.77 4831.59  870.84 4833.11  870.83 4833.53  870.83
 4861.88  870.02 4887.59  869.68  4911.6  869.62  4949.6   868.8 4961.05  868.71
 4972.62  867.31 4975.83  866.56 4979.35  867.29  4982.9  867.33 4990.69  868.56
 5040.07  868.69  5043.3  868.69 5043.64   868.7 5048.36  868.75 5069.54  870.16
 5095.72  870.92 5097.51  870.93 5097.92  870.92 5102.53  870.82 5147.62  869.59
  5155.4  869.07 5163.28  869.01  5221.4   869.2 5250.46  869.48 5265.65  869.56
 5278.21  869.46 5318.77  866.57 5335.94   865.9 5336.42  865.87  5337.9   865.8
 5354.05  864.24 5357.22  863.98 5444.98  864.05 5465.34  865.07 5471.34  865.39
  5478.7  866.18 5513.98  869.74 5523.52  869.84 5567.16  869.49 5652.23  868.23
 5682.71   868.1  5723.6  868.43 5727.11  868.35 5735.32  868.39 5753.77  865.97
 5765.85  864.29  5817.8  864.01 5829.67  864.05 5878.44  864.45 5902.15  864.47
 5964.83  865.23 5985.82  865.69 6000.67  866.82 6014.12  869.72 6016.78  870.21
 6027.44  874.94 6038.96   879.7  6048.3  883.98 6054.67  887.77 6063.09  892.31
 6079.03   901.8 6087.66  902.03 6093.82  902.34 6099.39  902.68 6100.73  902.58
 6141.47  903.58 6147.94  903.82 6151.48  903.32 6156.01  902.71  6161.4  901.68
 6171.81  899.61 6188.43  896.43 6192.19   895.5 6199.64  894.16 6200.24  894.05
 6277.96  894.05  6281.4   895.1    6293  900.21 6299.98  903.04 6302.62  903.62
 6313.38  905.46 6345.23  911.99 6347.19  912.34 6348.79  912.71 6349.59  912.88
 6359.59  913.29  6375.2  914.23 6401.63  915.68 6423.09  917.06 6428.79  917.38

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .06  1146.7     .09 2627.48     .06 3723.15     .04 3830.85     .09
 5318.77     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       3723.15 3885.43            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    3100     885       F
 4416.28 6428.79     885       F
```

```
Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=    3743    Downstream=    3743
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     845       6     872
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     845       6     872

Pier Data
Pier Station     Upstream=    3843    Downstream=    3843
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     860       6     872
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     860       6     872

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     865.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     865.43  * E.G. Elev (ft)         *     865.83  *     865.81  *
* Q Total (cfs)          *    5870.00  * W.S. Elev (ft)         *     865.37  *     865.35  *
* Q Bridge (cfs)         *    5870.00  * Crit W.S. (ft)         *     857.45  *     857.45  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      15.57  *      15.55  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.43  *       5.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1080.90  *    1078.46  *
* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    8219.48  *    8197.34  *
* Min El Weir Flow (ft)  *     867.59  * Hydr Depth (ft)        *       9.98  *      10.02  *
* Min El Prs (ft)        *     871.08  * W.P. Total (ft)        *     132.02  *     131.23  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *   175735.8  *   174875.2  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     108.34  *     107.64  *
* BR Open Area (sq ft)   *    1790.08  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       5.44  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.57  *       0.58  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.10  *       3.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	869.81	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	869.18	E.G. Elev (ft)	869.79	869.76
Q Total (cfs)	10900.00	W.S. Elev (ft)	869.04	869.01
Q Bridge (cfs)	10835.73	Crit W.S. (ft)	860.73	860.73
Q Weir (cfs)		Max Chl Dpth (ft)	19.24	19.21
Weir Sta Lft (ft)		Vel Total (ft/s)	6.50	6.54
Weir Sta Rgt (ft)		Flow Area (sq ft)	1677.27	1666.89
Weir Submerg		Froude # Chl	0.34	0.35
Weir Max Depth (ft)		Specif Force (cu ft)	14462.29	14411.83
Min El Weir Flow (ft)	867.59	Hydr Depth (ft)	5.63	5.68
Min El Prs (ft)	871.08	W.P. Total (ft)	364.27	358.65
Delta EG (ft)	0.10	Conv. Total (cfs)	266982.4	265896.8
Delta WS (ft)	0.11	Top Width (ft)	1063.88	1038.86
BR Open Area (sq ft)	1790.08	Frctn Loss (ft)	0.03	0.01
BR Open Vel (ft/s)	6.96	C & E Loss (ft)	0.00	0.03
Coef of Q		Shear Total (lb/sq ft)	0.48	0.49
Br Sel Method	Energy only	Power Total (lb/ft s)	3.11	3.19

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	870.72	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	870.03	E.G. Elev (ft)	870.69	870.65
Q Total (cfs)	12600.00	W.S. Elev (ft)	869.85	869.80
Q Bridge (cfs)	12337.94	Crit W.S. (ft)	861.64	861.64
Q Weir (cfs)		Max Chl Dpth (ft)	20.05	20.00
Weir Sta Lft (ft)		Vel Total (ft/s)	6.07	6.15
Weir Sta Rgt (ft)		Flow Area (sq ft)	2076.12	2048.07
Weir Submerg		Froude # Chl	0.31	0.31
Weir Max Depth (ft)		Specif Force (cu ft)	16464.49	16390.93
Min El Weir Flow (ft)	867.59	Hydr Depth (ft)	3.31	3.27
Min El Prs (ft)	871.08	W.P. Total (ft)	719.03	715.31
Delta EG (ft)	0.12	Conv. Total (cfs)	288508.9	287377.4
Delta WS (ft)	0.15	Top Width (ft)	1694.45	1678.29
BR Open Area (sq ft)	1790.08	Frctn Loss (ft)	0.04	0.02
BR Open Vel (ft/s)	7.46	C & E Loss (ft)	0.00	0.04
Coef of Q		Shear Total (lb/sq ft)	0.34	0.34
Br Sel Method	Energy only	Power Total (lb/ft s)	2.09	2.11

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	873.10	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	872.34	E.G. Elev (ft)	873.10	873.06
Q Total (cfs)	19100.00	W.S. Elev (ft)	872.34	872.27
Q Bridge (cfs)	10490.98	Crit W.S. (ft)	865.09	865.09
Q Weir (cfs)	8609.02	Max Chl Dpth (ft)	22.54	22.47
Weir Sta Lft (ft)	3359.43	Vel Total (ft/s)	5.09	5.21
Weir Sta Rgt (ft)	4435.71	Flow Area (sq ft)	3753.40	3664.38
Weir Submerg	0.89	Froude # Chl	0.24	0.24
Weir Max Depth (ft)	5.52	Specif Force (cu ft)	24764.31	24565.37
Min El Weir Flow (ft)	867.59	Hydr Depth (ft)	4.58	4.65
Min El Prs (ft)	871.08	W.P. Total (ft)	1150.49	1118.23
Delta EG (ft)	0.05	Conv. Total (cfs)		
Delta WS (ft)	0.07	Top Width (ft)	3598.03	3563.15
BR Open Area (sq ft)	1790.08	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.86	C & E Loss (ft)		

```
* Coef of Q              *            * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*******************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     875.36  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     874.67  * E.G. Elev (ft)         *     875.28  *     875.20  *
* Q Total (cfs)          *   27300.00  * W.S. Elev (ft)         *     874.79  *     874.67  *
* Q Bridge (cfs)         *   13778.92  * Crit W.S. (ft)         *     868.55  *     868.54  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.99  *      24.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.42  *       4.57  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6182.20  *    5969.00  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   37294.70  *   36568.10  *
* Min El Weir Flow (ft)  *     867.59  * Hydr Depth (ft)        *       5.66  *       5.59  *
* Min El Prs (ft)        *     871.08  * W.P. Total (ft)        *    1426.22  *    1401.25  *
* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *   434985.0  *   421557.8  *
* Delta WS (ft)          *       0.29  * Top Width (ft)         *    4907.11  *    4884.51  *
* BR Open Area (sq ft)   *    1790.08  * Frctn Loss (ft)        *       0.08  *       0.02  *
* BR Open Vel (ft/s)     *       7.70  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.07  *       1.12  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.71  *       5.10  *
*******************************************************************************************

Warning: The pure energy/weir flow answer did not converge within the given number of iterations.
         However, the error was small enough that the solution was treated as valid.
Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*******************************************************************************************
* E.G. US. (ft)          *     876.68  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     876.05  * E.G. Elev (ft)         *     876.57  *     876.50  *
* Q Total (cfs)          *   32830.00  * W.S. Elev (ft)         *     876.26  *     876.17  *
* Q Bridge (cfs)         *   12538.56  * Crit W.S. (ft)         *     872.36  *     872.30  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.46  *      26.37  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.09  *       4.21  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8036.03  *    7804.67  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   47674.53  *   46781.53  *
* Min El Weir Flow (ft)  *     867.59  * Hydr Depth (ft)        *       6.02  *       5.93  *
* Min El Prs (ft)        *     871.08  * W.P. Total (ft)        *    1669.42  *    1649.99  *
* Delta EG (ft)          *       0.24  * Conv. Total (cfs)      *   554670.8  *   537028.2  *
* Delta WS (ft)          *       0.33  * Top Width (ft)         *    5273.36  *    5269.30  *
* BR Open Area (sq ft)   *    1790.08  * Frctn Loss (ft)        *       0.07  *       0.02  *
* BR Open Vel (ft/s)     *       7.00  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.05  *       1.10  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.30  *       4.64  *
```

```
*****************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     877.96  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     877.40  * E.G. Elev (ft)         *     877.86  *     877.81  *
* Q Total (cfs)          *   38750.00  * W.S. Elev (ft)         *     877.59  *     877.52  *
* Q Bridge (cfs)         *   11255.23  * Crit W.S. (ft)         *     873.31  *     873.29  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.79  *      27.72  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.95  *       4.04  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9817.93  *    9592.63  *
* Weir Submerg           *             * Froude # Chl           *       0.16  *       0.16  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   60065.59  *   59056.78  *
* Min El Weir Flow (ft)  *     867.59  * Hydr Depth (ft)        *       7.35  *       7.29  *
* Min El Prs (ft)        *     871.08  * W.P. Total (ft)        *    1669.42  *    1649.99  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *   748485.6  *   730080.6  *
* Delta WS (ft)          *       0.27  * Top Width (ft)         *    5355.42  *    5351.35  *
* BR Open Area (sq ft)   *    1790.08  * Frctn Loss (ft)        *       0.05  *       0.02  *
* BR Open Vel (ft/s)     *       6.29  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.98  *       1.02  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.88  *       4.13  *
*****************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     879.62  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     879.13  * E.G. Elev (ft)         *     879.54  *     879.50  *
* Q Total (cfs)          *   46700.00  * W.S. Elev (ft)         *     879.29  *     879.24  *
* Q Bridge (cfs)         *    9907.02  * Crit W.S. (ft)         *     874.09  *     874.11  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.49  *      29.44  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.86  *       3.94  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12089.71  *   11853.78  *
* Weir Submerg           *             * Froude # Chl           *       0.15  *       0.15  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   79478.23  *   78254.00  *
* Min El Weir Flow (ft)  *     867.59  * Hydr Depth (ft)        *       9.05  *       9.01  *
* Min El Prs (ft)        *     871.08  * W.P. Total (ft)        *    1669.42  *    1649.99  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *  1037760.0  *  1017108.0  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *    5471.09  *    5469.15  *
* BR Open Area (sq ft)   *    1790.08  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       5.53  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.92  *       0.95  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.54  *       3.73  *
*****************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
```

```
* E.G. US. (ft)          *     873.39  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     872.62  * E.G. Elev (ft)         *     873.39  *     873.34  *
* Q Total (cfs)          *   20100.00  * W.S. Elev (ft)         *     872.62  *     872.55  *
* Q Bridge (cfs)         *   10538.76  * Crit W.S. (ft)         *     866.19  *     866.19  *
* Q Weir (cfs)           *    9561.24  * Max Chl Dpth (ft)      *      22.82  *      22.75  *
* Weir Sta Lft (ft)      *    3334.70  * Vel Total (ft/s)       *       5.04  *       5.17  *
* Weir Sta Rgt (ft)      *    4435.71  * Flow Area (sq ft)      *    3990.85  *    3888.79  *
* Weir Submerg           *       0.90  * Froude # Chl           *       0.23  *       0.24  *
* Weir Max Depth (ft)    *       5.81  * Specif Force (cu ft)   *   25992.24  *   25764.29  *
* Min El Weir Flow (ft)  *     867.59  * Hydr Depth (ft)        *       4.56  *       4.62  *
* Min El Prs (ft)        *     871.08  * W.P. Total (ft)        *    1204.96  *    1171.78  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *    3746.21  *    3708.81  *
* BR Open Area (sq ft)   *    1790.08  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.89  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*********************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 31.677

INPUT
Description: D/S of wooden bridge at 151st & Kenneth.  XS Copied from U/S side.
Station Elevation Data    num=     485
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
        0  906.36    2.85  907.03    5.16   908.3     5.5  908.86    6.83   908.9
    44.37  903.52   46.78  903.39   57.66  902.65   77.69  900.87   81.34  900.83
    87.34   900.8  105.89  899.96  130.81  898.02  148.52  896.53  155.73  895.85
   185.46  893.78  214.21  892.26  223.83  891.67  235.42  891.01  252.82  889.95
   265.04  888.63  287.53  887.93  293.92  887.81  298.39  888.15  314.27  888.46
   320.35  888.71  326.42  888.71  354.98  889.02  376.46  889.02  381.04  888.45
   385.49   887.3  390.77   887.1  395.87  885.98  401.53  885.58  405.11  885.41
   421.55  884.58  432.36  883.65  464.45  881.83  466.67  881.63  467.87  881.66
   489.02  881.11  508.52  880.78  517.31  880.38  538.78  880.22  552.75  879.61
   574.39   878.8  574.77  878.81  575.24  878.82  581.43  878.93  584.85  879.33
   588.97  879.83  592.18   878.3  594.66  877.13  606.82  877.83  607.73  877.94
    630.7  877.93  649.21  877.76  680.58  877.76  702.95   877.2  712.45  876.93
   737.42  876.72  767.75  876.01  797.27  874.98  807.64  874.56  838.49   873.7
   843.78  873.54  880.96  872.06  893.35   872.2  910.03  872.21  927.66  871.04
   952.09  870.39  953.41   870.4   956.1  870.44  963.64  870.53  971.57  868.83
   976.25  868.01  980.53  869.03  991.55  869.19 1011.53  868.76 1025.24  868.58
  1055.29  868.34 1083.02     868 1102.46  868.05  1146.7  868.28 1176.59  867.84
  1188.35  867.61 1202.95  867.71 1229.36  867.75 1254.33  868.38  1256.1  868.52
  1266.37   869.1 1287.99  865.77 1292.53  866.38 1296.79  866.93 1300.38  862.64
  1303.05  859.55 1306.93  859.57 1317.52  859.59 1320.87  862.13 1327.02  866.22
  1340.11  866.77  1370.4  867.59 1372.43  867.64 1373.52  867.66 1420.51  869.01
  1470.62  870.21 1476.85  870.04 1479.25  870.26 1498.23  870.18 1526.97  870.96
  1528.36  871.01 1609.39  871.38 1622.73  871.39 1659.77  871.15 1702.84  871.13
  1738.27  870.85 1779.98  870.78 1807.28  870.34  1808.2  870.34 1865.56  870.15
  1893.21  870.22 1900.16   870.3 1902.79   870.3 1911.81  870.11 1938.96   869.8
  1947.54  867.99 1949.23  867.72 1950.81  868.58 1953.74  869.21  1956.9  869.91
  1962.94  870.89 1967.12   870.6  1970.8  870.74 1981.03  872.26 1986.62  873.87
  1995.01  873.83 2003.34  873.59 2005.31  873.65 2010.49  873.84 2020.68  871.01
```

2032.5	868.7	2034.92	868.24	2056.86	868.68	2057.63	868.75	2058.22	868.74
2059.49	868.73	2059.76	868.73	2084.8	868.49	2086.04	868.49	2112.25	867.69
2116.01	867.69	2118.96	867.16	2124.67	866.75	2132.68	865.84	2145.23	863.9
2157.91	865.04	2166.68	865.6	2180.82	867.57	2181.15	868.19	2187.05	868.25
2230.38	869.23	2238.88	869.74	2245.04	869.69	2269.17	870.68	2289.28	870.86
2307.41	871.26	2329.67	871.86	2338.27	871.9	2360.78	871.93	2363.11	871.92
2364.99	871.92	2367.89	871.93	2419.58	871.57	2424.91	871.4	2427.04	871.4
2432.84	871.46	2474.68	871.7	2482.22	871.66	2486.02	871.74	2494.64	871.77
2521.65	871.71	2538.34	872.13	2557.3	872.15	2598.24	871.03	2599.75	871.01
2610.01	870.81	2627.48	869.58	2637.97	869.15	2641.34	869.87	2644.53	870.38
2647.99	870.47	2656.01	870.64	2660.09	871.99	2669.03	871.83	2692.41	871.58
2698.07	871.12	2701.05	871.65	2718.63	871.51	2724.53	871.52	2735.85	872.35
2753.35	871.93	2760.87	871.95	2814.78	872.73	2822.73	872.82	2879.43	873.32
2892.07	873.51	2901.43	873.53	2940.07	873.8	2946.32	873.91	2955.1	874.03
2980.54	874.56	3005.62	874.63	3023.49	874.77	3046.01	875.13	3066.02	875.02
3070.83	875.03	3075.9	875.1	3100.41	875.62	3140.51	875.5	3145.75	875.5
3165.91	875.56	3187.28	875.37	3191.96	875.34	3197.54	875.27	3227.75	875
3260.74	874.25	3261.34	874.24	3261.64	874.22	3261.88	874.24	3286.17	874.34
3316.95	873.56	3317.18	873.56	3349.36	873.24	3389.02	872.7	3390.98	872.65
3392.67	872.63	3394.86	872.62	3438.62	872.12	3441.34	872.08	3441.81	872.08
3442.28	872.07	3445.03	872.07	3473.25	871.99	3505.69	871.65	3510.3	872.08
3512.57	872.09	3513.3	872.09	3519.1	871.58	3543.1	871.59	3557.47	871.77
3570.36	871.79	3587.23	871.42	3603.8	871.28	3606.46	871.34	3624.93	871.37
3629.33	871.58	3638.48	871.94	3642.41	871.76	3649.19	871.38	3650.64	871.19
3653.2	870.92	3656.67	870.52	3659.02	870.3	3663.96	870.48	3665.58	870.53
3668.53	870.67	3672.09	870.7	3673.13	870.7	3685.87	870.81	3686.62	870.73
3701.21	870.79	3719.29	870.94	3723.15	870.87	3725.29	869.31	3727.06	868.02
3730.69	865.55	3742.39	857.99	3744.87	855.93	3746.55	855.14	3752	850.8
3777.5	849.8	3803	850.8	3808	854.96	3809.36	855.9	3813.16	856.59
3824.65	860.14	3827.17	862.44	3830.4	864.65	3830.85	864.67	3858.42	865.61
3867.62	866.02	3871.78	866.11	3872.57	866.13	3880.48	868.32	3885.43	869.55
3908.58	869.55	3935.37	868.42	3935.88	868.4	3936.27	868.41	3937.78	868.39
3939.05	868.38	3962.29	867.87	3966.8	867.74	3973.7	867.58	3977.27	867.67
3991.73	867.97	4004.62	868.04	4021.16	868.38	4039.71	868.38	4040.49	868.49
4047.81	868.94	4055.51	868.98	4060.33	869.04	4066.35	869.17	4074.5	868.91
4084.35	868.83	4094.34	868.63	4095.99	868.64	4102.07	869.1	4108.53	869.1
4112.41	869.12	4132.66	869.14	4134.06	869.15	4142.6	869.15	4146.45	869.22
4179.6	869.22	4181.14	869.23	4192.91	869.23	4217.77	869.43	4219.9	869.43
4234.02	869.54	4236.11	869.53	4250.28	869.64	4253.03	869.53	4293.97	869.48
4296.8	869.41	4299.39	869.44	4309.75	869.43	4309.86	869.42	4313.15	869.46
4329.2	869.37	4331.44	869.39	4346.66	869.29	4348.84	869.3	4373.1	869.34
4421.38	870.45	4468.95	870.6	4474.41	870.59	4481.63	870.63	4516.02	870.54
4523.88	870.55	4527.99	870.54	4547.81	870.54	4548	870.53	4548.1	870.54
4550.89	870.68	4558.9	870.69	4561.54	870.8	4570.45	870.77	4573.31	870.81
4582.35	870.77	4585.04	870.82	4594.25	870.76	4595.96	870.62	4606.32	870.6
4606.73	870.66	4614.76	870.91	4616.74	870.95	4624.04	871.18	4626.97	871.22
4638.98	871.58	4648.2	871.54	4663.36	871.69	4666.46	871.68	4675.63	871.79
4677	871.79	4684.12	871.89	4686.78	871.95	4687.29	871.95	4703.01	872.15
4712.05	872.08	4726.14	872.15	4736.98	872.05	4745.57	872.09	4756.78	872.04
4769.92	871.58	4778.06	871.41	4787.71	871.17	4793.07	870.91	4797.69	870.83
4800.55	870.83	4806.56	870.77	4831.59	870.84	4833.11	870.83	4833.53	870.83
4861.88	870.02	4887.59	869.68	4911.6	869.62	4949.6	868.8	4961.05	868.71
4972.62	867.31	4975.83	866.56	4979.35	867.29	4982.9	867.33	4990.69	868.56
5040.07	868.69	5043.3	868.69	5043.64	868.7	5048.36	868.75	5069.54	870.16
5095.72	870.92	5097.51	870.93	5097.92	870.92	5102.53	870.82	5147.62	869.59
5155.4	869.07	5163.28	869.01	5221.4	869.2	5250.46	869.48	5265.65	869.56
5278.21	869.46	5318.77	866.57	5335.94	865.9	5336.42	865.87	5337.9	865.8
5354.05	864.24	5357.22	863.98	5444.98	864.05	5465.34	865.07	5471.34	865.39
5478.7	866.18	5513.98	869.74	5523.52	869.84	5567.16	869.49	5652.23	868.23
5682.71	868.1	5723.6	868.43	5727.11	868.35	5735.32	868.39	5753.77	865.97
5765.85	864.29	5817.8	864.01	5829.67	864.05	5878.44	864.45	5902.15	864.47
5964.83	865.23	5985.82	865.69	6000.67	866.82	6014.12	869.72	6016.78	870.21
6027.44	874.94	6038.96	879.7	6048.3	883.98	6054.67	887.77	6063.09	892.31
6079.03	901.8	6087.66	902.03	6093.82	902.34	6099.39	902.68	6100.73	902.58
6141.47	903.58	6147.94	903.82	6151.48	903.32	6156.01	902.71	6161.4	901.68
6171.81	899.61	6188.43	896.43	6192.19	895.5	6199.64	894.16	6200.24	894.05
6277.96	894.05	6281.4	895.1	6293	900.21	6299.98	903.04	6302.62	903.62
6313.38	905.46	6345.23	911.99	6347.19	912.34	6348.79	912.71	6349.59	912.88
6359.59	913.29	6375.2	914.23	6401.63	915.68	6423.09	917.06	6428.79	917.38

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1146.7	.09	2627.48	.06	3723.15	.04	3830.85	.09
5318.77	.06								

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3723.15 3885.43          538.545 1306.621135.522             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    3100     885       F
 4416.28 6428.79     885       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  865.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  865.36  * Reach Len. (ft)        *  538.55  * 1306.62  * 1135.52  *
* Crit W.S. (ft)         *  857.50  * Flow Area (sq ft)      *          * 1129.65  *          *
* E.G. Slope (ft/ft)     *0.000878  * Area (sq ft)           *  140.26  * 1129.65  *  337.20  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *          * 5870.00  *          *
* Top Width (ft)         *  516.21  * Top Width (ft)          *   54.83  *  120.20  *  341.18  *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)        *          *    5.20  *          *
* Max Chl Dpth (ft)      *   15.56  * Hydr. Depth (ft)        *          *    9.40  *          *
* Conv. Total (cfs)      *198078.3  * Conv. (cfs)             *          *198078.3  *          *
* Length Wtd. (ft)       * 1306.54  * Wetted Per. (ft)        *          *  128.83  *          *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)        *          *    0.48  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    2.50  *          *
* Frctn Loss (ft)        *    1.38  * Cum Volume (acre-ft)    * 1203.85  * 7421.58  * 1041.32  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  367.89  *  596.63  *  355.82  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  869.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.041  *   0.090  *
* W.S. Elev (ft)         *  869.06  * Reach Len. (ft)        *  538.55  * 1306.62  * 1135.52  *
* Crit W.S. (ft)         *  860.68  * Flow Area (sq ft)      *          * 1670.70  *  119.64  *
* E.G. Slope (ft/ft)     *0.001181  * Area (sq ft)           *  969.01  * 1670.70  * 2220.39  *
* Q Total (cfs)          *10900.00  * Flow (cfs)              *          *10843.84  *   56.16  *
* Top Width (ft)         * 1748.20  * Top Width (ft)          *  639.69  *  157.84  *  950.66  *
* Vel Total (ft/s)       *    6.09  * Avg. Vel. (ft/s)        *          *    6.49  *    0.47  *
* Max Chl Dpth (ft)      *   19.26  * Hydr. Depth (ft)        *          *   10.58  *    0.69  *
* Conv. Total (cfs)      *317162.3  * Conv. (cfs)             *          *315528.2  *  1634.1  *
* Length Wtd. (ft)       * 1296.87  * Wetted Per. (ft)        *          *  168.04  *  173.24  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)        *          *    0.73  *    0.05  *
* Alpha                  *    1.13  * Stream Power (lb/ft s)  *          *    4.76  *    0.02  *
* Frctn Loss (ft)        *    1.73  * Cum Volume (acre-ft)    * 3326.96  * 9945.80  * 3153.51  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  717.20  *  642.01  *  716.60  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  870.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *          *   0.041  *   0.090  *
* W.S. Elev (ft)         *  869.88  * Reach Len. (ft)        *  538.55  * 1306.62  * 1135.52  *
* Crit W.S. (ft)         *  861.56  * Flow Area (sq ft)      *          * 1800.84  *  432.40  *
* E.G. Slope (ft/ft)     *0.001281  * Area (sq ft)           * 1539.63  * 1800.84  * 3291.28  *
* Q Total (cfs)          *12600.00  * Flow (cfs)              *          *12371.42  *  228.58  *
* Top Width (ft)         * 2498.49  * Top Width (ft)          *  755.95  *  160.92  * 1581.63  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)        *          *    6.87  *    0.53  *
* Max Chl Dpth (ft)      *   20.08  * Hydr. Depth (ft)        *          *   11.19  *    0.85  *
* Conv. Total (cfs)      *351989.2  * Conv. (cfs)             *          *345603.7  *  6385.5  *
* Length Wtd. (ft)       * 1292.54  * Wetted Per. (ft)        *          *  171.44  *  511.16  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)        *          *    0.84  *    0.07  *
* Alpha                  *    1.46  * Stream Power (lb/ft s)  *          *    5.77  *    0.04  *
* Frctn Loss (ft)        *    1.82  * Cum Volume (acre-ft)    * 4539.42  *11707.21  * 4530.41  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  824.33  *  670.33  *  876.06  *
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Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	873.06	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.79	Wt. n-Val.	0.060	0.042	0.090	
W.S. Elev (ft)	872.27	Reach Len. (ft)	538.55	1306.62	1135.52	
Crit W.S. (ft)	864.48	Flow Area (sq ft)	231.99	2188.40	1697.87	
E.G. Slope (ft/ft)	0.001384	Area (sq ft)	4815.27	2188.40	7817.25	
Q Total (cfs)	19100.00	Flow (cfs)	180.95	16655.52	2263.53	
Top Width (ft)	4463.75	Top Width (ft)	2165.48	162.28	2135.99	
Vel Total (ft/s)	4.64	Avg. Vel. (ft/s)	0.78	7.61	1.33	
Max Chl Dpth (ft)	22.47	Hydr. Depth (ft)	0.78	13.49	3.20	
Conv. Total (cfs)	513414.6	Conv. (cfs)	4864.0	447706.2	60844.4	
Length Wtd. (ft)	1264.67	Wetted Per. (ft)	297.82	173.12	530.96	
Min Ch El (ft)	849.80	Shear (lb/sq ft)	0.07	1.09	0.28	
Alpha	2.36	Stream Power (lb/ft s)	0.05	8.31	0.37	
Frctn Loss (ft)	1.86	Cum Volume (acre-ft)	7353.94	13843.98	7565.62	
C & E Loss (ft)	0.01	Cum SA (acres)	1042.40	693.64	1096.91	

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	875.15	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.77	Wt. n-Val.	0.060	0.043	0.090	
W.S. Elev (ft)	874.38	Reach Len. (ft)	538.55	1306.62	1135.52	
Crit W.S. (ft)	868.26	Flow Area (sq ft)	1033.08	2530.81	2817.99	
E.G. Slope (ft/ft)	0.001376	Area (sq ft)	9860.15	2530.81	12329.31	
Q Total (cfs)	27300.00	Flow (cfs)	1608.10	20441.27	5250.62	
Top Width (ft)	4928.98	Top Width (ft)	2625.95	162.28	2140.75	
Vel Total (ft/s)	4.28	Avg. Vel. (ft/s)	1.56	8.08	1.86	
Max Chl Dpth (ft)	24.58	Hydr. Depth (ft)	2.21	15.60	5.31	
Conv. Total (cfs)	736032.3	Conv. (cfs)	43355.9	551114.9	141561.5	
Length Wtd. (ft)	1209.82	Wetted Per. (ft)	468.31	173.12	530.96	
Min Ch El (ft)	849.80	Shear (lb/sq ft)	0.19	1.26	0.46	
Alpha	2.71	Stream Power (lb/ft s)	0.29	10.14	0.85	
Frctn Loss (ft)	1.56	Cum Volume (acre-ft)	11907.34	16933.28	12496.53	
C & E Loss (ft)	0.03	Cum SA (acres)	1502.48	721.96	1578.91	

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	876.44	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.72	Wt. n-Val.	0.060	0.043	0.090	
W.S. Elev (ft)	875.72	Reach Len. (ft)	538.55	1306.62	1135.52	
Crit W.S. (ft)	871.33	Flow Area (sq ft)	1727.01	2748.25	3529.28	
E.G. Slope (ft/ft)	0.001296	Area (sq ft)	13574.04	2748.25	15199.79	
Q Total (cfs)	32830.00	Flow (cfs)	3037.43	22376.53	7416.04	
Top Width (ft)	5253.27	Top Width (ft)	2947.09	162.28	2143.90	
Vel Total (ft/s)	4.10	Avg. Vel. (ft/s)	1.76	8.14	2.10	
Max Chl Dpth (ft)	25.92	Hydr. Depth (ft)	2.77	16.94	6.65	
Conv. Total (cfs)	911914.9	Conv. (cfs)	84370.3	621550.1	205994.5	
Length Wtd. (ft)	1177.54	Wetted Per. (ft)	623.33	173.12	530.96	
Min Ch El (ft)	849.80	Shear (lb/sq ft)	0.22	1.28	0.54	
Alpha	2.76	Stream Power (lb/ft s)	0.39	10.46	1.13	
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	15944.23	18813.02	16881.01	
C & E Loss (ft)	0.05	Cum SA (acres)	1824.24	729.10	2030.86	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

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         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  877.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.060  *   0.044  *   0.090  *
* W.S. Elev (ft)         *  877.14  * Reach Len. (ft)        *  538.55  * 1306.62  * 1135.52  *
* Crit W.S. (ft)         *  872.62  * Flow Area (sq ft)      * 2610.96  * 2978.45  * 4282.30  *
* E.G. Slope (ft/ft)     *0.001131  * Area (sq ft)           *17797.19  * 2978.45  *18243.38  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 5649.91  *23538.77  * 9561.32  *
* Top Width (ft)         * 5327.82  * Top Width (ft)         * 3018.20  *  162.28  * 2147.33  *
* Vel Total (ft/s)       *    3.93  * Avg. Vel. (ft/s)       *    2.16  *    7.90  *    2.23  *
* Max Chl Dpth (ft)      *   27.34  * Hydr. Depth (ft)       *    4.19  *   18.35  *    8.07  *
* Conv. Total (cfs)      *1152377.0  * Conv. (cfs)            *168021.4  *700013.9  *284342.0  *
* Length Wtd. (ft)       * 1142.68  * Wetted Per. (ft)        *  623.33  *  173.12  *  530.96  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.30  *    1.21  *    0.57  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    0.64  *    9.60  *    1.27  *
* Frctn Loss (ft)        *    1.15  * Cum Volume (acre-ft)   *19909.26  *20161.99  *21320.09  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 2045.06  *  730.05  * 2477.05  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  879.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.060  *   0.044  *   0.090  *
* W.S. Elev (ft)         *  878.93  * Reach Len. (ft)        *  538.55  * 1306.62  * 1135.52  *
* Crit W.S. (ft)         *  873.75  * Flow Area (sq ft)      * 3727.30  * 3269.17  * 5233.29  *
* E.G. Slope (ft/ft)     *0.000962  * Area (sq ft)           *23342.39  * 3269.17  *22094.08  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 9430.25  *24952.73  *12317.02  *
* Top Width (ft)         * 5456.75  * Top Width (ft)         * 3142.81  *  162.28  * 2151.67  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *    2.53  *    7.63  *    2.35  *
* Max Chl Dpth (ft)      *   29.13  * Hydr. Depth (ft)       *    5.98  *   20.15  *    9.86  *
* Conv. Total (cfs)      *1505964.0  * Conv. (cfs)            *304103.1  *804666.0  *397194.7  *
* Length Wtd. (ft)       * 1098.72  * Wetted Per. (ft)        *  623.33  *  173.12  *  530.96  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.36  *    1.13  *    0.59  *
* Alpha                  *    2.32  * Stream Power (lb/ft s) *    0.91  *    8.65  *    1.39  *
* Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   *26675.97  *22131.06  *28649.54  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 2378.70  *  732.47  * 2904.38  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  873.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.060  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  872.55  * Reach Len. (ft)        *  538.55  * 1306.62  * 1135.52  *
* Crit W.S. (ft)         *  865.79  * Flow Area (sq ft)      *  317.32  * 2233.11  * 1844.13  *
* E.G. Slope (ft/ft)     *0.001394  * Area (sq ft)           * 5420.09  * 2233.11  * 8405.83  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  290.64  *17201.92  * 2607.44  *
* Top Width (ft)         * 4520.82  * Top Width (ft)         * 2221.92  *  162.28  * 2136.61  *
* Vel Total (ft/s)       *    4.57  * Avg. Vel. (ft/s)       *    0.92  *    7.70  *    1.41  *
* Max Chl Dpth (ft)      *   22.75  * Hydr. Depth (ft)       *    0.99  *   13.76  *    3.47  *
* Conv. Total (cfs)      *538285.1  * Conv. (cfs)            *  7783.4  *460673.5  * 69828.2  *
* Length Wtd. (ft)       * 1258.48  * Wetted Per. (ft)        *  321.93  *  173.12  *  530.96  *
* Min Ch El (ft)         *  849.80  * Shear (lb/sq ft)       *    0.09  *    1.12  *    0.30  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    0.08  *    8.65  *    0.43  *
* Frctn Loss (ft)        *    1.83  * Cum Volume (acre-ft)   * 8356.57  *14810.42  * 8684.87  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1150.09  *  703.96  * 1179.21  *
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Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
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CROSS SECTION

RIVER: Blue River
REACH: Main RS: 31.429

INPUT
Description: Ineffective area due to road embankment upstream.
Station Elevation Data num= 470

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	910.67	5.11	910.59	15.97	910.29	17.18	910.4	20.2	910.17
29.05	910.36	35.48	910.43	40.83	910.58	61.67	910.78	62.24	910.68
62.56	910.65	75.56	908.42	82.29	907.11	89.65	905.72	97.49	903.36
99.36	903.31	110.05	903.04	115.18	902.88	126.95	901.87	141.85	901.12
146.51	901.1	154.3	901.09	176.88	899.17	202.37	900.58	209.88	898.89
220.82	899.62	236.37	900.04	241.81	900.7	244.93	900.38	259.83	894.09
286.29	892.88	305.47	892.22	308.31	892.13	312.15	891.94	330.16	891.11
346.81	890.86	360.48	890.49	367.67	890.12	371.32	889.14	375.64	887.84
391.37	888.22	393.21	888.27	394.91	888.23	418.8	887.8	435.48	887.59
439.06	887.55	466.83	887.43	473.33	887.34	505.38	886.8	523.38	886.39
548.64	885.58	561.72	885.33	578.52	885.16	606.44	884.73	609.88	884.69
611.97	884.64	637.44	884.28	651.58	883.97	665.64	883.69	674.84	883.71
681.99	883.43	691.25	882.22	691.76	882.2	706.99	881.71	708.89	881.85
715.99	882.41	745.92	883.01	748.27	882.95	775.84	882.28	790.77	881.5
795.06	881.25	804.99	881.03	824.05	880.35	833.87	880.73	853.4	880.71
883.16	880.21	883.41	880.21	883.63	880.2	897.04	879.57	898.58	879.57
911.18	879.97	914.11	879.91	917.94	879.8	934.11	879.78	937.2	879.85
955.53	879.94	960.35	879.89	971.12	879.9	973.98	879.64	984.45	879.57
987.46	879.57	988.23	879.64	1005.87	880.98	1011.32	879.49	1018.61	878.66
1035.66	878.64	1068.87	876.26	1082.74	876.02	1109	873.27	1111.93	872.94
1125.18	872.93	1136.4	872.2	1151.7	871.07	1155.24	871.05	1163.83	870.92
1171.05	870.16	1186.91	868.72	1187.82	868.76	1189.86	868.84	1206.27	869.46
1212.21	869.79	1222.28	867.86	1223.01	867.61	1226.07	865.97	1238.72	859.55
1239.47	859.18	1253.06	858.75	1256.86	858.64	1258.99	859.57	1276.84	866.3
1277.57	866.57	1279.51	866.92	1295.18	866.58	1298.23	866.49	1318.58	866.94
1334.77	867.04	1341.57	867.05	1359.83	866.79	1376.15	866.45	1385.35	866.65
1419.7	866.92	1421.38	865.31	1421.78	864.92	1423.99	863.36	1426.92	861.68
1432.85	858.64	1433.25	858.62	1437.67	858.46	1438.36	858.41	1442.08	858.29
1443.56	858.2	1449.31	858.04	1451.72	857.91	1456.16	857.81	1459.36	857.67
1464.56	857.52	1470.01	857.42	1475.16	857.39	1497.64	857.54	1508.26	857.45
1521.13	857.56	1524.63	857.55	1525.86	857.55	1527.02	857.57	1527.74	857.58
1528.55	857.61	1532.77	857.66	1534.74	857.76	1537.89	857.95	1540.61	858.02
1548.03	858.64	1548.97	859.1	1552.97	861.07	1565.2	867.11	1567.69	868.41
1568.79	869.06	1571.35	871.08	1592.95	870.52	1599.13	870.29	1613.26	870.16
1627.84	870.19	1642.04	870.15	1654.28	870.15	1664.48	870.01	1706.96	870
1723.71	869.86	1758.31	869.92	1765.44	869.44	1767.15	869.34	1790.53	869.26
1797.52	869.27	1807.1	869.43	1827.42	869.56	1848.01	869.55	1850.75	869.49
1853.3	869.16	1862.56	867.81	1863.16	867.72	1882.31	870.04	1883.63	870.24
1883.87	870.24	1884.38	870.25	1888.15	870.33	1889.82	870.37	1897.54	870.37
1906.04	870.07	1913.08	870.07	1925.96	869.99	1931.08	869.39	1933.49	869.1
1950.58	868.44	1951.22	868.44	1965.41	870.89	1972.1	871.87	2011.5	871.85
2020.19	871.98	2020.92	871.98	2029.54	871.85	2034.78	871.86	2052.33	871.86
2055.68	871.17	2058.57	871.04	2062.84	870.45	2070.6	868.44	2087.03	867.04
2102.73	866.02	2121.46	868.12	2121.85	868.18	2122.31	868.07	2141.72	864.32
2159.51	864.18	2168.79	864.13	2183.45	864.02	2212.19	863.85	2228.45	863.76
2228.91	863.76	2235.26	863.73	2237.45	864.89	2239.26	865.87	2247.6	866.36
2278.21	867.57	2280.14	867.65	2280.91	867.8	2284.71	868.53	2292.87	867.65
2293.88	867.54	2294.76	867.58	2322.51	868.35	2323.46	868.16	2330.07	866.89
2332.26	866.91	2334.61	866.94	2356.83	866.94	2360.32	865.75	2361.96	865.21
2365.81	865.8	2368.96	867.89	2381.24	867.88	2383.82	867.43	2397.36	868
2412.94	868.62	2417.02	868.76	2450.88	870.07	2461.06	870.4	2491.13	871.44
2495.08	871.57	2497.07	871.62	2521.58	872.09	2528.22	872.54	2533.65	872.79
2535.44	872.72	2544.05	872.68	2546.33	872.78	2557.14	873.43	2571.99	873.69
2600.07	874.7	2604.71	874.88	2607.78	874.93	2632.27	875.45	2651.75	875.95
2651.86	875.95	2676.9	875.85	2686.32	875.83	2716.89	875.48	2728.18	875.37
2734.74	875.27	2765.55	874.66	2779.14	874.42	2797.46	874.02	2812.84	873.58
2828.38	873.23	2862.98	872.6	2866.68	872.52	2870.18	872.49	2877.04	871.91
2879.06	871.71	2903.04	870.83	2907.73	869.76	2910.34	870.1	2921.15	871.42
2934.6	870.71	2935.48	870.66	2935.68	870.65	2949.1	871.17	2951.47	871.21
2988.4	870.62	2991.47	870.62	3016.99	870.34	3030.98	870.11	3041.19	869.76
3063.64	870.03	3064.33	870.04	3064.74	870.03	3091.54	869.26	3102.17	869.23
3144.86	868.66	3146.91	868.62	3160.04	868.43	3176.14	868.44	3179.27	868.16
3201.49	868.1	3213.56	868.15	3214.17	868.1	3219.47	868.77	3221.11	868.95
3222.39	868.96	3229.03	869.15	3229.85	869.56	3232.42	860.78	3233.22	857.66

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  3240.2  855.58 3244.42   854.3 3245.13  853.98 3245.68  853.66    3250   851.3
    3275  850.32    3300   851.3 3306.03  853.63  3308.2  854.16 3309.89  854.72
 3313.02   857.1 3324.62  864.26 3325.52  864.52 3328.83  864.84 3349.31  864.93
 3352.21  864.93 3378.59  865.02 3389.74  864.93 3390.37  865.08 3408.75  865.12
 3427.52  865.11 3432.15  865.15 3446.09  865.23 3466.76  865.25 3472.85  865.17
 3485.11  864.93 3508.54  864.12 3512.76  864.02 3528.27  863.95 3538.68  864.08
  3542.2  864.08 3544.86     864 3576.81  863.44 3582.67  863.35 3590.25  863.32
 3601.71  863.52 3720.64  866.42 3733.34  866.79 3735.64  866.86 3747.18  867.29
 3791.76  868.33 3815.91  868.24 3843.57  868.73 3852.38  869.13 3921.51  870.11
 3923.36  870.11 3925.38  870.09    3985   869.9 4006.34  869.72 4075.27  869.99
  4119.1  869.86 4142.65  869.86 4157.92  869.78 4217.36  869.66 4221.22  869.61
  4254.6  868.78  4254.9  868.78  4256.8  868.77 4265.89  868.77 4280.67  866.94
 4283.04  866.82 4302.86  865.59  4311.4  864.88 4313.17  864.24 4331.03  858.21
 4346.98  858.21 4357.95  861.24 4364.66  863.81  4385.2  864.94 4388.37  865.12
 4397.39  864.52 4404.42  863.97 4411.25  865.18 4412.62  865.34 4415.34  865.32
 4438.77  865.04 4501.02  865.21 4503.34  865.24 4506.44  865.24 4509.21  865.23
 4655.25  865.45 4660.79  865.49 4704.01  865.56 4707.27  865.55 4786.76  866.18
  4853.6  866.42 4856.06  866.42 4871.24  866.46 4894.09  866.21 4901.02  866.44
 4917.04   866.6 4930.78   866.7 4939.52  866.56 4965.49  864.19 4975.41  863.13
  4980.3  863.06 4989.15  862.53 4992.96  862.11 5005.24  861.48  5016.3  860.74
 5022.99  860.74 5059.28  861.73  5065.3  861.86  5076.9  861.96 5087.47  862.14
 5091.25  862.29 5097.14  862.37 5111.01  863.02 5119.04  863.32 5122.52  864.33
 5126.33  865.55 5142.06  869.73 5150.65  871.74 5153.08  871.97 5156.94  871.65
 5166.44   872.9 5171.17   872.4    5180  872.51 5187.03  873.16 5188.67  873.27
 5195.75  875.94  5196.9  875.81 5197.38  876.03 5199.13  876.86 5204.16  880.37
 5205.56  880.64 5214.43  882.21 5221.95  882.77 5222.57  882.83 5223.37  882.93
 5227.84  883.61 5235.03  885.49 5235.19  885.51 5255.88  885.85  5258.6  886.09
 5276.85  887.16 5298.22  888.32 5359.11  891.18 5372.87  892.14 5415.67  895.62
 5417.62  895.75 5421.95  896.03 5487.05  901.05 5494.02  901.45  5498.7   902.1
 5504.03  902.68 5511.15  902.69 5514.92  902.72 5517.98  903.18  5522.5  903.66

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  898.58      .1 2322.51     .06 3229.85     .04 3328.83     .11
 3582.67     .06 4313.17      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3229.85 3328.83          740.313  641.84431.2035              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    2650     882       F
 3935.25  5522.5     882       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  864.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.57  * Wt. n-Val.             *          *   0.040  *   0.071  *
* W.S. Elev (ft)          *  863.82  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)          *  857.71  * Flow Area (sq ft)      *          *  971.71  *   16.64  *
* E.G. Slope (ft/ft)      *0.001301  * Area (sq ft)           *  896.07  *  971.71  *  485.07  *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *          * 5864.54  *    5.46  *
* Top Width (ft)          *  546.08  * Top Width (ft)         *  192.75  *   92.37  *  260.96  *
* Vel Total (ft/s)        *    5.94  * Avg. Vel. (ft/s)       *          *    6.04  *    0.33  *
* Max Chl Dpth (ft)       *   13.50  * Hydr. Depth (ft)        *          *   10.52  *    0.28  *
* Conv. Total (cfs)       *162731.4  * Conv. (cfs)             *          *162580.1  *   151.3  *
* Length Wtd. (ft)        *  641.74  * Wetted Per. (ft)        *          *  101.66  *   58.77  *
* Min Ch El (ft)          *  850.32  * Shear (lb/sq ft)        *          *    0.78  *    0.02  *
* Alpha                   *    1.03  * Stream Power (lb/ft s) *          *    4.69  *    0.01  *
* Frctn Loss (ft)         *    0.75  * Cum Volume (acre-ft)   * 1197.45  * 7390.07  * 1030.60  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  366.36  *  593.44  *  347.97  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  867.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.78  * Wt. n-Val.             *          *   0.040  *   0.087  *
* W.S. Elev (ft)          *  867.20  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)          *  860.60  * Flow Area (sq ft)      *          * 1298.62  *  991.77  *
* E.G. Slope (ft/ft)      *0.001513  * Area (sq ft)           * 1975.89  * 1298.62  * 3178.53  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             *          * 9713.53  * 1186.47  *
* Top Width (ft)          * 1919.15  * Top Width (ft)         *  551.05  *   98.29  * 1269.81  *
```

```
* Vel Total (ft/s)       *    4.76  * Avg. Vel. (ft/s)       *          *    7.48  *    1.20  *
* Max Chl Dpth (ft)      *   16.88  * Hydr. Depth (ft)       *          *   13.21  *    2.38  *
* Conv. Total (cfs)      *280187.7  * Conv. (cfs)            *          *249689.2  * 30498.5  *
* Length Wtd. (ft)       *  628.45  * Wetted Per. (ft)       *          *  110.28  *  415.96  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *          *    1.11  *    0.23  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *          *    8.32  *    0.27  *
* Frctn Loss (ft)        *    0.98  * Cum Volume (acre-ft)   * 3308.76  * 9901.26  * 3083.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  709.84  *  638.16  *  687.66  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  868.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *          *   0.040  *   0.087  *
* W.S. Elev (ft)         *  867.95  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)         *  861.44  * Flow Area (sq ft)      *          * 1372.41  * 1314.66  *
* E.G. Slope (ft/ft)     *0.001558  * Area (sq ft)           * 2414.25  * 1372.41  * 4145.15  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *          *10754.32  * 1845.68  *
* Top Width (ft)         * 2047.98  * Top Width (ft)         *  640.12  *   98.51  * 1309.35  *
* Vel Total (ft/s)       *    4.69  * Avg. Vel. (ft/s)       *          *    7.84  *    1.40  *
* Max Chl Dpth (ft)      *   17.63  * Hydr. Depth (ft)       *          *   13.93  *    2.94  *
* Conv. Total (cfs)      *319262.2  * Conv. (cfs)            *          *272495.9  * 46766.3  *
* Length Wtd. (ft)       *  622.49  * Wetted Per. (ft)       *          *  111.06  *  446.64  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *          *    1.20  *    0.29  *
* Alpha                  *    2.40  * Stream Power (lb/ft s) *          *    9.42  *    0.40  *
* Frctn Loss (ft)        *    1.02  * Cum Volume (acre-ft)   * 4514.98  *11659.62  * 4433.49  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  815.70  *  666.44  *  838.38  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  871.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.060  *   0.040  *   0.085  *
* W.S. Elev (ft)         *  870.33  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)         *  866.28  * Flow Area (sq ft)      *  271.93  * 1608.30  * 2582.43  *
* E.G. Slope (ft/ft)     *0.001563  * Area (sq ft)           * 4651.04  * 1608.30  * 7690.26  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *  310.64  *13894.58  * 4894.79  *
* Top Width (ft)         * 3285.19  * Top Width (ft)         * 1370.40  *   98.98  * 1815.81  *
* Vel Total (ft/s)       *    4.28  * Avg. Vel. (ft/s)       *    1.14  *    8.64  *    1.90  *
* Max Chl Dpth (ft)      *   20.01  * Hydr. Depth (ft)       *    1.24  *   16.25  *    4.26  *
* Conv. Total (cfs)      *483064.4  * Conv. (cfs)            *  7856.5  *351412.3  *123795.7  *
* Length Wtd. (ft)       *  604.68  * Wetted Per. (ft)       *  219.87  *  112.74  *  606.55  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *    0.12  *    1.39  *    0.42  *
* Alpha                  *    3.02  * Stream Power (lb/ft s) *    0.14  *   12.03  *    0.79  *
* Frctn Loss (ft)        *    1.07  * Cum Volume (acre-ft)   * 7295.43  *13787.04  * 7363.50  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1020.54  *  689.72  * 1045.40  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  873.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.060  *   0.040  *   0.081  *
* W.S. Elev (ft)         *  872.89  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)         *  868.95  * Flow Area (sq ft)      * 1106.79  * 1861.34  * 4132.76  *
* E.G. Slope (ft/ft)     *0.001218  * Area (sq ft)           * 8796.03  * 1861.34  *12361.87  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 1939.71  *15647.36  * 9712.93  *
* Top Width (ft)         * 3759.37  * Top Width (ft)         * 1805.25  *   98.98  * 1855.14  *
* Vel Total (ft/s)       *    3.84  * Avg. Vel. (ft/s)       *    1.75  *    8.41  *    2.35  *
* Max Chl Dpth (ft)      *   22.57  * Hydr. Depth (ft)       *    2.89  *   18.81  *    6.82  *
* Conv. Total (cfs)      *782176.6  * Conv. (cfs)            * 55575.0  *448315.1  *278286.5  *
```

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* Length Wtd. (ft)       *  591.25  * Wetted Per. (ft)       *  383.36  *  112.74  *  606.55  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *    0.22  *    1.26  *    0.52  *
* Alpha                  *    2.89  * Stream Power (lb/ft s) *    0.38  *   10.56  *    1.22  *
* Frctn Loss (ft)        *    0.90  * Cum Volume (acre-ft)   *11792.01  *16867.40  *12174.71  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1475.08  *  718.04  * 1526.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  875.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *   0.060  *   0.040  *   0.079  *
* W.S. Elev (ft)         *  874.46  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)         *  870.33  * Flow Area (sq ft)      * 1766.37  * 2017.04  * 5086.69  *
* E.G. Slope (ft/ft)     *0.001039  * Area (sq ft)           *11758.55  * 2017.04  *15288.48  *
* Q Total (cfs)          *32830.00  * Flow (cfs)              * 3489.92  *16523.43  *12816.65  *
* Top Width (ft)         * 3911.11  * Top Width (ft)         * 1949.12  *   98.98  * 1863.01  *
* Vel Total (ft/s)       *    3.70  * Avg. Vel. (ft/s)        *    1.98  *    8.19  *    2.52  *
* Max Chl Dpth (ft)      *   24.14  * Hydr. Depth (ft)       *    3.90  *   20.38  *    8.39  *
* Conv. Total (cfs)      *1018363.0  * Conv. (cfs)            *108254.7  *512544.8  *397563.1  *
* Length Wtd. (ft)       *  586.66  * Wetted Per. (ft)       *  453.73  *  112.74  *  606.55  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *    0.25  *    1.16  *    0.54  *
* Alpha                  *    2.68  * Stream Power (lb/ft s) *    0.50  *    9.51  *    1.37  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   *15787.63  *18741.55  *16483.63  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1793.97  *  725.18  * 1978.63  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  876.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.              *   0.060  *   0.040  *   0.078  *
* W.S. Elev (ft)         *  876.07  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)         *  871.15  * Flow Area (sq ft)      * 2575.29  * 2175.78  * 6059.24  *
* E.G. Slope (ft/ft)     *0.000902  * Area (sq ft)           *15026.55  * 2175.78  *18279.97  *
* Q Total (cfs)          *38750.00  * Flow (cfs)              * 5172.53  *17466.05  *16111.42  *
* Top Width (ft)         * 4117.49  * Top Width (ft)         * 2149.88  *   98.98  * 1868.63  *
* Vel Total (ft/s)       *    3.58  * Avg. Vel. (ft/s)        *    2.01  *    8.03  *    2.66  *
* Max Chl Dpth (ft)      *   25.75  * Hydr. Depth (ft)       *    4.44  *   21.98  *    9.99  *
* Conv. Total (cfs)      *1290158.0  * Conv. (cfs)            *172216.4  *581521.8  *536420.0  *
* Length Wtd. (ft)       *  583.14  * Wetted Per. (ft)       *  580.39  *  112.74  *  606.55  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *    0.25  *    1.09  *    0.56  *
* Alpha                  *    2.53  * Stream Power (lb/ft s) *    0.50  *    8.72  *    1.50  *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   *19706.36  *20084.69  *20844.05  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 2013.11  *  726.13  * 2424.70  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  878.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *   0.060  *   0.040  *   0.078  *
* W.S. Elev (ft)         *  878.09  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)         *  872.09  * Flow Area (sq ft)      * 3747.97  * 2375.96  * 7285.67  *
* E.G. Slope (ft/ft)     *0.000729  * Area (sq ft)           *19419.22  * 2375.96  *22062.89  *
* Q Total (cfs)          *46700.00  * Flow (cfs)              * 8688.67  *18177.42  *19833.91  *
* Top Width (ft)         * 4157.56  * Top Width (ft)         * 2186.52  *   98.98  * 1872.06  *
* Vel Total (ft/s)       *    3.48  * Avg. Vel. (ft/s)        *    2.32  *    7.65  *    2.72  *
* Max Chl Dpth (ft)      *   27.77  * Hydr. Depth (ft)       *    6.46  *   24.00  *   12.01  *
* Conv. Total (cfs)      *1730042.0  * Conv. (cfs)            *321879.4  *673398.3  *734764.2  *
* Length Wtd. (ft)       *  582.68  * Wetted Per. (ft)       *  580.39  *  112.74  *  606.55  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *    0.29  *    0.96  *    0.55  *
```

```
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.68  *    7.33  *    1.49  *
* Frctn Loss (ft)        *    0.61  * Cum Volume (acre-ft)   *26411.63  *22046.40  *28074.00  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 2345.75  *  728.56  * 2851.93  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  871.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.060  *   0.040  *   0.084  *
* W.S. Elev (ft)         *  870.67  * Reach Len. (ft)        *  740.31  *  641.84  *  431.20  *
* Crit W.S. (ft)         *  866.69  * Flow Area (sq ft)      *  350.84  * 1641.24  * 2784.30  *
* E.G. Slope (ft/ft)     *0.001522  * Area (sq ft)           * 5120.58  * 1641.24  * 8294.95  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  423.58  *14179.14  * 5497.28  *
* Top Width (ft)         * 3361.63  * Top Width (ft)         * 1445.41  *   98.98  * 1817.24  *
* Vel Total (ft/s)       *    4.21  * Avg. Vel. (ft/s)       *    1.21  *    8.64  *    1.97  *
* Max Chl Dpth (ft)      *   20.35  * Hydr. Depth (ft)       *    1.37  *   16.58  *    4.59  *
* Conv. Total (cfs)      *515278.6  * Conv. (cfs)            * 10858.7  *363493.0  *140927.0  *
* Length Wtd. (ft)       *  602.27  * Wetted Per. (ft)       *  256.79  *  112.74  *  606.55  *
* Min Ch El (ft)         *  850.32  * Shear (lb/sq ft)       *    0.13  *    1.38  *    0.44  *
* Alpha                  *    3.04  * Stream Power (lb/ft s) *    0.16  *   11.95  *    0.86  *
* Frctn Loss (ft)        *    1.05  * Cum Volume (acre-ft)   * 8291.41  *14752.31  * 8467.19  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1127.42  *  700.04  * 1127.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 31.307

INPUT
Description:
Station Elevation Data    num=     454
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
        0  902.84     .32  902.83   17.69  902.44   38.99  902.03   76.46  901.03
    98.01  900.58  110.23  900.45  130.84  899.67  131.18  899.65   131.4  899.66
   131.52  899.66  154.93  896.69  155.48  896.53  172.59   896.3   173.6  896.28
   175.01  896.27  202.99  896.49  238.98  896.26  241.21  896.26  273.93   895.2
   281.95  894.81  298.97  894.15  315.72  893.62  330.87  893.22  349.81   894.7
   359.62  892.41  365.71  892.21  366.02  892.21  366.13  892.13  367.61  891.73
   368.97  891.38  369.71  891.24  370.29  891.12  373.69  890.57  522.31  890.57
   525.06  892.02  529.99  894.36   545.7  894.42  556.89  890.33  570.12  885.78
   571.61  886.11  573.64   885.4  577.74  883.58  578.43  883.18  581.64  883.08
    588.4  882.89  591.65  882.76  593.79  882.17  599.63   881.3  605.26  880.06
   607.81  879.18  609.38  879.12  618.11  878.86  618.93  878.79  625.91  878.44
   630.14  878.04  635.45  878.03  635.89  877.97   636.4  877.91  637.63  877.83
   644.62  878.33  646.79  878.29  647.36  878.26  653.23     878  653.78  877.91
   656.31  877.29  657.31  877.01  658.59  876.73  666.49  877.49  671.77  877.97
   674.26  878.24   678.4  878.86  682.84  878.76  691.56  878.67  708.38  878.86
   710.28  878.86  713.91   878.5  719.39  877.83  723.82  877.87  729.07  877.89
   732.07  877.83  736.24  877.54  740.29  877.95  757.02  878.49  759.83  878.62
   760.53  878.65  760.94  878.64  761.22  878.63  762.61   878.7  779.59  876.42
   790.17  874.95  792.82  875.14  798.82  875.38  806.99  875.61   812.7  875.81
   819.42  876.07   830.8  876.47  837.13   876.6  841.49  876.66  853.16  876.91
   859.38  877.31  878.12  877.61  885.15   877.7   916.3  878.39  924.32  878.52
   933.16  878.59  955.23  878.71  959.89  878.75  986.47  878.93  987.47  878.94
  1028.57  878.91 1061.01  878.16 1063.16  878.09  1092.2  876.75  1095.4  876.59
  1116.17  875.98 1123.43  875.72 1159.04  874.77 1164.15  874.67 1200.78  873.33
  1201.56  873.32 1203.04  873.28 1230.15  872.85 1238.46  872.61 1262.47  872.43
  1280.58  871.94  1295.5  871.63 1329.97  870.73 1331.81   870.7 1365.31  870.11
   1379.3  869.79 1400.04  869.45 1431.57  869.06  1434.3  869.01 1515.26  867.42
  1536.35  866.94 1560.11  866.76 1566.79  866.76 1605.34  866.43    1611  866.29
```

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 1636.94  865.78 1661.83  865.62 1671.86  865.42 1678.18  865.28  1708.2  864.84
 1734.88  865.06 1737.03  865.04 1740.34  865.05 1770.76  865.02 1786.98  865.06
 1808.16  865.26 1832.03  865.23 1835.14  865.25 1837.73  865.09 1839.48  864.99
 1847.07  864.76 1850.82  864.87 1866.62  865.36 1872.22  865.42 1880.34  865.41
 1886.04  865.53 1893.79  865.77  1901.1  856.43 1901.32  856.11 1901.54  856.11
 1913.74  856.02  1915.4  856.02  1940.4  855.84  1946.9  860.05 1949.99  859.41
 1978.66  868.65 1979.08  868.77 1979.76  868.96 1980.33  869.17 1984.71  869.21
 2008.86  869.39 2011.72  869.37 2012.92  869.32 2047.19  868.45 2048.58  868.43
 2052.35  868.34 2065.06  867.64 2070.61  868.49 2080.63  870.24 2086.13  870.37
  2094.4  870.37 2094.85  870.35 2100.46  870.07 2109.68  870.07 2126.28  866.44
 2129.78   865.7 2133.83  866.33 2151.82  868.34 2175.65  868.16 2176.79  868.15
 2177.74  868.15 2191.99   867.2 2208.16  865.78 2215.09  865.33 2226.98  864.69
 2244.01  864.62 2250.39  864.58 2263.55  864.53 2285.48  864.58 2299.74  864.69
 2309.81  864.55 2313.85  864.43 2317.87  866.46 2318.84  866.94 2341.67  866.94
 2344.54  866.26 2346.96  865.74 2353.83  867.36 2356.54  867.97 2360.05  866.59
 2375.42  864.75 2396.26   864.1    2407  863.84 2422.22  863.68 2464.53  863.55
 2495.99  863.36  2498.1  863.36 2543.26  862.96 2546.98  862.89 2553.65  862.89
 2576.41  862.92 2607.62  862.56 2617.31  862.66  2633.9  862.69  2651.4  862.28
 2670.22  862.26  2674.8  862.55 2683.72  862.78 2687.33  862.91 2688.78  862.93
 2691.31  862.96  2700.6  863.03 2709.26  860.72 2712.85  859.85  2719.9  857.99
 2720.71  859.16 2726.13  862.73 2732.79   864.4 2757.17  864.39 2764.68  864.35
 2784.51  864.55 2801.43  864.29 2807.35   864.4 2812.35  864.62 2814.37  864.59
 2823.97  864.49 2835.35  864.45 2864.19  865.15  2865.2  865.16 2867.88  865.31
 2886.57  866.12 2893.74  866.33 2913.98  866.83 2918.64  866.96 2941.73  867.34
 2949.03  867.44  2950.9  867.46 2955.57  867.57 2982.87  868.12 2990.71  868.02
 3010.23  867.81 3021.83  867.47 3040.13  867.81 3041.81  867.89 3045.76  867.27
 3057.88  865.45 3059.42  865.37 3070.48  865.08 3072.17  865.03 3094.78  864.43
 3098.26  864.19 3100.89  863.98  3107.1  864.16 3124.55  864.54 3134.41  864.54
 3138.46   864.4 3142.02  862.93 3145.58   862.1 3148.85  855.07 3149.46  853.66
    3155   850.5    3187   849.7    3219   850.5 3224.28  853.35 3225.92  853.54
 3226.94  853.63 3235.58  860.27 3237.61  861.77 3237.79  863.28 3238.09  865.16
 3241.61  865.07 3249.68  864.97 3257.98     865 3264.81  865.16 3269.97  865.17
 3273.01  865.17 3285.79  865.14 3285.99   865.1 3286.18  865.04 3287.85  864.93
 3292.89  864.61 3300.03  864.21  3304.8  863.92 3305.34  863.85 3305.68  863.69
 3324.87  863.23 3327.72  863.17 3327.83  863.22 3328.94  863.63 3340.95   864.1
 3342.87  864.15 3344.04  864.23 3344.22   864.3 3346.57     865 3369.62  865.22
 3370.33  865.22 3370.65  865.23 3370.95  865.23 3396.44  865.59 3416.39  865.41
  3427.8  865.28 3430.96  865.26    3458  865.26 3480.42   864.9 3499.38  865.24
 3512.48  865.12 3568.22  865.24 3571.23  865.22 3646.76  865.31 3760.45  865.21
 3804.65  865.26 3834.96  865.71 3848.18  865.68 4065.13  866.24 4075.52  866.24
  4144.6  866.34 4173.34  866.01 4190.98  865.98 4225.29  866.12 4289.77  865.81
  4302.1  865.89 4319.69  866.21 4323.12  866.19 4324.39  866.24 4338.11  863.97
 4352.31  859.53 4355.26  858.21 4370.58  858.21 4376.09  859.82 4385.06  862.39
 4395.63  862.59 4421.83  862.88 4426.06  863.41 4434.18  864.45 4445.33  865.71
 4480.98  865.49 4484.94  865.48 4488.98  865.44 4508.23  864.55 4522.19   864.2
 4525.38  864.17 4537.21  864.02 4553.45   863.1 4555.88  862.75 4579.32  862.65
 4601.05  862.87 4613.61  863.61 4636.48  864.28 4650.19  864.31 4664.02  864.37
 4682.53  865.86 4693.29  866.41 4700.57  866.76 4716.31  868.17 4721.21   868.5
 4730.11  868.74 4731.33  868.83 4741.51  864.67 4748.43  860.14 4752.38  859.88
 4756.22  859.72 4757.22   859.8 4761.16  861.77 4769.15  860.77  4771.5  861.53
 4773.85  861.67 4784.21  862.91 4793.44  863.29 4794.94  863.78 4798.32  864.01
  4799.9  864.39 4800.54  864.68 4805.68  866.44 4812.75  867.23 4820.11  867.96
  4827.8  868.86 4833.99  869.45 4835.03  869.56 4835.19  869.58  4835.4  869.61
 4835.59  869.63 4843.29  870.08 4860.92  870.68 4864.06  870.83 4865.65  871.02
 4873.45  871.59 4878.61  871.94 4895.21  873.25 4914.15  874.45 4921.03  874.63
 4921.26  874.65  4921.6  874.66 4923.33  874.69 4929.15  874.81 4946.43  875.69
 4947.52  875.62 4963.91  877.72  4971.6  878.55 4975.19  878.76    4980  878.64
 4995.67  878.86  5006.5  879.16 5043.53  880.32 5053.85  880.71 5065.52  881.27
 5115.64  883.18 5205.68  886.38 5229.41  887.42 5255.41  888.48    5286  890.54
 5303.39  891.35 5319.06   892.3 5359.62  894.14 5383.84  895.55 5390.96  895.98
 5397.69  896.22 5405.07  896.87 5456.13  900.27 5470.33  901.44 5474.92   902.3
 5477.29  902.69 5481.62   902.2 5483.99  902.01 5497.04  903.43 5498.19  903.54
 5521.13  906.22  5533.1  908.09 5550.07  910.29 5575.59  914.33

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .06 1786.98   .0765 3138.46     .04 3238.09      .1 3512.48     .06
 4352.31     .11 5115.64     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3138.46 3238.09         1063.472  951.88479.9655             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2986.12     882        F
 3574.47 5575.59     882        F
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Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2600    2800     863

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  863.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  863.13  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  856.15  * Flow Area (sq ft)      *          * 1060.59  *          *
* E.G. Slope (ft/ft)     *0.001047  * Area (sq ft)           *  399.30  * 1060.59  *  263.83  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *          * 5870.00  *          *
* Top Width (ft)         *  547.72  * Top Width (ft)          *  269.88  *   96.25  *  181.59  *
* Vel Total (ft/s)       *    5.53  * Avg. Vel. (ft/s)        *          *    5.53  *          *
* Max Chl Dpth (ft)      *   13.43  * Hydr. Depth (ft)        *          *   11.02  *          *
* Conv. Total (cfs)      *181404.5  * Conv. (cfs)             *          *181404.5  *          *
* Length Wtd. (ft)       *  953.58  * Wetted Per. (ft)        *          *  107.35  *          *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)        *          *    0.65  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    3.57  *          *
* Frctn Loss (ft)        *    0.82  * Cum Volume (acre-ft)    * 1186.44  * 7375.09  * 1026.89  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *  362.43  *  592.05  *  345.78  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  866.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *   0.076  *   0.040  *   0.092  *
* W.S. Elev (ft)         *  866.07  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  859.01  * Flow Area (sq ft)      *  118.86  * 1350.62  *  367.70  *
* E.G. Slope (ft/ft)     *0.001607  * Area (sq ft)           * 2288.37  * 1350.62  * 1777.01  *
* Q Total (cfs)          *10900.00  * Flow (cfs)              *  115.91  *10530.74  *  253.35  *
* Top Width (ft)         * 2481.34  * Top Width (ft)          * 1073.29  *   99.63  * 1308.42  *
* Vel Total (ft/s)       *    5.93  * Avg. Vel. (ft/s)        *    0.98  *    7.80  *    0.69  *
* Max Chl Dpth (ft)      *   16.37  * Hydr. Depth (ft)        *    1.40  *   13.56  *    1.09  *
* Conv. Total (cfs)      *271936.8  * Conv. (cfs)             *  2891.8  *262724.3  *  6320.7  *
* Length Wtd. (ft)       *  942.61  * Wetted Per. (ft)        *   84.78  *  112.71  *  336.70  *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)        *    0.14  *    1.20  *    0.11  *
* Alpha                  *    1.67  * Stream Power (lb/ft s)  *    0.14  *    9.37  *    0.08  *
* Frctn Loss (ft)        *    0.98  * Cum Volume (acre-ft)    * 3272.52  * 9881.75  * 3058.62  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)          *  696.04  *  636.71  *  674.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  867.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.076  *   0.040  *   0.091  *
* W.S. Elev (ft)         *  866.71  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  859.84  * Flow Area (sq ft)      *  174.54  * 1414.50  *  583.40  *
* E.G. Slope (ft/ft)     *0.001731  * Area (sq ft)           * 3006.93  * 1414.50  * 2725.99  *
* Q Total (cfs)          *12600.00  * Flow (cfs)              *  220.82  *11806.29  *  572.88  *
* Top Width (ft)         * 2812.32  * Top Width (ft)          * 1179.68  *   99.63  * 1533.00  *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)        *    1.27  *    8.35  *    0.98  *
* Max Chl Dpth (ft)      *   17.01  * Hydr. Depth (ft)        *    1.96  *   14.20  *    1.73  *
* Conv. Total (cfs)      *302837.9  * Conv. (cfs)             *  5307.4  *283761.4  * 13769.1  *
* Length Wtd. (ft)       *  930.00  * Wetted Per. (ft)        *   89.10  *  112.71  *  336.70  *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)        *    0.21  *    1.36  *    0.19  *
* Alpha                  *    1.94  * Stream Power (lb/ft s)  *    0.27  *   11.32  *    0.18  *
* Frctn Loss (ft)        *    0.98  * Cum Volume (acre-ft)    * 4468.91  *11639.09  * 4399.48  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)          *  800.23  *  664.98  *  824.31  *
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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  870.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *   0.076  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  868.81  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  862.78  * Flow Area (sq ft)      *  430.39  * 1623.62  * 1289.44  *
* E.G. Slope (ft/ft)     *0.002011  * Area (sq ft)           * 5967.20  * 1623.62  * 5996.98  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *  748.41  *16012.26  * 2339.33  *
* Top Width (ft)         * 3285.59  * Top Width (ft)         * 1597.03  *   99.63  * 1588.93  *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)       *    1.74  *    9.86  *    1.81  *
* Max Chl Dpth (ft)      *   19.11  * Hydr. Depth (ft)       *    2.83  *   16.30  *    3.83  *
* Conv. Total (cfs)      *425926.8  * Conv. (cfs)            * 16689.4  *357070.8  * 52166.6  *
* Length Wtd. (ft)       *  889.67  * Wetted Per. (ft)       *  152.58  *  112.71  *  336.70  *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)       *    0.35  *    1.81  *    0.48  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    0.62  *   17.83  *    0.87  *
* Frctn Loss (ft)        *    0.91  * Cum Volume (acre-ft)   * 7205.20  *13763.23  * 7295.75  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *  995.33  *  688.26  * 1028.55  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  872.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.076  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  871.28  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  867.84  * Flow Area (sq ft)      *  806.96  * 1869.90  * 2120.94  *
* E.G. Slope (ft/ft)     *0.001943  * Area (sq ft)           *10265.92  * 1869.90  * 9972.08  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 2097.07  *19914.10  * 5288.83  *
* Top Width (ft)         * 3560.32  * Top Width (ft)         * 1829.57  *   99.63  * 1631.12  *
* Vel Total (ft/s)       *    5.69  * Avg. Vel. (ft/s)       *    2.60  *   10.65  *    2.49  *
* Max Chl Dpth (ft)      *   21.58  * Hydr. Depth (ft)       *    5.30  *   18.77  *    6.31  *
* Conv. Total (cfs)      *619411.1  * Conv. (cfs)            * 47580.5  *451832.0  *119998.5  *
* Length Wtd. (ft)       *  857.21  * Wetted Per. (ft)       *  152.58  *  112.71  *  336.70  *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)       *    0.64  *    2.01  *    0.76  *
* Alpha                  *    2.61  * Stream Power (lb/ft s) *    1.67  *   21.43  *    1.90  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   *11630.03  *16839.91  *12064.16  *
* C & E Loss (ft)        *    0.31  * Cum SA (acres)         * 1444.20  *  716.58  * 1509.58  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  874.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *   0.076  *   0.040  *   0.089  *
* W.S. Elev (ft)         *  872.87  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  869.16  * Flow Area (sq ft)      * 1049.13  * 2028.28  * 2655.67  *
* E.G. Slope (ft/ft)     *0.001838  * Area (sq ft)           *13231.44  * 2028.28  *12582.27  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 3158.82  *22179.91  * 7491.27  *
* Top Width (ft)         * 3661.51  * Top Width (ft)         * 1909.58  *   99.63  * 1652.31  *
```

```
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)       *    3.01  *   10.94  *    2.82  *
* Max Chl Dpth (ft)      *   23.17  * Hydr. Depth (ft)       *    6.89  *   20.36  *    7.89  *
* Conv. Total (cfs)      *765837.9  * Conv. (cfs)            * 73686.9  *517399.2  *174751.8  *
* Length Wtd. (ft)       *  842.31  * Wetted Per. (ft)       *  152.58  *  112.71  *  336.70  *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)       *    0.79  *    2.06  *    0.90  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    2.38  *   22.58  *    2.55  *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   *15575.27  *18711.75  *16345.68  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         * 1761.18  *  723.72  * 1961.24  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  875.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *   0.076  *   0.040  *   0.089  *
* W.S. Elev (ft)         *  874.51  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  870.11  * Flow Area (sq ft)      * 1299.28  * 2191.87  * 3208.02  *
* E.G. Slope (ft/ft)     *0.001722  * Area (sq ft)           *16425.97  * 2191.87  *15315.01  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 4367.71  *24437.04  * 9945.25  *
* Top Width (ft)         * 3748.06  * Top Width (ft)         * 1969.99  *   99.63  * 1678.43  *
* Vel Total (ft/s)       *    5.78  * Avg. Vel. (ft/s)       *    3.36  *   11.15  *    3.10  *
* Max Chl Dpth (ft)      *   24.81  * Hydr. Depth (ft)       *    8.53  *   22.00  *    9.54  *
* Conv. Total (cfs)      *933674.4  * Conv. (cfs)            *105239.3  *588806.3  *239628.9  *
* Length Wtd. (ft)       *  830.23  * Wetted Per. (ft)       *  152.58  *  112.71  *  336.70  *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)       *    0.92  *    2.09  *    1.02  *
* Alpha                  *    2.45  * Stream Power (lb/ft s) *    3.08  *   23.31  *    3.18  *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)   *19439.08  *20052.51  *20677.77  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         * 1978.10  *  724.66  * 2407.15  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  877.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *   0.076  *   0.040  *   0.089  *
* W.S. Elev (ft)         *  876.55  * Reach Len. (ft)        * 1063.47  *  951.88  *  479.97  *
* Crit W.S. (ft)         *  871.21  * Flow Area (sq ft)      * 1609.01  * 2394.44  * 3891.95  *
* E.G. Slope (ft/ft)     *0.001611  * Area (sq ft)           *20547.46  * 2394.44  *18777.96  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 6032.55  *27385.02  *13282.43  *
* Top Width (ft)         * 3913.63  * Top Width (ft)         * 2097.35  *   99.63  * 1716.65  *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *    3.75  *   11.44  *    3.41  *
* Max Chl Dpth (ft)      *   26.85  * Hydr. Depth (ft)       *   10.56  *   24.03  *   11.57  *
* Conv. Total (cfs)      *1163477.0  * Conv. (cfs)            *150294.1  *682266.2  *330916.4  *
* Length Wtd. (ft)       *  818.59  * Wetted Per. (ft)       *  152.58  *  112.71  *  336.70  *
* Min Ch El (ft)         *  849.70  * Shear (lb/sq ft)       *    1.06  *    2.14  *    1.16  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    3.98  *   24.44  *    3.97  *
* Frctn Loss (ft)        *    0.59  * Cum Volume (acre-ft)   *26072.01  *22011.25  *27871.86  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         * 2309.35  *  727.09  * 2834.17  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  870.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.             *   0.076  *   0.040  *   0.090  *
```

* W.S. Elev (ft)	* 869.12	* Reach Len. (ft)	* 1063.47	* 951.88	* 479.97	*	
* Crit W.S. (ft)	* 863.19	* Flow Area (sq ft)	* 477.84	* 1654.66	* 1394.23	*	
* E.G. Slope (ft/ft)	*0.002014	* Area (sq ft)	* 6469.82	* 1654.66	* 6492.55	*	
* Q Total (cfs)	*20100.00	* Flow (cfs)	* 891.70	*16539.56	* 2668.75	*	
* Top Width (ft)	* 3323.40	* Top Width (ft)	* 1631.33	* 99.63	* 1592.44	*	
* Vel Total (ft/s)	* 5.70	* Avg. Vel. (ft/s)	* 1.87	* 10.00	* 1.91	*	
* Max Chl Dpth (ft)	* 19.42	* Hydr. Depth (ft)	* 3.14	* 16.61	* 4.14	*	
* Conv. Total (cfs)	*447850.0	* Conv. (cfs)	* 19868.0	*368519.4	* 59462.6	*	
* Length Wtd. (ft)	* 884.79	* Wetted Per. (ft)	* 152.58	* 112.71	* 336.70	*	
* Min Ch El (ft)	* 849.70	* Shear (lb/sq ft)	* 0.39	* 1.85	* 0.52	*	
* Alpha	* 2.55	* Stream Power (lb/ft s)	* 0.73	* 18.45	* 1.00	*	
* Frctn Loss (ft)	* 0.90	* Cum Volume (acre-ft)	* 8192.92	*14728.03	* 8394.00	*	
* C & E Loss (ft)	* 0.29	* Cum SA (acres)	* 1101.27	* 698.57	* 1110.80	*	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 31.127

INPUT
Description: Blocked low area on right is tributary channel.
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	907.8	3.85	907.95	11.72	908.12	22.85	908.46	31.18	908.56
34.79	908.45	61.05	908.61	70.45	908.71	72.89	908.49	80.08	908.11
106.34	906.79	108.6	906.68	109.27	906.64	122.88	899.43	129.89	895.48
132.05	895.88	133.23	896.11	145.13	898.35	153	899.87	154.32	900.12
157.99	898.16	161.54	896.21	162.81	896.84	165.11	898.14	170.49	901.21
172.26	902.23	175.9	904.24	186.62	903.99	188.79	903.94	194.06	903.82
199.92	903.4	211.69	902.82	226.87	902.69	241.89	901.48	246.84	901.32
260.26	900.22	274.15	899.54	276.73	899.35	291.77	898.84	305.69	898.14
313.86	897.7	335.16	896.55	338.03	896.38	338.7	896.38	339.94	896.38
340.48	896.27	358.94	895.43	382.35	894.46	390.75	894.11	409.15	893.22
428.06	892.27	440.62	891.68	459.72	890.81	484.92	889.62	491.6	888.26
514.16	888.09	515.46	888.02	515.81	888.01	539.66	884.71	545.77	884.49
556.22	884.11	560.49	884.07	565.1	883.99	569.63	883.93	577.76	884.56
585.7	885.32	590.38	885.1	599.96	884.64	609.32	884.72	644.07	881.71
647.69	881.57	654.79	881.33	683.36	880.49	699.62	879.85	732.86	878.9
735.98	878.93	742.46	878.61	769.66	877.87	780.56	877.67	801.75	877.2
808.72	877.1	812.34	877.01	817.44	876.96	846.98	876.7	848.4	876.51
850.87	876.2	851.96	876.06	852.65	876.12	857.18	876.52	865.88	875.71
870.01	875.33	878.54	874.37	889.55	873.87	913.01	872.89	941.03	872.07
942.47	872.03	944.64	871.96	973.04	871.18	978.81	871.04	979.96	870.88
981.01	870.7	983.34	870.77	988.38	870.89	1002.06	870.71	1028.17	870.2
1055.44	869.68	1062.72	869.55	1080.97	868.99	1088.9	868.76	1089.79	868.76
1093.22	868.78	1100.18	868.8	1106.47	868.83	1110.53	869.18	1113.43	869.48
1119.81	869.36	1124.68	869.27	1132.86	868.97	1149.02	868.23	1161.12	868.1
1192.63	867.88	1196.53	867.84	1205.21	867.7	1228.23	867.29	1236.66	867.22
1237.16	867.13	1240.43	866.55	1240.58	866.55	1252.53	866.84	1255.08	867.06
1259.06	867.5	1275.38	867.34	1276.83	867.29	1279.47	867.36	1306.36	867.56
1313.93	866.15	1324.37	864.57	1326.19	864.24	1328.25	864.3	1334.46	864.51
1337.85	864.38	1353.29	866.54	1363.35	868.35	1367.26	869.49	1369.07	870.01
1381.4	869	1395.51	867.85	1397.49	867.68	1404.56	867.09	1412.4	863.97
1416.09	861.58	1424.69	861.62	1426.71	861.63	1430.27	861.65	1435	864.63
1439.32	867.1	1440.05	867.2	1443.62	868.8	1445.41	869.62	1450.66	869.62
1453.36	869.62	1454.17	869.53	1458.12	869.12	1461.95	869.06	1469.15	868.95
1480.71	863.55	1490.49	862.19	1492.49	864.09	1497.01	864.19	1503.97	864.35
1510.91	863.64	1517.39	862.98	1535.84	861.94	1536.29	861.92	1556.55	861.32
1570.12	861.14	1584.76	861	1588.99	861	1592.79	861	1596.22	861
1610.3	860.7	1615.49	860.63	1620.34	860.69	1629.61	860.84	1639.27	860.99
1640.06	861	1640.92	861	1642.74	861	1646.53	861	1649.64	860.06
1660.55	859.61	1662.63	859.6	1662.77	859.29	1663.88	856.46	1667.78	858.2
1672.97	860.2	1695.09	860.2	1708.76	860.07	1717.7	860.22	1733.94	860.31

```
 1754.98  860.29 1762.71  860.27 1783.78  860.46  1794.6  860.54 1798.91  860.56
 1823.51  860.57 1841.28  860.52 1844.72  860.51 1846.35  860.34 1851.47  860.52
  1871.8  860.55 1882.63  860.63  1894.5  860.55 1902.75  860.49 1910.01  860.42
 1917.41  860.36 1919.13  859.52 1920.35  858.92 1922.78  858.94 1927.63  858.97
  1928.8  858.98 1930.34     859 1937.81  859.77 1939.27  859.73 1940.95  859.68
 1943.43  859.61 1943.46  858.04 1946.01  857.83 1946.63  857.76 1947.29  857.69
 1950.01  857.41  1954.4  856.94 1954.64  857.42  1955.8  859.25 1959.14  859.38
 1961.57  859.48  1968.4  859.76 1975.49  860.04 1980.77  860.25 1994.24  861.01
 1998.31  861.24 1999.13  861.29 2006.21   861.7 2014.13   861.8 2022.11  861.91
 2035.05  862.05 2040.01  862.11 2052.65  862.35 2062.13  862.27 2083.44  861.99
 2088.09  861.93 2090.84  861.91 2118.72  861.75 2129.59  860.56 2140.96  860.78
 2160.41  861.67 2172.93  861.19 2174.36  861.27 2178.23  861.51 2190.31  861.35
  2206.6  861.11 2213.59   860.9 2219.95  861.18 2226.79   861.7 2230.82  860.84
 2231.75  860.63 2236.47  860.74 2239.23  860.96 2248.41  861.87 2257.85  862.77
 2259.74  862.96  2269.3  863.27 2271.54  863.35 2271.78  863.31 2273.04  862.96
 2273.17  862.97 2276.47   863.2 2277.88  863.43  2306.4  861.68  2308.1  861.57
 2308.55  861.58 2308.62  862.38 2311.79  861.59 2341.08  862.04 2357.53  861.76
 2368.58  861.65 2374.95  860.98  2383.8  860.25 2389.01  861.19 2393.89  861.17
 2397.41  861.27 2397.42  861.27 2397.45  861.27 2418.17  861.53 2425.86  861.69
 2431.57  861.39 2440.71  861.05 2451.91  861.69 2461.32  861.15 2470.13  860.93
 2483.15  861.01 2483.15  860.98 2484.57  861.09 2492.97  856.23  2497.5  853.49
 2499.14  852.97 2499.68  852.66 2499.94  852.66    2505   849.5    2540  848.76
    2575   849.5 2580.63  852.66 2596.92  863.64 2598.05   864.6    2609  864.41
  2619.1  864.23 2632.04  864.07 2633.49  864.04 2654.95  864.39  2684.3  864.51
 2719.79  864.32 2769.86  863.85 2779.51  863.99 2851.13  863.64 2854.26  863.62
 2855.46   863.6 2858.12  863.63 2940.59  863.46 2978.26  863.47 3025.58  863.97
 3091.81   865.4 3112.32  865.86 3164.24  866.52 3197.94  866.25 3273.16  867.05
 3283.55  867.11  3288.2  867.15 3300.42  867.17 3350.18  867.33 3369.15  867.21
 3411.46  867.17 3454.76  866.91 3474.17  867.03 3525.04  866.83 3536.13  866.82
 3540.37  866.82 3598.29  866.62 3617.32  866.54 3635.41  866.48 3680.46  866.24
 3762.71  866.26  3783.3  866.34 3790.08  866.24  3810.8  865.92 3843.36  865.53
 3864.68  865.33  3886.8  865.26 3895.97  865.24 3911.69  864.72 3937.18  863.43
 3941.54  863.34 3943.32  863.28 3944.36  863.24 3978.56  862.43 3986.58  862.07
 3991.73  861.93 4016.09  860.81 4017.33   860.5 4028.81  858.01 4034.02  857.93
 4036.19   857.9 4038.64  857.89 4050.52  857.74 4058.69  857.63 4068.74   857.5
 4071.71  858.84 4077.77  861.54  4093.1  865.18 4102.19  867.34 4104.65  867.93
 4108.41  868.74 4133.27  874.14  4150.3  879.89 4161.03  879.93 4163.21     880
 4179.37  880.54 4193.84  881.07 4203.15  881.35 4212.25  881.57 4219.52  881.41
 4233.83  881.63 4324.27  883.85 4328.78  883.95 4329.84  883.97 4330.64  883.97
 4367.08  884.31 4405.96  884.79 4410.95  884.91 4422.37  885.32 4461.12   884.6
 4472.83  884.63    4483  884.26 4487.24  884.01 4490.81  882.94 4495.63  881.84
 4506.74  883.41 4507.49  883.53 4507.97  883.64 4508.41  883.75 4526.67  886.24
 4533.98  887.45 4534.09  887.47  4534.4  887.52 4542.22  887.95 4548.15  887.82
 4552.16  887.43 4561.38   888.8 4569.93     892 4570.74  892.16 4571.36  892.26
 4571.58  892.27 4571.74  892.28 4592.66  893.41 4598.42  892.38 4599.13  892.04
 4599.97  892.35 4602.34  892.91 4609.97  894.56 4618.93  894.79 4623.83  894.85
 4626.36  894.44 4630.54   893.5 4633.52  893.83 4637.15  894.18 4637.32   894.2
 4637.46   894.2 4649.14  894.28 4661.97  895.36 4666.44   895.9  4673.3  897.17
 4679.51  898.89 4681.49  900.02 4684.09  900.43 4687.92  900.97 4702.12  902.89
 4706.72  904.03 4709.11   904.6 4724.98  906.57 4728.66  907.16 4737.28  908.32
 4738.95  908.82 4744.44   910.8 4755.75  911.92 4770.88  913.72 4778.61  914.28
 4782.38  914.57 4786.73  915.77 4792.52  917.19 4798.06  917.16

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 2219.95      .1 2484.57     .04 2598.05     .06 3911.69     .11
 4233.83      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2484.57 2598.05          868.014  1235.2 999.369             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2118.41     880       F
 3108.23 4798.06     880       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0    1980     860

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  862.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.079  *   0.040  *          *
* W.S. Elev (ft)         *  862.42  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  854.92  * Flow Area (sq ft)      *  341.99  * 1210.49  *          *
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```
* E.G. Slope (ft/ft)     *0.000715  * Area (sq ft)           * 1294.34  * 1210.49  *  281.33  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  178.94  * 5691.06  *          *
* Top Width (ft)         * 1148.67  * Top Width (ft)         *  935.52  *  110.54  *  102.62  *
* Vel Total (ft/s)       *    3.78  * Avg. Vel. (ft/s)       *    0.52  *    4.70  *          *
* Max Chl Dpth (ft)      *   13.66  * Hydr. Depth (ft)       *    1.05  *   10.95  *          *
* Conv. Total (cfs)      *219600.9  * Conv. (cfs)            *  6694.1  *212906.8  *          *
* Length Wtd. (ft)       * 1215.87  * Wetted Per. (ft)       *  327.36  *  117.50  *          *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.05  *    0.46  *          *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.02  *    2.16  *          *
* Frctn Loss (ft)        *    1.27  * Cum Volume (acre-ft)   * 1165.77  * 7350.28  * 1023.89  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  347.72  *  589.79  *  344.21  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  865.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.082  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  865.46  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  857.66  * Flow Area (sq ft)      * 1433.48  * 1552.92  *  716.29  *
* E.G. Slope (ft/ft)     *0.000732  * Area (sq ft)           * 4372.37  * 1552.92  * 1484.84  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 1736.77  * 8550.29  *  612.94  *
* Top Width (ft)         * 1916.43  * Top Width (ft)         * 1062.85  *  113.48  *  740.10  *
* Vel Total (ft/s)       *    2.94  * Avg. Vel. (ft/s)       *    1.21  *    5.51  *    0.86  *
* Max Chl Dpth (ft)      *   16.70  * Hydr. Depth (ft)       *    3.91  *   13.68  *    1.44  *
* Conv. Total (cfs)      *402754.4  * Conv. (cfs)            * 64173.7  *315932.6  * 22648.1  *
* Length Wtd. (ft)       * 1145.43  * Wetted Per. (ft)       *  367.74  *  121.17  *  496.53  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.18  *    0.59  *    0.07  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    0.22  *    3.23  *    0.06  *
* Frctn Loss (ft)        *    1.07  * Cum Volume (acre-ft)   * 3191.22  * 9850.02  * 3040.64  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  669.96  *  634.38  *  663.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  866.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.083  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  866.19  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  858.47  * Flow Area (sq ft)      * 1699.36  * 1635.32  * 1084.65  *
* E.G. Slope (ft/ft)     *0.000708  * Area (sq ft)           * 5149.46  * 1635.32  * 2059.38  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 2257.27  * 9161.24  * 1181.49  *
* Top Width (ft)         * 2034.82  * Top Width (ft)         * 1077.44  *  113.48  *  843.89  *
* Vel Total (ft/s)       *    2.85  * Avg. Vel. (ft/s)       *    1.33  *    5.60  *    1.09  *
* Max Chl Dpth (ft)      *   17.43  * Hydr. Depth (ft)       *    4.64  *   14.41  *    2.13  *
* Conv. Total (cfs)      *473624.6  * Conv. (cfs)            * 84849.2  *344364.2  * 44411.2  *
* Length Wtd. (ft)       * 1127.73  * Wetted Per. (ft)       *  367.74  *  121.17  *  510.22  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.20  *    0.60  *    0.09  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    0.27  *    3.34  *    0.10  *
* Frctn Loss (ft)        *    1.00  * Cum Volume (acre-ft)   * 4369.35  *11605.76  * 4373.11  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  772.68  *  662.65  *  811.21  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  868.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.083  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  868.56  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
```

```
* Crit W.S. (ft)         *  862.73  * Flow Area (sq ft)      * 2568.72  * 1904.76  * 2295.96  *
* E.G. Slope (ft/ft)     *0.000621  * Area (sq ft)           * 7927.13  * 1904.76  * 5284.09  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 4176.64  *11062.24  * 3861.12  *
* Top Width (ft)         * 2916.22  * Top Width (ft)         * 1293.20  *  113.48  * 1509.53  *
* Vel Total (ft/s)       *    2.82  * Avg. Vel. (ft/s)       *    1.63  *    5.81  *    1.68  *
* Max Chl Dpth (ft)      *   19.80  * Hydr. Depth (ft)       *    7.02  *   16.78  *    4.50  *
* Conv. Total (cfs)      *766656.4  * Conv. (cfs)            *167646.5  *444028.2  *154981.8  *
* Length Wtd. (ft)       * 1086.41  * Wetted Per. (ft)       *  367.74  *  121.17  *  510.22  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.27  *    0.61  *    0.17  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    0.44  *    3.54  *    0.29  *
* Frctn Loss (ft)        *    0.82  * Cum Volume (acre-ft)   * 7035.59  *13724.68  * 7233.60  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  960.05  *  685.93  * 1011.48  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  871.50  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.084  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  871.21  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  865.56  * Flow Area (sq ft)      * 3538.21  * 2205.22  * 3646.76  *
* E.G. Slope (ft/ft)     *0.000529  * Area (sq ft)           *11693.31  * 2205.22  * 9297.04  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 6550.77  *13039.74  * 7709.49  *
* Top Width (ft)         * 3147.81  * Top Width (ft)         * 1512.60  *  113.48  * 1521.73  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    1.85  *    5.91  *    2.11  *
* Max Chl Dpth (ft)      *   22.45  * Hydr. Depth (ft)       *    9.66  *   19.43  *    7.15  *
* Conv. Total (cfs)      *1186655.0  * Conv. (cfs)            *284743.4  *566801.1  *335109.9  *
* Length Wtd. (ft)       * 1059.73  * Wetted Per. (ft)       *  367.74  *  121.17  *  510.22  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.32  *    0.60  *    0.24  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.59  *    3.56  *    0.50  *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   *11361.97  *16795.39  *11958.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1403.40  *  714.25  * 1492.21  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  873.15  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.084  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  872.87  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  866.35  * Flow Area (sq ft)      * 4145.71  * 2393.49  * 4493.21  *
* E.G. Slope (ft/ft)     *0.000483  * Area (sq ft)           *14251.95  * 2393.49  *11828.11  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 8133.20  *14272.63  *10424.17  *
* Top Width (ft)         * 3213.68  * Top Width (ft)         * 1570.83  *  113.48  * 1529.37  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)       *    1.96  *    5.96  *    2.32  *
* Max Chl Dpth (ft)      *   24.11  * Hydr. Depth (ft)       *   11.32  *   21.09  *    8.81  *
* Conv. Total (cfs)      *1494511.0  * Conv. (cfs)            *370245.7  *649729.2  *474536.5  *
* Length Wtd. (ft)       * 1048.74  * Wetted Per. (ft)       *  367.74  *  121.17  *  510.22  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.34  *    0.60  *    0.27  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *    0.67  *    3.55  *    0.62  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   *15239.78  *18663.44  *16211.20  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1718.70  *  721.39  * 1943.71  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  874.84  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.084  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  874.56  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  867.01  * Flow Area (sq ft)      * 4766.49  * 2585.88  * 5358.16  *
* E.G. Slope (ft/ft)     *0.000443  * Area (sq ft)           *16949.15  * 2585.88  *14427.42  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 9816.46  *15547.25  *13386.29  *
* Top Width (ft)         * 3257.71  * Top Width (ft)         * 1607.75  *  113.48  * 1536.48  *
* Vel Total (ft/s)       *    3.05  * Avg. Vel. (ft/s)       *    2.06  *    6.01  *    2.50  *
* Max Chl Dpth (ft)      *   25.80  * Hydr. Depth (ft)       *   13.02  *   22.79  *   10.50  *
* Conv. Total (cfs)      *1842095.0  * Conv. (cfs)            *466654.2  *739084.1  *636356.7  *
* Length Wtd. (ft)       * 1040.22  * Wetted Per. (ft)       *  367.74  *  121.17  *  510.22  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.36  *    0.59  *    0.29  *
```

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* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.74  *    3.54  *    0.72  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   *19031.67  *20000.31  *20513.91  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1934.43  *  722.34  * 2389.43  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  876.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.084  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  876.65  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  867.74  * Flow Area (sq ft)      * 5530.30  * 2822.60  * 6422.39  *
* E.G. Slope (ft/ft)     *0.000408  * Area (sq ft)           *20327.09  * 2822.60  *17638.95  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *12057.09  *17266.79  *17376.12  *
* Top Width (ft)         * 3293.35  * Top Width (ft)         * 1637.22  *  113.48  * 1542.65  *
* Vel Total (ft/s)       *    3.16  * Avg. Vel. (ft/s)       *    2.18  *    6.12  *    2.71  *
* Max Chl Dpth (ft)      *   27.89  * Hydr. Depth (ft)       *   15.10  *   24.87  *   12.59  *
* Conv. Total (cfs)      *2313132.0  * Conv. (cfs)            *597208.3  *855254.0  *860669.2  *
* Length Wtd. (ft)       * 1032.29  * Wetted Per. (ft)       *  367.74  *  121.17  *  510.22  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.38  *    0.59  *    0.32  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.83  *    3.63  *    0.87  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   *25573.05  *21954.25  *27671.23  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 2263.76  *  724.76  * 2816.21  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  869.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.083  *   0.040  *   0.060  *
* W.S. Elev (ft)         *  868.90  * Reach Len. (ft)        *  868.01  * 1235.20  *  999.37  *
* Crit W.S. (ft)         *  863.05  * Flow Area (sq ft)      * 2693.40  * 1943.40  * 2469.68  *
* E.G. Slope (ft/ft)     *0.000608  * Area (sq ft)           * 8372.21  * 1943.40  * 5798.38  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 4468.91  *11317.22  * 4313.88  *
* Top Width (ft)         * 2955.37  * Top Width (ft)         * 1330.78  *  113.48  * 1511.11  *
* Vel Total (ft/s)       *    2.83  * Avg. Vel. (ft/s)       *    1.66  *    5.82  *    1.75  *
* Max Chl Dpth (ft)      *   20.14  * Hydr. Depth (ft)       *    7.36  *   17.13  *    4.84  *
* Conv. Total (cfs)      *815462.8  * Conv. (cfs)            *181304.8  *459142.7  *175015.3  *
* Length Wtd. (ft)       * 1082.09  * Wetted Per. (ft)       *  367.74  *  121.17  *  510.22  *
* Min Ch El (ft)         *  848.76  * Shear (lb/sq ft)       *    0.28  *    0.61  *    0.18  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    0.46  *    3.54  *    0.32  *
* Frctn Loss (ft)        *    0.80  * Cum Volume (acre-ft)   * 8011.74  *14688.71  * 8326.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1065.12  *  696.25  * 1093.70  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 30.893

INPUT
Description:
Station Elevation Data    num=     400
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   910.9   11.01  910.82   23.79  908.52   24.56  908.41   26.12   908.1
   39.46  905.58    43.4  905.58   99.81  905.58  101.21  905.58  101.59  905.58
  101.96  905.58  102.28  905.53  108.48  904.86  129.31  902.56   133.8  902.19
   170.3   899.1  190.61  897.46  244.29  894.06   252.4  893.47  255.67  893.21
  309.19  888.92  310.51  888.85  314.72  888.62  362.04  886.25  377.45  884.85
  406.37  882.62   431.7  882.05   453.3  880.53  464.14  879.92  475.77  879.12
  484.85   879.1  491.37  879.07   504.7  879.65  504.93  879.62  505.53  879.51
  514.16  877.48  533.21  876.18  533.67  876.16  533.87  876.14  535.18  876.07
   546.3  876.07  553.31  876.07   560.3  876.07  561.47  874.87  576.43  875.28
  581.41   875.1  582.49  874.49  584.88  873.19  585.06   873.1  585.29  872.99
  589.24   870.6  589.63   870.6  589.92   870.6  589.94   870.6  589.98   870.6
  590.15   870.6   590.2   870.6   597.1   870.6   601.1   870.6  601.15   870.6
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602.28	870.6	603.2	870.6	603.96	870.6	604.78	870.6	605.44	870.6
606.13	870.6	619.45	870.6	635.37	870.6	638.13	870.6	646.98	870.6
649.28	870.6	654.03	870.6	660.88	870.6	662.75	870.6	664.91	870.6
670.17	870.6	671.8	870.6	673.79	870.6	675.27	870.6	676.87	870.6
684.48	870.6	685.75	870.6	686.59	870.6	692.96	870.6	694.98	870.6
707.06	870.6	729.2	870.6	730.76	870.6	730.87	870.6	730.97	870.6
743.83	870.6	751.65	870.6	752.1	870.6	752.49	870.6	762.6	870.6
769.05	872.9	773.32	874.51	781.34	874.27	786.47	874.11	789.33	873.18
791.51	872.58	807.89	867.54	819.79	863.76	822.43	862.87	827.37	863.61
843.25	865.59	847.88	864.52	853.23	863.26	857.76	862.89	859.81	862.73
862.13	862.91	863.65	863.03	864.95	863.15	867.96	863.44	878.69	863.32
892.33	863.17	892.49	863.18	894.85	863.31	896.04	863.04	897.95	862.61
900.33	862.07	903.27	862.53	905.28	862.86	905.95	862.84	910.46	862.66
917.1	862.62	925.94	862.59	975.58	862.19	982.77	862.13	985.91	862.13
991.2	862.05	1034.09	861.63	1051.82	861.76	1058.24	861.74	1097.03	861.33
1100.13	861.31	1105.05	861.43	1121.95	861.74	1135.16	861.95	1148.16	862.1
1164.88	863.18	1166.22	863.24	1166.72	863.16	1173.66	862.22	1175.65	862.01
1179.03	861.66	1186.99	860.83	1192.37	861.48	1192.91	861.55	1193.17	861.58
1193.42	861.58	1200.58	861.64	1202.22	861.65	1202.31	861.65	1203.11	862.04
1211.17	865.99	1211.73	866.3	1212.37	866.41	1216.86	867.2	1220.65	868.43
1221.8	868.8	1228.96	868.81	1230.38	868.82	1233.28	868.02	1233.89	867.85
1234.91	867.91	1237.33	868.05	1238.07	868.04	1244.35	867.96	1245.44	867.95
1246.37	867.55	1249.21	866.29	1249.27	866.29	1250.99	866.22	1254.87	865.4
1255.78	865.19	1257.26	864.45	1265.69	860.03	1267.82	858.82	1268.88	858.24
1271.03	859.28	1271.5	859.54	1272.15	859.64	1277.18	860.43	1281.04	860.37
1285.89	860.23	1285.94	860.4	1287.13	863.19	1289.91	862.72	1293.24	862.03
1297.52	863.16	1298.45	863.41	1299.1	863.55	1325.6	862.29	1342.44	861.49
1372.62	861.35	1395.23	861.08	1436.85	861.61	1440.79	861.67	1449.04	861.7
1485.61	861.85	1503.11	861.93	1533.84	861.83	1559.93	861.81	1593.44	861.58
1617.74	861.43	1650.97	861.24	1677.22	861.19	1730.58	860.68	1734.8	860.68
1749.68	860.7	1781.66	860.58	1783.76	860.7	1791.18	860.76	1836.06	861.25
1853.47	861.23	1866.89	860.46	1888.84	860.91	1933.15	860.8	1938.02	860.78
1940.88	860.8	1945.72	860.81	1982.5	860.93	1996.01	860.98	1996.36	860.97
1996.64	860.98	2004.43	861.3	2006.03	861.37	2014.64	862.02	2018.24	863.09
2024.3	864.04	2034.92	862.11	2051.62	861.09	2068.91	861.01	2097.3	860.69
2133.84	861.17	2207.31	862.01	2233.01	861.89	2256.74	862.37	2367.84	861.76
2373.27	861.71	2375.78	861.69	2388.11	861.63	2509.72	860.89	2517.29	860.9
2526.3	860.84	2599.33	860.95	2632.9	861.01	2669.03	860.79	2693.48	860.59
2717.32	860.5	2726.87	860.57	2735.25	860.81	2792.45	860.36	2814.83	860.08
2824.73	859.95	2829.47	858.52	2833.2	857.37	2842.77	859.83	2844.9	860.4
2845.61	860.56	2848.13	860.59	2884.94	861.06	2916.93	859.29	2922.1	858.9
2929.44	858.47	2952.15	852.09	2952.36	852.06	2952.86	852.16	2958.39	853.11
2960.75	853.49	2966.9	854.76	2973.05	854.6	2979.42	854.44	2983.97	854.34
2987.04	854.23	2998.41	852.1	2998.54	852.07	3010.42	849.82	3015	848.5
3028	847.56	3043	848.5	3047.09	850.24	3051.21	855.44	3052.69	857.57
3056.53	862.89	3061.76	863.04	3078.84	863.13	3126.03	863.37	3155.85	863.44
3200.53	864.17	3228.77	864.65	3253.06	865.15	3291.7	865.78	3319.96	865.64
3373.15	865.53	3407.42	866.02	3469.05	866.1	3499.21	866.4	3514.09	866.4
3537	866.21	3567.5	865.45	3609.18	864.98	3625.74	864.98	3629.29	864.91
3673.97	864.61	3674.73	864.57	3676.35	864.59	3688.71	864.51	3693.48	864.41
3703.78	864.18	3714.21	863.86	3716.03	863.86	3721.49	863.31	3724.78	863.05
3730.55	862.33	3731.31	862.06	3734.13	862.61	3737.44	863.13	3747.07	863.69
3757.08	863.63	3801.49	861.56	3802.33	861.55	3810.72	860.85	3821.92	859.98
3823.24	859.86	3871.5	859.14	3874.24	859.14	3876.82	859.16	3890.12	859.24
3912.57	859.41	3921.74	859.53	3933.18	859.71	3995.88	860.55	4014.6	860.09
4020.42	859.93	4036.21	859.47	4058.5	858.83	4065.83	859.03	4069.98	859.72
4073.05	858.8	4080.66	855.15	4090.38	854.88	4092.82	854.75	4098.35	855.66
4100.97	856.08	4105.26	856.99	4112.28	858.19	4120.01	859.51	4129.34	860.74
4134.26	861.38	4142.45	862.49	4147.13	863.61	4151.59	864.07	4154	863.92
4159.18	865.22	4165.8	867.06	4178.24	868.36	4192.26	869.06	4222.38	872.39
4230.37	873.03	4233.48	873.03	4246.04	873.05	4246.73	873.07	4247.45	873.27
4255.36	875.58	4258.04	875.71	4261.5	875.62	4265.75	875.58	4277.97	877.28
4296.77	880.1	4297.71	879.06	4298.2	877.36	4298.46	877.42	4299.14	877.59
4303.42	878.64	4304.38	878.85	4304.74	880.08	4305.77	880.08	4315.1	880.65
4317.57	880.65	4319.93	881.03	4323.61	881.88	4341.62	886.06	4358.4	887.89
4372.9	889.09	4376.75	889.81	4403.45	894.55	4412.47	895.98	4414.07	896.16
4417.67	896.78	4440.17	900.04	4446.34	900.93	4458.18	902.51	4467.95	903.36
4474.9	903.56	4478.22	903.87	4492.1	905.89	4505	908.7	4518.8	910.97

```
Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06 1996.64      .1  2966.9     .04 3056.53     .11

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2966.9 3056.53         1084.807  844.041088.734             .1       .3
```

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2266.42     880       F
 3293.25  4518.8     880       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  861.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  860.85  * Reach Len. (ft)        * 1084.81  *  844.04  * 1088.73  *
* Crit W.S. (ft)         *  856.31  * Flow Area (sq ft)      *  381.56  *  836.38  *          *
* E.G. Slope (ft/ft)     *0.001669  * Area (sq ft)           *  422.96  *  836.38  *  511.76  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  439.03  * 5430.97  *          *
* Top Width (ft)         *  899.44  * Top Width (ft)         *  491.91  *   88.15  *  319.37  *
* Vel Total (ft/s)       *    4.82  * Avg. Vel. (ft/s)       *    1.15  *    6.49  *          *
* Max Chl Dpth (ft)      *   13.29  * Hydr. Depth (ft)       *    1.31  *    9.49  *          *
* Conv. Total (cfs)      *143705.4  * Conv. (cfs)            * 10748.0  *132957.4  *          *
* Length Wtd. (ft)       *  860.85  * Wetted Per. (ft)       *  292.85  *   94.48  *          *
* Min Ch El (ft)         *  847.56  * Shear (lb/sq ft)       *    0.14  *    0.92  *          *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    0.16  *    5.99  *          *
* Frctn Loss (ft)        *    0.94  * Cum Volume (acre-ft)   * 1148.66  * 7321.26  * 1014.79  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  333.50  *  586.97  *  339.37  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  864.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.100  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  864.25  * Reach Len. (ft)        * 1084.81  *  844.04  * 1088.73  *
* Crit W.S. (ft)         *  858.58  * Flow Area (sq ft)      * 2562.55  * 1139.74  *  118.62  *
* E.G. Slope (ft/ft)     *0.001233  * Area (sq ft)           * 6214.43  * 1139.74  * 1902.81  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 3168.24  * 7683.33  *   48.43  *
* Top Width (ft)         * 2774.72  * Top Width (ft)         * 2082.05  *   89.63  *  603.04  *
* Vel Total (ft/s)       *    2.85  * Avg. Vel. (ft/s)       *    1.24  *    6.74  *    0.41  *
* Max Chl Dpth (ft)      *   16.69  * Hydr. Depth (ft)       *    3.66  *   12.72  *    0.80  *
* Conv. Total (cfs)      *310427.8  * Conv. (cfs)            * 90230.4  *218818.3  *  1379.2  *
* Length Wtd. (ft)       *  909.02  * Wetted Per. (ft)       *  702.49  *   97.00  *  148.53  *
* Min Ch El (ft)         *  847.56  * Shear (lb/sq ft)       *    0.28  *    0.90  *    0.06  *
* Alpha                  *    3.99  * Stream Power (lb/ft s) *    0.35  *    6.10  *    0.03  *
* Frctn Loss (ft)        *    0.84  * Cum Volume (acre-ft)   * 3085.74  * 9811.85  * 3001.78  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  638.63  *  631.50  *  648.20  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  865.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.100  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  865.07  * Reach Len. (ft)        * 1084.81  *  844.04  * 1088.73  *
* Crit W.S. (ft)         *  859.58  * Flow Area (sq ft)      * 3140.11  * 1213.64  *  260.16  *
* E.G. Slope (ft/ft)     *0.001136  * Area (sq ft)           * 7937.74  * 1213.64  * 2452.68  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 4266.93  * 8188.41  *  144.66  *
* Top Width (ft)         * 2937.97  * Top Width (ft)         * 2098.11  *   89.63  *  750.23  *
* Vel Total (ft/s)       *    2.73  * Avg. Vel. (ft/s)       *    1.36  *    6.75  *    0.56  *
* Max Chl Dpth (ft)      *   17.51  * Hydr. Depth (ft)       *    4.48  *   13.54  *    1.35  *
* Conv. Total (cfs)      *373877.8  * Conv. (cfs)            *126611.8  *242973.4  *  4292.6  *
* Length Wtd. (ft)       *  919.37  * Wetted Per. (ft)       *  702.49  *   97.00  *  192.73  *
* Min Ch El (ft)         *  847.56  * Shear (lb/sq ft)       *    0.32  *    0.89  *    0.10  *
* Alpha                  *    4.05  * Stream Power (lb/ft s) *    0.43  *    5.99  *    0.05  *
* Frctn Loss (ft)        *    0.83  * Cum Volume (acre-ft)   * 4238.95  *11565.37  * 4321.35  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  741.04  *  659.78  *  792.93  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	868.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.040	0.110
W.S. Elev (ft)	867.64	Reach Len. (ft)	1084.81	844.04	1088.73
Crit W.S. (ft)	863.60	Flow Area (sq ft)	4942.61	1444.28	852.85
E.G. Slope (ft/ft)	0.000945	Area (sq ft)	13386.03	1444.28	5042.78
Q Total (cfs)	19100.00	Flow (cfs)	8288.11	9979.81	832.08
Top Width (ft)	3335.93	Top Width (ft)	2131.43	89.63	1114.87
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	1.68	6.91	0.98
Max Chl Dpth (ft)	20.08	Hydr. Depth (ft)	7.06	16.11	3.60
Conv. Total (cfs)	621449.4	Conv. (cfs)	269666.9	324709.4	27073.1
Length Wtd. (ft)	943.83	Wetted Per. (ft)	702.49	97.00	236.74
Min Ch El (ft)	847.56	Shear (lb/sq ft)	0.41	0.88	0.21
Alpha	3.77	Stream Power (lb/ft s)	0.70	6.07	0.21
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	6823.24	13677.20	7115.14
C & E Loss (ft)	0.00	Cum SA (acres)	925.93	683.05	981.38

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	870.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.100	0.040	0.110
W.S. Elev (ft)	870.44	Reach Len. (ft)	1084.81	844.04	1088.73
Crit W.S. (ft)	864.95	Flow Area (sq ft)	6899.50	1694.67	1514.16
E.G. Slope (ft/ft)	0.000801	Area (sq ft)	19412.66	1694.67	8206.81
Q Total (cfs)	27300.00	Flow (cfs)	13308.16	11997.07	1994.77
Top Width (ft)	3406.26	Top Width (ft)	2168.43	89.63	1148.20
Vel Total (ft/s)	2.70	Avg. Vel. (ft/s)	1.93	7.08	1.32
Max Chl Dpth (ft)	22.88	Hydr. Depth (ft)	9.85	18.91	6.40
Conv. Total (cfs)	964511.2	Conv. (cfs)	470178.5	423857.4	70475.3
Length Wtd. (ft)	961.24	Wetted Per. (ft)	702.49	97.00	236.74
Min Ch El (ft)	847.56	Shear (lb/sq ft)	0.49	0.87	0.32
Alpha	3.29	Stream Power (lb/ft s)	0.95	6.19	0.42
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)	11052.05	16740.10	11757.21
C & E Loss (ft)	0.01	Cum SA (acres)	1366.72	711.37	1461.58

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	872.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.100	0.040	0.110
W.S. Elev (ft)	872.16	Reach Len. (ft)	1084.81	844.04	1088.73
Crit W.S. (ft)	865.67	Flow Area (sq ft)	8107.17	1849.20	1922.28
E.G. Slope (ft/ft)	0.000736	Area (sq ft)	23432.29	1849.20	10199.81
Q Total (cfs)	32830.00	Flow (cfs)	16687.43	13297.11	2845.46
Top Width (ft)	3607.78	Top Width (ft)	2354.36	89.63	1163.79
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)	2.06	7.19	1.48
Max Chl Dpth (ft)	24.60	Hydr. Depth (ft)	11.57	20.63	8.12
Conv. Total (cfs)	1210311.0	Conv. (cfs)	615198.9	490211.5	104900.7
Length Wtd. (ft)	968.87	Wetted Per. (ft)	702.49	97.00	236.74
Min Ch El (ft)	847.56	Shear (lb/sq ft)	0.53	0.88	0.37
Alpha	3.05	Stream Power (lb/ft s)	1.09	6.30	0.55
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	14864.32	18603.29	15958.51
C & E Loss (ft)	0.01	Cum SA (acres)	1679.59	718.51	1912.81

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	874.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.100	0.040	0.110
W.S. Elev (ft)	873.91	Reach Len. (ft)	1084.81	844.04	1088.73
Crit W.S. (ft)	866.39	Flow Area (sq ft)	9331.82	2005.90	2336.14

```
* E.G. Slope (ft/ft)     *0.000682  * Area (sq ft)           *27560.40  * 2005.90  *12262.91  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *20304.27  *14655.57  * 3790.16  *
* Top Width (ft)         * 3650.74  * Top Width (ft)         * 2367.99  *   89.63  * 1193.11  *
* Vel Total (ft/s)       *    2.83  * Avg. Vel. (ft/s)       *    2.18  *    7.31  *    1.62  *
* Max Chl Dpth (ft)      *   26.35  * Hydr. Depth (ft)       *   13.32  *   22.38  *    9.87  *
* Conv. Total (cfs)      *1484321.0  * Conv. (cfs)            *777756.3  *561382.6  *145182.4  *
* Length Wtd. (ft)       *  975.00  * Wetted Per. (ft)       *  702.49  *   97.00  *  236.74  *
* Min Ch El (ft)         *  847.56  * Shear (lb/sq ft)       *    0.57  *    0.88  *    0.42  *
* Alpha                  *    2.85  * Stream Power (lb/ft s) *    1.23  *    6.43  *    0.68  *
* Frctn Loss (ft)        *    0.69  * Cum Volume (acre-ft)   *18588.21  *19935.21  *20207.74  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1894.82  *  719.46  * 2358.12  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  876.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.100  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  876.04  * Reach Len. (ft)        * 1084.81  *  844.04  * 1088.73  *
* Crit W.S. (ft)         *  867.17  * Flow Area (sq ft)      *10822.55  * 2196.65  * 2839.92  *
* E.G. Slope (ft/ft)     *0.000637  * Area (sq ft)           *32649.36  * 2196.65  *14814.43  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *25136.04  *16488.90  * 5075.05  *
* Top Width (ft)         * 3708.72  * Top Width (ft)         * 2406.57  *   89.63  * 1212.52  *
* Vel Total (ft/s)       *    2.94  * Avg. Vel. (ft/s)       *    2.32  *    7.51  *    1.79  *
* Max Chl Dpth (ft)      *   28.48  * Hydr. Depth (ft)       *   15.45  *   24.51  *   12.00  *
* Conv. Total (cfs)      *1849849.0  * Conv. (cfs)            *995672.0  *653147.3  *201029.5  *
* Length Wtd. (ft)       *  980.86  * Wetted Per. (ft)       *  702.49  *   97.00  *  236.74  *
* Min Ch El (ft)         *  847.56  * Shear (lb/sq ft)       *    0.61  *    0.90  *    0.48  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    1.42  *    6.76  *    0.85  *
* Frctn Loss (ft)        *    0.67  * Cum Volume (acre-ft)   *25045.23  *21883.09  *27298.95  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 2223.47  *  721.88  * 2784.61  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  868.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.100  *   0.040  *   0.110  *
* W.S. Elev (ft)         *  868.01  * Reach Len. (ft)        * 1084.81  *  844.04  * 1088.73  *
* Crit W.S. (ft)         *  863.79  * Flow Area (sq ft)      * 5197.60  * 1476.90  *  939.02  *
* E.G. Slope (ft/ft)     *0.000922  * Area (sq ft)           *14162.88  * 1476.90  * 5449.24  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 8902.99  *10232.05  *  964.95  *
* Top Width (ft)         * 3350.63  * Top Width (ft)         * 2142.65  *   89.63  * 1118.35  *
* Vel Total (ft/s)       *    2.64  * Avg. Vel. (ft/s)       *    1.71  *    6.93  *    1.03  *
* Max Chl Dpth (ft)      *   20.45  * Hydr. Depth (ft)       *    7.42  *   16.48  *    3.97  *
* Conv. Total (cfs)      *662060.3  * Conv. (cfs)            *293249.6  *337026.7  * 31784.0  *
* Length Wtd. (ft)       *  946.55  * Wetted Per. (ft)       *  702.49  *   97.00  *  236.74  *
* Min Ch El (ft)         *  847.56  * Shear (lb/sq ft)       *    0.43  *    0.88  *    0.23  *
* Alpha                  *    3.70  * Stream Power (lb/ft s) *    0.73  *    6.07  *    0.23  *
* Frctn Loss (ft)        *    0.80  * Cum Volume (acre-ft)   * 7787.21  *14640.22  * 8197.26  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1030.51  *  693.37  * 1063.54  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 30.733

INPUT
Description: Blocked low areas from winding tributary channel.
Station Elevation Data    num=     406
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  907.67    9.46  904.71   31.79  904.34  100.68  897.75  104.74  897.76
  121.28  897.88   152.8  896.44  175.37  898.03   178.6   898.3  208.72  893.19
  226.48  894.46   237.6  893.55  246.96  892.22  260.87  890.93     267   888.9
```

274.05	889.5	276.01	889.18	285.18	887.7	289.54	886.99	300.87	885.97
333.83	883.08	344.31	881.38	347.03	881.41	352.6	881.03	430.9	878.62
434.82	878.49	434.9	878.49	435.22	878.39	443.44	875.93	451.03	878.76
451.86	879.09	452.84	879.05	476.18	878.21	481.51	876.63	483.99	875.89
489.95	875.67	492.64	875.58	494.76	875.33	496.05	875.2	498.26	876.3
551.33	872.02	565.6	871.38	580.7	870.52	633.56	869.49	660.03	869.49
714.36	868.77	739.36	868.32	786.88	867.97	810.48	867.48	818.69	867.42
835.35	867.18	897.91	866.26	928.42	865.98	977.36	865.77	989.81	865.13
997.33	864.54	999.72	864.35	1003.34	865.54	1003.91	865.72	1006.28	865.3
1013.61	864	1014.19	866.58	1014.22	866.72	1014.7	866.62	1022.52	865.12
1025.75	862.76	1026.36	862.31	1027.33	862.98	1029.39	864.56	1030.02	864.71
1030.67	864.87	1034.08	864.96	1039.57	865.12	1042	865.18	1046.42	866.12
1048.45	866.64	1051.69	867.24	1056.48	868.15	1057.27	868.39	1062.23	869.86
1064.55	869.37	1066.43	868.97	1069.06	868.42	1071.38	868.46	1078.19	868.56
1083.57	869.95	1084.35	870.15	1091.48	865.88	1092.32	865.37	1092.82	865.75
1093.86	866.47	1096.31	868.14	1098.4	867.32	1104.56	865.21	1107.15	861.32
1107.78	860.18	1108.25	860.43	1110.17	861.51	1113.64	863.14	1115.03	863.84
1120.71	865.13	1120.98	865.19	1121.31	863.78	1121.33	863.69	1122.38	863.65
1128.78	863.39	1129.06	863.41	1129.63	863.45	1147.2	864.89	1165.91	864.77
1259.94	866.13	1266.16	866.13	1271.19	866.19	1352.7	865.81	1353.38	865.81
1353.5	865.81	1397.79	863.34	1450.49	863.18	1459.21	863.16	1463.55	863.11
1469.13	862.6	1481.17	862.08	1524.7	861.69	1546.08	861.61	1548.95	861.51
1551.43	861.39	1558.11	861.07	1559.53	861.79	1560.1	862.15	1570.83	861.66
1578.38	861.52	1579.71	861.26	1583.99	862.86	1586.27	863.72	1590.34	863.03
1590.8	862.95	1592.47	862.75	1596.17	862.65	1673.65	861.41	1771.07	861.6
1820.9	861.37	1881.42	861.74	1989.06	861.94	2095.23	859.61	2173.2	859.42
2212.27	859.6	2342.98	857.99	2346.13	857.95	2347.09	857.94	2351.16	857.93
2352.94	857.92	2453.8	857.7	2456.6	857.63	2457.99	857.57	2463.04	857.85
2471.46	858.52	2480.05	859.15	2487.36	859.26	2502.52	859.1	2560.76	858.88
2656.97	858.52	2665.42	858.43	2686.73	859.04	2711.26	859.36	2719.24	859.26
2732.74	859.09	2734.29	857.64	2743.82	849.38	2745.44	848.74	2750	847.5
2780	846.63	2811	847.5	2815.5	848.85	2824.34	851.68	2837.47	857.1
2838.28	857.39	2838.95	857.9	2842.76	859.47	2853.72	864.55	2854.34	864.83
2856.22	864.85	2905.99	864.9	2947.11	865.11	2976.47	865.23	2985.43	865.14
3035	864.61	3036.32	864.53	3039.22	864.18	3048.81	862.75	3053.97	862.21
3056.34	861.35	3062.46	858.6	3067.55	856.31	3068.98	855.78	3080.41	854.19
3081.77	853.87	3088.94	852.29	3090.37	852	3093.58	852.2	3095.73	852.34
3096.46	852.58	3100.66	853.98	3104.98	854.23	3110.17	854.53	3116.09	856.54
3124.1	858.73	3156.6	858.59	3165.51	858.66	3176.66	858.65	3183.34	859.42
3196.7	861.46	3218.6	861.34	3238.96	861.4	3286.2	860.58	3299.71	860.35
3313.47	860.18	3361.94	859.5	3441.14	859.66	3447.21	859.7	3453.82	858.27
3464.81	855.55	3476.21	850.25	3480.23	848.73	3485.82	848.86	3491.46	849
3502.32	859.9	3502.49	860.1	3502.71	860.09	3562.89	859.41	3591.91	859.8
3599.12	859.77	3614.1	859.78	3624.07	859.46	3633.12	859.25	3641.66	859.02
3722.57	858.1	3722.95	858.1	3723.11	858.1	3723.15	858.1	3723.26	858.1
3723.62	858.1	3789.29	858.85	3801.34	858.73	3806.51	858.72	3848.77	859.43
3850.16	859.46	3850.59	859.48	3855.91	858.63	3863.49	856.51	3866.74	855.83
3867.62	855.51	3867.94	855.47	3877.32	854.56	3879.33	853.6	3881.73	852.72
3884.66	851.24	3889.49	851.18	3890.91	851.16	3892.04	852.78	3896.32	858.64
3897.78	858.87	3902.94	859.26	3919.75	860.86	3930.28	861.41	3932.93	861.72
3943.54	862.22	3952.78	862.74	3954.1	862.77	3969.51	863.03	3969.59	863.02
3976.63	861.51	3981.68	859.49	3985.76	858.22	3998.81	863.13	3998.89	863.14
4001.06	863.18	4064.15	864.29	4081.67	864.84	4099.61	865.41	4106.58	865.61
4112.41	859.04	4113.26	858.55	4113.74	857.91	4119.22	852.71	4130.12	852.7
4133.03	852.72	4143.41	856.79	4146.98	858.23	4162.69	858.64	4180.81	859.09
4198.37	859.13	4228.52	859.1	4233.28	859.2	4237.76	859.26	4245.17	859.24
4265.58	859.18	4265.78	859.09	4266.22	858.99	4276.47	856.62	4289.29	856.37
4289.32	856.37	4289.35	856.36	4294.4	853.78	4300.75	853.78	4305.44	853.78
4311.93	854.89	4316.72	857.36	4320.25	860.17	4322.69	860.14	4325.06	860.24
4326.51	860.31	4327.44	858.69	4330.13	854.05	4333.75	854.06	4340.38	854.06
4352.15	857.18	4363.21	858.98	4376.48	859.53	4402.42	860.14	4408	860.31
4417.99	860.29	4454.29	860.14	4458.36	860.15	4465.01	860.06	4514.49	861.16
4518.94	861.25	4520.81	861.3	4540.57	861.7	4543.76	861.78	4549.07	862.29
4560.86	863.33	4569.34	863.75	4582.99	864.13	4601.7	865.65	4604.68	865.85
4606.05	866.09	4620.04	866.85	4636.06	867.75	4638.09	868.09	4640.88	868
4646.06	868.76	4649.38	870	4653.26	870.68	4656.75	870.87	4668.83	872.29
4685.79	873.48	4688.09	873.67	4696.31	874.26	4713.86	875.84	4721.31	876.14
4726.18	876.33	4737.49	877.34	4747.49	878.77	4749.37	879.03	4751.18	879.09
4764.97	879.49	4771.01	884.58	4771.53	884.84	4794.73	885.47	4799.35	885.59
4813.99	886.45	4819.24	886.61	4819.99	886.65	4820.06	886.65	4820.2	886.66
4825.03	886.92	4862.76	889.31	4863.46	889.35	4864.43	889.38	4900.77	890.61
4913.24	890.83	4936.31	891.37	4945	891.58	4954.37	891.85	4986.07	892.49
5007.48	892.12	5033.13	892.49	5052.87	892.23	5072.11	891.85	5083.98	891.88
5087.15	891.88	5096.36	892.05	5098.96	892.08	5102.18	891.83	5110.95	891.32
5125.58	893.06	5127.69	893.28	5131.06	893.38	5161.02	892.54	5173.34	892.03
5203.4	891.11	5207.67	890.71	5213.42	890.48	5260.21	890.42	5272.75	890.71

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 5299.58  890.11 5300.11  890.14 5314.09  890.85 5318.52  891.21 5335.31  892.79
 5338.63  893.24 5343.66  892.99 5346.33   892.9 5346.55  892.89  5366.4  892.21
 5372.53  892.27

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .06 1570.83     .11 2732.74     .04 2854.34      .1 4799.35     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2732.74 2854.34         707.3955 1356.56373.7265              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2214.62     880       F
 2986.12 5372.53     880       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3050    3520     859

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  860.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.110  *   0.040  *          *
* W.S. Elev (ft)         *  860.10  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  853.11  * Flow Area (sq ft)      *  775.29  * 1158.63  *          *
* E.G. Slope (ft/ft)     *0.000771  * Area (sq ft)           *  850.81  * 1158.63  * 1580.93  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  380.49  * 5489.51  *          *
* Top Width (ft)         * 1790.99  * Top Width (ft)         *  659.89  *  111.38  * 1019.71  *
* Vel Total (ft/s)       *    3.04  * Avg. Vel. (ft/s)       *    0.49  *    4.74  *          *
* Max Chl Dpth (ft)      *   13.47  * Hydr. Depth (ft)       *    1.50  *   10.40  *          *
* Conv. Total (cfs)      *211352.7  * Conv. (cfs)            * 13699.6  *197653.1  *          *
* Length Wtd. (ft)       * 1329.52  * Wetted Per. (ft)       *  518.21  *  117.74  *          *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.07  *    0.47  *          *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.04  *    2.25  *          *
* Frctn Loss (ft)        *    1.05  * Cum Volume (acre-ft)   * 1132.80  * 7301.93  *  988.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  319.15  *  585.04  *  322.64  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  863.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.110  *   0.040  *          *
* W.S. Elev (ft)         *  863.53  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  855.87  * Flow Area (sq ft)      * 2551.11  * 1553.05  *          *
* E.G. Slope (ft/ft)     *0.000715  * Area (sq ft)           * 4281.62  * 1553.05  * 6010.01  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 2665.87  * 8234.13  *          *
* Top Width (ft)         * 2906.50  * Top Width (ft)         * 1354.00  *  118.78  * 1433.73  *
* Vel Total (ft/s)       *    2.66  * Avg. Vel. (ft/s)       *    1.04  *    5.30  *          *
* Max Chl Dpth (ft)      *   16.90  * Hydr. Depth (ft)       *    4.92  *   13.08  *          *
* Conv. Total (cfs)      *407759.2  * Conv. (cfs)            * 99727.8  *308031.4  *          *
* Length Wtd. (ft)       * 1190.08  * Wetted Per. (ft)       *  518.21  *  125.89  *          *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.22  *    0.55  *          *
* Alpha                  *    3.05  * Stream Power (lb/ft s) *    0.23  *    2.92  *          *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   * 2955.04  * 9785.76  * 2902.90  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  595.85  *  629.48  *  622.75  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  864.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.110  *   0.040  *          *
* W.S. Elev (ft)         *  864.32  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  856.67  * Flow Area (sq ft)      * 2963.16  * 1648.20  *          *
* E.G. Slope (ft/ft)     *0.000735  * Area (sq ft)           * 5374.32  * 1648.20  * 7179.15  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 3470.11  * 9129.89  *          *
```

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* Top Width (ft)         * 3016.44  * Top Width (ft)         * 1391.09  *  120.49  * 1504.86  *
* Vel Total (ft/s)       *    2.73  * Avg. Vel. (ft/s)       *    1.17  *    5.54  *          *
* Max Chl Dpth (ft)      *   17.69  * Hydr. Depth (ft)       *    5.72  *   13.68  *          *
* Conv. Total (cfs)      *464751.7  * Conv. (cfs)            *127995.3  *336756.4  *          *
* Length Wtd. (ft)       * 1161.61  * Wetted Per. (ft)       *  518.21  *  127.78  *          *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.26  *    0.59  *          *
* Alpha                  *    3.03  * Stream Power (lb/ft s) *    0.31  *    3.28  *          *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)   * 4073.19  *11537.65  * 4200.99  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  697.60  *  657.74  *  764.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  867.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *   0.110  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  866.82  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  860.82  * Flow Area (sq ft)      * 4256.82  * 1951.53  *  239.51  *
* E.G. Slope (ft/ft)     *0.000782  * Area (sq ft)           * 9345.68  * 1951.53  *11396.06  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 6548.08  *12403.66  *  148.25  *
* Top Width (ft)         * 3713.76  * Top Width (ft)         * 1826.99  *  121.60  * 1765.16  *
* Vel Total (ft/s)       *    2.96  * Avg. Vel. (ft/s)       *    1.54  *    6.36  *    0.62  *
* Max Chl Dpth (ft)      *   20.19  * Hydr. Depth (ft)       *    8.22  *   16.05  *    1.82  *
* Conv. Total (cfs)      *682855.8  * Conv. (cfs)            *234104.5  *443450.9  *  5300.3  *
* Length Wtd. (ft)       * 1093.82  * Wetted Per. (ft)       *  518.21  *  128.99  *  131.78  *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.40  *    0.74  *    0.09  *
* Alpha                  *    3.08  * Stream Power (lb/ft s) *    0.62  *    4.70  *    0.05  *
* Frctn Loss (ft)        *    0.70  * Cum Volume (acre-ft)   * 6540.18  *13644.30  * 6909.70  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  876.64  *  681.00  *  945.39  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  870.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.              *   0.110  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  869.57  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  862.49  * Flow Area (sq ft)      * 5681.24  * 2285.83  *  601.80  *
* E.G. Slope (ft/ft)     *0.000775  * Area (sq ft)           *14700.43  * 2285.83  *16301.33  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *10545.08  *16069.60  *  685.32  *
* Top Width (ft)         * 4013.20  * Top Width (ft)         * 2097.71  *  121.60  * 1793.89  *
* Vel Total (ft/s)       *    3.19  * Avg. Vel. (ft/s)       *    1.86  *    7.03  *    1.14  *
* Max Chl Dpth (ft)      *   22.94  * Hydr. Depth (ft)       *   10.97  *   18.80  *    4.57  *
* Conv. Total (cfs)      *980510.3  * Conv. (cfs)            *378738.3  *577158.0  * 24613.9  *
* Length Wtd. (ft)       * 1042.56  * Wetted Per. (ft)       *  518.21  *  128.99  *  131.78  *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.53  *    0.86  *    0.22  *
* Alpha                  *    3.00  * Stream Power (lb/ft s) *    0.98  *    6.03  *    0.25  *
* Frctn Loss (ft)        *    0.64  * Cum Volume (acre-ft)   *10627.28  *16701.53  *11450.94  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1313.60  *  709.32  * 1424.81  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  871.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.              *   0.110  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  871.29  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  863.39  * Flow Area (sq ft)      * 6571.12  * 2494.68  *  828.14  *
* E.G. Slope (ft/ft)     *0.000758  * Area (sq ft)           *18377.36  * 2494.68  *19390.32  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *13290.94  *18385.21  * 1153.86  *
* Top Width (ft)         * 4093.08  * Top Width (ft)         * 2165.52  *  121.60  * 1805.96  *
* Vel Total (ft/s)       *    3.32  * Avg. Vel. (ft/s)       *    2.02  *    7.37  *    1.39  *
* Max Chl Dpth (ft)      *   24.66  * Hydr. Depth (ft)       *   12.68  *   20.52  *    6.28  *
* Conv. Total (cfs)      *1192291.0  * Conv. (cfs)            *482688.8  *667697.9  * 41904.8  *
* Length Wtd. (ft)       * 1019.24  * Wetted Per. (ft)       *  518.21  *  128.99  *  131.78  *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.60  *    0.92  *    0.30  *
* Alpha                  *    2.92  * Stream Power (lb/ft s) *    1.21  *    6.75  *    0.41  *
```

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* Frctn Loss (ft)        *    0.60  * Cum Volume (acre-ft)   *14343.71  *18561.20  *15588.72  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1623.31  *  716.46  * 1875.70  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  873.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.110  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  873.04  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  864.23  * Flow Area (sq ft)      * 7476.95  * 2707.28  * 1058.53  *
* E.G. Slope (ft/ft)     *0.000737  * Area (sq ft)           *22191.53  * 2707.28  *22562.26  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *16256.32  *20780.48  * 1713.21  *
* Top Width (ft)         * 4140.72  * Top Width (ft)         * 2194.01  *  121.60  * 1825.12  *
* Vel Total (ft/s)       *    3.45  * Avg. Vel. (ft/s)       *    2.17  *    7.68  *    1.62  *
* Max Chl Dpth (ft)      *   26.41  * Hydr. Depth (ft)       *   14.43  *   22.26  *    8.03  *
* Conv. Total (cfs)      *1426893.0  * Conv. (cfs)           *598606.8  *765200.2  * 63085.5  *
* Length Wtd. (ft)       * 1000.24  * Wetted Per. (ft)       *  518.21  *  128.99  *  131.78  *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.66  *    0.97  *    0.37  *
* Alpha                  *    2.84  * Stream Power (lb/ft s) *    1.44  *    7.42  *    0.60  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   *17968.70  *19889.54  *19772.53  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1838.01  *  717.41  * 2320.40  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  875.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.110  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  875.15  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  865.20  * Flow Area (sq ft)      * 8573.27  * 2964.58  * 1337.37  *
* E.G. Slope (ft/ft)     *0.000724  * Area (sq ft)           *26861.73  * 2964.58  *26453.95  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *20235.94  *23957.24  * 2506.82  *
* Top Width (ft)         * 4193.72  * Top Width (ft)         * 2220.24  *  121.60  * 1851.88  *
* Vel Total (ft/s)       *    3.63  * Avg. Vel. (ft/s)       *    2.36  *    8.08  *    1.87  *
* Max Chl Dpth (ft)      *   28.52  * Hydr. Depth (ft)       *   16.55  *   24.38  *   10.15  *
* Conv. Total (cfs)      *1735291.0  * Conv. (cfs)           *751932.4  *890209.5  * 93149.0  *
* Length Wtd. (ft)       *  981.88  * Wetted Per. (ft)       *  518.21  *  128.99  *  131.78  *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.75  *    1.04  *    0.46  *
* Alpha                  *    2.74  * Stream Power (lb/ft s) *    1.77  *    8.40  *    0.86  *
* Frctn Loss (ft)        *    0.54  * Cum Volume (acre-ft)   *24304.20  *21833.08  *26783.22  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         * 2165.86  *  719.84  * 2746.31  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  867.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.110  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  867.18  * Reach Len. (ft)        *  707.40  * 1356.56  *  373.73  *
* Crit W.S. (ft)         *  861.04  * Flow Area (sq ft)      * 4440.81  * 1994.71  *  286.31  *
* E.G. Slope (ft/ft)     *0.000783  * Area (sq ft)           * 9999.46  * 1994.71  *12024.00  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 7029.83  *12870.47  *  199.70  *
* Top Width (ft)         * 3748.31  * Top Width (ft)         * 1855.21  *  121.60  * 1771.50  *
* Vel Total (ft/s)       *    2.99  * Avg. Vel. (ft/s)       *    1.58  *    6.45  *    0.70  *
* Max Chl Dpth (ft)      *   20.55  * Hydr. Depth (ft)       *    8.57  *   16.40  *    2.17  *
* Conv. Total (cfs)      *718271.1  * Conv. (cfs)           *251210.2  *459924.6  *  7136.4  *
* Length Wtd. (ft)       * 1085.97  * Wetted Per. (ft)       *  518.21  *  128.99  *  131.78  *
* Min Ch El (ft)         *  846.63  * Shear (lb/sq ft)       *    0.42  *    0.76  *    0.11  *
* Alpha                  *    3.08  * Stream Power (lb/ft s) *    0.66  *    4.88  *    0.07  *
* Frctn Loss (ft)        *    0.69  * Cum Volume (acre-ft)   * 7486.35  *14606.59  * 7978.90  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  980.73  *  691.32  * 1027.43  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION
```

RIVER: Blue River
REACH: Main RS: 30.476

INPUT
Description:
Station Elevation Data num= 336

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	904.68	11.74	905.08	25.12	901.57	47.84	900.69	97.22	890.92
111.56	889.67	114.44	891.32	119.31	893.91	126.32	897.98	129.08	899.62
145.94	883.93	152.1	878.21	154.55	877.39	159.28	875.89	161.82	875.71
163.63	875.58	167.98	882.93	176.26	895.8	187.04	894.79	198.87	894.18
206.91	893.83	216.16	893.96	255.38	888.03	259.17	887.65	302.38	885.71
314.68	884.07	320.87	884.44	329.76	883.2	333.4	882.32	348.99	878.56
349.8	878.18	361.07	873.1	366.28	873.22	375.41	872.72	389.18	872.32
412.02	871.64	447.99	869.71	491.35	868.85	509.29	868.45	568.31	866.48
583.72	866.66	633.49	867.41	648.68	867.11	653.64	867.04	700.49	866.22
706.61	866.22	731.43	866.12	752.62	865.86	771.01	865.82	783.22	864.45
791.22	863.43	791.96	863.91	795.99	866.36	800.33	865.83	805.7	865.12
805.88	864.03	806.46	861.38	807.3	862.63	808.44	864.31	809.33	864.6
813.48	864.87	820.04	863.29	820.11	863.27	820.17	863.29	820.22	863.32
827.18	866.64	830.69	867.27	834.19	868.15	836.56	867.82	837.78	867.65
838.76	867.5	842.52	869.79	842.64	869.86	842.95	869.79	843.54	869.66
848.56	868.58	849.31	868.42	853.43	868.49	857.58	868.56	864.13	870.04
864.6	870.15	865.32	869.5	869.89	865.36	871.23	867.34	871.76	868.14
879.25	866.16	882.78	865.21	883.81	862.3	884.5	860.25	887.23	861.13
888.38	861.51	891.22	862.03	892.46	862.26	893.21	863.3	893.59	863.84
895.12	864.03	902.03	864.93	904.03	865.19	905.74	864.57	906.41	864.86
910.87	864.23	915.59	863.39	944.13	863.37	948.41	863.36	952.77	863.37
1016.79	863.18	1028.51	863.13	1054.47	861.31	1070.05	860.86	1080.47	863.17
1081.12	863.39	1084.8	863.65	1108.74	864.7	1114.62	864.64	1117.92	864.34
1147.97	860.81	1156.75	861.7	1177.11	862.33	1183.07	862.58	1201.08	862.54
1234.56	862.26	1235.8	862.04	1242.18	860.83	1246.35	860.04	1261.3	861.64
1265.15	862.04	1265.41	862.04	1265.56	862.04	1275.06	862.05	1283.18	862.06
1317.4	861.76	1359.88	861.19	1408.32	861.89	1429.62	861.91	1449.62	861.93
1483.88	861.98	1517.74	861.87	1562.63	861.45	1600.59	861.46	1676.12	861.56
1678.01	861.56	1679.11	861.55	1684.68	861.52	1777.81	860.79	1818.74	860.72
1836.1	860.73	1907.78	860.71	1944.2	860.72	2006.35	860.78	2021.56	860.73
2025.94	860.76	2054.96	860.8	2123.55	860.97	2157.93	860.62	2172.79	860.46
2191.38	860.25	2199.98	860.12	2247.08	860.03	2251.33	859.98	2263.46	860.13
2323.74	861.15	2360.17	860.95	2391.89	860.61	2452.33	861.26	2564.45	861.93
2584.03	861.98	2589.28	862.01	2590.33	861.97	2592.42	861.96	2659.36	861.03
2664.27	860.94	2694.34	860.78	2705.93	860.64	2709.38	860.6	2731.66	860.54
2751.5	860.2	2762.3	860.22	2805.91	859.67	2814.76	859.17	2842.45	859.6
2872.13	859.55	2940.83	859.12	2944.96	859.1	2961.25	858.82	2971.74	858.59
2994.84	858.15	3006.1	858.34	3012.65	858.46	3015.96	858.47	3025.1	858.91
3031.97	859.04	3043.14	859.35	3045.67	859.44	3058.56	859.58	3059.18	859.58
3059.52	859.57	3059.67	859.58	3060.45	859.58	3069.37	859.54	3075.1	859.56
3083.22	859.5	3124.01	859.51	3179.05	859.44	3225.21	859.25	3233.11	859.14
3288.56	857.68	3307.47	857.53	3318.48	857.69	3332.12	857.4	3346.91	857.47
3350.09	857.51	3359.51	856.82	3367.74	856.48	3372.43	856	3381.04	854.59
3393.43	853.8	3401.05	853.35	3407.44	852.79	3409.86	852.58	3411.37	852.52
3414.79	851.52	3425.29	849.21	3426.8	848.95	3428.11	848.79	3437.53	847.49
3441.55	847.31	3443.07	847.25	3448	845.7	3468	844.69	3488	845.7
3493.74	847.31	3503.4	856.25	3505.86	858.68	3512.77	858.68	3526.36	858.69
3554.01	858.71	3587.46	859.3	3601.2	859.58	3624.11	859.69	3632.63	859.7
3633.31	859.68	3635.22	859.69	3643.18	859.7	3688.78	859.68	3694.83	859.57
3728.81	858.83	3803.72	857.17	3816.08	857.09	3857.78	857.73	3869.93	858.01
3905.63	859.13	3928.17	858.96	3977.3	858.84	4003.03	858.93	4032.66	859.09
4047.5	859.89	4077.19	859.63	4093.13	859.65	4119.2	859.59	4144.8	859.31
4189.59	859.02	4198.74	858.86	4203.81	858.91	4253.97	859.31	4254.39	859.32
4255.37	859.35	4305.91	859.59	4309.35	859.85	4324.75	861.02	4337.6	861.16
4350.06	861.29	4360.69	861.11	4370.72	860.84	4389.27	861.59	4391.71	861.69
4394.65	861.79	4397.12	861.88	4414.55	863.72	4430.28	865.29	4430.39	865.32
4430.72	865.38	4459.82	870.24	4462.55	870.74	4465.1	871.38	4499.19	880.16
4501.14	880.59	4501.84	880.66	4504.69	881.44	4524.11	885.36	4546.69	891.42
4556.82	894.26	4583.82	903.08	4588.62	904.1	4602.47	907.91	4604.83	908.55
4614.06	910.86	4621.97	911.92	4633.73	913.4	4643.12	915.93	4643.47	916.03
4644.24	916.14	4651.09	917.12	4668.62	920.72	4673.57	921.74	4676.5	922.58
4695.54	926.55	4700.26	927.5	4701.66	927.76	4712.88	929.88	4722.75	931.22
4735.56	933	4751.21	933.42	4765.79	933.8	4806.41	935.38	4820.68	935.77
4852.41	936.12	4855.7	936.14	4856.68	936.19	4856.95	936.22	4865.55	936.97
4885.45	939.47	4890.2	939.79	4906.65	940.4	4936.23	941.5	4939.91	941.83
4948.44	942.14	4963.34	944.48	4974.14	946.22	4989.68	948.66	5005.34	951.25
5008.49	951.81	5020.37	954.01	5027.05	954	5040.42	953.75	5058.97	953.74

```
 5062.61  953.34

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .06 1054.47      .1 2940.83      .1 3411.37     .04 3505.86      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3372.43 3505.86         245.4585  704.051027.026             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    2570     880       F
 3646.62 5062.61     880       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  859.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.100  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  859.06  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
* Crit W.S. (ft)         *  852.26  * Flow Area (sq ft)      *  221.42  * 1272.66  *   21.27  *
* E.G. Slope (ft/ft)     *0.000806  * Area (sq ft)           *  221.42  * 1272.66  *  245.28  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  102.30  * 5763.57  *    4.13  *
* Top Width (ft)         *  761.18  * Top Width (ft)         *  221.92  *  133.43  *  405.83  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    0.46  *    4.53  *    0.19  *
* Max Chl Dpth (ft)      *   14.37  * Hydr. Depth (ft)       *    1.00  *    9.54  *    0.31  *
* Conv. Total (cfs)      *206781.9  * Conv. (cfs)            *  3603.8  *203032.5  *   145.5  *
* Length Wtd. (ft)       *  699.51  * Wetted Per. (ft)       *  222.02  *  139.15  *   68.10  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.05  *    0.46  *    0.02  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *    0.02  *    2.08  *    0.00  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   * 1124.09  * 7264.07  *  980.80  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  311.99  *  581.23  *  316.52  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  863.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.100  *   0.044  *   0.100  *
* W.S. Elev (ft)         *  862.81  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
* Crit W.S. (ft)         *  855.26  * Flow Area (sq ft)      * 2677.03  * 1772.13  *  514.00  *
* E.G. Slope (ft/ft)     *0.000603  * Area (sq ft)           * 5044.71  * 1772.13  * 3245.47  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 2251.62  * 8203.62  *  444.75  *
* Top Width (ft)         * 3331.07  * Top Width (ft)         * 2297.62  *  133.43  *  900.02  *
* Vel Total (ft/s)       *    2.20  * Avg. Vel. (ft/s)       *    0.84  *    4.63  *    0.87  *
* Max Chl Dpth (ft)      *   18.12  * Hydr. Depth (ft)       *    3.34  *   13.28  *    3.65  *
* Conv. Total (cfs)      *443845.1  * Conv. (cfs)            * 91685.5  *334049.3  * 18110.3  *
* Length Wtd. (ft)       *  658.14  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.13  *    0.48  *    0.14  *
* Alpha                  *    3.38  * Stream Power (lb/ft s) *    0.11  *    2.22  *    0.12  *
* Frctn Loss (ft)        *    0.70  * Cum Volume (acre-ft)   * 2879.31  * 9733.98  * 2863.19  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  566.19  *  625.55  *  612.74  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  863.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.100  *   0.044  *   0.100  *
* W.S. Elev (ft)         *  863.65  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
* Crit W.S. (ft)         *  855.97  * Flow Area (sq ft)      * 3352.27  * 1884.41  *  632.45  *
* E.G. Slope (ft/ft)     *0.000577  * Area (sq ft)           * 7027.23  * 1884.41  * 4006.18  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 3167.25  * 8818.15  *  614.60  *
* Top Width (ft)         * 3477.16  * Top Width (ft)         * 2435.74  *  133.43  *  907.99  *
* Vel Total (ft/s)       *    2.15  * Avg. Vel. (ft/s)       *    0.94  *    4.68  *    0.97  *
```

```
* Max Chl Dpth (ft)      *   18.96  * Hydr. Depth (ft)       *    4.18  *   14.12  *    4.49  *
* Conv. Total (cfs)      *524572.9  * Conv. (cfs)            *131861.5  *367123.8  * 25587.6  *
* Length Wtd. (ft)       *  637.40  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.15  *    0.49  *    0.16  *
* Alpha                  *    3.38  * Stream Power (lb/ft s) *    0.14  *    2.28  *    0.16  *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)   * 3972.50  *11482.64  * 4153.00  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  666.52  *  653.79  *  754.39  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  866.48  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.045  *   0.100  *
* W.S. Elev (ft)         *  866.25  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
* Crit W.S. (ft)         *  858.53  * Flow Area (sq ft)      * 5441.36  * 2231.79  *  998.91  *
* E.G. Slope (ft/ft)     *0.000537  * Area (sq ft)           *13567.31  * 2231.79  * 6402.01  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 6765.32  *11064.34  * 1270.35  *
* Top Width (ft)         * 3685.12  * Top Width (ft)         * 2621.62  *  133.43  *  930.07  *
* Vel Total (ft/s)       *    2.20  * Avg. Vel. (ft/s)       *    1.24  *    4.96  *    1.27  *
* Max Chl Dpth (ft)      *   21.56  * Hydr. Depth (ft)       *    6.78  *   16.73  *    7.10  *
* Conv. Total (cfs)      *824097.0  * Conv. (cfs)            *291899.3  *477386.9  * 54810.9  *
* Length Wtd. (ft)       *  574.93  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.23  *    0.54  *    0.24  *
* Alpha                  *    3.07  * Stream Power (lb/ft s) *    0.28  *    2.67  *    0.30  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   * 6354.14  *13579.16  * 6833.35  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  840.51  *  677.03  *  933.82  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  869.33  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.045  *   0.100  *
* W.S. Elev (ft)         *  869.11  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
* Crit W.S. (ft)         *  861.85  * Flow Area (sq ft)      * 7733.85  * 2612.99  * 1401.05  *
* E.G. Slope (ft/ft)     *0.000492  * Area (sq ft)           *21508.40  * 2612.99  * 9083.59  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *11591.64  *13570.96  * 2137.40  *
* Top Width (ft)         * 3964.18  * Top Width (ft)         * 2883.57  *  133.43  *  947.18  *
* Vel Total (ft/s)       *    2.32  * Avg. Vel. (ft/s)       *    1.50  *    5.19  *    1.53  *
* Max Chl Dpth (ft)      *   24.42  * Hydr. Depth (ft)       *    9.64  *   19.58  *    9.95  *
* Conv. Total (cfs)      *1230335.0  * Conv. (cfs)            *522402.9  *611605.6  * 96326.8  *
* Length Wtd. (ft)       *  534.55  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.30  *    0.58  *    0.31  *
* Alpha                  *    2.69  * Stream Power (lb/ft s) *    0.44  *    3.00  *    0.47  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   *10333.27  *16625.25  *11342.04  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1273.16  *  705.35  * 1413.05  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  871.11  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.045  *   0.100  *
* W.S. Elev (ft)         *  870.88  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
```

```
* Crit W.S. (ft)         *  862.70  * Flow Area (sq ft)      * 9158.09  * 2849.82  * 1650.89  *
* E.G. Slope (ft/ft)     *0.000467  * Area (sq ft)           *26697.87  * 2849.82  *10774.04  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *14939.14  *15155.76  * 2735.09  *
* Top Width (ft)         * 4036.97  * Top Width (ft)         * 2946.28  *  133.43  *  957.26  *
* Vel Total (ft/s)       *    2.40  * Avg. Vel. (ft/s)       *    1.63  *    5.32  *    1.66  *
* Max Chl Dpth (ft)      *   26.19  * Hydr. Depth (ft)       *   11.41  *   21.36  *   11.73  *
* Conv. Total (cfs)      *1519911.0  * Conv. (cfs)           *691628.5  *701657.2  *126624.9  *
* Length Wtd. (ft)       *  518.32  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.33  *    0.60  *    0.34  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    0.54  *    3.17  *    0.57  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   *13977.71  *18477.98  *15459.32  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1581.80  *  712.49  * 1863.85  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  872.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.046  *   0.100  *
* W.S. Elev (ft)         *  872.68  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
* Crit W.S. (ft)         *  863.37  * Flow Area (sq ft)      *10601.81  * 3089.88  * 1904.14  *
* E.G. Slope (ft/ft)     *0.000443  * Area (sq ft)           *32037.12  * 3089.88  *12502.69  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *18569.94  *16798.60  * 3381.46  *
* Top Width (ft)         * 4093.40  * Top Width (ft)         * 2995.68  *  133.43  *  964.29  *
* Vel Total (ft/s)       *    2.48  * Avg. Vel. (ft/s)       *    1.75  *    5.44  *    1.78  *
* Max Chl Dpth (ft)      *   27.99  * Hydr. Depth (ft)       *   13.21  *   23.16  *   13.53  *
* Conv. Total (cfs)      *1840729.0  * Conv. (cfs)           *882121.6  *797978.4  *160628.4  *
* Length Wtd. (ft)       *  505.82  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.37  *    0.61  *    0.37  *
* Alpha                  *    2.36  * Stream Power (lb/ft s) *    0.64  *    3.34  *    0.66  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *17528.38  *19799.28  *19622.11  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1795.87  *  713.44  * 2308.44  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  875.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.046  *   0.100  *
* W.S. Elev (ft)         *  874.84  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
* Crit W.S. (ft)         *  864.13  * Flow Area (sq ft)      *12337.78  * 3378.55  * 2208.66  *
* E.G. Slope (ft/ft)     *0.000427  * Area (sq ft)           *38550.09  * 3378.55  *14597.92  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *23444.44  *19007.52  * 4248.04  *
* Top Width (ft)         * 4121.35  * Top Width (ft)         * 3015.23  *  133.43  *  972.69  *
* Vel Total (ft/s)       *    2.61  * Avg. Vel. (ft/s)       *    1.90  *    5.63  *    1.92  *
* Max Chl Dpth (ft)      *   30.15  * Hydr. Depth (ft)       *   15.38  *   25.32  *   15.69  *
* Conv. Total (cfs)      *2261172.0  * Conv. (cfs)           *1135159.0  *920327.3  *205686.2  *
* Length Wtd. (ft)       *  494.99  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.41  *    0.65  *    0.42  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    0.78  *    3.64  *    0.80  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *23773.07  *21734.31  *26607.12  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 2123.35  *  715.87  * 2734.20  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  866.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.045  *   0.100  *
* W.S. Elev (ft)         *  866.62  * Reach Len. (ft)        *  245.46  *  704.05  * 1027.03  *
```

```
* Crit W.S. (ft)         *  859.10  * Flow Area (sq ft)      * 5738.70  * 2281.23  * 1051.07  *
* E.G. Slope (ft/ft)     *0.000531  * Area (sq ft)           *14544.67  * 2281.23  * 6747.05  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 7343.08  *11382.29  * 1374.63  *
* Top Width (ft)         * 3728.68  * Top Width (ft)         * 2662.96  *  133.43  *  932.29  *
* Vel Total (ft/s)       *    2.22  * Avg. Vel. (ft/s)       *    1.28  *    4.99  *    1.31  *
* Max Chl Dpth (ft)      *   21.93  * Hydr. Depth (ft)       *    7.15  *   17.10  *    7.47  *
* Conv. Total (cfs)      *872406.9  * Conv. (cfs)            *318714.3  *494029.3  * 59663.3  *
* Length Wtd. (ft)       *  568.22  * Wetted Per. (ft)       *  802.58  *  139.15  *  140.77  *
* Min Ch El (ft)         *  844.69  * Shear (lb/sq ft)       *    0.24  *    0.54  *    0.25  *
* Alpha                  *    3.02  * Stream Power (lb/ft s) *    0.30  *    2.71  *    0.32  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   * 7287.06  *14540.01  * 7898.38  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  944.04  *  687.35  * 1015.83  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 30.343

INPUT
Description:
Station Elevation Data    num=     254
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  902.35    3.83  902.15   13.36  901.66   28.41  898.88   36.92  896.96
   47.77  899.44   48.62  899.62   49.62   898.8   57.61   891.9   71.94  879.57
   73.46  878.21   83.92  875.95   84.23  875.89   84.86  875.86      91  875.58
   99.34   881.4  128.64  902.92  150.25  896.27  156.38  894.25  185.75  898.55
  193.49  899.69   199.3  899.36  241.91  892.25  246.76  891.64   250.7  891.11
  270.95  888.59  294.24  885.07  335.07  879.44  359.59  879.15  372.58  878.56
  375.92  876.19  379.57   873.1   390.2  872.47  414.51  871.15  442.27  869.98
  490.16   866.9  543.43  867.05  567.25  867.14  642.86  866.15  644.34  866.15
  645.99   866.1   649.5  866.14  721.71  865.95   734.2  865.14  767.13  863.54
  767.68  863.51  767.73  863.53  767.88  863.53  776.93  865.96  788.08  865.13
  788.18  865.12  788.21  864.78  788.49   860.7  789.58  862.72  790.67  864.56
  793.48  864.71  796.04  864.87  801.09  865.57  807.63   866.7  813.12  867.86
  814.85  868.15  815.27  868.08  815.89  867.97  817.36  867.72  819.25  868.53
  822.41  869.86  828.01  868.94  831.21  868.42  836.86  868.52  839.35  868.56
   844.8  870.03  845.25  870.15  845.71  869.78   846.2  869.38  851.38   865.2
  851.56  865.95  852.09  868.14  856.16  866.91   859.2  865.99  861.81  865.21
  863.67  861.22  864.23  860.05  864.34  860.31  864.83  861.51  868.76  861.71
  872.93  861.94  875.66   863.4   876.4  863.84  879.07     864  920.22  864.07
  943.95  864.19  946.13   864.2  953.94  864.22  956.39  864.12  958.55  864.19
 1016.49  862.68 1017.49  862.67 1041.41  862.81 1068.23  863.13 1092.57  862.73
 1101.02  861.39 1107.33  861.57 1134.48  861.16 1157.04  860.93 1157.77  860.94
 1159.52  860.92 1193.93  860.92  1262.4  860.92 1302.03  860.99 1333.82  860.96
 1371.78  860.77 1443.61  860.94 1478.71  860.89 1501.92  860.93 1576.25  860.72
 1661.84  860.16 1667.22  860.14 1668.03  860.12 1704.39  859.72 1723.21  859.72
 1833.64  859.85 1906.46  859.85 1933.92  859.71 2029.54  859.66 2032.94  859.67
 2034.11  859.67 2098.75  860.45 2109.97   860.5  2141.2  860.59 2170.39  860.95
 2215.76  861.22 2220.49  861.28 2253.75  861.21 2264.27  861.08 2293.12  860.43
 2304.97  860.46 2316.76  860.46 2325.95  860.46 2384.02  860.55 2396.64  860.52
 2406.85   860.5  2455.8  860.54 2470.99  860.73 2475.01  860.34 2492.09  859.14
 2500.82  856.44 2507.96  854.01 2524.26  852.24 2524.41  852.22 2524.53  852.21
 2525.34  852.12 2541.37  853.18 2552.49  852.93 2562.88  853.22 2570.45  852.76
 2581.84  852.07 2583.79  851.96 2585.48  851.73 2592.65  851.82 2601.04  852.76
 2602.06  853.03 2614.84  856.74 2624.91  857.23 2633.36  857.58  2640.4  858.31
    2655  859.55 2658.48  859.58 2670.19  859.64 2670.93  859.53 2671.41  859.43
 2680.72  858.84 2683.63  857.79 2688.39  857.13 2691.32  856.85 2698.51  857.65
 2709.06  857.17 2714.56  857.16 2723.86  861.55 2730.98  861.16 2733.06  861.11
 2755.77  859.81 2759.28  859.58 2785.38  858.91  2789.6   858.8 2789.94  858.69
 2790.36  858.62 2791.05  858.67  2795.3  858.73  2827.1  858.11 2831.37  857.83
  2836.4   856.9  2837.1  856.91 2846.59  857.04  2861.3  850.81 2867.23  849.42
 2873.25  849.68 2875.79  849.76 2882.71  852.57 2886.33  853.37 2893.39  853.25
 2895.55  853.36  2908.5  854.13 2918.11  855.34 2936.12  856.56 2941.11   856.5
 2967.16  856.59 2980.12  856.74 3036.94  857.76 3050.27  857.84 3068.07  856.82
 3068.37  856.81 3068.69  856.81 3076.66  856.87 3088.78  856.95 3111.46  857.09
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  3122.8  850.67 3129.37  846.89    3134   845.6    3153  844.59    3172   845.6
 3177.27  846.77 3182.39  847.87 3188.37  849.34 3190.89  852.22 3193.93  855.71
 3194.26  856.04 3195.43   856.2 3205.75  857.13 3215.01  859.68 3226.33   862.1
 3242.96  864.24 3248.23  864.97    3261  866.21 3267.68  866.75  3269.6  867.71
 3271.88  868.69 3275.37  869.33 3293.78  871.92 3310.92  876.97    3316  878.16
 3340.68   886.6 3356.01  892.74 3361.97  894.92 3398.28  905.18 3405.61  907.25
 3413.01  908.73 3428.93  912.08  3434.5   913.4 3437.57  914.03 3441.96  913.82
 3460.02  912.92 3465.54  912.51 3471.59  912.13 3472.85  912.05

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  767.13      .1 2316.76      .1 3111.46     .04 3195.43      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3111.46 3195.43              840  685.86 817.824             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    2467     875       F
    2467 3040.24   860.5       T

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  858.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  857.78  * Reach Len. (ft)        *  840.00  *  685.86  *  817.82  *
* Crit W.S. (ft)         *  852.50  * Flow Area (sq ft)      *   43.64  *  839.75  *   12.22  *
* E.G. Slope (ft/ft)     *0.001794  * Area (sq ft)           * 1089.51  *  839.75  *   12.22  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *   22.19  * 5840.35  *    7.46  *
* Top Width (ft)         *  535.42  * Top Width (ft)         *  438.78  *   83.97  *   12.66  *
* Vel Total (ft/s)       *    6.55  * Avg. Vel. (ft/s)       *    0.51  *    6.95  *    0.61  *
* Max Chl Dpth (ft)      *   13.19  * Hydr. Depth (ft)       *    0.73  *   10.00  *    0.96  *
* Conv. Total (cfs)      *138582.3  * Conv. (cfs)            *   523.9  *137882.3  *   176.0  *
* Length Wtd. (ft)       *  687.60  * Wetted Per. (ft)       *   60.09  *   90.37  *   12.79  *
* Min Ch El (ft)         *  844.59  * Shear (lb/sq ft)       *    0.08  *    1.04  *    0.11  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *    0.04  *    7.24  *    0.07  *
* Frctn Loss (ft)        *    0.86  * Cum Volume (acre-ft)   * 1120.40  * 7247.00  *  977.77  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  310.13  *  579.47  *  311.59  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  862.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.35  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  860.90  * Reach Len. (ft)        *  840.00  *  685.86  *  817.82  *
* Crit W.S. (ft)         *  855.68  * Flow Area (sq ft)      *  479.66  * 1101.70  *   70.17  *
* E.G. Slope (ft/ft)     *0.002341  * Area (sq ft)           * 3405.59  * 1101.70  *   70.17  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  313.45  *10488.22  *   98.33  *
* Top Width (ft)         * 1670.74  * Top Width (ft)         * 1561.50  *   83.97  *   25.26  *
* Vel Total (ft/s)       *    6.60  * Avg. Vel. (ft/s)       *    0.65  *    9.52  *    1.40  *
* Max Chl Dpth (ft)      *   16.31  * Hydr. Depth (ft)       *    0.76  *   13.12  *    2.78  *
* Conv. Total (cfs)      *225299.3  * Conv. (cfs)            *  6478.9  *216787.9  *  2032.5  *
* Length Wtd. (ft)       *  700.00  * Wetted Per. (ft)       *  635.51  *   90.37  *   25.78  *
* Min Ch El (ft)         *  844.59  * Shear (lb/sq ft)       *    0.11  *    1.78  *    0.40  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    0.07  *   16.96  *    0.56  *
* Frctn Loss (ft)        *    0.90  * Cum Volume (acre-ft)   * 2855.50  * 9710.75  * 2824.11  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         *  555.32  *  623.79  *  601.83  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  863.14  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    1.33  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  861.81  * Reach Len. (ft)        *  840.00  *  685.86  *  817.82  *
* Crit W.S. (ft)         *  856.62  * Flow Area (sq ft)      * 1060.73  * 1178.49  *   95.22  *
* E.G. Slope (ft/ft)     *0.002220  * Area (sq ft)           * 5187.22  * 1178.49  *   95.22  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1029.26  *11427.25  *  143.49  *
* Top Width (ft)         * 2134.44  * Top Width (ft)         * 2020.93  *   83.97  *   29.54  *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *    0.97  *    9.70  *    1.51  *
* Max Chl Dpth (ft)      *   17.22  * Hydr. Depth (ft)       *    1.65  *   14.03  *    3.22  *
* Conv. Total (cfs)      *267443.0  * Conv. (cfs)            * 21846.6  *242550.7  *  3045.7  *
* Length Wtd. (ft)       *  706.55  * Wetted Per. (ft)       *  650.02  *   90.37  *   30.15  *
* Min Ch El (ft)         *  844.59  * Shear (lb/sq ft)       *    0.23  *    1.81  *    0.44  *
* Alpha                  *    2.93  * Stream Power (lb/ft s) *    0.22  *   17.52  *    0.66  *
* Frctn Loss (ft)        *    0.88  * Cum Volume (acre-ft)   * 3938.08  *11457.89  * 4104.65  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *  653.97  *  652.03  *  743.34  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  865.91  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  864.90  * Reach Len. (ft)        *  840.00  *  685.86  *  817.82  *
* Crit W.S. (ft)         *  860.09  * Flow Area (sq ft)      * 3050.00  * 1437.68  *  220.67  *
* E.G. Slope (ft/ft)     *0.001628  * Area (sq ft)           *11788.83  * 1437.68  *  220.67  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 5125.65  *13632.31  *  342.04  *
* Top Width (ft)         * 2427.52  * Top Width (ft)         * 2291.28  *   83.97  *   52.27  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    1.68  *    9.48  *    1.55  *
* Max Chl Dpth (ft)      *   20.31  * Hydr. Depth (ft)       *    4.73  *   17.12  *    4.22  *
* Conv. Total (cfs)      *473328.1  * Conv. (cfs)            *127021.7  *337830.0  *  8476.3  *
* Length Wtd. (ft)       *  727.07  * Wetted Per. (ft)       *  650.02  *   90.37  *   53.09  *
* Min Ch El (ft)         *  844.59  * Shear (lb/sq ft)       *    0.48  *    1.62  *    0.42  *
* Alpha                  *    3.95  * Stream Power (lb/ft s) *    0.80  *   15.34  *    0.65  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   * 6282.70  *13549.50  * 6755.28  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *  826.67  *  675.27  *  922.24  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  868.87  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  868.05  * Reach Len. (ft)        *  840.00  *  685.86  *  817.82  *
* Crit W.S. (ft)         *  860.26  * Flow Area (sq ft)      * 5079.36  * 1702.09  *  430.42  *
* E.G. Slope (ft/ft)     *0.001273  * Area (sq ft)           *19492.48  * 1702.09  *  430.42  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *10604.67  *15971.27  *  724.06  *
* Top Width (ft)         * 2766.71  * Top Width (ft)         * 2607.79  *   83.97  *   74.95  *
* Vel Total (ft/s)       *    3.79  * Avg. Vel. (ft/s)       *    2.09  *    9.38  *    1.68  *
* Max Chl Dpth (ft)      *   23.46  * Hydr. Depth (ft)       *    7.88  *   20.27  *    5.74  *
* Conv. Total (cfs)      *765111.0  * Conv. (cfs)            *297207.0  *447611.5  * 20292.5  *
* Length Wtd. (ft)       *  740.84  * Wetted Per. (ft)       *  650.02  *   90.37  *   76.16  *
* Min Ch El (ft)         *  844.59  * Shear (lb/sq ft)       *    0.62  *    1.50  *    0.45  *
* Alpha                  *    3.72  * Stream Power (lb/ft s) *    1.30  *   14.05  *    0.76  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   *10217.75  *16590.38  *11229.88  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         * 1257.68  *  703.59  * 1401.00  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
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CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	870.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	869.93	Reach Len. (ft)	840.00	685.86	817.82
Crit W.S. (ft)	864.84	Flow Area (sq ft)	6291.30	1860.00	578.16
E.G. Slope (ft/ft)	0.001136	Area (sq ft)	24455.37	1860.00	578.16
Q Total (cfs)	32830.00	Flow (cfs)	14307.62	17488.04	1034.34
Top Width (ft)	2835.38	Top Width (ft)	2667.23	83.97	84.17
Vel Total (ft/s)	3.76	Avg. Vel. (ft/s)	2.27	9.40	1.79
Max Chl Dpth (ft)	25.34	Hydr. Depth (ft)	9.76	22.15	6.87
Conv. Total (cfs)	974200.3	Conv. (cfs)	424565.5	518941.6	30693.2
Length Wtd. (ft)	746.58	Wetted Per. (ft)	650.02	90.37	85.61
Min Ch El (ft)	844.59	Shear (lb/sq ft)	0.69	1.46	0.48
Alpha	3.50	Stream Power (lb/ft s)	1.56	13.72	0.86
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	13833.59	18439.92	15325.50
C & E Loss (ft)	0.08	Cum SA (acres)	1565.98	710.73	1851.57

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	872.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	871.80	Reach Len. (ft)	840.00	685.86	817.82
Crit W.S. (ft)	865.64	Flow Area (sq ft)	7498.21	2017.26	748.26
E.G. Slope (ft/ft)	0.001033	Area (sq ft)	29492.04	2017.26	748.26
Q Total (cfs)	38750.00	Flow (cfs)	18280.79	19093.54	1375.67
Top Width (ft)	2890.35	Top Width (ft)	2708.89	83.97	97.49
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)	2.44	9.47	1.84
Max Chl Dpth (ft)	27.21	Hydr. Depth (ft)	11.63	24.02	7.68
Conv. Total (cfs)	1205729.0	Conv. (cfs)	568817.7	594106.6	42804.8
Length Wtd. (ft)	751.05	Wetted Per. (ft)	650.02	90.37	99.06
Min Ch El (ft)	844.59	Shear (lb/sq ft)	0.74	1.44	0.49
Alpha	3.30	Stream Power (lb/ft s)	1.81	13.62	0.90
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	17355.02	19758.00	19465.90
C & E Loss (ft)	0.06	Cum SA (acres)	1779.80	711.68	2295.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	874.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	874.01	Reach Len. (ft)	840.00	685.86	817.82
Crit W.S. (ft)	866.66	Flow Area (sq ft)	8924.09	2203.04	973.23
E.G. Slope (ft/ft)	0.000955	Area (sq ft)	35522.26	2203.04	973.23
Q Total (cfs)	46700.00	Flow (cfs)	23494.33	21262.44	1943.23
Top Width (ft)	2922.38	Top Width (ft)	2732.97	83.97	105.45
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)	2.63	9.65	2.00
Max Chl Dpth (ft)	29.42	Hydr. Depth (ft)	13.85	26.24	9.23
Conv. Total (cfs)	1511255.0	Conv. (cfs)	760298.3	688072.0	62884.7
Length Wtd. (ft)	755.25	Wetted Per. (ft)	650.02	90.37	107.33
Min Ch El (ft)	844.59	Shear (lb/sq ft)	0.82	1.45	0.54
Alpha	3.09	Stream Power (lb/ft s)	2.15	14.03	1.08
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	23564.38	21689.21	26423.55
C & E Loss (ft)	0.04	Cum SA (acres)	2107.16	714.11	2721.49

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	866.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	865.32	Reach Len. (ft)	840.00	685.86	817.82
Crit W.S. (ft)	860.26	Flow Area (sq ft)	3321.85	1473.10	243.55
E.G. Slope (ft/ft)	0.001567	Area (sq ft)	12758.38	1473.10	243.55
Q Total (cfs)	20100.00	Flow (cfs)	5797.09	13926.72	376.19
Top Width (ft)	2447.34	Top Width (ft)	2306.99	83.97	56.38

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* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *    1.75  *    9.45  *    1.54  *
* Max Chl Dpth (ft)      *   20.73  * Hydr. Depth (ft)       *    5.15  *   17.54  *    4.32  *
* Conv. Total (cfs)      *507764.3  * Conv. (cfs)            *146445.6  *351815.5  *  9503.3  *
* Length Wtd. (ft)       *  729.29  * Wetted Per. (ft)       *  650.02  *   90.37  *   57.23  *
* Min Ch El (ft)         *  844.59  * Shear (lb/sq ft)       *    0.50  *    1.59  *    0.42  *
* Alpha                  *    3.95  * Stream Power (lb/ft s) *    0.87  *   15.08  *    0.64  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   * 7210.13  *14509.67  * 7815.97  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  930.04  *  685.59  * 1004.17  *
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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 30.213

INPUT
Description: 1400 ft. Upstream of MO-150
Station Elevation Data num= 306

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	883.74	81	880.34	96.08	879.49	97.05	879.51	103.79	879.2
135.6	877.93	145.52	877.4	168.61	877.08	174.25	876.87	176.94	876.81
183.07	876.66	206.63	876.1	226.4	875.58	229.92	876.52	232.15	877.09
237.45	876.2	242.67	875.3	246.15	874.72	251.04	873.85	257.1	873.67
269.28	873.18	269.65	875.63	269.8	876.3	274.34	876.08	274.79	876.05
275.3	876.01	275.93	875.97	286.98	875.38	288.16	875.29	291.51	875.11
292.99	875	295.95	874.84	300.46	874.5	305.08	874.23	316.02	872.42
320.59	872.34	323.62	872.28	328.36	872.18	333.14	873.38	333.27	874.72
333.39	875.9	335.85	875.77	342.47	875.42	348.16	874.67	362.44	876.83
363.09	876.84	363.42	876.84	363.54	876.84	363.63	876.84	365.18	876.95
383.93	875.78	387.48	875.91	403.56	875.43	417.22	874.03	444.24	872.89
464.68	872.79	479.47	872.84	488.8	872.88	506.51	872.93	526.82	872.03
538.75	871.64	562.87	870.05	566.22	869.75	568.51	872.67	570.53	874.16
576.08	871.7	588.28	866.99	602.67	867.57	608.85	867.85	614.27	866.7
621.72	865.57	640.41	865.26	658.85	865.42	677.54	866.05	685.14	866.36
688.88	866.07	746.22	864.56	762.3	864.27	763.11	864.25	771.1	864.74
775.89	865.02	776.28	865.24	777.84	866.08	781.17	867.84	781.43	866.98
782.62	863.73	790.63	864	801.16	864.35	804.28	866.12	818.84	864.98
827.38	864.35	833.22	863.91	875.16	864.02	875.74	864.02	876.01	863.95
888.11	861.22	888.14	861.23	896.69	865.84	905.66	866.7	906.12	866.74
906.8	866.8	915.27	867.5	930.98	866.75	934.69	866.58	945.6	866.05
946.96	865.43	956.94	861.15	962.11	861.67	967.53	862.27	1020.29	861.65
1040.02	861.33	1049.04	861.34	1057.14	861.46	1110.74	861.42	1150.03	861.56
1190.54	861.44	1213.07	861.42	1240.25	861.45	1309.92	861.29	1337.53	861.28
1415.36	860.6	1445.79	860.32	1523	861.11	1565.07	861.03	1632.44	860.8
1661.52	861.18	1670.46	860.47	1708.42	860.5	1734.66	860.56	1753.96	860.54
1797.75	860.28	1803.02	860.19	1805.53	860.09	1806.3	860.08	1807.98	860
1819.07	859.88	1826.32	859.72	1838.22	859.53	1867.53	858.68	1878.65	858.51
1885.8	858.56	1896.37	858.66	1920.03	858.15	1921.24	858.12	1922.04	858.12
1922.66	858.12	1938.58	858.39	1943.33	858.41	1957.68	858.42	1969.77	858.28
1977.62	858.21	1989	857.56	2002.88	857.7	2021.85	857.8	2036.5	858.25
2037.54	858.25	2038	858.24	2074.72	857.73	2089.22	857.63	2096.73	857.74
2107.87	857.5	2115.59	857.44	2122.81	857.57	2124.07	857.59	2139.09	857.75
2142.41	857.83	2154.62	858.06	2160.02	858.14	2169.79	858.32	2177.1	858.46
2188.03	858.74	2189.65	858.8	2193.89	858.92	2198.53	858.88	2212.52	858.72
2228.4	857.77	2235.89	857.62	2241.72	857.24	2294.94	857.34	2327.97	857.22
2337.8	857.14	2345.37	857.25	2346.44	857.3	2362.92	857.3	2368.57	857.41
2381.66	857.23	2390.66	857.37	2415.1	857.53	2423.17	857.62	2432.22	858.28
2449.42	854.99	2450.36	854.91	2451.27	854.87	2452	854.9	2470.6	854.79
2479.99	855.55	2490.98	856.19	2492.37	856.35	2502.83	856.48	2512.62	856.45
2532.15	856.38	2541.92	856.37	2548.11	855.56	2551.43	855.33	2562.69	854.2
2564.89	854.53	2566.47	854	2570.02	852.79	2582.33	847.65	2584.13	847.63
2602.5	847.47	2614.75	846.52	2619.62	846.2	2625	845.6	2643.5	844.6
2662	845.6	2667.44	846.22	2679.77	854.61	2679.88	854.67	2679.97	854.67
2685.08	855.11	2704.98	856.83	2747.65	856.35	2769.39	856.42	2776.13	856.44
2788.94	856.37	2795	856.34	2797.85	856.39	2801.03	856.42	2845.81	856.57
2887.01	856.07	2902.8	855.96	2950.06	855.31	2951.29	855.35	2951.77	855.38
2952.27	855.4	2963.82	855.68	2966.55	855.82	2971.52	855.94	2984.07	856.41
2992.3	856.59	2999.37	856.9	3006.03	857.03	3008.7	857.14	3020.43	857.01

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 3033.25   856.9 3037.89  857.01 3047.64  857.06 3058.12  857.11  3065.8   857.3
 3070.06  857.64 3074.19  857.92 3081.85  858.48  3092.9  859.06 3097.96  859.48
 3098.62  859.58 3099.67  859.77 3112.68   861.9  3115.7  862.34 3122.19  863.24
 3128.56  864.17    3144  866.32 3144.88  866.47 3148.35  866.75 3155.04  867.52
 3156.26  867.85 3166.64  870.52 3171.37  871.59 3181.85  875.38 3192.95  878.68
  3194.5  879.25 3201.89  881.44 3203.29  881.89 3203.48  881.96 3203.78  882.01
  3228.5  889.68 3235.38   891.6 3240.78  893.22 3247.97  895.04  3252.4  896.31
 3263.09  899.13 3272.85  901.13 3280.54  902.11 3293.09  905.13 3295.82  904.89
 3297.56  905.68 3304.64  906.02 3311.62  905.76 3325.58  910.51 3333.83  910.58
 3341.38  910.66 3347.01  910.75 3356.54  910.81 3357.77  910.85 3360.32  910.84
 3371.04  911.42 3379.27  911.82 3388.62   912.3 3393.58  912.47  3400.7  912.69
 3418.79  913.31 3422.25  913.44 3428.42  913.33 3430.18  913.27 3448.22  912.89
 3450.02  913.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  781.17      .1 2241.72      .1 2564.89     .04 2679.97      .1
 3081.85     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2541.92 2704.98         1666.665    1181 620.235             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2284.89     875       F
 2841.98 3450.02     875       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  857.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.34  * Wt. n-Val.              *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)          *  857.20  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)          *  851.30  * Flow Area (sq ft)      *  136.49  * 1213.69  *   98.16  *
* E.G. Slope (ft/ft)      *0.000920  * Area (sq ft)           *  136.49  * 1213.69  *  295.54  *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *   73.29  * 5761.29  *   35.42  *
* Top Width (ft)          *  635.18  * Top Width (ft)         *  115.38  *  163.06  *  356.74  *
* Vel Total (ft/s)        *    4.05  * Avg. Vel. (ft/s)       *    0.54  *    4.75  *    0.36  *
* Max Chl Dpth (ft)       *   12.60  * Hydr. Depth (ft)       *    1.18  *    7.44  *    0.72  *
* Conv. Total (cfs)       *193548.3  * Conv. (cfs)            *  2416.6  *189963.8  *  1167.8  *
* Length Wtd. (ft)        * 1175.20  * Wetted Per. (ft)       *  115.65  *  167.38  *  137.00  *
* Min Ch El (ft)          *  844.60  * Shear (lb/sq ft)       *    0.07  *    0.42  *    0.04  *
* Alpha                   *    1.35  * Stream Power (lb/ft s) *    0.04  *    1.98  *    0.01  *
* Frctn Loss (ft)         *    1.00  * Cum Volume (acre-ft)   * 1108.58  * 7230.83  *  974.88  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  304.79  *  577.53  *  308.12  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  861.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.              *   0.100  *   0.042  *   0.100  *
* W.S. Elev (ft)          *  860.70  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)          *  853.83  * Flow Area (sq ft)      * 1007.96  * 1784.47  *  577.72  *
* E.G. Slope (ft/ft)      *0.000808  * Area (sq ft)           * 2250.12  * 1784.47  * 1636.36  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             * 1057.31  * 9205.97  *  636.72  *
* Top Width (ft)          * 1516.69  * Top Width (ft)         *  953.27  *  163.06  *  400.37  *
* Vel Total (ft/s)        *    3.23  * Avg. Vel. (ft/s)       *    1.05  *    5.16  *    1.10  *
* Max Chl Dpth (ft)       *   16.10  * Hydr. Depth (ft)       *    3.92  *   10.94  *    4.22  *
* Conv. Total (cfs)       *383568.8  * Conv. (cfs)            * 37206.7  *323956.1  * 22406.0  *
* Length Wtd. (ft)        * 1143.56  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)          *  844.60  * Shear (lb/sq ft)       *    0.20  *    0.54  *    0.21  *
* Alpha                   *    2.17  * Stream Power (lb/ft s) *    0.21  *    2.77  *    0.23  *
* Frctn Loss (ft)         *    0.88  * Cum Volume (acre-ft)   * 2800.97  * 9688.03  * 2808.09  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  531.07  *  621.85  *  597.83  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  861.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.36  * Wt. n-Val.              *   0.100  *   0.042  *   0.100  *
* W.S. Elev (ft)          *  861.61  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)          *  854.72  * Flow Area (sq ft)      * 1241.35  * 1932.53  *  702.12  *
* E.G. Slope (ft/ft)      *0.000793  * Area (sq ft)           * 3336.58  * 1932.53  * 2002.42  *
* Q Total (cfs)           *12600.00  * Flow (cfs)             * 1482.79  *10243.77  *  873.43  *
* Top Width (ft)          * 2096.05  * Top Width (ft)         * 1527.08  *  163.06  *  405.91  *
* Vel Total (ft/s)        *    3.25  * Avg. Vel. (ft/s)       *    1.19  *    5.30  *    1.24  *
* Max Chl Dpth (ft)       *   17.01  * Hydr. Depth (ft)       *    4.83  *   11.85  *    5.12  *
* Conv. Total (cfs)       *447363.9  * Conv. (cfs)            * 52646.7  *363705.8  * 31011.4  *
* Length Wtd. (ft)        * 1141.62  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)          *  844.60  * Shear (lb/sq ft)       *    0.24  *    0.57  *    0.25  *
* Alpha                   *    2.19  * Stream Power (lb/ft s) *    0.29  *    3.03  *    0.32  *
* Frctn Loss (ft)         *    0.86  * Cum Volume (acre-ft)   * 3855.90  *11433.39  * 4084.96  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  619.76  *  650.08  *  739.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)          *  864.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.40  * Wt. n-Val.              *   0.100  *   0.043  *   0.100  *
* W.S. Elev (ft)          *  864.53  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)          *  858.00  * Flow Area (sq ft)      * 1993.77  * 2409.87  * 1103.17  *
* E.G. Slope (ft/ft)      *0.000774  * Area (sq ft)           * 8041.31  * 2409.87  * 3220.03  *
* Q Total (cfs)           *19100.00  * Flow (cfs)             * 3225.96  *14042.17  * 1831.87  *
* Top Width (ft)          * 2290.84  * Top Width (ft)         * 1701.58  *  163.06  *  426.20  *
* Vel Total (ft/s)        *    3.47  * Avg. Vel. (ft/s)       *    1.62  *    5.83  *    1.66  *
* Max Chl Dpth (ft)       *   19.93  * Hydr. Depth (ft)       *    7.76  *   14.78  *    8.05  *
* Conv. Total (cfs)       *686615.3  * Conv. (cfs)            *115968.4  *504794.2  * 65852.8  *
* Length Wtd. (ft)        * 1150.60  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)          *  844.60  * Shear (lb/sq ft)       *    0.37  *    0.70  *    0.39  *
* Alpha                   *    2.13  * Stream Power (lb/ft s) *    0.61  *    4.05  *    0.65  *
* Frctn Loss (ft)         *    0.79  * Cum Volume (acre-ft)   * 6091.50  *13519.21  * 6722.98  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *  788.17  *  673.33  *  917.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  868.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.45  * Wt. n-Val.              *   0.100  *   0.044  *   0.100  *
* W.S. Elev (ft)          *  867.59  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)          *  859.79  * Flow Area (sq ft)      * 2778.13  * 2907.47  * 1521.24  *
* E.G. Slope (ft/ft)      *0.000767  * Area (sq ft)           *13656.58  * 2907.47  * 4555.78  *
* Q Total (cfs)           *27300.00  * Flow (cfs)             * 5582.40  *18602.15  * 3115.45  *
* Top Width (ft)          * 2560.94  * Top Width (ft)         * 1947.57  *  163.06  *  450.31  *
* Vel Total (ft/s)        *    3.79  * Avg. Vel. (ft/s)       *    2.01  *    6.40  *    2.05  *
* Max Chl Dpth (ft)       *   22.99  * Hydr. Depth (ft)       *   10.81  *   17.83  *   11.10  *
* Conv. Total (cfs)       *985849.5  * Conv. (cfs)            *201590.1  *671755.2  *112504.2  *
* Length Wtd. (ft)        * 1168.63  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)          *  844.60  * Shear (lb/sq ft)       *    0.52  *    0.83  *    0.53  *
* Alpha                   *    2.03  * Stream Power (lb/ft s) *    1.04  *    5.32  *    1.09  *
* Frctn Loss (ft)         *    0.72  * Cum Volume (acre-ft)   * 9898.14  *16554.09  *11183.08  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         * 1213.76  *  701.65  * 1396.07  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  869.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.49  * Wt. n-Val.              *   0.100  *   0.044  *   0.100  *
* W.S. Elev (ft)          *  869.43  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)          *  860.67  * Flow Area (sq ft)      * 3252.96  * 3208.70  * 1774.33  *
* E.G. Slope (ft/ft)      *0.000761  * Area (sq ft)           *17271.91  * 3208.70  * 5394.20  *
* Q Total (cfs)           *32830.00  * Flow (cfs)             * 7235.63  *21582.37  * 4012.00  *
```

```
* Top Width (ft)         * 2580.47  * Top Width (ft)         * 1959.97  *  163.06  *  457.44  *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *    2.22  *    6.73  *    2.26  *
* Max Chl Dpth (ft)      *   24.83  * Hydr. Depth (ft)       *   12.66  *   19.68  *   12.95  *
* Conv. Total (cfs)      *1189796.0  * Conv. (cfs)            *262227.4  *782169.1  *145399.3  *
* Length Wtd. (ft)       * 1177.98  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)         *  844.60  * Shear (lb/sq ft)       *    0.60  *    0.91  *    0.62  *
* Alpha                  *    1.98  * Stream Power (lb/ft s) *    1.34  *    6.13  *    1.39  *
* Frctn Loss (ft)        *    0.69  * Cum Volume (acre-ft)   *13431.26  *18400.01  *15269.43  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1521.37  *  708.79  * 1846.49  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  871.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.100  *   0.045  *   0.100  *
* W.S. Elev (ft)         *  871.28  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)         *  861.53  * Flow Area (sq ft)      * 3728.46  * 3510.36  * 2027.77  *
* E.G. Slope (ft/ft)     *0.000755  * Area (sq ft)           *20919.35  * 3510.36  * 6247.26  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 9044.37  *24715.02  * 4990.62  *
* Top Width (ft)         * 2616.13  * Top Width (ft)         * 1988.03  *  163.06  *  465.04  *
* Vel Total (ft/s)       *    4.18  * Avg. Vel. (ft/s)       *    2.43  *    7.04  *    2.46  *
* Max Chl Dpth (ft)      *   26.68  * Hydr. Depth (ft)       *   14.51  *   21.53  *   14.80  *
* Conv. Total (cfs)      *1410337.0  * Conv. (cfs)            *329176.8  *899522.4  *181637.4  *
* Length Wtd. (ft)       * 1184.38  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)         *  844.60  * Shear (lb/sq ft)       *    0.68  *    0.99  *    0.70  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    1.66  *    6.96  *    1.72  *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   *16868.96  *19714.48  *19400.23  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         * 1734.51  *  709.74  * 2290.64  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  874.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.100  *   0.045  *   0.100  *
* W.S. Elev (ft)         *  873.46  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)         *  862.53  * Flow Area (sq ft)      * 4288.47  * 3865.63  * 2326.27  *
* E.G. Slope (ft/ft)     *0.000763  * Area (sq ft)           *25372.19  * 3865.63  * 7268.06  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *11484.32  *28906.21  * 6309.47  *
* Top Width (ft)         * 2773.86  * Top Width (ft)         * 2139.23  *  163.06  *  471.57  *
* Vel Total (ft/s)       *    4.46  * Avg. Vel. (ft/s)       *    2.68  *    7.48  *    2.71  *
* Max Chl Dpth (ft)      *   28.86  * Hydr. Depth (ft)       *   16.68  *   23.71  *   16.98  *
* Conv. Total (cfs)      *1690165.0  * Conv. (cfs)            *415640.2  *1046172.0  *228352.1  *
* Length Wtd. (ft)       * 1194.50  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)         *  844.60  * Shear (lb/sq ft)       *    0.79  *    1.10  *    0.81  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    2.13  *    8.23  *    2.19  *
* Frctn Loss (ft)        *    0.64  * Cum Volume (acre-ft)   *22977.24  *21641.43  *26346.19  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         * 2060.18  *  712.16  * 2716.07  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  865.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.100  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  864.94  * Reach Len. (ft)        * 1666.67  * 1181.00  *  620.24  *
* Crit W.S. (ft)         *  858.36  * Flow Area (sq ft)      * 2098.02  * 2476.00  * 1158.73  *
* E.G. Slope (ft/ft)     *0.000772  * Area (sq ft)           * 8737.72  * 2476.00  * 3393.48  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 3507.09  *14607.45  * 1985.46  *
* Top Width (ft)         * 2324.42  * Top Width (ft)         * 1732.25  *  163.06  *  429.11  *
* Vel Total (ft/s)       *    3.51  * Avg. Vel. (ft/s)       *    1.67  *    5.90  *    1.71  *
* Max Chl Dpth (ft)      *   20.34  * Hydr. Depth (ft)       *    8.16  *   15.18  *    8.46  *
* Conv. Total (cfs)      *723566.3  * Conv. (cfs)            *126249.4  *525843.7  * 71473.2  *
* Length Wtd. (ft)       * 1152.89  * Wetted Per. (ft)       *  257.44  *  167.38  *  137.00  *
* Min Ch El (ft)         *  844.60  * Shear (lb/sq ft)       *    0.39  *    0.71  *    0.41  *
* Alpha                  *    2.12  * Stream Power (lb/ft s) *    0.66  *    4.20  *    0.70  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   * 7002.87  *14478.58  * 7781.82  *
```

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* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  891.09  *  683.65  *  999.61  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 29.990

INPUT
Description: Upstream side of Route 150
Station Elevation Data    num=     326
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  940.55    4.67  940.23    5.32  940.18    7.45  939.96   30.45   938.6
    33.4  938.35   76.64  935.27   77.07  935.28   77.67   935.3   86.57  936.13
  120.13  934.95  137.88  934.04  163.44  932.97  168.66  932.64  178.67  931.41
   188.2   930.8  195.34  930.38  242.69  928.31  248.25  927.85  266.91  926.03
  297.26  923.07  299.33  922.95  315.97  921.73  338.48  919.97  390.37  916.51
  406.69  915.79  418.53  914.99  431.14  914.47  487.75  912.27  515.38     911
   556.5  908.86  568.65  908.07  581.61  907.45  598.43  906.54   603.3  906.38
  620.52  905.66  632.08  905.24  642.84     905  650.84  904.51  656.64  903.85
   681.4   902.6  695.16  902.18  705.76  901.81  727.45  900.47  728.79  900.25
  730.23  900.05  731.18  899.92  751.18  896.63  761.11  895.64  772.95  894.61
  780.01  894.03  794.41  892.52   797.3  892.71  807.27  893.29  812.86  892.06
  825.18  891.84  830.17   891.8  833.47  891.73  844.04  893.57  850.33  894.07
  865.39  894.39  865.95   894.4  866.22   894.4  886.27  894.47   906.4  894.95
  910.53  895.15  925.07  896.36  933.18  897.38  959.09  898.21 1016.16  896.75
 1025.89  896.58 1040.31  896.22  1056.2   896.1 1061.38  895.97 1068.75  895.79
 1079.19   895.6 1101.52  895.32 1107.02  895.26  1124.6  895.21 1141.66     895
 1156.88  894.54 1163.86  894.46 1194.75  894.26 1202.98  892.52  1204.6  892.15
 1215.48  891.89 1218.29  891.83 1218.94  891.88  1224.6  892.28 1231.61  893.24
 1259.53  893.54 1272.81  893.82 1282.55  893.85 1286.49  893.92 1300.56  894.19
 1312.99  894.36 1322.24  894.47 1336.24  894.57 1346.97  894.79 1353.32  894.65
 1361.45  894.64 1398.51  894.17 1411.96  894.03 1422.52     894 1470.29  894.13
 1475.53  894.14 1490.78  893.92 1507.13  891.12 1512.47  890.61  1517.4     892
 1525.15  894.37 1527.35  894.99 1536.08  895.05 1541.39  895.05  1543.7  894.99
 1554.67  894.68 1586.22  893.83 1600.57  892.52 1604.75  892.21  1609.3   891.9
 1623.27  890.92 1627.84  889.46 1642.13  888.39 1646.54  888.22 1651.93  887.88
 1655.09  887.67 1674.13  887.74 1683.38  887.53 1685.76  886.98 1693.09  886.04
 1717.82  884.46 1729.88   883.7 1747.62  882.67 1763.06  882.03 1768.25  881.92
 1787.29  881.26 1802.33   881.1 1805.04  880.97 1812.88  880.94 1814.33  880.94
  1819.8  880.84 1841.59  879.76 1847.02  879.47 1855.59  879.03  1870.7  878.24
 1872.65  878.23 1875.79  878.26 1885.41   878.3 1891.43   878.4 1913.65  879.35
 1919.03  879.53 1934.48  880.17 1945.02  880.89 1945.65  880.92 1946.24  880.94
  1960.6  881.59 1967.22  881.83 1986.35  882.76 1988.95  882.82 1995.09  883.06
 2007.56  882.81 2025.71   882.2 2029.06  882.14 2043.28  881.37 2054.12  880.72
 2061.16  879.99 2081.91  876.65 2085.92  875.93 2106.72  871.97 2114.64  870.36
 2116.64  869.51 2120.87   867.6  2123.5  867.37 2130.57  867.21 2149.84  867.01
 2161.88  868.58  2168.5  869.58 2184.57  869.51 2191.89  869.47 2204.67   867.8
 2205.12  867.75 2205.66  867.53 2213.53  864.36 2215.97   864.2 2236.11  863.12
 2307.94  861.62 2443.75  860.21 2465.45  859.94 2472.46   859.9 2533.08  859.29
 2578.09  858.83 2581.09  858.89 2596.02  859.26 2604.29  858.33  2625.7  857.98
 2628.44  857.88 2633.55  857.71 2640.53  857.58 2656.59  857.32 2664.94  857.29
 2666.89  857.46 2676.04  858.26 2684.26  858.99 2686.22  859.15 2705.37  844.79
 2705.69  844.57  2705.8  844.57    2710     843    2735     842    2760     843
 2764.67  844.57 2767.93   845.7 2780.27  849.68 2780.93   849.8  2792.5  850.04
 2805.48  850.68 2828.34  851.53 2832.91  851.68 2836.92   852.2 2854.65  854.37
 2901.36  855.25 2914.75  855.56 2917.86   855.7 2925.29  856.09 2939.14  856.07
 2979.08     856 2986.13     856 2991.56  855.39 2996.45  854.81 3002.92  854.03
 3010.72  855.38 3012.37  855.69  3017.6   855.7 3061.68  855.47 3067.41  855.29
 3076.72  855.24  3144.8  854.59 3151.73  854.57 3173.51  854.54 3183.34  855.33
 3191.78  855.31 3206.49  855.03 3212.02     855  3245.9   855.1 3265.17  855.39
 3296.99  855.12 3304.56  855.11 3311.14  855.19 3319.91  855.25 3326.89  855.22
 3410.34  856.25 3414.86  856.22 3418.05  856.28 3438.64   856.4 3442.27  856.26
 3449.36  856.27 3514.58  856.24 3534.89  856.52 3544.76  856.57 3554.77  856.79
 3564.09  856.92 3567.92  856.98 3572.03  857.06 3599.29  860.25 3599.52  860.28
 3612.59  863.48 3617.32  864.02 3622.03  864.36 3630.13  865.57  3639.3  866.29
    3640  866.42 3641.02  866.57 3642.17  866.75  3649.9  868.16 3658.85  869.88
 3661.02   870.3 3668.01  871.19 3671.03   871.7 3678.35  872.54 3684.32   873.6
 3691.05  874.49  3699.2  875.29 3704.61  875.84 3708.21  875.98 3715.33  877.63
 3719.56  878.25 3732.37  879.97 3733.99  880.25 3742.88   881.7 3754.56  883.31
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 3757.21  883.69 3774.84  886.02 3789.83  888.03 3799.92  889.48 3810.55  891.14
 3832.77  892.34 3844.34  894.53 3850.45  895.29 3855.12  895.63 3878.37  897.85
 3884.67  898.28 3889.58  898.27 3941.24  906.55 3943.25  906.69 3945.12  906.85
 3945.41  907.03 3947.03  907.09 3961.26  909.65 3976.54  909.74 3996.98  909.86
 4017.69  909.82 4028.86  909.86 4050.11  909.78 4053.43  909.79  4066.1  909.73
 4098.78  909.37 4112.67   909.2 4138.79  908.91  4173.2  908.85 4186.74  908.74
 4209.96   908.5 4216.72  908.46 4240.81   908.2 4273.65  908.29 4277.01  908.27
  4289.9  908.31

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 2472.46      .1 2686.22     .04 2780.93      .1 3554.77     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2684.26 2854.65              174     174     174             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 3206.46  4289.9   877.8       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  856.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.045  *   0.100  *
* W.S. Elev (ft)         *  856.26  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  849.32  * Flow Area (sq ft)      *          * 1396.98  *  355.79  *
* E.G. Slope (ft/ft)     *0.000790  * Area (sq ft)           *          * 1396.98  *  532.17  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *          * 5720.42  *  149.58  *
* Top Width (ft)         *  774.81  * Top Width (ft)         *          *  164.58  *  610.23  *
* Vel Total (ft/s)       *    3.35  * Avg. Vel. (ft/s)       *          *    4.09  *    0.42  *
* Max Chl Dpth (ft)      *   14.26  * Hydr. Depth (ft)       *          *    8.49  *    1.01  *
* Conv. Total (cfs)      *208910.0  * Conv. (cfs)             *          *203586.7  *  5323.3  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *          *  170.08  *  352.14  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)       *          *    0.40  *    0.05  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *          *    1.66  *    0.02  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1105.96  * 7195.44  *  968.99  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  302.58  *  573.08  *  301.24  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  860.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.100  *   0.047  *   0.100  *
* W.S. Elev (ft)         *  859.88  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  852.58  * Flow Area (sq ft)      *  241.24  * 2002.75  * 1629.41  *
* E.G. Slope (ft/ft)     *0.000738  * Area (sq ft)           *  241.24  * 2002.75  * 3140.49  *
* Q Total (cfs)          *10900.00  * Flow (cfs)              *  106.81  * 8966.35  * 1826.84  *
* Top Width (ft)         * 1121.80  * Top Width (ft)         *  209.93  *  170.39  *  741.49  *
* Vel Total (ft/s)       *    2.81  * Avg. Vel. (ft/s)       *    0.44  *    4.48  *    1.12  *
* Max Chl Dpth (ft)      *   17.88  * Hydr. Depth (ft)       *    1.15  *   11.75  *    4.63  *
* Conv. Total (cfs)      *401141.5  * Conv. (cfs)             *  3931.0  *329979.3  * 67231.2  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *  210.07  *  176.86  *  352.14  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)       *    0.05  *    0.52  *    0.21  *
* Alpha                  *    2.11  * Stream Power (lb/ft s) *    0.02  *    2.34  *    0.24  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2753.31  * 9636.69  * 2774.08  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  508.82  *  617.33  *  589.71  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  861.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.098  *   0.047  *   0.100  *
* W.S. Elev (ft)         *  860.82  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  853.21  * Flow Area (sq ft)      *  480.83  * 2162.92  * 1960.13  *
* E.G. Slope (ft/ft)     *0.000712  * Area (sq ft)           *  480.83  * 2162.92  * 3840.64  *
* Q Total (cfs)          *12600.00  * Flow (cfs)              *  300.22  * 9859.08  * 2440.69  *
* Top Width (ft)         * 1216.85  * Top Width (ft)         *  299.38  *  170.39  *  747.08  *
* Vel Total (ft/s)       *    2.74  * Avg. Vel. (ft/s)       *    0.62  *    4.56  *    1.25  *
* Max Chl Dpth (ft)      *   18.82  * Hydr. Depth (ft)       *    1.61  *   12.69  *    5.57  *
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* Conv. Total (cfs)      *472266.6  * Conv. (cfs)            * 11252.8  *369533.0  * 91480.8  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *  299.54  *  176.86  *  352.14  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)        *    0.07  *    0.54  *    0.25  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    0.04  *    2.48  *    0.31  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 3782.87  *11377.88  * 4043.36  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  584.82  *  645.56  *  731.05  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  864.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.              *   0.085  *   0.049  *   0.100  *
* W.S. Elev (ft)         *  863.86  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  855.90  * Flow Area (sq ft)      * 1707.61  * 2681.37  * 3030.59  *
* E.G. Slope (ft/ft)     *0.000607  * Area (sq ft)           * 1707.61  * 2681.37  * 6133.05  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 1876.91  *12564.72  * 4658.37  *
* Top Width (ft)         * 1393.72  * Top Width (ft)         *  462.02  *  170.39  *  761.30  *
* Vel Total (ft/s)       *    2.57  * Avg. Vel. (ft/s)       *    1.10  *    4.69  *    1.54  *
* Max Chl Dpth (ft)      *   21.86  * Hydr. Depth (ft)       *    3.70  *   15.74  *    8.61  *
* Conv. Total (cfs)      *775413.3  * Conv. (cfs)            * 76198.1  *510096.8  *189118.4  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *  462.22  *  176.86  *  352.14  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)        *    0.14  *    0.57  *    0.33  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.15  *    2.69  *    0.50  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 5904.99  *13450.20  * 6656.39  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  746.78  *  668.81  *  909.30  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  867.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.              *   0.080  *   0.050  *   0.100  *
* W.S. Elev (ft)         *  867.04  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  858.05  * Flow Area (sq ft)      * 3207.24  * 3221.71  * 4146.26  *
* E.G. Slope (ft/ft)     *0.000507  * Area (sq ft)           * 3207.24  * 3221.71  * 8593.51  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4910.22  *15212.90  * 7176.88  *
* Top Width (ft)         * 1439.46  * Top Width (ft)         *  479.99  *  170.39  *  789.08  *
* Vel Total (ft/s)       *    2.58  * Avg. Vel. (ft/s)       *    1.53  *    4.72  *    1.73  *
* Max Chl Dpth (ft)      *   25.04  * Hydr. Depth (ft)       *    6.68  *   18.91  *   11.79  *
* Conv. Total (cfs)      *1212945.0  * Conv. (cfs)            *218162.1  *675912.5  *318870.5  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *  480.71  *  176.86  *  352.14  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)        *    0.21  *    0.58  *    0.37  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *    0.32  *    2.72  *    0.64  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 9575.52  *16471.00  *11089.46  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1167.32  *  697.13  * 1387.25  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  869.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.              *   0.078  *   0.050  *   0.100  *
* W.S. Elev (ft)         *  868.94  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  859.06  * Flow Area (sq ft)      * 4194.33  * 3547.11  * 4818.12  *
* E.G. Slope (ft/ft)     *0.000462  * Area (sq ft)           * 4194.33  * 3547.11  *10110.36  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 7154.27  *16871.19  * 8804.54  *
* Top Width (ft)         * 1504.48  * Top Width (ft)         *  534.76  *  170.39  *  799.33  *
* Vel Total (ft/s)       *    2.61  * Avg. Vel. (ft/s)       *    1.71  *    4.76  *    1.83  *
* Max Chl Dpth (ft)      *   26.94  * Hydr. Depth (ft)       *    7.84  *   20.82  *   13.70  *
* Conv. Total (cfs)      *1527147.0  * Conv. (cfs)            *332793.7  *784794.0  *409559.0  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *  536.13  *  176.86  *  352.14  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)        *    0.23  *    0.58  *    0.39  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.39  *    2.75  *    0.72  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *13020.59  *18308.43  *15159.05  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1473.64  *  704.27  * 1837.54  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	871.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.078	0.050	0.100
W.S. Elev (ft)	870.85	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	860.05	Flow Area (sq ft)	5258.92	3870.88	5486.61
E.G. Slope (ft/ft)	0.000432	Area (sq ft)	5258.92	3870.88	11638.99
Q Total (cfs)	38750.00	Flow (cfs)	9467.87	18706.58	10575.55
Top Width (ft)	1553.05	Top Width (ft)	572.01	170.39	810.65
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)	1.80	4.83	1.93
Max Chl Dpth (ft)	28.85	Hydr. Depth (ft)	9.19	22.72	15.60
Conv. Total (cfs)	1863501.0	Conv. (cfs)	455313.1	899605.7	508581.8
Length Wtd. (ft)	20.00	Wetted Per. (ft)	573.81	176.86	352.14
Min Ch El (ft)	842.00	Shear (lb/sq ft)	0.25	0.59	0.42
Alpha	1.86	Stream Power (lb/ft s)	0.45	2.86	0.81
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	16368.15	19614.42	19272.89
C & E Loss (ft)	0.00	Cum SA (acres)	1685.54	705.22	2281.56

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	873.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.076	0.051	0.100
W.S. Elev (ft)	873.08	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	861.15	Flow Area (sq ft)	6551.93	4252.31	6274.17
E.G. Slope (ft/ft)	0.000401	Area (sq ft)	6551.93	4252.31	13472.13
Q Total (cfs)	46700.00	Flow (cfs)	13095.35	20874.82	12729.84
Top Width (ft)	1580.54	Top Width (ft)	583.39	170.39	826.76
Vel Total (ft/s)	2.73	Avg. Vel. (ft/s)	2.00	4.91	2.03
Max Chl Dpth (ft)	31.08	Hydr. Depth (ft)	11.23	24.96	17.83
Conv. Total (cfs)	2333145.0	Conv. (cfs)	654247.1	1042911.0	635986.1
Length Wtd. (ft)	20.00	Wetted Per. (ft)	585.41	176.86	352.14
Min Ch El (ft)	842.00	Shear (lb/sq ft)	0.28	0.60	0.45
Alpha	1.74	Stream Power (lb/ft s)	0.56	2.95	0.90
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	22366.51	21531.38	26198.53
C & E Loss (ft)	0.00	Cum SA (acres)	2008.09	707.64	2706.83

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	864.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.084	0.049	0.100
W.S. Elev (ft)	864.29	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	856.00	Flow Area (sq ft)	1904.78	2753.48	3179.47
E.G. Slope (ft/ft)	0.000591	Area (sq ft)	1904.78	2753.48	6456.17
Q Total (cfs)	20100.00	Flow (cfs)	2208.63	12911.35	4980.02
Top Width (ft)	1406.38	Top Width (ft)	469.62	170.39	766.37
Vel Total (ft/s)	2.56	Avg. Vel. (ft/s)	1.16	4.69	1.57
Max Chl Dpth (ft)	22.29	Hydr. Depth (ft)	4.06	16.16	9.04
Conv. Total (cfs)	826816.3	Conv. (cfs)	90852.1	531110.3	204854.0
Length Wtd. (ft)	20.00	Wetted Per. (ft)	469.82	176.86	352.14
Min Ch El (ft)	842.00	Shear (lb/sq ft)	0.15	0.57	0.33
Alpha	2.26	Stream Power (lb/ft s)	0.17	2.69	0.52
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	6799.27	14407.69	7711.70
C & E Loss (ft)	0.00	Cum SA (acres)	848.97	679.13	991.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 29.973

INPUT

Description: Hwy 150
Distance from Upstream XS = 20
Deck/Roadway Width = 135
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
600	905	840	1350	902	840	1700	898	840
2025	900	840	2025.1	900	893	3631	907.7	900.7
3631.1	907.7	840	4000	909.5	840			

Upstream Bridge Cross Section Data
Station Elevation Data num= 326

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	940.55	4.67	940.23	5.32	940.18	7.45	939.96	30.45	938.6
33.4	938.35	76.64	935.27	77.07	935.28	77.67	935.3	86.57	936.13
120.13	934.95	137.88	934.04	163.44	932.97	168.66	932.64	178.67	931.41
188.2	930.8	195.34	930.38	242.69	928.31	248.25	927.85	266.91	926.03
297.26	923.07	299.33	922.95	315.97	921.73	338.48	919.97	390.37	916.51
406.69	915.79	418.53	914.99	431.14	914.47	487.75	912.27	515.38	911
556.5	908.86	568.65	908.07	581.61	907.45	598.43	906.54	603.3	906.38
620.52	905.66	632.08	905.24	642.84	905	650.84	904.51	656.64	903.85
681.4	902.6	695.16	902.18	705.76	901.81	727.45	900.47	728.79	900.25
730.23	900.05	731.18	899.92	751.18	896.63	761.11	895.64	772.95	894.61
780.01	894.03	794.41	892.52	797.3	892.71	807.27	893.29	812.86	892.06
825.18	891.84	830.17	891.8	833.47	891.73	844.04	893.57	850.33	894.07
865.39	894.39	865.95	894.4	866.22	894.4	886.27	894.47	906.4	894.95
910.53	895.15	925.07	896.36	933.18	897.38	959.09	898.21	1016.16	896.75
1025.89	896.58	1040.31	896.22	1056.2	896.1	1061.38	895.97	1068.75	895.79
1079.19	895.6	1101.52	895.32	1107.02	895.26	1124.6	895.21	1141.66	895
1156.88	894.54	1163.86	894.46	1194.75	894.26	1202.98	892.52	1204.6	892.15
1215.48	891.89	1218.29	891.83	1218.94	891.88	1224.6	892.28	1231.61	893.24
1259.53	893.54	1272.81	893.82	1282.55	893.85	1286.49	893.92	1300.56	894.19
1312.99	894.36	1322.24	894.47	1336.24	894.57	1346.97	894.79	1353.32	894.65
1361.45	894.64	1398.51	894.17	1411.96	894.03	1422.52	894	1470.29	894.13
1475.53	894.14	1490.78	893.92	1507.13	891.12	1512.47	890.61	1517.4	892
1525.15	894.37	1527.35	894.99	1536.08	895.05	1541.39	895.05	1543.7	894.99
1554.67	894.68	1586.22	893.83	1600.57	892.52	1604.75	892.21	1609.3	891.9
1623.27	890.92	1627.84	889.46	1642.13	888.39	1646.54	888.22	1651.93	887.88
1655.09	887.67	1674.13	887.74	1683.38	887.53	1685.76	886.98	1693.09	886.04
1717.82	884.46	1729.88	883.7	1747.62	882.67	1763.06	882.03	1768.25	881.92
1787.29	881.26	1802.33	881.1	1805.04	880.97	1812.88	880.94	1814.33	880.94
1819.8	880.84	1841.59	879.76	1847.02	879.47	1855.59	879.03	1870.7	878.24
1872.65	878.23	1875.79	878.26	1885.41	878.3	1891.43	878.4	1913.65	879.35
1919.03	879.53	1934.48	880.17	1945.02	880.89	1945.65	880.92	1946.24	880.94
1960.6	881.59	1967.22	881.83	1986.35	882.76	1988.95	882.82	1995.09	883.06
2007.56	882.81	2025.71	882.2	2029.06	882.14	2043.28	881.37	2054.12	880.72
2061.16	879.99	2081.91	876.65	2085.92	875.93	2106.72	871.97	2114.64	870.36
2116.64	869.51	2120.87	867.6	2123.5	867.37	2130.57	867.21	2149.84	867.01
2161.88	868.58	2168.5	869.58	2184.57	869.51	2191.89	869.47	2204.67	867.8
2205.12	867.75	2205.66	867.53	2213.53	864.36	2215.97	864.2	2236.11	863.12
2307.94	861.62	2443.75	860.21	2465.45	859.94	2472.46	859.9	2533.08	859.29
2578.09	858.83	2581.09	858.89	2596.02	859.26	2604.29	858.33	2625.7	857.98
2628.44	857.88	2633.55	857.71	2640.53	857.58	2656.59	857.32	2664.94	857.29
2666.89	857.46	2676.04	858.26	2684.26	858.99	2686.22	859.15	2705.37	844.79
2705.69	844.57	2705.8	844.57	2710	843	2735	842	2760	843
2764.67	844.57	2767.93	845.7	2780.27	849.68	2780.93	849.8	2792.5	850.04
2805.48	850.68	2828.34	851.53	2832.91	851.68	2836.92	852.2	2854.65	854.37
2901.36	855.25	2914.75	855.56	2917.86	855.7	2925.29	856.09	2939.14	856.07
2979.08	856	2986.13	856	2991.56	855.39	2996.45	854.81	3002.92	854.03
3010.72	855.38	3012.37	855.69	3017.6	855.7	3061.68	855.47	3067.41	855.29
3076.72	855.24	3144.8	854.59	3151.73	854.57	3173.51	854.54	3183.34	855.33
3191.78	855.31	3206.49	855.03	3212.02	855	3245.9	855.1	3265.17	855.39
3296.99	855.12	3304.56	855.11	3311.14	855.19	3319.91	855.25	3326.89	855.22
3410.34	856.25	3414.86	856.22	3418.05	856.28	3438.64	856.4	3442.27	856.26
3449.36	856.27	3514.58	856.24	3534.89	856.52	3544.76	856.57	3554.77	856.79
3564.09	856.92	3567.92	856.98	3572.03	857.06	3599.29	860.25	3599.52	860.28
3612.59	863.48	3617.32	864.02	3622.03	864.36	3630.13	865.57	3639.3	866.29
3640	866.42	3641.02	866.57	3642.17	866.75	3649.9	868.16	3658.85	869.88
3661.02	870.3	3668.01	871.19	3671.03	871.7	3678.35	872.54	3684.32	873.6
3691.05	874.49	3699.2	875.29	3704.61	875.84	3708.21	875.98	3715.33	877.63
3719.56	878.25	3732.37	879.97	3733.99	880.25	3742.88	881.7	3754.56	883.31
3757.21	883.69	3774.84	886.02	3789.83	888.03	3799.92	889.48	3810.55	891.14
3832.77	892.34	3844.34	894.53	3850.45	895.29	3855.12	895.63	3878.37	897.85

3884.67	898.28	3889.58	898.27	3941.24	906.55	3943.25	906.69	3945.12	906.85
3945.41	907.03	3947.03	907.09	3961.26	909.65	3976.54	909.74	3996.98	909.86
4017.69	909.82	4028.86	909.86	4050.11	909.78	4053.43	909.79	4066.1	909.73
4098.78	909.37	4112.67	909.2	4138.79	908.91	4173.2	908.85	4186.74	908.74
4209.96	908.5	4216.72	908.46	4240.81	908.2	4273.65	908.29	4277.01	908.27
4289.9	908.31								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2472.46	.1	2686.22	.04	2780.93	.1	3554.77	.06

Bank Sta: Left Right Coeff Contr. Expan.
2684.26 2854.65 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
3206.46	4289.9	877.8	F

Downstream Deck/Roadway Coordinates
num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
600	905	840	1350	902	840	1700	898	840
2025	900	840	2025.1	900	893	3631	907.7	900.7
3631.1	907.7	840	4000	909.5	840			

Downstream Bridge Cross Section Data
Station Elevation Data num= 326

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	940.55	4.67	940.23	5.32	940.18	7.45	939.96	30.45	938.6
33.4	938.35	76.64	935.27	77.07	935.28	77.67	935.3	86.57	936.13
120.13	934.95	137.88	934.04	163.44	932.97	168.66	932.64	178.67	931.41
188.2	930.8	195.34	930.38	242.69	928.31	248.25	927.85	266.91	926.03
297.26	923.07	299.33	922.95	315.97	921.73	338.48	919.97	390.37	916.51
406.69	915.79	418.53	914.99	431.14	914.47	487.75	912.27	515.38	911
556.5	908.86	568.65	908.07	581.61	907.45	598.43	906.54	603.3	906.38
620.52	905.66	632.08	905.24	642.84	905	650.84	904.51	656.64	903.85
681.4	902.6	695.16	902.18	705.76	901.81	727.45	900.47	728.79	900.25
730.23	900.05	731.18	899.92	751.18	896.63	761.11	895.64	772.95	894.61
780.01	894.03	794.41	892.52	797.3	892.71	807.27	893.29	812.86	892.06
825.18	891.84	830.17	891.8	833.47	891.73	844.04	893.57	850.33	894.07
865.39	894.39	865.95	894.4	866.22	894.4	886.27	894.47	906.4	894.95
910.53	895.15	925.07	896.36	933.18	897.38	959.09	898.21	1016.16	896.75
1025.89	896.58	1040.31	896.22	1056.2	896.1	1061.38	895.97	1068.75	895.79
1079.19	895.6	1101.52	895.32	1107.02	895.26	1124.6	895.21	1141.66	895
1156.88	894.54	1163.86	894.46	1194.75	894.26	1202.98	892.52	1204.6	892.15
1215.48	891.89	1218.29	891.83	1218.94	891.88	1224.6	892.28	1231.61	893.24
1259.53	893.54	1272.81	893.82	1282.55	893.85	1286.49	893.92	1300.56	894.19
1312.99	894.36	1322.24	894.47	1336.24	894.57	1346.97	894.79	1353.32	894.65
1361.45	894.64	1398.51	894.17	1411.96	894.03	1422.52	894	1470.29	894.13
1475.53	894.14	1490.78	893.92	1507.13	891.12	1512.47	890.61	1517.4	892
1525.15	894.37	1527.35	894.99	1536.08	895.05	1541.39	895.05	1543.7	894.99
1554.67	894.68	1586.22	893.83	1600.57	892.52	1604.75	892.21	1609.3	891.9
1623.27	890.92	1627.84	889.46	1642.13	888.39	1646.54	888.22	1651.93	887.88
1655.09	887.67	1674.13	887.74	1683.38	887.53	1685.76	886.98	1693.09	886.04
1717.82	884.46	1729.88	883.7	1747.62	882.67	1763.06	882.03	1768.25	881.92
1787.29	881.26	1802.33	881.1	1805.04	880.97	1812.88	880.94	1814.33	880.94
1819.8	880.84	1841.59	879.76	1847.02	879.47	1855.59	879.03	1870.7	878.24
1872.65	878.23	1875.79	878.26	1885.41	878.3	1891.43	878.4	1913.65	879.35
1919.03	879.53	1934.48	880.17	1945.02	880.89	1945.65	880.92	1946.24	880.94
1960.6	881.59	1967.22	881.83	1986.35	882.76	1988.95	882.82	1995.09	883.06
2007.56	882.81	2025.71	882.2	2029.06	882.14	2043.28	881.37	2054.12	880.72
2061.16	879.99	2081.91	876.65	2085.92	875.93	2106.72	871.97	2114.64	870.36
2116.64	869.51	2120.87	867.6	2123.5	867.37	2130.57	867.21	2149.84	867.01
2161.88	868.58	2168.5	869.58	2184.57	869.51	2191.89	869.47	2204.67	867.8
2205.12	867.75	2205.66	867.53	2213.53	864.36	2215.97	864.2	2236.11	863.12
2307.94	861.62	2443.75	860.21	2465.45	859.94	2472.46	859.9	2533.08	859.29
2578.09	858.83	2581.09	858.89	2596.02	859.26	2604.29	858.33	2625.7	857.98
2628.44	857.88	2633.55	857.71	2640.53	857.58	2656.59	857.32	2664.94	857.29
2666.89	857.46	2676.04	858.26	2684.26	858.99	2686.22	859.15	2705.37	844.79
2705.69	844.57	2705.8	844.57	2710	843	2735	842	2760	843
2764.67	844.57	2767.93	845.7	2780.27	849.68	2780.93	849.8	2792.5	850.04
2805.48	850.68	2828.34	851.53	2832.91	851.68	2836.92	852.2	2854.65	854.37
2901.36	855.25	2914.75	855.56	2917.86	855.7	2925.29	856.09	2939.14	856.07
2979.08	856	2986.13	856	2991.56	855.39	2996.45	854.81	3002.92	854.03

```
 3010.72  855.38 3012.37  855.69  3017.6   855.7 3061.68  855.47 3067.41  855.29
 3076.72  855.24  3144.8  854.59 3151.73  854.57 3173.51  854.54 3183.34  855.33
 3191.78  855.31 3206.49  855.03 3212.02     855  3245.9   855.1 3265.17  855.39
 3296.99  855.12 3304.56  855.11 3311.14  855.19 3319.91  855.25 3326.89  855.22
 3410.34  856.25 3414.86  856.22 3418.05  856.28 3438.64   856.4 3442.27  856.26
 3449.36  856.27 3514.58  856.24 3534.89  856.52 3544.76  856.57 3554.77  856.79
 3564.09  856.92 3567.92  856.98 3572.03  857.06 3599.29  860.25 3599.52  860.28
 3612.59  863.48 3617.32  864.02 3622.03  864.36 3630.13  865.57  3639.3  866.29
    3640  866.42 3641.02  866.57 3642.17  866.75  3649.9  868.16 3658.85  869.88
 3661.02   870.3 3668.01  871.19 3671.03   871.7 3678.35  872.54 3684.32   873.6
 3691.05  874.49  3699.2  875.29 3704.61  875.84 3708.21  875.98 3715.33  877.63
 3719.56  878.25 3732.37  879.97 3733.99  880.25 3742.88   881.7 3754.56  883.31
 3757.21  883.69 3774.84  886.02 3789.83  888.03 3799.92  889.48 3810.55  891.14
 3832.77  892.34 3844.34  894.53 3850.45  895.29 3855.12  895.63 3878.37  897.85
 3884.67  898.28 3889.58  898.27 3941.24  906.55 3943.25  906.69 3945.12  906.85
 3945.41  907.03 3947.03  907.09 3961.26  909.65 3976.54  909.74 3996.98  909.86
 4017.69  909.82 4028.86  909.86 4050.11  909.78 4053.43  909.79  4066.1  909.73
 4098.78  909.37 4112.67   909.2 4138.79  908.91  4173.2  908.85 4186.74  908.74
 4209.96   908.5 4216.72  908.46 4240.81   908.2 4273.65  908.29 4277.01  908.27
  4289.9  908.31

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 2472.46      .1 2686.22     .04 2780.93      .1 3554.77     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2684.26 2854.65             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 3265.17  4289.9  879.02       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  15

Pier Data
Pier Station     Upstream=    2088    Downstream=    2088
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    2178    Downstream=    2178
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    2262    Downstream=    2262
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     840       3     900

Pier Data
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```
Pier Station     Upstream=    2346    Downstream=    2346
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    2456    Downstream=    2456
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    2566    Downstream=    2566
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    2676    Downstream=    2676
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    2786    Downstream=    2786
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    2896    Downstream=    2896
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    3006    Downstream=    3006
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
```

```
Pier Data
Pier Station     Upstream=    3116    Downstream=    3116
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    3226    Downstream=    3226
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    3336    Downstream=    3336
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    3446    Downstream=    3446
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Pier Data
Pier Station     Upstream=    3556    Downstream=    3556
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     840       3     900

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. US. (ft)          *     856.51  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     856.26  * E.G. Elev (ft)         *     856.50  *     856.39  *
* Q Total (cfs)          *    5870.00  * W.S. Elev (ft)         *     856.24  *     856.12  *
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* Q Bridge (cfs)         *    5870.00  * Crit W.S. (ft)         *     849.33  *     849.33  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      14.24  *      14.12  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.44  *       3.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1708.62  *    1704.02  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    8259.10  *    8096.94  *
* Min El Weir Flow (ft)  *     898.01  * Hydr Depth (ft)        *       3.39  *       3.04  *
* Min El Prs (ft)        *     900.70  * W.P. Total (ft)        *     531.05  *     587.76  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *   205666.7  *   202030.3  *
* Delta WS (ft)          *       0.16  * Top Width (ft)         *     704.44  *     691.25  *
* BR Open Area (sq ft)   *   60112.79  * Frctn Loss (ft)        *       0.11  *       0.02  *
* BR Open Vel (ft/s)     *       3.44  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.16  *       0.15  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.56  *       0.53  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     860.14  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     859.88  * E.G. Elev (ft)         *     860.12  *     860.01  *
* Q Total (cfs)          *   10900.00  * W.S. Elev (ft)         *     859.85  *     859.75  *
* Q Bridge (cfs)         *   10900.00  * Crit W.S. (ft)         *     852.59  *     852.59  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      17.85  *      17.75  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.89  *       2.76  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3766.87  *    3955.50  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   18533.78  *   18728.69  *
* Min El Weir Flow (ft)  *     898.01  * Hydr Depth (ft)        *       5.30  *       5.23  *
* Min El Prs (ft)        *     900.70  * W.P. Total (ft)        *     772.49  *     826.64  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *   386545.8  *   389679.5  *
* Delta WS (ft)          *       0.14  * Top Width (ft)         *    1088.21  *    1077.57  *
* BR Open Area (sq ft)   *   60112.79  * Frctn Loss (ft)        *       0.11  *       0.01  *
* BR Open Vel (ft/s)     *       2.89  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.24  *       0.23  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.70  *       0.64  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     861.08  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     860.82  * E.G. Elev (ft)         *     861.06  *     860.95  *
* Q Total (cfs)          *   12600.00  * W.S. Elev (ft)         *     860.79  *     860.69  *
* Q Bridge (cfs)         *   12600.00  * Crit W.S. (ft)         *     853.22  *     853.22  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      18.79  *      18.69  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.82  *       2.68  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4473.03  *    4709.57  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   22588.25  *   22989.31  *
* Min El Weir Flow (ft)  *     898.01  * Hydr Depth (ft)        *       5.61  *       5.58  *
* Min El Prs (ft)        *     900.70  * W.P. Total (ft)        *     871.48  *     928.17  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *   451938.8  *   457770.5  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *    1180.22  *    1170.83  *
* BR Open Area (sq ft)   *   60112.79  * Frctn Loss (ft)        *       0.10  *       0.01  *
* BR Open Vel (ft/s)     *       2.82  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.25  *       0.24  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.70  *       0.64  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     864.10  * Element                *Inside BR US *Inside BR DS *
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* W.S. US. (ft)          *     863.86  * E.G. Elev (ft)         *     864.08  *     863.99  *
* Q Total (cfs)          *   19100.00  * W.S. Elev (ft)         *     863.82  *     863.75  *
* Q Bridge (cfs)         *   19100.00  * Crit W.S. (ft)         *     855.92  *     855.99  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.82  *      21.75  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.65  *       2.51  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7203.38  *    7609.92  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   40879.85  *   42302.17  *
* Min El Weir Flow (ft)  *     898.01  * Hydr Depth (ft)        *       7.53  *       7.53  *
* Min El Prs (ft)        *     900.70  * W.P. Total (ft)        *    1081.12  *    1151.39  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *   727645.8  *   744100.2  *
* Delta WS (ft)          *       0.11  * Top Width (ft)         *    1353.61  *    1351.48  *
* BR Open Area (sq ft)   *   60112.79  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       2.65  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.29  *       0.27  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.76  *       0.68  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     867.25  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     867.04  * E.G. Elev (ft)         *     867.23  *     867.15  *
* Q Total (cfs)          *   27300.00  * W.S. Elev (ft)         *     866.99  *     866.92  *
* Q Bridge (cfs)         *   27300.00  * Crit W.S. (ft)         *     858.09  *     858.10  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.99  *      24.92  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.66  *       2.51  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10266.72  *   10860.85  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   69336.17  *   72405.86  *
* Min El Weir Flow (ft)  *     898.01  * Hydr Depth (ft)        *      10.56  *      10.56  *
* Min El Prs (ft)        *     900.70  * W.P. Total (ft)        *    1154.60  *    1232.72  *
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)      *  1109977.0  *  1140391.0  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *    1385.05  *    1384.89  *
* BR Open Area (sq ft)   *   60112.79  * Frctn Loss (ft)        *       0.08  *       0.01  *
* BR Open Vel (ft/s)     *       2.66  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.34  *       0.32  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.89  *       0.79  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     869.15  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     868.94  * E.G. Elev (ft)         *     869.14  *     869.05  *
* Q Total (cfs)          *   32830.00  * W.S. Elev (ft)         *     868.90  *     868.84  *
* Q Bridge (cfs)         *   32830.00  * Crit W.S. (ft)         *     859.12  *     859.07  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.90  *      26.84  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.69  *       2.55  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12194.13  *   12896.37  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   91317.88  *   95653.60  *
* Min El Weir Flow (ft)  *     898.01  * Hydr Depth (ft)        *      11.85  *      11.90  *
* Min El Prs (ft)        *     900.70  * W.P. Total (ft)        *    1246.25  *    1327.45  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *  1378247.0  *  1417787.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *    1441.74  *    1440.75  *
* BR Open Area (sq ft)   *   60112.79  * Frctn Loss (ft)        *       0.07  *       0.01  *
* BR Open Vel (ft/s)     *       2.69  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.35  *       0.33  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.93  *       0.83  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
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*********************************************************************************************
* E.G. US. (ft)           *     871.05  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)           *     870.85  * E.G. Elev (ft)          *     871.04  *     870.96  *
* Q Total (cfs)           *   38750.00  * W.S. Elev (ft)          *     870.80  *     870.74  *
* Q Bridge (cfs)          *   38750.00  * Crit W.S. (ft)          *     860.07  *     859.97  *
* Q Weir (cfs)            *             * Max Chl Dpth (ft)       *      28.80  *      28.74  *
* Weir Sta Lft (ft)       *             * Vel Total (ft/s)        *       2.73  *       2.58  *
* Weir Sta Rgt (ft)       *             * Flow Area (sq ft)       *   14195.74  *   15006.44  *
* Weir Submerg            *             * Froude # Chl            *       0.19  *       0.19  *
* Weir Max Depth (ft)     *             * Specif Force (cu ft)    *  117032.30  *  122833.80  *
* Min El Weir Flow (ft)   *     898.01  * Hydr Depth (ft)         *      13.34  *      13.41  *
* Min El Prs (ft)         *     900.70  * W.P. Total (ft)         *    1318.27  *    1403.97  *
* Delta EG (ft)           *       0.11  * Conv. Total (cfs)       *  1673965.0  *  1722841.0  *
* Delta WS (ft)           *       0.09  * Top Width (ft)          *    1476.57  *    1476.29  *
* BR Open Area (sq ft)    *   60112.79  * Frctn Loss (ft)         *       0.07  *       0.01  *
* BR Open Vel (ft/s)      *       2.73  * C & E Loss (ft)         *       0.01  *       0.01  *
* Coef of Q               *             * Shear Total (lb/sq ft)  *       0.36  *       0.34  *
* Br Sel Method           *Energy only  * Power Total (lb/ft s)   *       0.98  *       0.87  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)           *     873.29  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)           *     873.08  * E.G. Elev (ft)          *     873.27  *     873.20  *
* Q Total (cfs)           *   46700.00  * W.S. Elev (ft)          *     873.03  *     872.98  *
* Q Bridge (cfs)          *   46700.00  * Crit W.S. (ft)          *     861.26  *     861.05  *
* Q Weir (cfs)            *             * Max Chl Dpth (ft)       *      31.03  *      30.98  *
* Weir Sta Lft (ft)       *             * Vel Total (ft/s)        *       2.82  *       2.67  *
* Weir Sta Rgt (ft)       *             * Flow Area (sq ft)       *   16584.01  *   17521.79  *
* Weir Submerg            *             * Froude # Chl            *       0.19  *       0.18  *
* Weir Max Depth (ft)     *             * Specif Force (cu ft)    *  152321.80  *  160081.20  *
* Min El Weir Flow (ft)   *     898.01  * Hydr Depth (ft)         *      15.42  *      15.50  *
* Min El Prs (ft)         *     900.70  * W.P. Total (ft)         *    1374.48  *    1464.72  *
* Delta EG (ft)           *       0.11  * Conv. Total (cfs)       *  2058020.0  *  2118241.0  *
* Delta WS (ft)           *       0.09  * Top Width (ft)          *    1487.91  *    1487.63  *
* BR Open Area (sq ft)    *   60112.79  * Frctn Loss (ft)         *       0.07  *       0.01  *
* BR Open Vel (ft/s)      *       2.82  * C & E Loss (ft)         *       0.01  *       0.01  *
* Coef of Q               *             * Shear Total (lb/sq ft)  *       0.39  *       0.36  *
* Br Sel Method           *Energy only  * Power Total (lb/ft s)   *       1.09  *       0.97  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)           *     864.52  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)           *     864.29  * E.G. Elev (ft)          *     864.50  *     864.41  *
* Q Total (cfs)           *   20100.00  * W.S. Elev (ft)          *     864.25  *     864.17  *
* Q Bridge (cfs)          *   20100.00  * Crit W.S. (ft)          *     856.41  *     856.50  *
* Q Weir (cfs)            *             * Max Chl Dpth (ft)       *      22.25  *      22.17  *
* Weir Sta Lft (ft)       *             * Vel Total (ft/s)        *       2.64  *       2.50  *
* Weir Sta Rgt (ft)       *             * Flow Area (sq ft)       *    7609.37  *    8040.96  *
* Weir Submerg            *             * Froude # Chl            *       0.22  *       0.21  *
* Weir Max Depth (ft)     *             * Specif Force (cu ft)    *   44106.23  *   45715.80  *
* Min El Weir Flow (ft)   *     898.01  * Hydr Depth (ft)         *       7.89  *       7.89  *
* Min El Prs (ft)         *     900.70  * W.P. Total (ft)         *    1096.47  *    1167.82  *
* Delta EG (ft)           *       0.13  * Conv. Total (cfs)       *   773622.0  *   791821.4  *
* Delta WS (ft)           *       0.11  * Top Width (ft)          *    1366.19  *    1363.89  *
* BR Open Area (sq ft)    *   60112.79  * Frctn Loss (ft)         *       0.09  *       0.01  *
* BR Open Vel (ft/s)      *       2.64  * C & E Loss (ft)         *       0.01  *       0.01  *
* Coef of Q               *             * Shear Total (lb/sq ft)  *       0.29  *       0.28  *
* Br Sel Method           *Energy only  * Power Total (lb/ft s)   *       0.77  *       0.69  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 29.957

INPUT
Description: Downstream side of Route 150 Bridge , copied from upstream side
Station Elevation Data num= 326

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	940.55	4.67	940.23	5.32	940.18	7.45	939.96	30.45	938.6
33.4	938.35	76.64	935.27	77.07	935.28	77.67	935.3	86.57	936.13
120.13	934.95	137.88	934.04	163.44	932.97	168.66	932.64	178.67	931.41
188.2	930.8	195.34	930.38	242.69	928.31	248.25	927.85	266.91	926.03
297.26	923.07	299.33	922.95	315.97	921.73	338.48	919.97	390.37	916.51
406.69	915.79	418.53	914.99	431.14	914.47	487.75	912.27	515.38	911
556.5	908.86	568.65	908.07	581.61	907.45	598.43	906.54	603.3	906.38
620.52	905.66	632.08	905.24	642.84	905	650.84	904.51	656.64	903.85
681.4	902.6	695.16	902.18	705.76	901.81	727.45	900.47	728.79	900.25
730.23	900.05	731.18	899.92	751.18	896.63	761.11	895.64	772.95	894.61
780.01	894.03	794.41	892.52	797.3	892.71	807.27	893.29	812.86	892.06
825.18	891.84	830.17	891.8	833.47	891.73	844.04	893.57	850.33	894.07
865.39	894.39	865.95	894.4	866.22	894.4	886.27	894.47	906.4	894.95
910.53	895.15	925.07	896.36	933.18	897.38	959.09	898.21	1016.16	896.75
1025.89	896.58	1040.31	896.22	1056.2	896.1	1061.38	895.97	1068.75	895.79
1079.19	895.6	1101.52	895.32	1107.02	895.26	1124.6	895.21	1141.66	895
1156.88	894.54	1163.86	894.46	1194.75	894.26	1202.98	892.52	1204.6	892.15
1215.48	891.89	1218.29	891.83	1218.94	891.88	1224.6	892.28	1231.61	893.24
1259.53	893.54	1272.81	893.82	1282.55	893.85	1286.49	893.92	1300.56	894.19
1312.99	894.36	1322.24	894.47	1336.24	894.57	1346.97	894.79	1353.32	894.65
1361.45	894.64	1398.51	894.17	1411.96	894.03	1422.52	894	1470.29	894.13
1475.53	894.14	1490.78	893.92	1507.13	891.12	1512.47	890.61	1517.4	892
1525.15	894.37	1527.35	894.99	1536.08	895.05	1541.39	895.05	1543.7	894.99
1554.67	894.68	1586.22	893.83	1600.57	892.52	1604.75	892.21	1609.3	891.9
1623.27	890.92	1627.84	889.46	1642.13	888.39	1646.54	888.22	1651.93	887.88
1655.09	887.67	1674.13	887.74	1683.38	887.53	1685.76	886.98	1693.09	886.04
1717.82	884.46	1729.88	883.7	1747.62	882.67	1763.06	882.03	1768.25	881.92
1787.29	881.26	1802.33	881.1	1805.04	880.97	1812.88	880.94	1814.33	880.94
1819.8	880.84	1841.59	879.76	1847.02	879.47	1855.59	879.03	1870.7	878.24
1872.65	878.23	1875.79	878.26	1885.41	878.3	1891.43	878.4	1913.65	879.35
1919.03	879.53	1934.48	880.17	1945.02	880.89	1945.65	880.92	1946.24	880.94
1960.6	881.59	1967.22	881.83	1986.35	882.76	1988.95	882.82	1995.09	883.06
2007.56	882.81	2025.71	882.2	2029.06	882.14	2043.28	881.37	2054.12	880.72
2061.16	879.99	2081.91	876.65	2085.92	875.93	2106.72	871.97	2114.64	870.36
2116.64	869.51	2120.87	867.6	2123.5	867.37	2130.57	867.21	2149.84	867.01
2161.88	868.58	2168.5	869.58	2184.57	869.51	2191.89	869.47	2204.67	867.8
2205.12	867.75	2205.66	867.53	2213.53	864.36	2215.97	864.2	2236.11	863.12
2307.94	861.62	2443.75	860.21	2465.45	859.94	2472.46	859.9	2533.08	859.29
2578.09	858.83	2581.09	858.89	2596.02	859.26	2604.29	858.33	2625.7	857.98
2628.44	857.88	2633.55	857.71	2640.53	857.58	2656.59	857.32	2664.94	857.29
2666.89	857.46	2676.04	858.26	2684.26	858.99	2686.22	859.15	2705.37	844.79
2705.69	844.57	2705.8	844.57	2710	843	2735	842	2760	843
2764.67	844.57	2767.93	845.7	2780.27	849.68	2780.93	849.8	2792.5	850.04
2805.48	850.68	2828.34	851.53	2832.91	851.68	2836.92	852.2	2854.65	854.37
2901.36	855.25	2914.75	855.56	2917.86	855.7	2925.29	856.09	2939.14	856.07
2979.08	856	2986.13	856	2991.56	855.39	2996.45	854.81	3002.92	854.03
3010.72	855.38	3012.37	855.69	3017.6	855.7	3061.68	855.47	3067.41	855.29
3076.72	855.24	3144.8	854.59	3151.73	854.57	3173.51	854.54	3183.34	855.33
3191.78	855.31	3206.49	855.03	3212.02	855	3245.9	855.1	3265.17	855.39
3296.99	855.12	3304.56	855.11	3311.14	855.19	3319.91	855.25	3326.89	855.22
3410.34	856.25	3414.86	856.22	3418.05	856.28	3438.64	856.4	3442.27	856.26
3449.36	856.27	3514.58	856.24	3534.89	856.52	3544.76	856.57	3554.77	856.79
3564.09	856.92	3567.92	856.98	3572.03	857.06	3599.29	860.25	3599.52	860.28
3612.59	863.48	3617.32	864.02	3622.03	864.36	3630.13	865.57	3639.3	866.29
3640	866.42	3641.02	866.57	3642.17	866.75	3649.9	868.16	3658.85	869.88
3661.02	870.3	3668.01	871.19	3671.03	871.7	3678.35	872.54	3684.32	873.6
3691.05	874.49	3699.2	875.29	3704.61	875.84	3708.21	875.98	3715.33	877.63
3719.56	878.25	3732.37	879.97	3733.99	880.25	3742.88	881.7	3754.56	883.31
3757.21	883.69	3774.84	886.02	3789.83	888.03	3799.92	889.48	3810.55	891.14
3832.77	892.34	3844.34	894.53	3850.45	895.29	3855.12	895.63	3878.37	897.85
3884.67	898.28	3889.58	898.27	3941.24	906.55	3943.25	906.69	3945.12	906.85
3945.41	907.03	3947.03	907.09	3961.26	909.65	3976.54	909.74	3996.98	909.86
4017.69	909.82	4028.86	909.86	4050.11	909.78	4053.43	909.79	4066.1	909.73
4098.78	909.37	4112.67	909.2	4138.79	908.91	4173.2	908.85	4186.74	908.74

```
 4209.96   908.5 4216.72  908.46 4240.81   908.2 4273.65  908.29 4277.01  908.27
  4289.9  908.31

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .06 2472.46      .1 2686.22     .04 2780.93      .1 3554.77     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2684.26 2854.65          527.835     660  401.94             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 3265.17  4289.9  879.02       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  856.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.044  *   0.100  *
* W.S. Elev (ft)         *  856.10  * Reach Len. (ft)        *  527.84  *  660.00  *  401.94  *
* Crit W.S. (ft)         *  849.32  * Flow Area (sq ft)      *          * 1371.18  *  358.93  *
* E.G. Slope (ft/ft)     *0.000830  * Area (sq ft)           *          * 1371.18  *  445.21  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *          * 5729.54  *  140.46  *
* Top Width (ft)         *  708.24  * Top Width (ft)          *          *  164.37  *  543.87  *
* Vel Total (ft/s)       *    3.39  * Avg. Vel. (ft/s)       *          *    4.18  *    0.39  *
* Max Chl Dpth (ft)      *   14.10  * Hydr. Depth (ft)        *          *    8.34  *    0.87  *
* Conv. Total (cfs)      *203697.6  * Conv. (cfs)             *          *198823.5  *  4874.1  *
* Length Wtd. (ft)       *  649.38  * Wetted Per. (ft)        *          *  169.82  *  410.85  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)        *          *    0.42  *    0.05  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *          *    1.75  *    0.02  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   * 1105.96  * 7189.99  *  967.11  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  302.58  *  572.44  *  299.08  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  859.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.100  *   0.047  *   0.100  *
* W.S. Elev (ft)         *  859.75  * Reach Len. (ft)        *  527.84  *  660.00  *  401.94  *
* Crit W.S. (ft)         *  852.58  * Flow Area (sq ft)      *  213.70  * 1979.65  * 1853.83  *
* E.G. Slope (ft/ft)     *0.000732  * Area (sq ft)           *  213.70  * 1979.65  * 3040.05  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *   90.79  * 8774.80  * 2034.41  *
* Top Width (ft)         * 1107.18  * Top Width (ft)          *  196.46  *  170.39  *  740.33  *
* Vel Total (ft/s)       *    2.69  * Avg. Vel. (ft/s)       *    0.42  *    4.43  *    1.10  *
* Max Chl Dpth (ft)      *   17.75  * Hydr. Depth (ft)        *    1.09  *   11.62  *    4.52  *
* Conv. Total (cfs)      *403007.5  * Conv. (cfs)             *  3356.8  *324432.2  * 75218.5  *
* Length Wtd. (ft)       *  615.32  * Wetted Per. (ft)        *  196.60  *  176.86  *  410.85  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)        *    0.05  *    0.51  *    0.21  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    0.02  *    2.27  *    0.23  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 2752.44  * 9628.85  * 2762.10  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  508.04  *  616.66  *  586.82  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  860.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.098  *   0.047  *   0.100  *
* W.S. Elev (ft)         *  860.69  * Reach Len. (ft)        *  527.84  *  660.00  *  401.94  *
* Crit W.S. (ft)         *  853.21  * Flow Area (sq ft)      *  442.55  * 2140.67  * 2241.78  *
* E.G. Slope (ft/ft)     *0.000697  * Area (sq ft)           *  442.55  * 2140.67  * 3743.10  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  263.07  * 9610.50  * 2726.44  *
* Top Width (ft)         * 1203.74  * Top Width (ft)          *  286.80  *  170.39  *  746.55  *
* Vel Total (ft/s)       *    2.61  * Avg. Vel. (ft/s)       *    0.59  *    4.49  *    1.22  *
* Max Chl Dpth (ft)      *   18.69  * Hydr. Depth (ft)        *    1.54  *   12.56  *    5.46  *
* Conv. Total (cfs)      *477129.8  * Conv. (cfs)             *  9961.7  *363924.9  *103243.2  *
* Length Wtd. (ft)       *  607.72  * Wetted Per. (ft)        *  286.95  *  176.86  *  410.85  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)        *    0.07  *    0.53  *    0.24  *
* Alpha                  *    2.30  * Stream Power (lb/ft s) *    0.04  *    2.37  *    0.29  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   * 3781.09  *11369.41  * 4028.66  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  583.68  *  644.89  *  728.14  *
*****************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	863.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.085	0.049	0.100
W.S. Elev (ft)	863.75	Reach Len. (ft)	527.84	660.00	401.94
Crit W.S. (ft)	856.00	Flow Area (sq ft)	1655.81	2662.23	3498.37
E.G. Slope (ft/ft)	0.000579	Area (sq ft)	1655.81	2662.23	6047.56
Q Total (cfs)	19100.00	Flow (cfs)	1744.76	12139.99	5215.25
Top Width (ft)	1390.64	Top Width (ft)	459.93	170.39	760.32
Vel Total (ft/s)	2.44	Avg. Vel. (ft/s)	1.05	4.56	1.49
Max Chl Dpth (ft)	21.75	Hydr. Depth (ft)	3.60	15.62	8.52
Conv. Total (cfs)	793855.4	Conv. (cfs)	72517.8	504575.7	216761.9
Length Wtd. (ft)	588.48	Wetted Per. (ft)	460.12	176.86	410.85
Min Ch El (ft)	842.00	Shear (lb/sq ft)	0.13	0.54	0.31
Alpha	2.33	Stream Power (lb/ft s)	0.14	2.48	0.46
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	5898.50	13439.68	6632.75
C & E Loss (ft)	0.03	Cum SA (acres)	745.00	668.14	906.33

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	867.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.080	0.050	0.100
W.S. Elev (ft)	866.94	Reach Len. (ft)	527.84	660.00	401.94
Crit W.S. (ft)	858.07	Flow Area (sq ft)	3159.58	3204.71	4805.37
E.G. Slope (ft/ft)	0.000476	Area (sq ft)	3159.58	3204.71	8514.80
Q Total (cfs)	27300.00	Flow (cfs)	4642.17	14629.28	8028.55
Top Width (ft)	1436.05	Top Width (ft)	477.12	170.39	788.54
Vel Total (ft/s)	2.44	Avg. Vel. (ft/s)	1.47	4.56	1.67
Max Chl Dpth (ft)	24.94	Hydr. Depth (ft)	6.62	18.81	11.71
Conv. Total (cfs)	1251059.0	Conv. (cfs)	212733.5	670406.1	367918.9
Length Wtd. (ft)	575.54	Wetted Per. (ft)	477.83	176.86	410.85
Min Ch El (ft)	842.00	Shear (lb/sq ft)	0.20	0.54	0.35
Alpha	2.07	Stream Power (lb/ft s)	0.29	2.46	0.58
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	9563.21	16458.37	11056.27
C & E Loss (ft)	0.04	Cum SA (acres)	1165.47	696.46	1384.22

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	869.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.078	0.050	0.100
W.S. Elev (ft)	868.85	Reach Len. (ft)	527.84	660.00	401.94
Crit W.S. (ft)	859.01	Flow Area (sq ft)	4144.01	3531.06	5591.64
E.G. Slope (ft/ft)	0.000432	Area (sq ft)	4144.01	3531.06	10035.05
Q Total (cfs)	32830.00	Flow (cfs)	6789.06	16196.75	9844.20
Top Width (ft)	1502.44	Top Width (ft)	533.20	170.39	798.84
Vel Total (ft/s)	2.47	Avg. Vel. (ft/s)	1.64	4.59	1.76
Max Chl Dpth (ft)	26.85	Hydr. Depth (ft)	7.77	20.72	13.62
Conv. Total (cfs)	1579534.0	Conv. (cfs)	326638.5	779266.3	473629.0
Length Wtd. (ft)	570.13	Wetted Per. (ft)	534.54	176.86	410.85
Min Ch El (ft)	842.00	Shear (lb/sq ft)	0.21	0.54	0.37
Alpha	1.94	Stream Power (lb/ft s)	0.34	2.47	0.65
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	13004.46	18294.52	15120.06
C & E Loss (ft)	0.04	Cum SA (acres)	1471.57	703.60	1834.50

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	870.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.078	0.050	0.100
W.S. Elev (ft)	870.76	Reach Len. (ft)	527.84	660.00	401.94

```
* Crit W.S. (ft)         *  859.84  * Flow Area (sq ft)      * 5208.52  * 3855.86  * 6374.19  *
* E.G. Slope (ft/ft)     *0.000403  * Area (sq ft)           * 5208.52  * 3855.86  *11567.57  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 8990.39  *17938.98  *11820.63  *
* Top Width (ft)         * 1551.92  * Top Width (ft)         *  571.57  *  170.39  *  809.96  *
* Vel Total (ft/s)       *    2.51  * Avg. Vel. (ft/s)       *    1.73  *    4.65  *    1.85  *
* Max Chl Dpth (ft)      *   28.76  * Hydr. Depth (ft)       *    9.11  *   22.63  *   15.53  *
* Conv. Total (cfs)      *1931433.0  * Conv. (cfs)           *448111.6  *894140.2  *589180.8  *
* Length Wtd. (ft)       *  565.97  * Wetted Per. (ft)       *  573.36  *  176.86  *  410.85  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)       *    0.23  *    0.55  *    0.39  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.39  *    2.55  *    0.72  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *16347.88  *19599.23  *19228.12  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1683.32  *  704.55  * 2278.52  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  873.18  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.076  *   0.051  *   0.100  *
* W.S. Elev (ft)         *  873.00  * Reach Len. (ft)        *  527.84  *  660.00  *  401.94  *
* Crit W.S. (ft)         *  860.95  * Flow Area (sq ft)      * 6501.46  * 4237.56  * 7293.83  *
* E.G. Slope (ft/ft)     *0.000372  * Area (sq ft)           * 6501.46  * 4237.56  *13400.60  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *12462.13  *20009.26  *14228.61  *
* Top Width (ft)         * 1579.60  * Top Width (ft)         *  582.93  *  170.39  *  826.27  *
* Vel Total (ft/s)       *    2.59  * Avg. Vel. (ft/s)       *    1.92  *    4.72  *    1.95  *
* Max Chl Dpth (ft)      *   31.00  * Hydr. Depth (ft)       *   11.15  *   24.87  *   17.77  *
* Conv. Total (cfs)      *2420770.0  * Conv. (cfs)           *645994.8  *1037212.0  *737563.1  *
* Length Wtd. (ft)       *  561.99  * Wetted Per. (ft)       *  584.94  *  176.86  *  410.85  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)       *    0.26  *    0.56  *    0.41  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.49  *    2.63  *    0.80  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *22341.23  *21514.70  *26146.95  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 2005.83  *  706.97  * 2703.78  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  864.39  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.084  *   0.049  *   0.100  *
* W.S. Elev (ft)         *  864.18  * Reach Len. (ft)        *  527.84  *  660.00  *  401.94  *
* Crit W.S. (ft)         *  856.56  * Flow Area (sq ft)      * 1853.25  * 2734.74  * 3673.09  *
* E.G. Slope (ft/ft)     *0.000562  * Area (sq ft)           * 1853.25  * 2734.74  * 6372.01  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2060.90  *12464.06  * 5575.04  *
* Top Width (ft)         * 1403.10  * Top Width (ft)         *  467.86  *  170.39  *  764.85  *
* Vel Total (ft/s)       *    2.43  * Avg. Vel. (ft/s)       *    1.11  *    4.56  *    1.52  *
* Max Chl Dpth (ft)      *   22.18  * Hydr. Depth (ft)       *    3.96  *   16.05  *    8.95  *
* Conv. Total (cfs)      *847630.9  * Conv. (cfs)           * 86909.8  *525617.9  *235103.3  *
* Length Wtd. (ft)       *  586.39  * Wetted Per. (ft)       *  468.07  *  176.86  *  410.85  *
* Min Ch El (ft)         *  842.00  * Shear (lb/sq ft)       *    0.14  *    0.54  *    0.31  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.15  *    2.47  *    0.48  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 6792.01  *14396.89  * 7686.80  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  847.15  *  678.46  *  988.12  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 29.832

INPUT
Description: 600 Ft. Downstream of MO-150
Station Elevation Data    num=     246
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  917.92   45.69  917.14   55.96  916.96   57.51  916.96   85.29  916.79
  191.69  916.16  205.49  916.14   270.4  915.77  313.54  915.58  336.54  915.36
  383.23  914.94  408.44  914.77  465.23  914.96  529.19  914.92  531.13  914.92
  552.99  914.93  588.58  914.73  617.31  915.02  624.95  915.18  653.71  919.99
  660.33  921.11  669.09   921.1  676.38  921.04  695.68  916.89  717.75  912.08
   727.1     913  736.72  913.84  738.76  913.79  748.41  913.69   777.7  913.19
   782.8  913.11  794.65  912.91  797.43  912.84  799.85  912.79  802.03  912.82
  813.32  912.89   819.1  911.69  824.73  910.68  835.26  912.06  870.09  916.37
   873.3  916.37  877.96  916.39  909.35  916.47  920.86  916.26  929.46  916.29
  935.44  916.33  941.95  916.05  965.98  914.82  969.77  914.58  975.82  914.38
  990.25  913.39 1011.44  912.16 1030.58  910.99 1037.14  910.55 1041.04  910.23
 1051.03  909.53 1112.69  905.42 1121.29  904.76 1134.94  903.17 1135.02  903.16
 1135.13  903.16 1135.72  903.12 1143.83  902.34 1144.91  902.18 1159.92   901.4
 1171.67  900.63 1184.65  899.59 1203.38  897.97 1206.36  897.72 1206.84   897.7
 1208.32  897.55  1221.6  896.11 1232.54  895.01 1234.17  894.84    1240  894.27
 1252.03  893.24 1255.64  892.95 1270.86   891.6 1279.06  890.94  1280.8  890.82
 1292.33  889.92 1296.12  889.69 1305.55  888.96 1311.01  888.67 1317.04   888.4
 1334.62  887.25 1338.31  886.99 1339.02  886.94 1339.58   886.9 1344.52  886.34
 1359.52  884.29 1364.22  883.58  1365.8  883.31 1368.52  882.78 1373.36   881.7
 1379.42  880.56 1386.39  881.31 1401.29  878.81 1404.84  878.98 1408.27   879.1
  1420.4  879.31 1421.76  879.38 1428.88  879.88  1444.1  881.25 1448.13  881.16
 1451.59  880.99 1465.04  881.01 1469.94  880.95 1471.17  880.96 1472.98  880.63
 1476.26  880.15 1478.31  879.98 1483.24  879.61 1487.29  879.29 1489.66  879.12
 1507.75  875.69 1508.75  875.47  1530.4  874.58 1542.52  874.08 1549.69  873.86
 1563.05  873.41 1621.55  871.45 1622.47  871.42 1622.98   871.3 1636.62   868.1
 1640.08  868.72 1642.42  869.14 1644.95  869.31 1648.66  869.55 1651.68  869.78
 1668.37  869.88 1674.53  869.88 1683.49  868.06 1685.02  867.74 1686.33  867.23
 1694.81  863.83  1698.4  864.25 1702.55  864.74  1715.6  863.79 1728.33  863.11
 1803.09  860.53 1827.46  859.51 1847.97  859.02 1865.82  858.78  1876.8  858.63
 1886.13   859.1 1888.27  859.16 1921.16  858.64 1952.98  858.06 1966.11   857.8
 2045.73  857.24 2118.32  856.68 2199.48  856.26  2246.3  855.92 2337.88  855.82
 2437.66  855.75 2461.79   855.8 2487.17  855.85 2491.88  856.29 2493.45  856.41
 2514.84  856.51 2676.51  856.85 2736.56  857.24 2777.32  857.33 2799.41  857.45
 2803.65   856.6  2812.3  854.26 2831.75  854.08 2838.95  854.14 2846.54  854.11
 2854.87  854.05 2870.03  853.95 2878.56  851.31 2881.26  849.53 2884.41  846.96
 2889.39  842.72    2920   841.9 2951.73  842.72 2955.54  842.72 2957.06  842.72
 2958.77  843.75 2973.46  852.86 2986.44  853.85 2989.73  854.06 2990.87  854.18
 2992.06  854.21  3017.9  854.08  3023.4  853.98 3040.93  853.66 3046.51  853.49
 3062.94  853.01 3074.34  852.82 3106.05  846.99 3107.72  846.71 3124.09  848.51
 3128.67  849.17 3139.38  851.84 3141.33  852.69 3142.39   852.7 3143.88   852.7
 3146.69  852.71 3186.59  852.53 3213.69  853.39 3252.49  854.35 3269.11  854.61
 3288.88   855.2 3396.59  858.34 3396.97  858.35 3397.64  858.37 3397.85  858.38
 3397.97  858.39 3398.13  858.39  3398.2  858.39 3398.28  858.39 3399.09  858.41
 3510.81  860.91 3536.33  862.28 3542.12  862.66 3547.88  862.84 3551.97  863.34
 3552.15  863.36 3573.05  869.87 3574.65  870.31 3575.43  870.48 3575.88  870.55
 3576.14  870.58 3576.27  870.59 3576.71  870.59 3578.04  870.55  3584.1   870.1
 3605.85  867.27 3625.99  870.44 3634.68  872.01 3670.09   879.4  3673.9   880.2
 3711.51  889.09 3718.43   890.7 3719.71  890.96 3730.99  894.03 3762.07  902.24
 3767.76   903.6 3789.48  908.61 3809.22  912.91 3823.62  915.99 3833.77   918.1
 3856.83  925.01

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 2461.79     .11 2870.03     .04 2973.46      .1 3605.85      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2854.87 2973.46         643.2195     8401094.719              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2602.08  875.57       F
 3146.48 3856.83  876.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3075 3856.83     852

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  855.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.110  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  855.51  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  848.31  * Flow Area (sq ft)      *   61.61  * 1155.51  *  434.58  *
* E.G. Slope (ft/ft)     *0.000761  * Area (sq ft)           *   61.61  * 1155.51  *  714.45  *
```

```
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *   27.36  * 5513.78  *  328.86  *
* Top Width (ft)         *  491.96  * Top Width (ft)         *   47.20  *  118.59  *  326.17  *
* Vel Total (ft/s)       *    3.55  * Avg. Vel. (ft/s)       *    0.44  *    4.77  *    0.76  *
* Max Chl Dpth (ft)      *   13.61  * Hydr. Depth (ft)       *    1.31  *    9.74  *    2.51  *
* Conv. Total (cfs)      *212749.0  * Conv. (cfs)            *   991.6  *199838.2  * 11919.1  *
* Length Wtd. (ft)       *  843.38  * Wetted Per. (ft)       *   47.37  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.06  *    0.44  *    0.12  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *    0.03  *    2.10  *    0.09  *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   * 1105.59  * 7170.84  *  961.76  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  302.30  *  570.29  *  295.06  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  859.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *   0.110  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  859.10  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  851.18  * Flow Area (sq ft)      *  660.00  * 1580.67  * 1054.89  *
* E.G. Slope (ft/ft)     *0.000773  * Area (sq ft)           * 2433.44  * 1580.67  * 2106.79  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  469.58  * 8977.31  * 1453.11  *
* Top Width (ft)         * 1579.11  * Top Width (ft)         * 1004.12  *  118.59  *  456.40  *
* Vel Total (ft/s)       *    3.31  * Avg. Vel. (ft/s)       *    0.71  *    5.68  *    1.38  *
* Max Chl Dpth (ft)      *   17.20  * Hydr. Depth (ft)       *    2.61  *   13.33  *    6.10  *
* Conv. Total (cfs)      *391975.2  * Conv. (cfs)            * 16886.6  *322833.4  * 52255.2  *
* Length Wtd. (ft)       *  851.49  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.13  *    0.61  *    0.29  *
* Alpha                  *    2.45  * Stream Power (lb/ft s) *    0.09  *    3.47  *    0.40  *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)   * 2736.40  * 9601.88  * 2738.35  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  500.76  *  614.47  *  581.30  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  860.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.              *   0.110  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  860.04  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  852.21  * Flow Area (sq ft)      *  897.19  * 1691.94  * 1217.23  *
* E.G. Slope (ft/ft)     *0.000772  * Area (sq ft)           * 3397.03  * 1691.94  * 2554.69  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  782.69  * 9974.18  * 1843.13  *
* Top Width (ft)         * 1656.91  * Top Width (ft)         * 1040.00  *  118.59  *  498.33  *
* Vel Total (ft/s)       *    3.31  * Avg. Vel. (ft/s)       *    0.87  *    5.90  *    1.51  *
* Max Chl Dpth (ft)      *   18.14  * Hydr. Depth (ft)       *    3.55  *   14.27  *    7.04  *
* Conv. Total (cfs)      *453478.8  * Conv. (cfs)            * 28169.4  *358974.6  * 66334.8  *
* Length Wtd. (ft)       *  851.10  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.17  *    0.65  *    0.34  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    0.15  *    3.85  *    0.51  *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)   * 3757.83  *11340.37  * 3999.60  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  575.64  *  642.70  *  722.39  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  863.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.              *   0.110  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  863.05  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  855.71  * Flow Area (sq ft)      * 1659.35  * 2049.49  * 1738.89  *
* E.G. Slope (ft/ft)     *0.000779  * Area (sq ft)           * 6657.39  * 2049.49  * 4200.24  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2191.38  *13553.16  * 3355.46  *
* Top Width (ft)         * 1819.60  * Top Width (ft)         * 1124.85  *  118.59  *  576.15  *
* Vel Total (ft/s)       *    3.51  * Avg. Vel. (ft/s)       *    1.32  *    6.61  *    1.93  *
* Max Chl Dpth (ft)      *   21.15  * Hydr. Depth (ft)       *    6.56  *   17.28  *   10.05  *
* Conv. Total (cfs)      *684206.8  * Conv. (cfs)            * 78500.2  *485506.1  *120200.5  *
* Length Wtd. (ft)       *  849.68  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.32  *    0.80  *    0.49  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    0.42  *    5.28  *    0.94  *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   * 5848.14  *13403.99  * 6585.47  *
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* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  735.39  *  665.95  *  900.17  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  866.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *   0.110  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  866.17  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  858.16  * Flow Area (sq ft)      * 2448.30  * 2419.61  * 2278.88  *
* E.G. Slope (ft/ft)     *0.000790  * Area (sq ft)           *10254.26  * 2419.61  * 6018.62  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4219.75  *17777.18  * 5303.07  *
* Top Width (ft)         * 1872.21  * Top Width (ft)         * 1165.90  *  118.59  *  587.72  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *    1.72  *    7.35  *    2.33  *
* Max Chl Dpth (ft)      *   24.27  * Hydr. Depth (ft)       *    9.69  *   20.40  *   13.17  *
* Conv. Total (cfs)      *971160.4  * Conv. (cfs)            *150111.8  *632399.0  *188649.5  *
* Length Wtd. (ft)       *  848.66  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.48  *    0.96  *    0.65  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    0.82  *    7.02  *    1.51  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   * 9481.94  *16415.76  *10989.22  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1155.51  *  694.27  * 1377.87  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  868.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.              *   0.110  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  868.05  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  859.23  * Flow Area (sq ft)      * 2922.93  * 2642.27  * 2603.73  *
* E.G. Slope (ft/ft)     *0.000794  * Area (sq ft)           *12447.85  * 2642.27  * 7132.03  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 5681.29  *20512.94  * 6635.77  *
* Top Width (ft)         * 1894.63  * Top Width (ft)         * 1171.33  *  118.59  *  604.70  *
* Vel Total (ft/s)       *    4.02  * Avg. Vel. (ft/s)       *    1.94  *    7.76  *    2.55  *
* Max Chl Dpth (ft)      *   26.15  * Hydr. Depth (ft)       *   11.56  *   22.28  *   15.05  *
* Conv. Total (cfs)      *1165453.0  * Conv. (cfs)           *201683.8  *728201.8  *235567.3  *
* Length Wtd. (ft)       *  848.34  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.57  *    1.05  *    0.74  *
* Alpha                  *    2.45  * Stream Power (lb/ft s) *    1.11  *    8.14  *    1.90  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   *12903.94  *18247.75  *15040.86  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1461.24  *  701.41  * 1828.03  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  870.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.              *   0.110  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  869.92  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  860.22  * Flow Area (sq ft)      * 3395.11  * 2863.77  * 2926.91  *
* E.G. Slope (ft/ft)     *0.000795  * Area (sq ft)           *14664.93  * 2863.77  * 8291.62  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 7300.41  *23375.60  * 8073.99  *
* Top Width (ft)         * 1981.53  * Top Width (ft)         * 1226.00  *  118.59  *  636.94  *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)       *    2.15  *    8.16  *    2.76  *
* Max Chl Dpth (ft)      *   28.02  * Hydr. Depth (ft)       *   13.43  *   24.15  *   16.92  *
* Conv. Total (cfs)      *1374000.0  * Conv. (cfs)           *258858.5  *828853.3  *286288.0  *
* Length Wtd. (ft)       *  848.25  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.67  *    1.14  *    0.84  *
* Alpha                  *    2.40  * Stream Power (lb/ft s) *    1.43  *    9.29  *    2.31  *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   *16227.48  *19548.33  *19136.49  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1672.43  *  702.36  * 2271.84  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
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* E.G. Elev (ft)         *  872.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.110  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  872.09  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  861.39  * Flow Area (sq ft)      * 3943.89  * 3121.22  * 3302.52  *
* E.G. Slope (ft/ft)     *0.000816  * Area (sq ft)           *17342.23  * 3121.22  * 9709.93  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 9492.55  *27205.96  *10001.49  *
* Top Width (ft)         * 2032.58  * Top Width (ft)         * 1252.39  *  118.59  *  661.60  *
* Vel Total (ft/s)       *    4.50  * Avg. Vel. (ft/s)       *    2.41  *    8.72  *    3.03  *
* Max Chl Dpth (ft)      *   30.19  * Hydr. Depth (ft)       *   15.60  *   26.32  *   19.09  *
* Conv. Total (cfs)      *1634739.0  * Conv. (cfs)            *332287.8  *952347.6  *350103.4  *
* Length Wtd. (ft)       *  848.36  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.79  *    1.27  *    0.97  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    1.91  *   11.10  *    2.94  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   *22196.77  *21458.95  *26040.32  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1994.71  *  704.79  * 2696.91  *
*****************************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

```
CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  863.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.110  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  863.47  * Reach Len. (ft)        *  643.22  *  840.00  * 1094.72  *
* Crit W.S. (ft)         *  855.99  * Flow Area (sq ft)      * 1765.24  * 2099.16  * 1811.36  *
* E.G. Slope (ft/ft)     *0.000779  * Area (sq ft)           * 7130.45  * 2099.16  * 4442.27  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2429.49  *14078.56  * 3591.96  *
* Top Width (ft)         * 1830.93  * Top Width (ft)         * 1133.29  *  118.59  *  579.05  *
* Vel Total (ft/s)       *    3.54  * Avg. Vel. (ft/s)       *    1.38  *    6.71  *    1.98  *
* Max Chl Dpth (ft)      *   21.57  * Hydr. Depth (ft)       *    6.98  *   17.70  *   10.47  *
* Conv. Total (cfs)      *719992.7  * Conv. (cfs)            * 87025.5  *504301.4  *128665.7  *
* Length Wtd. (ft)       *  849.52  * Wetted Per. (ft)       *  253.19  *  124.90  *  173.31  *
* Min Ch El (ft)         *  841.90  * Shear (lb/sq ft)       *    0.34  *    0.82  *    0.51  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    0.47  *    5.48  *    1.01  *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   * 6737.58  *14360.27  * 7636.90  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  837.45  *  676.27  *  981.92  *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 29.673

INPUT
Description:
Station Elevation Data num= 318

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	915.16	14.99	914.99	45.18	914.72	90.19	914.3	92.48	914.29
95.81	914.27	102.47	913.99	122.64	913.22	132.31	913.58	143.15	913.94
151.35	913.86	161.68	913.76	175.8	913.63	188.1	913.51	199.14	913.05
207.71	912.69	212.41	912.52	218.33	912.24	225.94	912.29	237.26	912.43
244.01	912.51	246.24	912.54	251.05	912.6	259.34	912.6	262.04	912.5
275.4	912.3	283.04	912.21	290.72	912.12	294.33	911.82	297.16	911.47
305.35	910.73	307.56	910.54	308.72	910.43	315.11	909.35	316.87	909.28
318.17	909.22	321.35	909.12	322.26	909.09	324.1	909.03	325.16	908.97
326.44	908.88	339.58	908.03	345.36	907.6	350.66	907.21	353.64	907.54
363.37	908.82	365	909	367.35	909.22	387.59	910.88	393.93	911.41
406.08	912.84	420.83	912.95	426.52	912.77	450.38	913.32	454.74	913.33
479.29	913.58	496.4	913.66	538.74	914.05	557.06	914.28	559.45	914.31
567.68	913.67	573.06	913.35	576.97	913.14	582.66	913.18	589.3	913.16
600.84	912.54	608.39	912.3	619.02	911.93	627.04	912.04	635.11	912.1
646.54	911.64	652.47	911.35	672.87	911.21	693.96	911.06	698.83	911.46
699.13	911.47	700.68	911.47	727.24	911.6	729.87	911.3	740.72	910.08
746.41	909.29	767.46	907.49	774.76	907.01	775.16	907.3	778.08	908.78
779.9	909.23	781.86	909.47	784.46	908.74	786.61	908.83	788.43	908.6
791.61	908.12	794.54	907.46	798.73	905.66	806.05	905.22	812.42	904.65
818.16	904.35	820.25	904.22	828.32	903.89	832.72	903.68	836.08	903.57
854.88	902.79	859.82	902.54	877.59	901.93	908.47	900.75	916.62	901.03
918.61	900.32	941.07	899.58	941.66	899.96	943.18	899.58	944.67	899.52
971.22	898.58	982.59	898.23	989.29	897.66	1034.91	908.21	1041.7	908.04

```
 1058.65  895.26 1081.76  894.23  1091.4  893.28 1114.51  890.43 1115.77  890.26
 1116.15  890.28 1129.46  890.49 1138.89   890.5 1142.96  890.53 1151.94  888.29
  1169.8  883.59 1169.96  883.58 1170.81  883.53  1204.5  881.69 1208.67  881.48
 1210.95   881.3 1212.87  881.21 1238.28  879.38 1238.64  879.37 1241.55  878.85
  1243.9  878.39 1246.61   878.7 1250.08  879.08 1252.66  879.46 1258.08  879.16
 1307.48  876.85 1365.09  874.78 1375.85  874.33 1405.12  873.37 1440.24   872.2
 1456.04  871.75  1517.4   869.9 1525.78  869.59 1560.82  868.93 1585.43  868.55
 1592.55  867.27  1596.5  866.68 1598.91  867.17 1607.19     869 1613.93  869.53
 1625.02  870.51 1644.88   870.4 1649.06  870.37 1650.38  870.03 1663.51  866.55
 1667.41  866.54 1679.96  866.52 1684.92   866.1 1691.48  865.97 1722.78   864.6
 1749.02  864.09 1753.77  864.04 1756.06  864.01 1760.49     864  1820.2  863.67
    1821  863.63 1821.64  863.59 1851.86  861.71 1854.83  861.76 1877.29  861.65
 1886.12  861.17 1908.24   860.3 1918.02  860.23  1932.8  860.07 1955.74  859.77
  1990.5  858.71 2005.59  858.36 2036.85  857.87 2050.68  857.74 2078.67  857.76
 2110.95  856.68 2120.35   856.5 2141.71  856.61 2162.08  856.75 2171.08  856.74
 2200.03  855.59  2205.9  855.36 2208.26  855.36 2233.18  855.86 2277.93  854.91
 2285.12  854.62 2287.58   854.6 2291.33  854.59 2298.11  854.41 2338.13  853.58
 2353.47  853.68 2370.72  853.76 2411.34  853.48    2412  853.47 2416.59  853.45
 2451.35   853.3 2458.18   853.4 2495.73  854.03 2531.82  855.45 2537.44  855.64
 2550.15  855.92 2591.95  856.58 2625.01  856.47 2652.07   856.4 2664.33  856.39
 2675.42  856.41 2700.23  856.46 2712.16  856.56 2732.68  856.53 2772.32  856.54
 2787.68  856.73 2822.44  856.65 2832.45  856.66 2840.36  856.66 2892.57  856.67
 2948.04  856.87  2952.7   856.9  2954.5   856.9 2958.59  856.94 2996.21  857.26
 3012.82  857.44 3028.99  857.46 3030.81  857.48 3033.03  856.87  3050.1  853.29
 3063.86  852.75 3069.36  852.54 3072.94  852.42 3093.37  852.34 3124.69  852.82
 3130.77   852.9 3135.47  851.74 3141.19  851.04 3153.22  849.93 3159.86  849.32
 3161.92  849.13 3170.24  845.76 3174.14  844.16 3177.61   842.4 3178.83  841.78
    3179  841.69 3184.01  841.69    3207  840.45 3238.91  841.64 3245.28  849.72
 3249.92  854.58 3259.82  854.78  3262.7  854.82 3267.02  854.73 3267.32  854.72
 3313.44  853.95 3323.54  853.41 3337.02   853.4 3339.25  853.43 3372.45  854.35
  3373.4  854.36 3375.49  854.56  3427.8  858.23  3431.9  858.71 3452.43  861.27
 3464.62  863.03 3481.14  865.37 3499.48   868.2 3520.58  873.01 3538.24  877.98
 3547.93  880.37 3559.03  883.33 3570.22  885.56  3585.9  888.63 3596.93  891.14
 3613.76   895.3 3641.57  903.08 3650.94  905.56 3670.59  911.15 3672.11  911.48
 3677.77  912.84 3678.62  912.93 3693.04  914.42 3702.71  916.16 3707.53  917.12
  3714.8   919.2 3721.44  920.79 3746.33  927.76 3752.28  929.89 3774.55  937.55
 3777.46  938.43 3788.82  942.44 3799.37  944.13 3805.94  945.06 3838.41  951.99
 3844.88  953.36 3853.19  954.79 3861.85  956.17 3872.65  958.16 3886.62  959.78
 3886.66  959.78 3887.18   959.8 3888.24  959.84 3894.48  960.29 3919.33  961.22
  3926.4  961.59 3929.97   961.8 3943.57  962.47 3950.51  962.72 3960.14  963.18
 3966.01  963.63 3980.14  963.47 3987.31  963.23

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0    .075 2652.07      .1 3159.86     .04 3249.92      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3159.86  3262.7          922.887  922.65851.6235             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2952.71     875        F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  855.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.42  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  854.73  * Reach Len. (ft)        *  922.89  *  922.65  *  851.62  *
* Crit W.S. (ft)          *  847.57  * Flow Area (sq ft)      *  290.51  * 1053.99  *   79.02  *
* E.G. Slope (ft/ft)      *0.000863  * Area (sq ft)           *  510.15  * 1053.99  *   79.02  *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *  232.39  * 5610.14  *   27.47  *
* Top Width (ft)          *  556.71  * Top Width (ft)         *  347.94  *   97.65  *  111.11  *
* Vel Total (ft/s)        *    4.12  * Avg. Vel. (ft/s)       *    0.80  *    5.32  *    0.35  *
* Max Chl Dpth (ft)       *   14.28  * Hydr. Depth (ft)       *    2.49  *   10.79  *    0.71  *
* Conv. Total (cfs)       *199852.2  * Conv. (cfs)            *  7912.1  *191004.8  *   935.2  *
* Length Wtd. (ft)        *  921.43  * Wetted Per. (ft)       *  117.08  *  105.28  *  111.16  *
* Min Ch El (ft)          *  840.45  * Shear (lb/sq ft)       *    0.13  *    0.54  *    0.04  *
* Alpha                   *    1.59  * Stream Power (lb/ft s) *    0.11  *    2.87  *    0.01  *
* Frctn Loss (ft)         *    0.82  * Cum Volume (acre-ft)   * 1101.37  * 7149.54  *  951.79  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  299.38  *  568.21  *  289.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	858.74	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.60	Wt. n-Val.	0.100	0.040	0.100	
W.S. Elev (ft)	858.14	Reach Len. (ft)	922.89	922.65	851.62	
Crit W.S. (ft)	850.60	Flow Area (sq ft)	785.64	1404.06	554.17	
E.G. Slope (ft/ft)	0.001023	Area (sq ft)	2948.01	1404.06	554.17	
Q Total (cfs)	10900.00	Flow (cfs)	905.88	9401.02	593.10	
Top Width (ft)	1406.89	Top Width (ft)	1140.23	102.84	163.82	
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	1.15	6.70	1.07	
Max Chl Dpth (ft)	17.69	Hydr. Depth (ft)	3.79	13.65	3.38	
Conv. Total (cfs)	340796.3	Conv. (cfs)	28323.1	293929.6	18543.6	
Length Wtd. (ft)	917.46	Wetted Per. (ft)	207.89	110.47	163.99	
Min Ch El (ft)	840.45	Shear (lb/sq ft)	0.24	0.81	0.22	
Alpha	2.46	Stream Power (lb/ft s)	0.28	5.43	0.23	
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)	2696.67	9573.10	2704.92	
C & E Loss (ft)	0.05	Cum SA (acres)	484.93	612.34	573.51	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	859.70	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.62	Wt. n-Val.	0.100	0.040	0.100	
W.S. Elev (ft)	859.07	Reach Len. (ft)	922.89	922.65	851.62	
Crit W.S. (ft)	851.48	Flow Area (sq ft)	978.93	1500.02	711.17	
E.G. Slope (ft/ft)	0.001026	Area (sq ft)	4033.80	1500.02	711.17	
Q Total (cfs)	12600.00	Flow (cfs)	1308.72	10420.61	870.67	
Top Width (ft)	1456.21	Top Width (ft)	1181.26	102.84	172.11	
Vel Total (ft/s)	3.95	Avg. Vel. (ft/s)	1.34	6.95	1.22	
Max Chl Dpth (ft)	18.62	Hydr. Depth (ft)	4.73	14.59	4.13	
Conv. Total (cfs)	393442.8	Conv. (cfs)	40865.5	325389.9	27187.3	
Length Wtd. (ft)	916.50	Wetted Per. (ft)	207.89	110.47	172.33	
Min Ch El (ft)	840.45	Shear (lb/sq ft)	0.30	0.87	0.26	
Alpha	2.58	Stream Power (lb/ft s)	0.40	6.04	0.32	
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)	3702.97	11309.60	3958.56	
C & E Loss (ft)	0.05	Cum SA (acres)	559.24	640.57	713.97	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	862.77	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.70	Wt. n-Val.	0.100	0.041	0.100	
W.S. Elev (ft)	862.07	Reach Len. (ft)	922.89	922.65	851.62	
Crit W.S. (ft)	855.52	Flow Area (sq ft)	1599.18	1807.95	1262.10	
E.G. Slope (ft/ft)	0.001038	Area (sq ft)	7771.85	1807.95	1262.10	
Q Total (cfs)	19100.00	Flow (cfs)	2983.74	14022.31	2093.95	
Top Width (ft)	1611.83	Top Width (ft)	1313.74	102.84	195.25	
Vel Total (ft/s)	4.09	Avg. Vel. (ft/s)	1.87	7.76	1.66	
Max Chl Dpth (ft)	21.62	Hydr. Depth (ft)	7.72	17.58	6.46	
Conv. Total (cfs)	592750.7	Conv. (cfs)	92597.7	435169.2	64983.8	
Length Wtd. (ft)	914.00	Wetted Per. (ft)	207.89	110.47	195.67	
Min Ch El (ft)	840.45	Shear (lb/sq ft)	0.50	1.06	0.42	
Alpha	2.69	Stream Power (lb/ft s)	0.93	8.23	0.69	
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	5741.60	13366.80	6516.83	
C & E Loss (ft)	0.05	Cum SA (acres)	717.39	663.82	890.47	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	865.95	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.78	Wt. n-Val.	0.100	0.041	0.100	
W.S. Elev (ft)	865.17	Reach Len. (ft)	922.89	922.65	851.62	
Crit W.S. (ft)	857.08	Flow Area (sq ft)	2242.91	2127.53	1902.61	
E.G. Slope (ft/ft)	0.001043	Area (sq ft)	12032.63	2127.53	1902.61	
Q Total (cfs)	27300.00	Flow (cfs)	5255.30	18170.83	3873.87	
Top Width (ft)	1770.11	Top Width (ft)	1450.21	102.84	217.06	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)	2.34	8.54	2.04	

```
* Max Chl Dpth (ft)      *   24.72  * Hydr. Depth (ft)       *   10.83  *   20.69  *    8.77  *
* Conv. Total (cfs)      *845322.4  * Conv. (cfs)            *162726.2  *562644.9  *119951.3  *
* Length Wtd. (ft)       *  912.13  * Wetted Per. (ft)       *  207.89  *  110.47  *  217.70  *
* Min Ch El (ft)         *  840.45  * Shear (lb/sq ft)       *    0.70  *    1.25  *    0.57  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *    1.65  *   10.71  *    1.16  *
* Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   * 9317.39  *16371.91  *10889.68  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1136.20  *  692.13  * 1367.76  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  867.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  867.05  * Reach Len. (ft)        *  922.89  *  922.65  *  851.62  *
* Crit W.S. (ft)         *  859.45  * Flow Area (sq ft)      * 2632.24  * 2320.81  * 2322.21  *
* E.G. Slope (ft/ft)     *0.001037  * Area (sq ft)           *14805.40  * 2320.81  * 2322.21  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 6840.71  *20801.73  * 5187.56  *
* Top Width (ft)         * 1834.79  * Top Width (ft)         * 1502.60  *  102.84  *  229.35  *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)       *    2.60  *    8.96  *    2.23  *
* Max Chl Dpth (ft)      *   26.60  * Hydr. Depth (ft)       *   12.71  *   22.57  *   10.12  *
* Conv. Total (cfs)      *1019726.0  * Conv. (cfs)            *212477.9  *646118.4  *161129.7  *
* Length Wtd. (ft)       *  911.23  * Wetted Per. (ft)       *  207.89  *  110.47  *  230.14  *
* Min Ch El (ft)         *  840.45  * Shear (lb/sq ft)       *    0.82  *    1.36  *    0.65  *
* Alpha                  *    2.61  * Stream Power (lb/ft s) *    2.13  *   12.19  *    1.46  *
* Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   *12702.72  *18199.89  *14922.06  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1441.50  *  699.28  * 1817.55  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  869.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.87  * Wt. n-Val.             *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  868.93  * Reach Len. (ft)        *  922.89  *  922.65  *  851.62  *
* Crit W.S. (ft)         *  860.47  * Flow Area (sq ft)      * 3020.87  * 2513.75  * 2763.35  *
* E.G. Slope (ft/ft)     *0.001025  * Area (sq ft)           *17653.61  * 2513.75  * 2763.35  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 8558.76  *23504.61  * 6686.63  *
* Top Width (ft)         * 1894.23  * Top Width (ft)         * 1551.40  *  102.84  *  239.98  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    2.83  *    9.35  *    2.42  *
* Max Chl Dpth (ft)      *   28.48  * Hydr. Depth (ft)       *   14.58  *   24.44  *   11.51  *
* Conv. Total (cfs)      *1210189.0  * Conv. (cfs)            *267296.0  *734065.3  *208828.0  *
* Length Wtd. (ft)       *  910.45  * Wetted Per. (ft)       *  207.89  *  110.47  *  240.93  *
* Min Ch El (ft)         *  840.45  * Shear (lb/sq ft)       *    0.93  *    1.46  *    0.73  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    2.64  *   13.62  *    1.78  *
* Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   *15988.86  *19496.48  *18997.58  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1651.92  *  700.22  * 2260.82  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  872.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  871.09  * Reach Len. (ft)        *  922.89  *  922.65  *  851.62  *
* Crit W.S. (ft)         *  861.73  * Flow Area (sq ft)      * 3467.73  * 2735.59  * 3291.24  *
* E.G. Slope (ft/ft)     *0.001038  * Area (sq ft)           *21147.00  * 2735.59  * 3291.24  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *10839.15  *27090.00  * 8770.85  *
* Top Width (ft)         * 2034.13  * Top Width (ft)         * 1681.85  *  102.84  *  249.45  *
* Vel Total (ft/s)       *    4.92  * Avg. Vel. (ft/s)       *    3.13  *    9.90  *    2.66  *
* Max Chl Dpth (ft)      *   30.64  * Hydr. Depth (ft)       *   16.74  *   26.60  *   13.19  *
* Conv. Total (cfs)      *1449336.0  * Conv. (cfs)            *336393.2  *840738.7  *272203.6  *
* Length Wtd. (ft)       *  909.66  * Wetted Per. (ft)       *  207.89  *  110.47  *  250.64  *
* Min Ch El (ft)         *  840.45  * Shear (lb/sq ft)       *    1.08  *    1.61  *    0.85  *
* Alpha                  *    2.50  * Stream Power (lb/ft s) *    3.38  *   15.89  *    2.27  *
* Frctn Loss (ft)        *    0.94  * Cum Volume (acre-ft)   *21912.59  *21402.48  *25876.96  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1973.04  *  702.65  * 2685.46  *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	863.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.	0.100	0.041	0.100
W.S. Elev (ft)	862.49	Reach Len. (ft)	922.89	922.65	851.62
Crit W.S. (ft)	855.86	Flow Area (sq ft)	1685.98	1851.04	1344.52
E.G. Slope (ft/ft)	0.001037	Area (sq ft)	8323.72	1851.04	1344.52
Q Total (cfs)	20100.00	Flow (cfs)	3256.38	14541.30	2302.32
Top Width (ft)	1621.47	Top Width (ft)	1320.48	102.84	198.15
Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)	1.93	7.86	1.71
Max Chl Dpth (ft)	22.04	Hydr. Depth (ft)	8.14	18.00	6.79
Conv. Total (cfs)	624192.5	Conv. (cfs)	101124.8	451570.8	71496.9
Length Wtd. (ft)	913.71	Wetted Per. (ft)	207.89	110.47	198.60
Min Ch El (ft)	840.45	Shear (lb/sq ft)	0.53	1.08	0.44
Alpha	2.69	Stream Power (lb/ft s)	1.01	8.52	0.75
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	6623.48	14322.18	7564.19
C & E Loss (ft)	0.05	Cum SA (acres)	819.33	674.13	972.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 29.498

INPUT
Description:
Station Elevation Data num= 324

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	918.26	15.64	917.92	45.35	917.62	61.25	917.32	67.41	917.52
69.77	917.6	129.78	916.95	136.93	917.02	158.33	916.95	165.09	916.93
178.16	916.88	235.22	916.57	243.13	916.56	247.56	916.64	302.28	917.16
303.98	916.95	311.2	915.78	329.53	912.68	333.15	912.24	351.48	912.43
358.48	912.5	359.65	912.51	360.93	912.53	378.77	912.71	392.16	912.85
414.36	913.08	417.56	913.11	421.26	913.15	429.21	913.48	436.4	913.74
439.61	913.76	445.6	913.71	448.56	913.69	450.25	913.68	457.42	913.12
460.35	912.89	465.86	912.43	475.14	912.75	494.04	913.9	498.24	913.92
527.98	914.08	555.45	914.21	574	914.3	586.92	914.43	604.51	914.27
614.2	914.21	622.86	912.21	623.2	912.12	624.33	912.31	637.83	914.67
644.1	914.62	653.56	914.71	658.37	914.69	669.7	914.26	681.39	913.7
705.49	913.01	712.17	913.37	728.14	913.98	756.79	912.98	787.22	911.66
844.57	909.57	849	909.4	851.43	909.29	862.15	909.11	867.19	907.72
873.26	906.06	875.08	905.83	880.5	904.84	911.42	900.13	969.24	898.89
972.6	898.82	974.01	898.81	1011.64	898.9	1015.29	898.97	1017.31	898.95
1021.16	898.8	1024.83	898.57	1026.87	898.81	1028.31	898.78	1040.43	898.01
1043.57	898.01	1045.59	897.99	1047.49	898	1067.48	897.54	1094.94	897.14
1094.96	897.14	1094.98	897.14	1095.01	897.14	1095.04	897.14	1095.06	897.14
1095.09	897.14	1095.11	897.14	1095.14	897.14	1095.16	897.14	1128.72	895.78
1157.86	893.8	1185.25	891.47	1202.33	890.05	1214.55	889.25	1216.38	889.05
1228.09	887.83	1237.24	889.68	1258.8	893.75	1271.44	893.48	1275.77	893.43
1280.15	892.13	1326.42	875.97	1326.98	875.78	1339.67	872.98	1341.9	872.86
1342.87	872.8	1378.28	870.64	1397.27	870.31	1417.55	868.96	1419.78	868.92
1425.87	867.75	1426.89	867.54	1428.05	867.41	1438.61	866.15	1441.49	867.03
1448.81	869.57	1457.57	870.74	1462.27	871.39	1464.36	871.41	1469.29	871.44
1472.16	870.44	1474.72	869.54	1476.11	869.56	1482.14	869.64	1484.42	869.64
1487.32	869.64	1491.54	868.63	1493.68	868.15	1503.15	864.42	1505.17	863.61
1507.8	863.63	1519.53	863.89	1521.06	863.53	1530.5	862.34	1530.81	862.37
1538.43	863.07	1543.16	863.08	1554.68	862.84	1583.09	860.18	1586.21	859.98
1587.72	859.93	1590.15	859.92	1590.17	859.92	1590.2	859.92	1590.58	859.91
1590.75	859.91	1590.92	859.91	1592.96	859.87	1596.47	859.82	1630.03	859.39
1637.63	859.16	1641.1	858.66	1645.97	857.51	1647.95	857.31	1650.34	857.59
1661.03	858.49	1663.05	858.42	1676.19	857.86	1710.1	857.88	1711.59	857.85
1712.54	857.84	1735.67	857.4	1763.86	857.21	1774.53	857.09	1778.84	857.04
1788.05	857.03	1819.61	857.11	1837.38	857.02	1872.24	856.58	1899.15	856.2
1940.41	855.99	1953.98	856.01	1960.93	855.97	1994.86	855.82	2022.7	855.64
2035.73	855.62	2061.2	855.6	2076.62	855.53	2084.48	855.47	2108.83	855.12
2146.25	854.71	2162.68	854.12	2182	853.81	2203.66	854.16	2215.13	854.44
2247.5	854.36	2249.97	854.33	2253.48	854.26	2269.8	853.89	2302.83	853.8

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  2330.7  853.86 2338.21  853.86 2358.03   853.9  2366.8  853.34 2388.61  852.29
 2401.68  852.01 2422.55  851.65 2438.75  851.66 2450.89  851.66 2458.19  851.66
 2483.63  852.06 2488.77  852.15 2513.37   852.4 2535.18  852.51 2571.14  852.69
 2583.03  852.79 2605.98  852.68 2624.23  852.61 2632.19  852.54 2643.54  852.42
  2653.3  852.32 2655.42  852.29 2676.71  852.06 2680.39  844.98 2682.57     840
    2705  839.32    2727     840 2732.11  842.17 2740.24  844.07 2749.84  845.91
 2753.52  846.64 2769.77  849.85  2774.7   850.1 2783.54  850.65 2797.54  851.58
 2805.59  850.17 2809.95  849.49 2812.15  850.95 2816.48  852.84 2825.91  852.68
 2853.05  853.19 2855.09  852.98 2860.83  852.11 2868.75  852.17 2873.31  852.59
  2891.7  852.86 2902.71  852.99 2911.87  852.99 2922.67  852.99 2953.13     853
 2965.27  852.77 2965.38  852.76 2965.81  852.75 2966.03  852.74 2966.26  852.73
 2966.38  852.73 2966.51  852.73 2966.67  852.72 2967.28   852.7 2973.83  852.48
 2983.82  851.41  2986.1  851.21 2993.06  851.86 2998.24   852.4 3018.85  853.14
 3023.14  853.19 3041.81  852.51 3048.94  850.74 3056.69  848.58 3067.56  852.48
 3070.35  853.59 3071.53  853.58 3090.19  853.67 3094.75  853.57 3120.81  853.46
 3121.26  853.39 3127.38  852.35 3138.96  850.43 3144.35  851.08 3159.49  852.95
 3166.72  853.07 3195.93   853.4 3211.93  853.79 3218.74  855.11 3227.85  857.06
 3243.83  860.25 3255.74  861.99 3276.95  866.71 3284.22  867.66 3295.07  868.11
 3295.84  868.12 3296.39  868.27 3304.21  869.82 3312.12  871.53 3327.87  873.59
 3348.25  876.56 3356.34  877.98  3380.4  883.23 3383.12  883.89 3393.27  885.33
 3427.29  890.18 3438.66  891.11  3443.5  891.89  3476.2  897.77 3490.73  900.38
 3492.73  900.79 3494.49  901.05 3513.01  903.67 3518.94  904.92 3540.14  908.34
 3552.52  909.74 3566.94  911.49 3590.95  915.81 3609.95  919.32 3630.76  924.75
 3642.03  927.12 3647.57  928.01 3658.92  929.41 3679.25  932.27 3697.08  934.12
 3704.98  934.71  3715.3  935.65 3739.94  937.44 3760.24  939.37 3775.87  940.52
 3802.98  942.85 3804.07  942.91 3805.04  942.97 3819.29  943.75

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0    .075 2535.18      .1 2676.71     .04 2769.77      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2653.3 2769.77          820.5015  887.32901.8345             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2482.12     875       F
 2911.19 3819.29     875       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  854.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.39  * Wt. n-Val.             *   0.089  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  853.94  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)          *  847.18  * Flow Area (sq ft)      *  241.69  * 1080.43  *  260.97  *
* E.G. Slope (ft/ft)      *0.000920  * Area (sq ft)           *  476.36  * 1080.43  *  647.39  *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *  155.46  * 5538.51  *  176.03  *
* Top Width (ft)          *  960.80  * Top Width (ft)         *  401.41  *  116.47  *  442.92  *
* Vel Total (ft/s)        *    3.71  * Avg. Vel. (ft/s)       *    0.64  *    5.13  *    0.67  *
* Max Chl Dpth (ft)       *   14.62  * Hydr. Depth (ft)       *    1.41  *    9.28  *    1.85  *
* Conv. Total (cfs)       *193479.3  * Conv. (cfs)            *  5124.0  *182553.1  *  5802.2  *
* Length Wtd. (ft)        *  884.61  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)          *  839.32  * Shear (lb/sq ft)       *    0.08  *    0.50  *    0.11  *
* Alpha                   *    1.81  * Stream Power (lb/ft s) *    0.05  *    2.54  *    0.07  *
* Frctn Loss (ft)         *    0.72  * Cum Volume (acre-ft)   * 1090.92  * 7126.94  *  944.69  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  291.44  *  565.94  *  284.15  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  857.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *   0.090  *   0.041  *   0.100  *
* W.S. Elev (ft)          *  857.38  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)          *  850.29  * Flow Area (sq ft)      *  830.18  * 1480.84  *  747.15  *
* E.G. Slope (ft/ft)      *0.000905  * Area (sq ft)           * 2686.28  * 1480.84  * 2199.35  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             * 1181.30  * 8711.01  * 1007.69  *
* Top Width (ft)          * 1491.29  * Top Width (ft)         *  915.16  *  116.47  *  459.66  *
* Vel Total (ft/s)        *    3.56  * Avg. Vel. (ft/s)       *    1.42  *    5.88  *    1.35  *
* Max Chl Dpth (ft)       *   18.06  * Hydr. Depth (ft)       *    4.85  *   12.71  *    5.28  *
* Conv. Total (cfs)       *362289.1  * Conv. (cfs)            * 39263.5  *289532.6  * 33493.1  *
* Length Wtd. (ft)        *  878.35  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)          *  839.32  * Shear (lb/sq ft)       *    0.27  *    0.67  *    0.30  *
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```
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    0.39  *    3.93  *    0.40  *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   * 2636.98  * 9542.55  * 2678.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  463.16  *  610.01  *  567.41  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  858.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.090  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  858.31  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)         *  851.14  * Flow Area (sq ft)      *  990.32  * 1589.80  *  879.45  *
* E.G. Slope (ft/ft)     *0.000905  * Area (sq ft)           * 3587.32  * 1589.80  * 2631.54  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1583.15  * 9694.56  * 1322.30  *
* Top Width (ft)         * 1584.82  * Top Width (ft)         * 1004.01  *  116.47  *  464.35  *
* Vel Total (ft/s)       *    3.64  * Avg. Vel. (ft/s)       *    1.60  *    6.10  *    1.50  *
* Max Chl Dpth (ft)      *   18.99  * Hydr. Depth (ft)       *    5.79  *   13.65  *    6.22  *
* Conv. Total (cfs)      *418792.4  * Conv. (cfs)            * 52619.9  *322222.7  * 43949.8  *
* Length Wtd. (ft)       *  877.08  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *    0.33  *    0.72  *    0.35  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.52  *    4.37  *    0.52  *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   * 3622.24  *11276.87  * 3925.89  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  536.09  *  638.25  *  707.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  861.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.090  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  861.28  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)         *  854.90  * Flow Area (sq ft)      * 1499.26  * 1936.08  * 1299.91  *
* E.G. Slope (ft/ft)     *0.000935  * Area (sq ft)           * 6700.22  * 1936.08  * 4035.23  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 3204.74  *13318.13  * 2577.13  *
* Top Width (ft)         * 1679.61  * Top Width (ft)         * 1082.00  *  116.47  *  481.14  *
* Vel Total (ft/s)       *    4.03  * Avg. Vel. (ft/s)       *    2.14  *    6.88  *    1.98  *
* Max Chl Dpth (ft)      *   21.96  * Hydr. Depth (ft)       *    8.76  *   16.62  *    9.19  *
* Conv. Total (cfs)      *624728.3  * Conv. (cfs)            *104821.7  *435613.1  * 84293.6  *
* Length Wtd. (ft)       *  874.11  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *    0.51  *    0.90  *    0.53  *
* Alpha                  *    2.11  * Stream Power (lb/ft s) *    1.09  *    6.20  *    1.05  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   * 5588.30  *13327.15  * 6465.05  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  692.01  *  661.49  *  883.86  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  864.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.090  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  864.36  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)         *  856.66  * Flow Area (sq ft)      * 2026.03  * 2294.49  * 1735.10  *
* E.G. Slope (ft/ft)     *0.000969  * Area (sq ft)           *10127.56  * 2294.49  * 5541.62  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 5385.56  *17667.54  * 4246.90  *
* Top Width (ft)         * 1763.10  * Top Width (ft)         * 1150.00  *  116.47  *  496.63  *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)       *    2.66  *    7.70  *    2.45  *
* Max Chl Dpth (ft)      *   25.04  * Hydr. Depth (ft)       *   11.84  *   19.70  *   12.27  *
* Conv. Total (cfs)      *876803.0  * Conv. (cfs)            *172969.6  *567434.2  *136399.1  *
* Length Wtd. (ft)       *  872.19  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *    0.72  *    1.11  *    0.74  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    1.90  *    8.54  *    1.80  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   * 9082.65  *16325.08  *10816.91  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1108.65  *  689.81  * 1360.78  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

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CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  866.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.090  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  866.23  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)         *  857.64  * Flow Area (sq ft)      * 2345.39  * 2511.78  * 1998.94  *
* E.G. Slope (ft/ft)     *0.000982  * Area (sq ft)           *12277.52  * 2511.78  * 6475.97  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 6916.05  *20501.76  * 5412.19  *
* Top Width (ft)         * 1777.11  * Top Width (ft)         * 1155.63  *  116.47  *  505.01  *
* Vel Total (ft/s)       *    4.79  * Avg. Vel. (ft/s)       *    2.95  *    8.16  *    2.71  *
* Max Chl Dpth (ft)      *   26.91  * Hydr. Depth (ft)       *   13.70  *   21.57  *   14.13  *
* Conv. Total (cfs)      *1047536.0  * Conv. (cfs)           *220676.5  *654167.8  *172691.5  *
* Length Wtd. (ft)       *  871.36  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *    0.84  *    1.23  *    0.86  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    2.48  *   10.04  *    2.33  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *12415.82  *18148.71  *14836.05  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1413.34  *  696.95  * 1810.37  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  868.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.090  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  868.09  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)         *  858.59  * Flow Area (sq ft)      * 2664.42  * 2728.85  * 2262.51  *
* E.G. Slope (ft/ft)     *0.000991  * Area (sq ft)           *14455.24  * 2728.85  * 7429.50  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 8589.96  *23477.12  * 6682.93  *
* Top Width (ft)         * 1821.22  * Top Width (ft)         * 1179.92  *  116.47  *  524.83  *
* Vel Total (ft/s)       *    5.06  * Avg. Vel. (ft/s)       *    3.22  *    8.60  *    2.95  *
* Max Chl Dpth (ft)      *   28.77  * Hydr. Depth (ft)       *   15.57  *   23.43  *   16.00  *
* Conv. Total (cfs)      *1230908.0  * Conv. (cfs)           *272863.2  *745759.4  *212285.7  *
* Length Wtd. (ft)       *  870.73  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *    0.96  *    1.35  *    0.98  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    3.10  *   11.60  *    2.90  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *15648.73  *19440.96  *18897.94  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1622.99  *  697.90  * 2253.34  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  871.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.090  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  870.20  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)         *  859.73  * Flow Area (sq ft)      * 3026.30  * 2975.07  * 2561.47  *
* E.G. Slope (ft/ft)     *0.001032  * Area (sq ft)           *16995.58  * 2975.07  * 8552.11  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *10834.74  *27479.29  * 8385.97  *
* Top Width (ft)         * 1887.87  * Top Width (ft)         * 1235.18  *  116.47  *  536.22  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    3.58  *    9.24  *    3.27  *
* Max Chl Dpth (ft)      *   30.88  * Hydr. Depth (ft)       *   17.68  *   25.54  *   18.11  *
* Conv. Total (cfs)      *1453840.0  * Conv. (cfs)           *337301.4  *855471.2  *261067.7  *
* Length Wtd. (ft)       *  870.14  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *    1.14  *    1.53  *    1.16  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    4.08  *   14.13  *    3.79  *
* Frctn Loss (ft)        *    0.84  * Cum Volume (acre-ft)   *21508.54  *21342.00  *25761.19  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1942.14  *  700.33  * 2677.78  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  862.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.090  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  861.70  * Reach Len. (ft)        *  820.50  *  887.32  *  901.83  *
* Crit W.S. (ft)         *  855.16  * Flow Area (sq ft)      * 1570.68  * 1984.67  * 1358.92  *
* E.G. Slope (ft/ft)     *0.000937  * Area (sq ft)           * 7152.60  * 1984.67  * 4236.58  *
```

```
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 3466.67  *13855.04  * 2778.29  *
* Top Width (ft)         * 1686.92  * Top Width (ft)         * 1086.46  *  116.47  *  483.99  *
* Vel Total (ft/s)       *    4.09  * Avg. Vel. (ft/s)       *    2.21  *    6.98  *    2.04  *
* Max Chl Dpth (ft)      *   22.38  * Hydr. Depth (ft)       *    9.18  *   17.04  *    9.61  *
* Conv. Total (cfs)      *656666.5  * Conv. (cfs)            *113256.0  *452643.8  * 90766.7  *
* Length Wtd. (ft)       *  873.80  * Wetted Per. (ft)       *  171.19  *  125.27  *  142.59  *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *    0.54  *    0.93  *    0.56  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    1.18  *    6.47  *    1.14  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   * 6459.54  *14281.56  * 7509.63  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  793.84  *  671.81  *  965.49  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 29.330

INPUT
Description:
Station Elevation Data num= 324

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	911.15	15.2	911.14	24.42	911.15	36.28	911.1	55.51	910.9
72.7	910.83	85.56	910.76	101.35	910.51	106.59	910.4	118.69	909.16
122.49	908.71	138.26	905	150.56	902.43	161.23	901.64	161.85	901.61
162.18	901.61	162.67	901.43	166.55	900.28	171.29	898.04	172.74	897.93
174.74	898.38	177.08	897.21	178.69	897.12	183.57	896.61	183.84	896.64
184.27	896.67	189.61	897.08	193.91	897.59	207.89	897.68	216.36	897.69
255.77	898.51	279.26	898.75	286.55	898.2	299.02	897.25	307.2	898.61
325.82	901.82	332.52	902.17	340.04	902.42	343.71	902.61	351.67	902.86
357.41	902.79	371.19	902.49	375.66	902.3	383.03	902.08	478.91	901.89
488.32	901.74	587.86	898.88	592.23	899.59	595.43	899.68	627.5	898.84
628.45	898.84	629.02	898.83	630.9	898.8	641.1	898.68	649.94	898.6
654.84	898.23	668.56	897.31	669.95	897.25	671.17	897.17	678.36	896.79
687.83	896.18	690.23	896.23	691.74	896.26	701.15	896.39	701.29	896.39
701.33	896.39	709.22	896.82	718.89	897.51	722.95	897.62	726.42	897.66
730.32	897.74	744.86	898.1	747.45	898.01	753.29	898.07	780.12	898.07
785.95	897.61	792.47	897.51	794.46	897.44	799.82	897.25	808.7	896.78
818.85	895.71	822.06	895.44	826.68	894.47	827.35	894.34	827.98	894.12
848.61	893.68	849.01	893.66	849.46	893.66	850.26	893.66	880.67	893.47
890.63	893.85	898.11	894.3	902.47	893.25	911.23	891.46	913.38	890.91
925.63	887.77	930.13	886.67	942.55	886.34	956.12	886.09	968.99	885.53
1011.2	883.23	1013.06	884.3	1015.28	885.58	1020.86	888.79	1025.46	890.87
1032.7	894.25	1041.66	894.29	1043.09	894.23	1048.46	894.06	1074.82	892.72
1087.76	892.2	1090.05	892.15	1094.68	891.8	1095.94	891.68	1098.11	889.82
1103.02	885.42	1108.23	881.64	1109.22	880.9	1109.24	880.89	1109.4	880.88
1124.89	879.85	1148.12	879.25	1186.08	878.15	1204.68	877.7	1222.35	876.31
1226.18	876.1	1228.39	876.03	1248.47	875.68	1287.58	874.9	1289.6	874.94
1291.39	875.08	1296.77	875.69	1302.33	874.9	1305.99	874.36	1310.82	872.5
1315.24	870.72	1319.75	868.89	1323.08	869.28	1332.65	870.37	1335.38	870.39
1339.75	870.42	1343.93	869.96	1344.12	869.94	1344.39	869.93	1350.67	869.85
1353.97	869.43	1356.77	869.12	1365.27	872.41	1368.35	873.62	1370.09	873.59
1384.48	873.22	1393.39	870.7	1394.87	870.26	1398.27	870.57	1406.84	871.38
1414.51	871.53	1417.96	871.59	1419.4	871.59	1422.39	871.59	1423.13	871.59
1425.37	871.55	1431.88	871.36	1438.08	873.44	1441.36	874.28	1447.69	873.5
1448.39	873.42	1449.04	873.34	1476.39	870.66	1491.07	869.75	1512.87	869.23
1525.07	868.69	1541.67	868.49	1556.49	867.87	1584.37	866.44	1603.76	865.52
1627.76	864.53	1666.28	862.95	1668.16	862.9	1669.65	862.85	1672.11	862.73
1727.48	860.5	1742.19	860.68	1745.62	860.72	1752.59	860.12	1760.23	859.39
1765.18	859.96	1769.13	860.33	1771.34	859.99	1780.14	858.83	1791.18	856.93
1794.92	856.25	1801.83	855.95	1817.71	855.66	1829.33	854.86	1839.5	854.47
1855.26	853.91	1871.67	853.54	1902.77	853.12	1916.18	852.94	1931.19	852.85
1978.33	852.39	2016.08	852.35	2034.7	852.04	2039.75	851.73	2049.69	851.2
2056.26	850.96	2064.75	851.58	2070.26	852.01	2072.69	852.04	2105.07	852.47
2115.3	852.55	2134.16	852.69	2166.56	852.93	2203.56	852.93	2227.88	853.02
2241.3	853.08	2252.1	853.16	2258.97	853.09	2287.58	852.37	2317.63	851.39
2353.97	850.54	2372.09	850.26	2386.65	850.14	2394.44	849.32	2416.03	847.16
2419.58	847.29	2427.16	847.77	2445.8	848.79	2460.61	849.62	2479.28	849.91
2481.25	849.91	2520.51	849.96	2541.75	850.31	2561.09	850.42	2596.84	850.67
2601.67	850.66	2604.29	850.68	2642.24	850.88	2666.66	851.05	2712.31	851.33
2723.41	851.29	2729.34	851.27	2763.98	851.27	2791.88	851.26	2804.56	851.23
2806.77	851.23	2849.54	851.23	2850.83	851.24	2857.13	851.25	2905.68	851.37

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 2913.78  851.26  2952.2   851.4 2952.27  851.36 2953.42  850.69 2954.61  849.91
 2957.47   848.2 2962.33   844.6 2968.29  841.54 2989.11  841.54 3014.01   839.8
    3028  838.57 3041.68   839.8 3046.42  841.54 3050.09  848.67 3052.43  854.29
 3052.53  854.53 3061.84  854.66 3073.15  854.73 3080.62  855.02 3093.17  855.31
 3128.12  856.06 3148.11  857.12  3186.6  859.44 3187.64  859.62 3200.51  862.06
 3218.13  865.35 3225.01  867.61 3239.26  870.82 3250.43   875.1 3257.37  877.98
 3266.51  880.64 3276.83   883.6 3289.35  886.38 3300.95  889.13 3310.43  891.11
 3328.91  896.14 3348.44  901.05 3367.91  904.09 3389.77  909.31 3398.66  911.49
  3408.1  913.12 3418.93  914.87 3432.75  916.58 3434.56  916.84 3452.22  919.32
 3453.31  919.44 3454.82  919.72 3458.41  920.22 3496.98  926.41 3504.07  927.66
 3522.96  931.26 3525.58  931.78 3528.71  932.06 3559.22  935.07 3590.44  939.11
 3591.94  939.36 3600.62  939.98 3622.35  941.43  3627.8  941.84 3638.97  942.77
  3684.1   947.3 3704.51  949.27 3713.91  949.71 3738.96     952 3750.43  952.83
 3775.93  954.72 3779.06   954.9 3781.97   955.1 3819.93  957.55 3834.19  957.98
 3851.94  958.98 3866.51  959.85 3871.71  960.18 3873.05  960.26

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0    .075 2394.44      .1 2952.27     .04 3052.53      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2952.27 3052.53         1252.471 1871.131362.742             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2666.67     875        F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  853.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.33  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)          *  853.25  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)          *  845.92  * Flow Area (sq ft)      *  567.21  * 1152.40  *          *
* E.G. Slope (ft/ft)      *0.000727  * Area (sq ft)           * 1994.03  * 1152.40  *          *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *  358.96  * 5511.04  *          *
* Top Width (ft)          * 1159.05  * Top Width (ft)         * 1059.32  *   99.73  *          *
* Vel Total (ft/s)        *    3.41  * Avg. Vel. (ft/s)       *    0.63  *    4.78  *          *
* Max Chl Dpth (ft)       *   14.68  * Hydr. Depth (ft)       *    1.99  *   11.56  *          *
* Conv. Total (cfs)       *217752.8  * Conv. (cfs)            * 13316.1  *204436.7  *          *
* Length Wtd. (ft)        * 1846.41  * Wetted Per. (ft)       *  285.61  *  110.43  *          *
* Min Ch El (ft)          *  838.57  * Shear (lb/sq ft)       *    0.09  *    0.47  *          *
* Alpha                   *    1.84  * Stream Power (lb/ft s) *    0.06  *    2.26  *          *
* Frctn Loss (ft)         *    1.49  * Cum Volume (acre-ft)   * 1067.65  * 7104.19  *  937.99  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  277.68  *  563.74  *  279.57  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  857.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.45  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  856.60  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)          *  848.62  * Flow Area (sq ft)      * 1522.98  * 1487.58  *  105.76  *
* E.G. Slope (ft/ft)      *0.000818  * Area (sq ft)           * 5744.02  * 1487.58  *  105.76  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             * 1975.26  * 8873.07  *   51.67  *
* Top Width (ft)          * 1345.29  * Top Width (ft)         * 1159.27  *  100.26  *   85.76  *
* Vel Total (ft/s)        *    3.50  * Avg. Vel. (ft/s)       *    1.30  *    5.96  *    0.49  *
* Max Chl Dpth (ft)       *   18.03  * Hydr. Depth (ft)       *    5.33  *   14.84  *    1.23  *
* Conv. Total (cfs)       *381157.1  * Conv. (cfs)            * 69071.9  *310278.4  *  1806.8  *
* Length Wtd. (ft)        * 1762.76  * Wetted Per. (ft)       *  285.61  *  111.81  *   85.79  *
* Min Ch El (ft)          *  838.57  * Shear (lb/sq ft)       *    0.27  *    0.68  *    0.06  *
* Alpha                   *    2.39  * Stream Power (lb/ft s) *    0.35  *    4.05  *    0.03  *
* Frctn Loss (ft)         *    1.52  * Cum Volume (acre-ft)   * 2557.59  * 9512.32  * 2654.14  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *  443.62  *  607.80  *  561.77  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
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*********************************************************************************************
* E.G. Elev (ft)         *  858.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  857.52  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)         *  849.43  * Flow Area (sq ft)      * 1785.24  * 1579.65  *  192.28  *
* E.G. Slope (ft/ft)     *0.000830  * Area (sq ft)           * 6810.92  * 1579.65  *  192.28  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 2593.53  * 9881.04  *  125.44  *
* Top Width (ft)         * 1366.94  * Top Width (ft)         * 1164.50  *  100.26  *  102.17  *
* Vel Total (ft/s)       *    3.54  * Avg. Vel. (ft/s)       *    1.45  *    6.26  *    0.65  *
* Max Chl Dpth (ft)      *   18.95  * Hydr. Depth (ft)       *    6.25  *   15.76  *    1.88  *
* Conv. Total (cfs)      *437305.6  * Conv. (cfs)            * 90012.9  *342939.3  *  4353.5  *
* Length Wtd. (ft)       * 1742.41  * Wetted Per. (ft)       *  285.61  *  111.81  *  102.23  *
* Min Ch El (ft)         *  838.57  * Shear (lb/sq ft)       *    0.32  *    0.73  *    0.10  *
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    0.47  *    4.58  *    0.06  *
* Frctn Loss (ft)        *    1.49  * Cum Volume (acre-ft)   * 3524.30  *11244.59  * 3896.66  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  515.67  *  636.04  *  701.88  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  861.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  860.44  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)         *  853.44  * Flow Area (sq ft)      * 2621.05  * 1873.06  *  556.72  *
* E.G. Slope (ft/ft)     *0.000871  * Area (sq ft)           *10256.75  * 1873.06  *  556.72  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 5039.16  *13446.96  *  613.88  *
* Top Width (ft)         * 1443.16  * Top Width (ft)         * 1203.44  *  100.26  *  139.46  *
* Vel Total (ft/s)       *    3.78  * Avg. Vel. (ft/s)       *    1.92  *    7.18  *    1.10  *
* Max Chl Dpth (ft)      *   21.87  * Hydr. Depth (ft)       *    9.18  *   18.68  *    3.99  *
* Conv. Total (cfs)      *647061.1  * Conv. (cfs)            *170714.3  *455550.1  * 20796.7  *
* Length Wtd. (ft)       * 1692.26  * Wetted Per. (ft)       *  285.61  *  111.81  *  139.66  *
* Min Ch El (ft)         *  838.57  * Shear (lb/sq ft)       *    0.50  *    0.91  *    0.22  *
* Alpha                  *    2.61  * Stream Power (lb/ft s) *    0.96  *    6.54  *    0.24  *
* Frctn Loss (ft)        *    1.47  * Cum Volume (acre-ft)   * 5428.59  *13288.35  * 6417.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  670.49  *  659.29  *  877.44  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  864.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  863.51  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)         *  855.56  * Flow Area (sq ft)      * 3496.25  * 2180.30  * 1008.92  *
* E.G. Slope (ft/ft)     *0.000891  * Area (sq ft)           *14118.96  * 2180.30  * 1008.92  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 8235.56  *17512.81  * 1551.63  *
* Top Width (ft)         * 1555.60  * Top Width (ft)         * 1299.60  *  100.26  *  155.74  *
* Vel Total (ft/s)       *    4.08  * Avg. Vel. (ft/s)       *    2.36  *    8.03  *    1.54  *
* Max Chl Dpth (ft)      *   24.94  * Hydr. Depth (ft)       *   12.24  *   21.75  *    6.48  *
* Conv. Total (cfs)      *914707.6  * Conv. (cfs)            *275938.9  *586780.2  * 51988.5  *
* Length Wtd. (ft)       * 1656.03  * Wetted Per. (ft)       *  285.61  *  111.81  *  156.23  *
* Min Ch El (ft)         *  838.57  * Shear (lb/sq ft)       *    0.68  *    1.08  *    0.36  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    1.60  *    8.71  *    0.55  *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)   * 8854.29  *16279.50  *10749.10  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1085.58  *  687.60  * 1354.03  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  866.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  865.38  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
```

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* Crit W.S. (ft)         *  856.77  * Flow Area (sq ft)      * 4031.54  * 2368.21  * 1310.21  *
* E.G. Slope (ft/ft)     *0.000890  * Area (sq ft)           *16597.53  * 2368.21  * 1310.21  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *10438.56  *20092.32  * 2299.12  *
* Top Width (ft)         * 1611.14  * Top Width (ft)         * 1345.18  *  100.26  *  165.70  *
* Vel Total (ft/s)       *    4.26  * Avg. Vel. (ft/s)       *    2.59  *    8.48  *    1.75  *
* Max Chl Dpth (ft)      *   26.81  * Hydr. Depth (ft)       *   14.12  *   23.62  *    7.91  *
* Conv. Total (cfs)      *1100418.0  * Conv. (cfs)           *349886.8  *673467.8  * 77063.5  *
* Length Wtd. (ft)       * 1639.42  * Wetted Per. (ft)       *  285.61  *  111.81  *  166.37  *
* Min Ch El (ft)         *  838.57  * Shear (lb/sq ft)       *    0.78  *    1.18  *    0.44  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    2.03  *    9.99  *    0.77  *
* Frctn Loss (ft)        *    1.42  * Cum Volume (acre-ft)   *12143.88  *18099.01  *14755.45  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1389.78  *  694.75  * 1803.42  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  868.03  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  867.27  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)         *  857.86  * Flow Area (sq ft)      * 4569.44  * 2557.05  * 1627.69  *
* E.G. Slope (ft/ft)     *0.000882  * Area (sq ft)           *19168.70  * 2557.05  * 1627.69  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *12806.19  *22734.43  * 3209.38  *
* Top Width (ft)         * 1655.70  * Top Width (ft)         * 1384.00  *  100.26  *  171.43  *
* Vel Total (ft/s)       *    4.43  * Avg. Vel. (ft/s)       *    2.80  *    8.89  *    1.97  *
* Max Chl Dpth (ft)      *   28.70  * Hydr. Depth (ft)       *   16.00  *   25.50  *    9.49  *
* Conv. Total (cfs)      *1304469.0  * Conv. (cfs)           *431103.8  *765325.3  *108039.6  *
* Length Wtd. (ft)       * 1625.62  * Wetted Per. (ft)       *  285.61  *  111.81  *  172.40  *
* Min Ch El (ft)         *  838.57  * Shear (lb/sq ft)       *    0.88  *    1.26  *    0.52  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *    2.47  *   11.20  *    1.03  *
* Frctn Loss (ft)        *    1.39  * Cum Volume (acre-ft)   *15332.05  *19387.12  *18804.19  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1598.84  *  695.69  * 2246.14  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  870.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  869.37  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)         *  859.14  * Flow Area (sq ft)      * 5169.68  * 2767.76  * 1996.87  *
* E.G. Slope (ft/ft)     *0.000908  * Area (sq ft)           *22136.13  * 2767.76  * 1996.87  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *15958.93  *26317.85  * 4423.22  *
* Top Width (ft)         * 1733.87  * Top Width (ft)         * 1453.33  *  100.26  *  180.28  *
* Vel Total (ft/s)       *    4.70  * Avg. Vel. (ft/s)       *    3.09  *    9.51  *    2.22  *
* Max Chl Dpth (ft)      *   30.80  * Hydr. Depth (ft)       *   18.10  *   27.61  *   11.08  *
* Conv. Total (cfs)      *1549635.0  * Conv. (cfs)           *529561.5  *873299.0  *146774.8  *
* Length Wtd. (ft)       * 1613.21  * Wetted Per. (ft)       *  285.61  *  111.81  *  181.51  *
* Min Ch El (ft)         *  838.57  * Shear (lb/sq ft)       *    1.03  *    1.40  *    0.62  *
* Alpha                  *    2.47  * Stream Power (lb/ft s) *    3.17  *   13.35  *    1.38  *
* Frctn Loss (ft)        *    1.43  * Cum Volume (acre-ft)   *21139.99  *21283.51  *25651.99  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1916.82  *  698.12  * 2670.37  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  861.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  860.86  * Reach Len. (ft)        * 1252.47  * 1871.13  * 1362.74  *
* Crit W.S. (ft)         *  853.74  * Flow Area (sq ft)      * 2740.20  * 1914.89  *  615.35  *
* E.G. Slope (ft/ft)     *0.000872  * Area (sq ft)           *10765.85  * 1914.89  *  615.35  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 5427.89  *13954.22  *  717.89  *
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* Top Width (ft)          * 1475.67  * Top Width (ft)          * 1233.76  *  100.26  *  141.66  *
* Vel Total (ft/s)        *    3.81  * Avg. Vel. (ft/s)        *    1.98  *    7.29  *    1.17  *
* Max Chl Dpth (ft)       *   22.29  * Hydr. Depth (ft)        *    9.59  *   19.10  *    4.34  *
* Conv. Total (cfs)       *680788.0  * Conv. (cfs)             *183842.9  *472630.2  * 24314.9  *
* Length Wtd. (ft)        * 1686.44  * Wetted Per. (ft)        *  285.61  *  111.81  *  141.90  *
* Min Ch El (ft)          *  838.57  * Shear (lb/sq ft)        *    0.52  *    0.93  *    0.24  *
* Alpha                   *    2.61  * Stream Power (lb/ft s) *    1.03  *    6.79  *    0.28  *
* Frctn Loss (ft)         *    1.46  * Cum Volume (acre-ft)   * 6290.78  *14241.84  * 7459.41  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  771.98  *  669.60  *  959.01  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 28.975

INPUT
Description:
Station Elevation Data    num=     428
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  886.33   17.13  885.66    27.4  885.31   45.71  884.81    52.4  885.13
   57.66  885.65   65.27     886   76.25  886.65   76.49  886.64    86.4  885.59
   90.37  884.75  102.33  884.36  141.18  882.85  151.64  882.68  167.33   882.4
  201.39  881.92  257.67  881.11  261.26  881.02   268.4  880.88  321.31  879.78
  347.97  879.16  368.02  878.79  381.35  878.32  403.91  877.97  438.28  877.49
  440.13  877.47  441.31  877.43  443.98  877.36  480.35  876.26   494.8  875.66
  503.92  875.11  510.82  874.94  521.47  874.62  528.01  874.01  537.77  873.37
  546.33  872.95  561.48  872.17  584.41  871.69  618.89  870.58  620.47  870.55
  621.69  870.55  622.83  870.57  669.23  871.12  675.84  871.19  688.43  871.12
  696.54  870.87  703.26  870.63  721.51  870.04  737.12  869.43  742.28  869.56
  745.35  869.69  751.88  868.95  752.33   868.9  753.45  868.45  760.37  865.84
  763.35  865.87  779.35  866.01  781.19  866.51  791.71  868.78  805.58  868.63
  821.55  868.67  834.68  868.62  846.54  868.77   860.2  868.72  876.12  868.87
   886.9   868.9  897.07  868.74  901.59  868.78  910.57  868.86  924.07  868.67
  940.98   868.7  943.12  868.76  944.89  868.09  950.53  865.73  953.71  865.75
  965.62  865.82  967.68  865.84  968.41  865.84  969.04  866.14  975.14  869.85
  984.66  870.71  986.13  870.81   996.8  871.13 1000.22  870.47 1016.05  867.43
 1017.85  867.11 1025.11  865.92 1033.83  865.92 1061.98  865.89 1123.41  865.85
 1143.98  865.82 1146.84  866.42 1153.75  867.39  1159.9  867.97 1163.07  868.19
 1164.85  868.21    1167  868.18 1178.75  868.11 1214.79  866.88 1220.16  866.85
 1231.62  866.79 1240.24  867.11  1244.3   867.5  1250.6  867.55 1265.98  867.48
 1281.49  867.14 1285.89   870.1 1287.94  871.37 1297.15  872.58 1299.24  872.85
 1299.42  872.87 1299.56  872.87 1315.66  872.93 1344.71  873.24 1358.49  873.39
 1370.19  873.46 1384.88  873.86 1400.25   874.4  1409.5  874.59 1414.35  873.33
 1415.99  872.91 1440.73  871.64 1454.69  871.67 1466.15  871.23 1479.12  871.11
 1493.99  870.46 1499.01  869.96 1504.58  869.71 1515.34   869.4 1522.62   868.9
 1527.96  868.57 1542.22  867.67 1544.97  867.54 1551.26  867.16 1557.25  866.57
 1571.46   864.5 1571.76  864.48 1571.98  864.47 1585.06  863.71 1593.35  863.27
 1599.87  863.04 1601.68  862.91 1604.62  862.86 1612.69  863.35 1624.15  862.89
 1632.45  862.75 1636.29  862.52 1656.61  860.63 1656.98   860.6  1657.2   860.6
 1658.05  860.52 1679.92  858.29 1688.97  857.64 1692.01   857.7 1698.03  857.78
 1699.75  859.53 1704.38  861.84 1706.31  862.27 1709.91  863.07 1712.96   863.6
 1713.56   863.6 1714.26   863.3 1718.99  860.71 1724.89  859.64  1732.9  857.71
 1740.75  857.66 1749.71  857.59 1764.76  871.59 1769.62  874.69  1780.2  877.81
 1781.72  878.03 1787.34  878.06 1808.75  878.26 1816.81  878.26 1845.73  879.01
 1852.37  878.99 1856.75  879.03 1886.22   878.7 1887.28  878.56 1888.99  878.09
 1893.74  876.78 1902.29   870.4 1907.22  867.26 1915.62  863.99  1918.3  862.72
 1925.94  866.95 1928.27   868.2  1929.3  868.38  1931.4  868.71 1932.95  868.96
 1933.53  869.05 1939.36  869.83 1940.35  869.97 1941.55  869.97 1945.84  869.97
 1951.55  870.17 1952.29   870.2 1955.27  869.69  1957.9  869.25 1959.09  869.03
 1966.25  867.59 1971.23  869.34  1976.8  871.32  1983.1  871.76 1990.28  872.31
 2003.87  870.65 2006.97  870.24 2008.97  870.05 2016.99   870.1 2020.62  870.09
 2023.98  870.45 2027.08  870.78  2031.4  871.23  2034.8  871.59 2046.91  870.77
 2049.04  870.62 2054.34  870.63 2054.92  870.63 2062.77  870.38 2067.26  870.24
  2082.5  872.46 2084.38  872.69  2093.8  871.61  2094.2  871.55 2138.61  868.53
 2141.06  868.31 2144.01  868.22 2182.67  867.24  2207.3  867.28 2246.87  866.59
 2258.62  866.26 2302.75   864.8 2334.66  864.07 2353.66  863.65 2368.44   863.4
 2374.98  863.25 2380.33   863.2 2390.75  862.95 2401.94  861.73 2417.27  860.22
 2421.41  860.04 2433.02  859.14 2443.44  858.15 2468.68  854.87 2472.79  854.46
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 2475.54  854.36 2479.53  853.94 2508.13  852.29 2558.99  851.34 2561.27  851.29
 2563.53  851.31 2589.95  851.22 2603.42   851.2  2633.9  850.94 2646.08  850.83
 2655.67  850.97  2688.7  851.25 2692.85  851.33  2698.9  851.45 2718.08     852
 2722.41  851.78 2729.42  851.41 2747.94  852.22 2761.74  852.52 2762.44  852.53
 2763.37  852.55 2766.53  852.62 2775.52   852.8 2780.31  846.35 2784.57  840.79
 2802.52   838.1    2820  837.65    2845   838.5 2853.36  840.81 2856.41  840.81
 2858.76  841.44  2861.4  841.97 2866.15  845.73 2866.83  846.31  2872.3  850.91
 2914.94  850.51 2916.13  850.48 2917.04  850.49 2973.37  850.67  2996.8  850.64
 3010.01  850.72 3034.67  850.74 3044.73  850.64 3058.19  850.56 3103.35   850.6
 3150.01  850.55 3162.61  850.48 3172.04  850.53 3201.93   850.6 3240.73  850.64
 3241.47  850.64 3242.52  850.62 3242.73  850.61 3266.98  850.09 3278.84  848.85
 3290.59  847.64 3300.46  848.73    3307  849.57 3315.02   849.6  3340.9  849.99
 3365.71  850.82 3380.11  851.41 3398.23  852.21 3425.36  852.24 3437.66  852.22
 3446.73  852.35 3476.96  852.73 3515.03     853 3516.25  853.03  3517.5  853.06
 3522.13  853.17 3560.07  854.08 3579.45  854.41 3604.72   854.5 3605.54  854.49
 3606.26  854.51 3606.88  854.52 3625.99  854.71 3652.72  854.86 3678.26  854.92
 3700.93  855.24 3712.84   855.4 3721.53  855.45 3782.71  855.81 3790.22  855.86
 3792.74  855.87  3858.9  856.05 3878.53  855.54 3896.31  855.09 3917.34   855.1
 3945.87  855.49 3959.11  855.45 3975.14   855.4  3983.9  854.41 3989.77   853.8
 3998.77  853.62 4013.71  853.74  4022.2  853.75 4027.31  853.75 4034.71  853.75
 4046.96  853.72 4047.92  853.76 4050.28  853.84 4065.42  853.76 4066.69  853.75
 4069.67  853.81 4092.47  854.81 4092.68  854.83 4094.75  854.87 4100.67  854.99
 4101.96  854.67 4105.49  853.85  4107.9  854.17 4127.01  857.72 4145.36  860.98
 4146.75  861.32 4155.53  863.38 4166.42  865.37 4180.33  870.61  4185.1  872.52
 4186.96  872.89 4189.39   873.3 4198.91  874.91 4201.23  876.41 4203.94  877.98
 4222.92  886.69 4234.28  891.11 4257.28  897.64 4271.25  902.71 4274.89  903.72
 4276.72  904.29 4291.62  908.94    4298  911.49 4319.27  916.26 4319.52  916.31
 4319.91   916.4 4334.24  919.29 4343.13  921.69 4363.58  926.25 4376.14  928.98
 4397.59  935.28 4399.74  935.72 4409.94  936.45 4421.93  937.25 4424.62  937.53
 4434.54  938.64 4439.89  939.23 4440.69  939.29 4441.52  939.36 4461.89  940.17
 4477.41  940.95 4497.91     942 4526.76  943.28 4538.95  943.43 4541.96  943.53
 4556.95  943.63 4578.44  943.84 4590.63  943.85 4590.97  943.85  4591.5  943.85
 4597.64  943.16 4612.95  940.69 4613.09  940.68 4613.36  940.67  4624.1  940.08
 4632.13  939.07 4639.22  938.07 4648.88  933.69 4656.56  930.65 4656.85  930.54
 4657.14  930.65 4661.72  932.34 4663.45  932.39 4671.63  932.59 4679.26  933.09
 4692.85  934.13 4700.86  934.68 4706.56  935.18 4709.56  934.89 4720.96  933.63
  4721.5  933.89 4722.18  934.16 4726.93  936.19

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0      .1 2775.52     .04  2872.3      .1 3242.73     .06 4100.67      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2766.53  2872.3            892.5 1241.31 881.622              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2560.55  870.93       F
 3102.65 4726.93     870       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  852.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  851.67  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  844.54  * Flow Area (sq ft)      *   76.94  * 1087.65  *  237.12  *
* E.G. Slope (ft/ft)     *0.000897  * Area (sq ft)           *   80.36  * 1087.65  *  644.38  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *   21.83  * 5740.62  *  107.56  *
* Top Width (ft)         *  785.45  * Top Width (ft)         *  175.86  *   95.94  *  513.65  *
* Vel Total (ft/s)       *    4.19  * Avg. Vel. (ft/s)       *    0.28  *    5.28  *    0.45  *
* Max Chl Dpth (ft)      *   14.02  * Hydr. Depth (ft)       *    0.49  *   11.34  *    1.03  *
* Conv. Total (cfs)      *196041.2  * Conv. (cfs)            *   729.0  *191720.1  *  3592.1  *
* Length Wtd. (ft)       * 1228.89  * Wetted Per. (ft)       *  156.76  *  105.23  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.03  *    0.58  *    0.06  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.01  *    3.05  *    0.03  *
* Frctn Loss (ft)        *    1.46  * Cum Volume (acre-ft)   * 1037.83  * 7056.08  *  927.91  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  259.93  *  559.54  *  271.53  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  855.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  855.04  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  847.37  * Flow Area (sq ft)      *  751.84  * 1434.89  * 1014.78  *
* E.G. Slope (ft/ft)     *0.000908  * Area (sq ft)           *  984.02  * 1434.89  * 2967.01  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  797.80  * 8881.37  * 1220.84  *
* Top Width (ft)         * 1354.01  * Top Width (ft)         *  299.19  *  105.77  *  949.06  *
* Vel Total (ft/s)       *    3.40  * Avg. Vel. (ft/s)       *    1.06  *    6.19  *    1.20  *
* Max Chl Dpth (ft)      *   17.39  * Hydr. Depth (ft)       *    3.65  *   13.57  *    4.41  *
* Conv. Total (cfs)      *361786.1  * Conv. (cfs)            * 26479.9  *294784.9  * 40521.2  *
* Length Wtd. (ft)       * 1174.22  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.21  *    0.70  *    0.25  *
* Alpha                  *    2.71  * Stream Power (lb/ft s) *    0.22  *    4.35  *    0.30  *
* Frctn Loss (ft)        *    1.24  * Cum Volume (acre-ft)   * 2460.86  * 9449.55  * 2606.07  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  422.65  *  603.38  *  545.58  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  856.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  856.02  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  848.19  * Flow Area (sq ft)      *  953.23  * 1538.30  * 1239.99  *
* E.G. Slope (ft/ft)     *0.000880  * Area (sq ft)           * 1280.22  * 1538.30  * 4029.88  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1166.83  * 9754.11  * 1679.06  *
* Top Width (ft)         * 1646.55  * Top Width (ft)         *  306.71  *  105.77  * 1234.07  *
* Vel Total (ft/s)       *    3.38  * Avg. Vel. (ft/s)       *    1.22  *    6.34  *    1.35  *
* Max Chl Dpth (ft)      *   18.37  * Hydr. Depth (ft)       *    4.63  *   14.54  *    5.38  *
* Conv. Total (cfs)      *424686.6  * Conv. (cfs)            * 39328.2  *328765.1  * 56593.3  *
* Length Wtd. (ft)       * 1161.44  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.25  *    0.73  *    0.30  *
* Alpha                  *    2.76  * Stream Power (lb/ft s) *    0.31  *    4.64  *    0.40  *
* Frctn Loss (ft)        *    1.17  * Cum Volume (acre-ft)   * 3407.98  *11177.63  * 3830.61  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  494.52  *  631.61  *  680.98  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  859.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  859.01  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  853.03  * Flow Area (sq ft)      * 1568.65  * 1854.31  * 1928.22  *
* E.G. Slope (ft/ft)     *0.000863  * Area (sq ft)           * 2283.82  * 1854.31  * 7775.37  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2649.71  *12980.71  * 3469.58  *
* Top Width (ft)         * 1749.98  * Top Width (ft)         *  382.24  *  105.77  * 1261.97  *
* Vel Total (ft/s)       *    3.57  * Avg. Vel. (ft/s)       *    1.69  *    7.00  *    1.80  *
* Max Chl Dpth (ft)      *   21.36  * Hydr. Depth (ft)       *    7.62  *   17.53  *    8.37  *
* Conv. Total (cfs)      *650252.6  * Conv. (cfs)            * 90208.6  *441923.5  *118120.6  *
* Length Wtd. (ft)       * 1133.06  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.41  *    0.86  *    0.45  *
* Alpha                  *    2.69  * Stream Power (lb/ft s) *    0.69  *    6.05  *    0.81  *
* Frctn Loss (ft)        *    1.11  * Cum Volume (acre-ft)   * 5248.31  *13208.29  * 6287.18  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  647.69  *  654.86  *  855.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  862.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  862.12  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  854.88  * Flow Area (sq ft)      * 2208.86  * 2183.06  * 2644.18  *
* E.G. Slope (ft/ft)     *0.000856  * Area (sq ft)           * 3614.84  * 2183.06  *11724.01  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4667.86  *16784.05  * 5848.09  *
* Top Width (ft)         * 1854.93  * Top Width (ft)         *  471.31  *  105.77  * 1277.85  *
* Vel Total (ft/s)       *    3.88  * Avg. Vel. (ft/s)       *    2.11  *    7.69  *    2.21  *
* Max Chl Dpth (ft)      *   24.47  * Hydr. Depth (ft)       *   10.72  *   20.64  *   11.48  *
* Conv. Total (cfs)      *933323.9  * Conv. (cfs)            *159583.4  *573807.8  *199932.7  *
* Length Wtd. (ft)       * 1113.65  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.57  *    1.01  *    0.61  *
* Alpha                  *    2.53  * Stream Power (lb/ft s) *    1.21  *    7.75  *    1.36  *
* Frctn Loss (ft)        *    1.09  * Cum Volume (acre-ft)   * 8599.34  *16185.79  *10549.93  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1060.12  *  683.18  * 1331.60  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  864.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  864.03  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  855.86  * Flow Area (sq ft)      * 2601.98  * 2384.93  * 3083.81  *
* E.G. Slope (ft/ft)     *0.000845  * Area (sq ft)           * 4628.96  * 2384.93  *14170.81  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 6093.69  *19227.94  * 7508.37  *
* Top Width (ft)         * 2004.56  * Top Width (ft)         *  612.02  *  105.77  * 1286.77  *
* Vel Total (ft/s)       *    4.07  * Avg. Vel. (ft/s)       *    2.34  *    8.06  *    2.43  *
* Max Chl Dpth (ft)      *   26.38  * Hydr. Depth (ft)       *   12.63  *   22.55  *   13.39  *
* Conv. Total (cfs)      *1129629.0  * Conv. (cfs)            *209674.4  *661603.3  *258351.1  *
* Length Wtd. (ft)       * 1102.61  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.67  *    1.09  *    0.71  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    1.56  *    8.77  *    1.72  *
* Frctn Loss (ft)        *    1.04  * Cum Volume (acre-ft)   *11838.72  *17996.93  *14513.30  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1361.65  *  690.32  * 1780.70  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  866.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  865.94  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  856.76  * Flow Area (sq ft)      * 2997.05  * 2587.80  * 3525.62  *
* E.G. Slope (ft/ft)     *0.000832  * Area (sq ft)           * 5917.10  * 2587.80  *16648.46  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 7655.92  *21777.45  * 9316.63  *
* Top Width (ft)         * 2260.38  * Top Width (ft)         *  858.97  *  105.77  * 1295.64  *
* Vel Total (ft/s)       *    4.25  * Avg. Vel. (ft/s)       *    2.55  *    8.42  *    2.64  *
* Max Chl Dpth (ft)      *   28.29  * Hydr. Depth (ft)       *   14.55  *   24.47  *   15.31  *
* Conv. Total (cfs)      *1343192.0  * Conv. (cfs)            *265377.3  *754871.9  *322942.5  *
* Length Wtd. (ft)       * 1093.60  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.76  *    1.16  *    0.80  *
* Alpha                  *    2.36  * Stream Power (lb/ft s) *    1.93  *    9.79  *    2.10  *
* Frctn Loss (ft)        *    1.00  * Cum Volume (acre-ft)   *14971.41  *19276.62  *18518.31  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1566.59  *  691.27  * 2223.19  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  868.76  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.100  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  868.02  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  857.89  * Flow Area (sq ft)      * 3424.19  * 2807.13  * 4003.29  *
* E.G. Slope (ft/ft)     *0.000861  * Area (sq ft)           * 7980.30  * 2807.13  *19340.91  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 9722.03  *25268.19  *11709.79  *
* Top Width (ft)         * 2580.50  * Top Width (ft)         * 1173.59  *  105.77  * 1301.15  *
* Vel Total (ft/s)       *    4.56  * Avg. Vel. (ft/s)       *    2.84  *    9.00  *    2.93  *
* Max Chl Dpth (ft)      *   30.37  * Hydr. Depth (ft)       *   16.62  *   26.54  *   17.38  *
* Conv. Total (cfs)      *1591704.0  * Conv. (cfs)           *331361.6  *861230.5  *399111.6  *
* Length Wtd. (ft)       * 1085.78  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.89  *    1.30  *    0.93  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    2.54  *   11.74  *    2.73  *
* Frctn Loss (ft)        *    1.01  * Cum Volume (acre-ft)   *20707.03  *21163.77  *25318.22  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1879.06  *  693.70  * 2647.19  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  859.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  859.44  * Reach Len. (ft)        *  892.50  * 1241.31  *  881.62  *
* Crit W.S. (ft)         *  853.29  * Flow Area (sq ft)      * 1657.43  * 1899.90  * 2027.51  *
* E.G. Slope (ft/ft)     *0.000857  * Area (sq ft)           * 2451.15  * 1899.90  * 8319.84  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2894.28  *13446.38  * 3759.34  *
* Top Width (ft)         * 1764.55  * Top Width (ft)         *  394.39  *  105.77  * 1264.39  *
* Vel Total (ft/s)       *    3.60  * Avg. Vel. (ft/s)       *    1.75  *    7.08  *    1.85  *
* Max Chl Dpth (ft)      *   21.79  * Hydr. Depth (ft)       *    8.05  *   17.96  *    8.80  *
* Conv. Total (cfs)      *686677.9  * Conv. (cfs)           * 98877.6  *459369.7  *128430.7  *
* Length Wtd. (ft)       * 1130.19  * Wetted Per. (ft)       *  206.03  *  115.63  *  230.35  *
* Min Ch El (ft)         *  837.65  * Shear (lb/sq ft)       *    0.43  *    0.88  *    0.47  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    0.75  *    6.22  *    0.87  *
* Frctn Loss (ft)        *    1.10  * Cum Volume (acre-ft)   * 6100.77  *14159.91  * 7319.64  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  748.58  *  665.18  *  937.02  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 28.740

INPUT
Description:
Station Elevation Data    num=     385
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   880.1   13.51  879.95    66.6  879.04   70.72  879.02   73.44     879
   106.8  878.82  133.37  878.64  152.26  878.74  177.77  878.66  188.01  878.38
  210.31  878.68  210.66  878.67  211.53  878.65  234.45   877.7  244.56  877.76
  248.83  877.72  259.41  877.62  266.79   877.6  270.08  878.24  270.12  877.59
  271.57  877.58   272.9  877.64  277.88  878.25  284.15  879.07  288.74  879.79
  292.21  880.33  296.13  880.74  312.45   880.5  318.65  880.02  321.87  879.08
  327.16   877.7  327.22   877.7  329.18  878.82   340.6  885.14  342.02  885.46
  344.03  885.38  345.92  885.38   355.2  885.79  367.43   885.8  382.02  885.29
  389.54  885.24   394.6  885.27  406.03  885.22  419.98   884.9  426.16  885.24
  427.45  884.68  427.88  884.64  434.14  875.83   456.6   875.6  532.17  874.86
  532.21  874.86  532.67  874.86  536.65  875.66  536.89  875.72  547.25  876.09
     555  876.34  566.31  877.21  569.21  875.31  572.84  874.65  609.69   872.9
  611.81   872.8  612.81  872.76  653.17  874.97  655.83  875.01  657.68  874.93
  665.74  874.83  671.16  874.42  679.57  873.93  683.36  874.02  689.56  876.35
  695.93  878.97  701.74  878.92  716.93  880.29  718.76  880.29  729.26  875.38
  732.73  873.75  743.33  871.52  746.22  870.98  792.24  870.54  792.44  870.54
  797.25  870.55  812.05  870.59   812.9  870.59  817.99  870.66  848.17  871.01
  855.75  871.16  903.87  871.16  917.28  870.82  945.49   869.3  955.45  869.22
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  971.23  869.27   972.4  869.27  973.53  869.27 1008.83  869.06 1032.33  869.12
 1045.02  869.08 1064.55  869.18 1088.98  869.23 1092.27  869.19 1146.77  868.62
 1152.19  868.58 1154.05  868.54 1154.91  868.54 1212.12  867.91 1225.56  867.76
 1245.61   867.7 1266.66  867.51 1290.97   867.3 1307.31  867.11 1314.54  867.07
 1330.32  866.65 1337.19  866.32 1357.91  865.12 1364.91  864.18 1366.27     864
 1374.06  863.91 1374.61   863.9 1383.44  863.73 1384.55  863.72 1393.35  867.42
 1397.32   869.1 1397.93  869.11 1404.44  869.27 1405.95  869.43 1411.64  870.06
 1414.03  870.06 1417.49  870.07 1417.67  870.04 1417.99  870.01  1423.7  869.33
 1425.32  869.14 1428.79  869.16 1436.43  869.21 1440.32  869.22 1442.34  869.22
 1447.09  868.14 1453.07   866.8 1459.95  863.45 1464.09  861.51 1475.36  862.92
 1483.32  864.11 1488.67  864.35 1494.73  864.56 1498.11  864.02 1509.26  862.05
 1517.44  861.82 1550.21  860.68 1561.34  860.43 1582.03  860.01 1604.57  859.78
 1615.82  858.78 1621.52   858.1 1630.63  858.93 1643.39  859.77 1647.34  860.04
 1650.45   860.2 1655.45  860.42 1664.61  860.67 1670.01  860.97 1674.86  861.14
 1691.21  861.56 1700.48  861.48  1709.4  861.34 1712.13  861.33 1719.19   860.8
 1720.27   860.7 1724.53  860.26 1726.06  860.04 1733.76  858.67 1740.05  858.93
 1754.54  859.58 1776.26  859.51 1792.63  859.88 1797.23  860.01 1817.03  860.22
 1830.16   860.8 1835.69  861.05 1837.52  861.55 1837.68  861.55  1837.7  861.64
 1837.84  861.55 1838.38  861.73 1839.15  861.84 1846.32  862.86 1862.01  864.96
 1867.81   865.7 1876.94  866.43 1877.18  866.44 1877.28  866.45  1882.2  866.91
 1888.17  867.52 1889.52  867.66 1890.26  867.73 1896.45  868.35 1899.83   868.6
 1906.07   869.1 1907.74  869.28 1914.87  870.04 1916.35  870.21 1918.31  870.34
 1933.17  870.75 1948.72  870.26 1954.25  870.02 1957.23   869.9 1969.52  869.52
 1982.56  869.09 1989.89  868.49 2002.17  867.52 2013.09  866.59 2020.02  866.26
 2023.37  866.34 2038.16  866.14 2062.77  862.08 2066.67   861.2 2078.92     861
 2124.97  860.22 2135.92   857.7 2139.49  857.03  2145.1  855.72 2148.79  855.79
 2153.36  855.56 2163.39  854.42 2182.65  853.01 2186.04  852.78 2227.97  849.64
 2230.94  849.35 2243.22  848.91 2257.43  848.44 2274.16  847.88 2277.83  847.69
 2280.47  847.43 2286.52  846.94 2287.16  846.98 2293.33  847.43  2297.5  847.82
 2309.03  847.34 2320.19   847.1 2333.32  846.77 2340.45  845.75 2352.19  843.95
 2357.66   843.2 2359.92  842.62  2376.9  842.31 2377.53  842.28 2389.75  841.77
  2393.9  841.63 2393.93  841.66  2399.7  848.42 2401.52  848.55 2417.48  848.92
 2434.28  848.81 2470.66  848.82 2488.42  848.75  2515.3  848.55 2530.59  848.38
 2560.59   848.1 2590.53  847.57  2601.8  847.49 2673.17  848.05 2675.18  848.04
 2734.76   847.2 2741.91  847.08  2749.5  846.66 2763.32  845.59 2771.66  844.79
 2778.75  844.81 2784.68  844.56 2789.21  845.37 2806.16  847.35 2810.54  847.33
 2818.85  847.58 2861.17  848.28 2869.36  848.46 2876.12  848.53 2889.86   848.4
 2941.79  847.78 2968.24   847.8 3005.43  847.61 3023.16  847.66 3025.38  847.68
 3033.34  848.23 3040.27   848.8 3065.19  849.08 3070.58  849.12 3073.87  849.15
 3125.41  848.43 3133.89  848.24 3147.98  846.65 3150.74  846.35  3152.1  846.49
 3166.02  847.74 3174.74  847.93 3176.68  847.97 3210.93  848.85 3246.63  849.36
 3268.28  849.18  3283.6  849.13 3288.52  847.82 3289.91  847.45 3292.34  846.71
 3297.94  846.16  3304.9  845.45 3310.68   842.6 3311.43  842.27 3316.48  840.05
 3316.75  839.92 3316.99  837.05    3370     838  3371.1  839.92  3372.1  840.81
 3375.87  843.47 3386.49   850.5 3390.24  850.43  3391.8  850.44 3427.59  850.72
 3432.59  850.94 3435.77  852.01 3442.22   853.9 3446.64   855.2 3453.09  857.48
 3473.54   858.4 3488.14  859.22 3493.36  859.44 3495.33  859.41 3513.56  859.81
 3518.06  859.91 3526.03  860.11 3527.54  859.86 3527.92  859.59 3529.13  859.54
 3547.21  856.34 3560.35  855.45 3563.88   854.9 3576.77  855.24 3582.69   855.3
 3595.32   855.5  3600.8  855.66 3608.57  855.99 3614.62   855.8 3652.49  856.13
 3690.71  857.33 3701.65  857.69 3708.37  857.92 3738.98  859.59 3751.89  860.49
 3778.67  861.22  3781.2   861.3 3784.28  861.51  3803.7   862.8 3814.51  863.32
 3824.18  863.88 3837.85  865.15 3852.25  866.46 3900.28  869.46 3902.21  869.56
 3903.08  869.62 3906.22  869.77 3967.02  872.96 3982.53  873.57 4008.33  873.63
  4022.5   873.5 4031.02  873.47 4063.94  874.07 4094.71  874.45 4101.63  874.57
 4116.01  874.62 4160.71   875.6 4167.25  875.76 4182.07  874.41 4186.33  873.88
 4195.54  869.97  4203.1  866.65 4205.44  867.84 4210.39  870.67 4225.12  872.09
 4235.69  873.43 4254.87  875.99 4257.69  876.27  4259.5  876.66 4275.23  879.76
  4279.1  880.55 4279.67  880.67 4280.63  880.74 4294.41  881.89 4321.59  883.47

Manning's n Values        num=       5
      Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
        0     .06 1453.07     .09  3283.6     .04 3386.49     .06 3652.49     .11

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3268.28 3390.24           1102.5 1190.21930.2685              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    3065     870       F
    3525 4321.59     870       F

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)          *  850.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.54  * Wt. n-Val.             *   0.090  *   0.040  *          *
```

```
* W.S. Elev (ft)         *  850.09  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  844.64  * Flow Area (sq ft)      *  317.46  *  925.26  *          *
* E.G. Slope (ft/ft)     *0.001636  * Area (sq ft)           * 2459.22  *  925.26  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  285.19  * 5584.81  *          *
* Top Width (ft)         * 1163.84  * Top Width (ft)         * 1046.26  *  117.58  *          *
* Vel Total (ft/s)       *    4.72  * Avg. Vel. (ft/s)       *    0.90  *    6.04  *          *
* Max Chl Dpth (ft)      *   13.04  * Hydr. Depth (ft)       *    1.56  *    7.87  *          *
* Conv. Total (cfs)      *145119.1  * Conv. (cfs)            *  7050.6  *138068.5  *          *
* Length Wtd. (ft)       * 1188.08  * Wetted Per. (ft)       *  203.47  *  126.14  *          *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    0.16  *    0.75  *          *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.14  *    4.52  *          *
* Frctn Loss (ft)        *    2.33  * Cum Volume (acre-ft)   * 1011.81  * 7027.40  *  921.39  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  247.41  *  556.50  *  266.34  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  854.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.090  *   0.041  *   0.060  *
* W.S. Elev (ft)         *  853.77  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  848.22  * Flow Area (sq ft)      * 1066.82  * 1373.29  *  146.74  *
* E.G. Slope (ft/ft)     *0.001241  * Area (sq ft)           * 6407.18  * 1373.29  *  146.74  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 1872.62  * 8771.65  *  255.74  *
* Top Width (ft)         * 1269.54  * Top Width (ft)         * 1096.03  *  121.96  *   51.54  *
* Vel Total (ft/s)       *    4.21  * Avg. Vel. (ft/s)       *    1.76  *    6.39  *    1.74  *
* Max Chl Dpth (ft)      *   16.72  * Hydr. Depth (ft)       *    5.25  *   11.26  *    2.85  *
* Conv. Total (cfs)      *309414.2  * Conv. (cfs)            * 53157.3  *248997.4  *  7259.5  *
* Length Wtd. (ft)       * 1179.03  * Wetted Per. (ft)       *  203.47  *  130.64  *   51.98  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    0.41  *    0.81  *    0.22  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.71  *    5.20  *    0.38  *
* Frctn Loss (ft)        *    1.92  * Cum Volume (acre-ft)   * 2385.14  * 9409.54  * 2574.56  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  408.36  *  600.14  *  535.45  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  855.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.090  *   0.041  *   0.060  *
* W.S. Elev (ft)         *  854.82  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  849.96  * Flow Area (sq ft)      * 1280.11  * 1501.26  *  202.70  *
* E.G. Slope (ft/ft)     *0.001161  * Area (sq ft)           * 7564.33  * 1501.26  *  202.70  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 2454.52  * 9740.73  *  404.74  *
* Top Width (ft)         * 1285.49  * Top Width (ft)         * 1108.42  *  121.96  *   55.11  *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)       *    1.92  *    6.49  *    2.00  *
* Max Chl Dpth (ft)      *   17.77  * Hydr. Depth (ft)       *    6.30  *   12.31  *    3.68  *
* Conv. Total (cfs)      *369739.2  * Conv. (cfs)            * 72026.4  *285835.8  * 11877.0  *
* Length Wtd. (ft)       * 1175.38  * Wetted Per. (ft)       *  203.47  *  130.64  *   55.70  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    0.46  *    0.83  *    0.26  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.87  *    5.41  *    0.53  *
* Frctn Loss (ft)        *    1.77  * Cum Volume (acre-ft)   * 3317.38  *11134.32  * 3787.78  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  480.02  *  628.37  *  667.94  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  858.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.090  *   0.041  *   0.060  *
* W.S. Elev (ft)         *  857.82  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  851.94  * Flow Area (sq ft)      * 1890.15  * 1867.26  *  382.57  *
* E.G. Slope (ft/ft)     *0.001125  * Area (sq ft)           *10934.99  * 1867.26  *  659.78  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 4625.17  *13502.64  *  972.19  *
```

```
* Top Width (ft)         * 1491.97  * Top Width (ft)         * 1132.89  *  121.96  *  237.12  *
* Vel Total (ft/s)       *    4.61  * Avg. Vel. (ft/s)       *    2.45  *    7.23  *    2.54  *
* Max Chl Dpth (ft)      *   20.77  * Hydr. Depth (ft)       *    9.30  *   15.31  *    5.43  *
* Conv. Total (cfs)      *569479.8  * Conv. (cfs)            *137902.7  *402590.5  * 28986.5  *
* Length Wtd. (ft)       * 1160.31  * Wetted Per. (ft)       *  203.47  *  130.64  *   71.49  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    0.65  *    1.00  *    0.38  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    1.60  *    7.26  *    0.96  *
* Frctn Loss (ft)        *    1.57  * Cum Volume (acre-ft)   * 5112.89  *13155.27  * 6201.82  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  632.17  *  651.62  *  840.35  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  861.61  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.090  *   0.042  *   0.060  *
* W.S. Elev (ft)         *  860.90  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  853.66  * Flow Area (sq ft)      * 2515.91  * 2242.69  *  711.36  *
* E.G. Slope (ft/ft)     *0.001124  * Area (sq ft)           *14710.14  * 2242.69  * 1615.98  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 7447.85  *18070.77  * 1781.38  *
* Top Width (ft)         * 1921.52  * Top Width (ft)         * 1422.87  *  121.96  *  376.70  *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)       *    2.96  *    8.06  *    2.50  *
* Max Chl Dpth (ft)      *   23.85  * Hydr. Depth (ft)       *   12.38  *   18.39  *    5.28  *
* Conv. Total (cfs)      *814146.0  * Conv. (cfs)            *222111.2  *538910.1  * 53124.7  *
* Length Wtd. (ft)       * 1135.40  * Wetted Per. (ft)       *  203.47  *  130.64  *  135.85  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    0.87  *    1.21  *    0.37  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    2.57  *    9.71  *    0.92  *
* Frctn Loss (ft)        *    1.12  * Cum Volume (acre-ft)   * 8411.61  *16122.73  *10414.94  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1040.72  *  679.93  * 1314.86  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  863.60  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.090  *   0.042  *   0.060  *
* W.S. Elev (ft)         *  862.87  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  854.62  * Flow Area (sq ft)      * 2916.85  * 2483.24  *  977.16  *
* E.G. Slope (ft/ft)     *0.001059  * Area (sq ft)           *17706.07  * 2483.24  * 2402.82  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 9247.03  *20648.80  * 2934.17  *
* Top Width (ft)         * 2102.85  * Top Width (ft)         * 1565.92  *  121.96  *  414.97  *
* Vel Total (ft/s)       *    5.15  * Avg. Vel. (ft/s)       *    3.17  *    8.32  *    3.00  *
* Max Chl Dpth (ft)      *   25.82  * Hydr. Depth (ft)       *   14.35  *   20.36  *    7.25  *
* Conv. Total (cfs)      *1008952.0  * Conv. (cfs)           *284185.7  *634592.1  * 90174.7  *
* Length Wtd. (ft)       * 1130.47  * Wetted Per. (ft)       *  203.47  *  130.64  *  135.85  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    0.95  *    1.26  *    0.48  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    3.00  *   10.45  *    1.43  *
* Frctn Loss (ft)        *    1.04  * Cum Volume (acre-ft)   *11609.91  *17927.56  *14345.58  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1339.33  *  687.08  * 1763.48  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  865.60  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.090  *   0.042  *   0.060  *
* W.S. Elev (ft)         *  864.85  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  855.55  * Flow Area (sq ft)      * 3317.92  * 2723.87  * 1243.04  *
* E.G. Slope (ft/ft)     *0.001003  * Area (sq ft)           *20876.02  * 2723.87  * 3254.89  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *11156.51  *23328.09  * 4265.39  *
* Top Width (ft)         * 2219.91  * Top Width (ft)         * 1653.62  *  121.96  *  444.33  *
```

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* Vel Total (ft/s)       *    5.32  * Avg. Vel. (ft/s)       *    3.36  *    8.56  *    3.43  *
* Max Chl Dpth (ft)      *   27.80  * Hydr. Depth (ft)       *   16.32  *   22.33  *    9.22  *
* Conv. Total (cfs)      *1223488.0  * Conv. (cfs)            *352254.5  *736558.7  *134675.0  *
* Length Wtd. (ft)       * 1115.03  * Wetted Per. (ft)       *  203.47  *  130.64  *  135.85  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    1.02  *    1.31  *    0.57  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    3.43  *   11.18  *    1.97  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *14696.93  *19200.94  *18316.89  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         * 1540.85  *  688.02  * 2205.58  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  867.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.090  *   0.042  *   0.060  *
* W.S. Elev (ft)         *  866.90  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  856.70  * Flow Area (sq ft)      * 3735.81  * 2974.58  * 1520.07  *
* E.G. Slope (ft/ft)     *0.001014  * Area (sq ft)           *24363.65  * 2974.58  * 4192.03  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *13666.46  *27037.67  * 5995.87  *
* Top Width (ft)         * 2351.67  * Top Width (ft)         * 1759.57  *  121.96  *  470.14  *
* Vel Total (ft/s)       *    5.67  * Avg. Vel. (ft/s)       *    3.66  *    9.09  *    3.94  *
* Max Chl Dpth (ft)      *   29.85  * Hydr. Depth (ft)       *   18.38  *   24.39  *   11.28  *
* Conv. Total (cfs)      *1466837.0  * Conv. (cfs)            *429260.4  *849247.1  *188329.0  *
* Length Wtd. (ft)       * 1105.82  * Wetted Per. (ft)       *  203.47  *  130.64  *  135.85  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    1.16  *    1.44  *    0.71  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    4.25  *   13.10  *    2.79  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *20375.68  *21081.39  *25080.07  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         * 1849.01  *  690.45  * 2629.27  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  858.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.090  *   0.041  *   0.060  *
* W.S. Elev (ft)         *  858.25  * Reach Len. (ft)        * 1102.50  * 1190.21  *  930.27  *
* Crit W.S. (ft)         *  852.19  * Flow Area (sq ft)      * 1977.04  * 1919.39  *  414.71  *
* E.G. Slope (ft/ft)     *0.001123  * Area (sq ft)           *11419.83  * 1919.39  *  765.75  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 4981.73  *14095.67  * 1022.60  *
* Top Width (ft)         * 1517.53  * Top Width (ft)         * 1137.64  *  121.96  *  257.94  *
* Vel Total (ft/s)       *    4.66  * Avg. Vel. (ft/s)       *    2.52  *    7.34  *    2.47  *
* Max Chl Dpth (ft)      *   21.20  * Hydr. Depth (ft)       *    9.73  *   15.74  *    5.19  *
* Conv. Total (cfs)      *599680.0  * Conv. (cfs)            *148629.1  *420541.7  * 30509.1  *
* Length Wtd. (ft)       * 1160.38  * Wetted Per. (ft)       *  203.47  *  130.64  *   81.00  *
* Min Ch El (ft)         *  837.05  * Shear (lb/sq ft)       *    0.68  *    1.03  *    0.36  *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *    1.72  *    7.57  *    0.89  *
* Frctn Loss (ft)        *    1.58  * Cum Volume (acre-ft)   * 5958.67  *14105.49  * 7227.70  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  732.88  *  661.93  *  921.61  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 28.515

INPUT
Description: Upstream side of Holmes Road.  Tributary basin blocked out on ROB.
Station Elevation Data    num=     441
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
```

****

0	886.92	2.39	886.87	8.5	886.65	14.34	886.35	15.57	886.22
28.25	885.33	32.93	885.58	43.46	886.06	46.67	886.26	47.36	886.24
47.94	886.22	48.33	886.21	48.83	886.19	49.53	886.13	54.99	885.62
59.52	885.46	59.54	885.57	60.33	885.56	76.24	885.07	90.77	884.74
91.43	884.71	102.79	884.71	103.43	884.71	104.36	884.71	123.28	884.62
128.3	884.85	135.6	884.96	163.22	885.25	164.53	885.26	178.78	885.81
180.71	885.88	211.17	886.02	217.83	885.93	226.94	885.78	238.09	885.65
246.13	885.68	263.91	885.06	265.98	884.96	275.74	883.36	278.88	883.03
281.83	883.21	289.74	883.38	306.5	883.65	312.93	883.8	315.85	883.84
325.41	884.1	336.5	884.45	338.42	884.47	350.56	884.72	363.04	883.96
367.03	883.62	370.25	883.4	376.46	883.25	390.7	882.77	397.13	882.49
418.83	880.59	422.09	880.34	425.13	880.08	445.46	878.82	454.41	878.34
467.13	878.31	487.81	878.51	502.44	878.46	510.41	878.47	522.21	878.43
530.8	878.59	537.43	878.68	540.34	878.73	545.19	878.83	545.81	878.83
547.11	878.79	597.85	878.01	599.81	878.01	603.06	877.95	604.95	877.91
628.79	877.37	655.24	876.65	657.69	876.59	660.27	876.54	687.14	874.84
687.63	874.81	688.61	874.77	699.28	874.38	704.06	874.41	709.37	874.45
718.7	874.5	728.2	874.62	734.42	874.41	734.56	874.4	734.83	874.42
739.63	874.81	741.47	874.9	746.75	875.12	759.37	875.53	772.33	875.52
784.46	875.49	807.67	875.57	832.33	875.54	845.2	875.49	853.13	875.31
891.05	874.29	902.45	874.17	921.51	874.09	935.82	874.58	936.37	874.6
942.34	874.24	946.81	873.8	958.75	873.68	966.83	873.73	967.11	873.73
967.36	873.76	969.91	873.75	979.04	873.79	992.81	873.74	1013.91	873.71
1022.62	873.61	1026.46	873.65	1068.17	873.26	1120.95	872.38	1125.2	872.31
1127.32	872.35	1153.13	873.29	1160.49	873.56	1161.09	873.5	1176.08	872.01
1185.39	871.05	1194.1	870.05	1194.68	870.16	1199.15	871.04	1201.25	871.31
1205.3	871.87	1213.25	872.03	1215.36	872.08	1219.44	872.06	1220.89	872.06
1221.7	871.98	1226.34	871.44	1227.36	871.46	1232.27	871.63	1236.65	871.61
1237.75	871.61	1252.54	871.67	1254.98	871.69	1266.88	871.06	1270.04	870.96
1315.6	869.98	1318.47	869.99	1341.25	869.74	1344.73	869.74	1352.92	869.67
1381.21	868.84	1384.47	868.71	1385.02	868.66	1385.78	868.55	1393.33	867.34
1400.54	866.59	1403.11	865.95	1410.96	865.69	1442.8	864.11	1471.1	863.44
1488.9	863	1515.1	862.37	1539.77	861.94	1550.47	861.66	1561.85	861.37
1608.43	860.58	1634.8	860.16	1656.59	859.67	1677.09	859.57	1691.96	859.68
1707.76	859.34	1735.84	859.04	1758.51	858.41	1774.92	858.05	1785.84	857.61
1789.97	857.33	1811.14	856.38	1828.17	856.13	1840.12	856.36	1857.83	856.31
1891.16	856.23	1896.08	856.26	1902.38	856.35	1905.9	855.88	1910.07	855.34
1916.24	854.54	1920.37	854.85	1922.69	855.06	1933.25	854.88	1952.34	854.52
1959.17	855.24	1972.35	856.57	1985.64	857.88	1995.64	857.88	2009.18	858
2012.68	858.01	2017.46	858.03	2063.24	858.1	2073.35	858.24	2098.81	858.66
2132.79	859.39	2182.45	860.35	2189.47	860.43	2193.22	860.54	2289.1	861.16
2297.07	861.17	2299.86	861.18	2303.49	861.2	2306.53	861.27	2390.08	861.7
2394.55	861.69	2399.82	861.67	2412.35	861.63	2433.83	861.49	2441.09	861.54
2449.93	861.02	2450.3	861	2450.82	860.97	2452.01	860.89	2477.92	859.23
2490.08	858.41	2498.24	857.67	2500.94	857.05	2503.32	856.75	2506.68	856.77
2507.62	856.72	2511.91	856.76	2522.63	856.98	2528.34	856.82	2528.6	856.81
2528.88	856.8	2552.05	856.17	2553.3	856.16	2554.47	856.16	2564.99	856
2565.83	856	2572.35	855.69	2574.83	856.17	2579.29	856.22	2583.21	856.05
2590.88	855.97	2599.26	855.83	2605.78	855.76	2612.94	855.56	2615.95	855.36
2621.56	855.31	2624.08	855.34	2625.29	855.34	2641.07	854.56	2657.35	854.07
2660.53	854.02	2676.62	853.82	2678.67	853.79	2679.36	853.76	2685.81	853.5
2689.05	853.17	2689.74	852.75	2689.76	852.77	2689.85	852.69	2690.52	852.11
2693.25	849.73	2698.59	845.1	2705.92	841.78	2709.94	839.92	2713.65	839.36
2715.74	839.04	2718.41	838.03	2720.08	836.8	2738	836.15	2754.16	837.61
2762.09	837.66	2765.03	838.35	2769.99	839.33	2779.8	840.3	2784.6	840.67
2789.94	842.4	2794.65	843.46	2795	843.54	2800.68	844.79	2802.75	845.13
2806.9	845.97	2812.6	847.04	2817.59	847.78	2827.5	849.62	2829.77	850.02
2830.74	850.33	2837.22	850.85	2838.67	850.97	2838.8	850.91	2843.36	850.59
2847.71	850.97	2851.21	851.01	2858.77	851	2860.67	851	2861.15	851
2861.18	850.98	2861.3	851	2861.48	850.98	2865.01	851.02	2873.11	850.94
2876.72	850.95	2887.58	851.2	2891.85	851.21	2896.65	851.23	2906.68	851.43
2912.09	851.45	2920.59	851.53	2927.9	851.64	2935.45	851.71	2943.48	851.83
2951.44	851.89	2957.54	852.08	2966.08	852.14	2971.43	852.3	2979.43	852.45
2983.55	851.5	2989.27	850.12	2997.86	850.08	2999.31	850.01	3000.92	850.03
3003.89	850	3022.28	849.76	3026.88	849.86	3038.9	849.9	3043.29	849.94
3046.24	849.87	3053.52	847.94	3057.49	848.28	3063.23	852.08	3065.83	852.58
3073.88	853.67	3085.83	853.97	3091.17	854.06	3105.33	854.07	3132.63	854.18
3143.66	854.13	3159.8	854.13	3175.26	854.13	3212.17	854.76	3241.68	855.06
3259.15	855.13	3275.73	855.18	3296.19	855.26	3308.25	855.27	3316.47	854.84
3343.86	854.01	3347.47	853.68	3355.86	853.23	3366.25	853.97	3366.4	853.98
3366.5	853.99	3368.57	853.97	3409.67	853.58	3420.64	853.46	3421.55	853.45
3421.74	853.45	3423.46	853.43	3456.79	853.17	3463.58	853.12	3503.69	853.15
3519.17	853.47	3528.81	854.52	3531.95	854.82	3540.92	855.45	3545.89	855.76
3561.46	856.22	3562.52	856.25	3563	856.26	3580.68	855.99	3597.74	855.73
3613.83	854.51	3621.94	855.62	3622.11	855.57	3622.27	855.52	3630.26	851.08

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 3650.28   848.5 3650.37  848.48 3650.45  848.47 3652.24  848.24 3653.01  848.23
 3671.74     847 3673.85  847.23 3688.13  848.76 3690.32  848.76 3705.74  848.69
 3707.42  848.92 3714.61  850.07  3720.4  850.04 3724.57     850 3736.51  849.91
 3746.38   849.8 3751.88   849.2 3754.96   848.9 3757.56  848.83  3761.3  848.72
 3779.48  847.44 3788.54  846.92 3795.13  846.73 3802.81  846.76 3818.86  847.02
 3864.97  846.66 3878.46  846.47 3893.14  846.44 3918.51   846.5 3950.49  846.42
    3960  846.55 3970.51  846.18 3997.48  845.69 4011.08  845.86 4019.85  845.81
 4032.14  845.81 4032.62  845.81 4033.01  845.75 4059.87  841.61  4070.7  844.76
 4076.68  847.58 4087.93   853.9 4104.76  865.11 4105.17  865.37  4106.1  865.82
 4129.58  877.07 4134.41  877.56 4157.59  880.97 4173.12  882.72 4184.24  883.84
 4190.09  884.55 4221.11  890.63 4222.69  891.11 4230.72  893.61 4253.56  901.05
 4278.21  911.37 4278.58  911.52 4279.47  911.77 4305.73  919.31 4324.33   924.6
 4339.91  927.24 4349.05  928.35 4353.83   928.4  4375.1  928.06 4391.07  928.28
 4423.73  927.91

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 2689.05     .04 2830.74   .1255 3000.92    .075 3997.48     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2689.05 2830.74               53      53      53             .3       .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
 1340.98 2502.64     865       F
    3525 4090.75  861.83       T
    3019    3300     856       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2300    2400     870

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  848.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.69  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)          *  847.59  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)          *  843.75  * Flow Area (sq ft)      *          *  878.47  *          *
* E.G. Slope (ft/ft)      *0.002388  * Area (sq ft)           *          *  878.47  *  452.61  *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *          * 5870.00  *          *
* Top Width (ft)          *  434.29  * Top Width (ft)         *          *  120.57  *  313.72  *
* Vel Total (ft/s)        *    6.68  * Avg. Vel. (ft/s)       *          *    6.68  *          *
* Max Chl Dpth (ft)       *   11.44  * Hydr. Depth (ft)       *          *    7.29  *          *
* Conv. Total (cfs)       *120124.3  * Conv. (cfs)            *          *120124.3  *          *
* Length Wtd. (ft)        *    8.00  * Wetted Per. (ft)       *          *  124.39  *          *
* Min Ch El (ft)          *  836.15  * Shear (lb/sq ft)       *          *    1.05  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.04  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *  980.69  * 7002.76  *  916.55  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  234.16  *  553.24  *  262.99  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  852.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.96  * Wt. n-Val.             *          *   0.040  *   0.094  *
* W.S. Elev (ft)          *  851.37  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)          *  846.46  * Flow Area (sq ft)      *          * 1378.98  *   72.10  *
* E.G. Slope (ft/ft)      *0.002224  * Area (sq ft)           *          * 1378.98  * 2107.78  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             *          *10849.79  *   50.20  *
* Top Width (ft)          *  744.20  * Top Width (ft)         *          *  139.37  *  604.83  *
* Vel Total (ft/s)        *    7.51  * Avg. Vel. (ft/s)       *          *    7.87  *    0.70  *
* Max Chl Dpth (ft)       *   15.22  * Hydr. Depth (ft)       *          *    9.89  *    0.67  *
* Conv. Total (cfs)       *231146.2  * Conv. (cfs)            *          *230081.6  *  1064.6  *
* Length Wtd. (ft)        *    8.00  * Wetted Per. (ft)       *          *  144.87  *  108.20  *
* Min Ch El (ft)          *  836.15  * Shear (lb/sq ft)       *          *    1.32  *    0.09  *
* Alpha                   *    1.09  * Stream Power (lb/ft s) *          *   10.40  *    0.06  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   * 2304.06  * 9371.94  * 2550.49  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  394.49  *  596.56  *  528.44  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	853.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.040	0.106
W.S. Elev (ft)	852.53	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	847.21	Flow Area (sq ft)		1541.47	253.07
E.G. Slope (ft/ft)	0.002035	Area (sq ft)		1541.47	2869.08
Q Total (cfs)	12600.00	Flow (cfs)		12395.30	204.70
Top Width (ft)	833.40	Top Width (ft)		140.71	692.69
Vel Total (ft/s)	7.02	Avg. Vel. (ft/s)		8.04	0.81
Max Chl Dpth (ft)	16.38	Hydr. Depth (ft)		10.96	1.34
Conv. Total (cfs)	279326.8	Conv. (cfs)		274788.9	4537.8
Length Wtd. (ft)	8.00	Wetted Per. (ft)		146.64	188.63
Min Ch El (ft)	836.15	Shear (lb/sq ft)		1.34	0.17
Alpha	1.29	Stream Power (lb/ft s)		10.74	0.14
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	3221.65	11092.75	3754.98
C & E Loss (ft)	0.04	Cum SA (acres)	466.00	624.78	659.95

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	856.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.	0.060	0.040	0.102
W.S. Elev (ft)	855.79	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	849.72	Flow Area (sq ft)	106.52	2002.51	1338.98
E.G. Slope (ft/ft)	0.001648	Area (sq ft)	156.12	2002.51	5956.00
Q Total (cfs)	19100.00	Flow (cfs)	123.24	17157.57	1819.19
Top Width (ft)	1501.26	Top Width (ft)	146.55	141.69	1213.02
Vel Total (ft/s)	5.54	Avg. Vel. (ft/s)	1.16	8.57	1.36
Max Chl Dpth (ft)	19.64	Hydr. Depth (ft)	1.20	14.13	3.24
Conv. Total (cfs)	470565.9	Conv. (cfs)	3036.2	422710.3	44819.3
Length Wtd. (ft)	8.00	Wetted Per. (ft)	88.62	147.83	413.77
Min Ch El (ft)	836.15	Shear (lb/sq ft)	0.12	1.39	0.33
Alpha	2.16	Stream Power (lb/ft s)	0.14	11.94	0.45
Frctn Loss (ft)		Cum Volume (acre-ft)	4972.53	13102.40	6131.18
C & E Loss (ft)		Cum SA (acres)	615.98	648.01	824.86

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	860.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.060	0.040	0.091
W.S. Elev (ft)	859.86	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	852.78	Flow Area (sq ft)	810.08	2578.63	4115.06
E.G. Slope (ft/ft)	0.000873	Area (sq ft)	1953.82	2578.63	11080.69
Q Total (cfs)	27300.00	Flow (cfs)	1577.71	19035.86	6686.43
Top Width (ft)	2137.19	Top Width (ft)	729.37	141.69	1266.13
Vel Total (ft/s)	3.64	Avg. Vel. (ft/s)	1.95	7.38	1.62
Max Chl Dpth (ft)	23.70	Hydr. Depth (ft)	4.35	18.20	5.88
Conv. Total (cfs)	923971.7	Conv. (cfs)	53397.8	644270.9	226303.1
Length Wtd. (ft)	8.00	Wetted Per. (ft)	186.55	147.83	703.65
Min Ch El (ft)	836.15	Shear (lb/sq ft)	0.24	0.95	0.32
Alpha	2.94	Stream Power (lb/ft s)	0.46	7.02	0.52
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	8200.73	16056.86	10279.36
C & E Loss (ft)	0.09	Cum SA (acres)	1013.48	676.33	1297.32

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

```
*****************************************************************************************
* E.G. Elev (ft)          *  862.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.62  * Wt. n-Val.             *   0.060  *   0.040  *   0.093  *
* W.S. Elev (ft)          *  861.91  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)          *  854.92  * Flow Area (sq ft)      * 1193.69  * 2870.21  * 5606.38  *
* E.G. Slope (ft/ft)      *0.000807  * Area (sq ft)           * 3789.32  * 2870.21  *13689.39  *
* Q Total (cfs)           *32830.00  * Flow (cfs)             * 2894.03  *21876.89  * 8059.07  *
* Top Width (ft)          * 2459.15  * Top Width (ft)         * 1048.24  *  141.69  * 1269.22  *
* Vel Total (ft/s)        *    3.39  * Avg. Vel. (ft/s)       *    2.42  *    7.62  *    1.44  *
* Max Chl Dpth (ft)       *   25.76  * Hydr. Depth (ft)       *    6.40  *   20.26  *    4.42  *
* Conv. Total (cfs)       *1155831.0  * Conv. (cfs)           *101889.0  *770209.9  *283732.1  *
* Length Wtd. (ft)        *    8.00  * Wetted Per. (ft)       *  186.55  *  147.83  * 1278.66  *
* Min Ch El (ft)          *  836.15  * Shear (lb/sq ft)       *    0.32  *    0.98  *    0.22  *
* Alpha                   *    3.45  * Stream Power (lb/ft s) *    0.78  *    7.45  *    0.32  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)   *11337.88  *17854.43  *14173.74  *
* C & E Loss (ft)         *    0.11  * Cum SA (acres)         * 1306.25  *  683.47  * 1745.50  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  864.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.42  * Wt. n-Val.             *   0.060  *   0.040  *   0.089  *
* W.S. Elev (ft)          *  864.27  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)          *  855.94  * Flow Area (sq ft)      * 1633.32  * 3204.37  * 8603.88  *
* E.G. Slope (ft/ft)      *0.000550  * Area (sq ft)           * 6390.71  * 3204.37  *16686.89  *
* Q Total (cfs)           *38750.00  * Flow (cfs)             * 4028.52  *21695.82  *13025.66  *
* Top Width (ft)          * 2563.95  * Top Width (ft)         * 1149.50  *  141.69  * 1272.76  *
* Vel Total (ft/s)        *    2.88  * Avg. Vel. (ft/s)       *    2.47  *    6.77  *    1.51  *
* Max Chl Dpth (ft)       *   28.12  * Hydr. Depth (ft)       *    8.76  *   22.62  *    6.76  *
* Conv. Total (cfs)       *1652799.0  * Conv. (cfs)           *171827.9  *925389.3  *555582.1  *
* Length Wtd. (ft)        *    8.00  * Wetted Per. (ft)       *  186.55  *  147.83  * 1282.91  *
* Min Ch El (ft)          *  836.15  * Shear (lb/sq ft)       *    0.30  *    0.74  *    0.23  *
* Alpha                   *    3.26  * Stream Power (lb/ft s) *    0.74  *    5.04  *    0.35  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)   *14351.87  *19119.95  *18103.95  *
* C & E Loss (ft)         *    0.10  * Cum SA (acres)         * 1505.38  *  684.42  * 2187.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  867.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.15  * Wt. n-Val.             *   0.060  *   0.040  *   0.086  *
* W.S. Elev (ft)          *  866.89  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)          *  858.16  * Flow Area (sq ft)      * 9469.21  * 3575.81  *11946.23  *
* E.G. Slope (ft/ft)      *0.000243  * Area (sq ft)           * 9469.21  * 3575.81  *20029.24  *
* Q Total (cfs)           *46700.00  * Flow (cfs)             *14577.36  *17327.25  *14795.39  *
* Top Width (ft)          * 2610.71  * Top Width (ft)         * 1191.42  *  141.69  * 1277.60  *
* Vel Total (ft/s)        *    1.87  * Avg. Vel. (ft/s)       *    1.54  *    4.85  *    1.24  *
* Max Chl Dpth (ft)       *   30.74  * Hydr. Depth (ft)       *    7.95  *   25.24  *    9.35  *
* Conv. Total (cfs)       *2994310.0  * Conv. (cfs)           *934671.0  *1110988.0  *948650.8  *
* Length Wtd. (ft)        *    8.00  * Wetted Per. (ft)       * 1203.30  *  147.83  * 1288.43  *
* Min Ch El (ft)          *  836.15  * Shear (lb/sq ft)       *    0.12  *    0.37  *    0.14  *
* Alpha                   *    2.85  * Stream Power (lb/ft s) *    0.18  *    1.78  *    0.17  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)   *19947.53  *20991.90  *24821.44  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         * 1811.66  *  686.85  * 2610.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  857.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.060  *   0.040  *   0.106  *
* W.S. Elev (ft)         *  856.16  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  850.11  * Flow Area (sq ft)      *  146.80  * 2055.20  * 1537.95  *
* E.G. Slope (ft/ft)     *0.001676  * Area (sq ft)           *  219.24  * 2055.20  * 6414.09  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  175.84  *18072.99  * 1851.18  *
* Top Width (ft)         * 1590.40  * Top Width (ft)         *  198.17  *  141.69  * 1250.54  *
* Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *    1.20  *    8.79  *    1.20  *
* Max Chl Dpth (ft)      *   20.01  * Hydr. Depth (ft)       *    1.13  *   14.50  *    2.21  *
* Conv. Total (cfs)      *490917.9  * Conv. (cfs)            *  4294.6  *441410.6  * 45212.8  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  130.10  *  147.83  *  696.98  *
* Min Ch El (ft)         *  836.15  * Shear (lb/sq ft)       *    0.12  *    1.45  *    0.23  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.14  *   12.79  *    0.28  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 5811.38  *14051.19  * 7151.03  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  715.98  *  658.33  *  905.50  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main                RS: 28.510

INPUT
Description: HOLMES ROAD
Distance from Upstream XS =       8
Deck/Roadway Width        =      36
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    2500   856.3     835    2689   856.3     835  2689.1   856.3  853.84
    3019   856.3  853.84  3019.1   856.3     835    3300  855.25     835

Upstream Bridge Cross Section Data
Station Elevation Data    num=     441
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  886.92    2.39  886.87     8.5  886.65   14.34  886.35   15.57  886.22
   28.25  885.33   32.93  885.58   43.46  886.06   46.67  886.26   47.36  886.24
   47.94  886.22   48.33  886.21   48.83  886.19   49.53  886.13   54.99  885.62
   59.52  885.46   59.54  885.57   60.33  885.56   76.24  885.07   90.77  884.74
   91.43  884.71  102.79  884.71  103.43  884.71  104.36  884.71  123.28  884.62
   128.3  884.85   135.6  884.96  163.22  885.25  164.53  885.26  178.78  885.81
  180.71  885.88  211.17  886.02  217.83  885.93  226.94  885.78  238.09  885.65
  246.13  885.68  263.91  885.06  265.98  884.96  275.74  883.36  278.88  883.03
  281.83  883.21  289.74  883.38   306.5  883.65  312.93   883.8  315.85  883.84
  325.41   884.1   336.5  884.45  338.42  884.47  350.56  884.72  363.04  883.96
  367.03  883.62  370.25   883.4  376.46  883.25   390.7  882.77  397.13  882.49
  418.83  880.59  422.09  880.34  425.13  880.08  445.46  878.82  454.41  878.34
  467.13  878.31  487.81  878.51  502.44  878.46  510.41  878.47  522.21  878.43
   530.8  878.59  537.43  878.68  540.34  878.73  545.19  878.83  545.81  878.83
  547.11  878.79  597.85  878.01  599.81  878.01  603.06  877.95  604.95  877.91
  628.79  877.37  655.24  876.65  657.69  876.59  660.27  876.54  687.14  874.84
  687.63  874.81  688.61  874.77  699.28  874.38  704.06  874.41  709.37  874.45
   718.7   874.5   728.2  874.62  734.42  874.41  734.56   874.4  734.83  874.42
  739.63  874.81  741.47   874.9  746.75  875.12  759.37  875.53  772.33  875.52
  784.46  875.49  807.67  875.57  832.33  875.54   845.2  875.49  853.13  875.31
  891.05  874.29  902.45  874.17  921.51  874.09  935.82  874.58  936.37   874.6
  942.34  874.24  946.81   873.8  958.75  873.68  966.83  873.73  967.11  873.73
  967.36  873.76  969.91  873.75  979.04  873.79  992.81  873.74 1013.91  873.71
 1022.62  873.61 1026.46  873.65 1068.17  873.26 1120.95  872.38  1125.2  872.31
 1127.32  872.35 1153.13  873.29 1160.49  873.56 1161.09   873.5 1176.08  872.01
 1185.39  871.05  1194.1  870.05 1194.68  870.16 1199.15  871.04 1201.25  871.31
  1205.3  871.87 1213.25  872.03 1215.36  872.08 1219.44  872.06 1220.89  872.06
  1221.7  871.98 1226.34  871.44 1227.36  871.46 1232.27  871.63 1236.65  871.61
 1237.75  871.61 1252.54  871.67 1254.98  871.69 1266.88  871.06 1270.04  870.96
  1315.6  869.98 1318.47  869.99 1341.25  869.74 1344.73  869.74 1352.92  869.67
 1381.21  868.84 1384.47  868.71 1385.02  868.66 1385.78  868.55 1393.33  867.34
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 1400.54  866.59 1403.11  865.95 1410.96  865.69  1442.8  864.11  1471.1  863.44
  1488.9     863  1515.1  862.37 1539.77  861.94 1550.47  861.66 1561.85  861.37
 1608.43  860.58  1634.8  860.16 1656.59  859.67 1677.09  859.57 1691.96  859.68
 1707.76  859.34 1735.84  859.04 1758.51  858.41 1774.92  858.05 1785.84  857.61
 1789.97  857.33 1811.14  856.38 1828.17  856.13 1840.12  856.36 1857.83  856.31
 1891.16  856.23 1896.08  856.26 1902.38  856.35  1905.9  855.88 1910.07  855.34
 1916.24  854.54 1920.37  854.85 1922.69  855.06 1933.25  854.88 1952.34  854.52
 1959.17  855.24 1972.35  856.57 1985.64  857.88 1995.64  857.88 2009.18     858
 2012.68  858.01 2017.46  858.03 2063.24   858.1 2073.35  858.24 2098.81  858.66
 2132.79  859.39 2182.45  860.35 2189.47  860.43 2193.22  860.54  2289.1  861.16
 2297.07  861.17 2299.86  861.18 2303.49   861.2 2306.53  861.27 2390.08   861.7
 2394.55  861.69 2399.82  861.67 2412.35  861.63 2433.83  861.49 2441.09  861.54
 2449.93  861.02  2450.3     861 2450.82  860.97 2452.01  860.89 2477.92  859.23
 2490.08  858.41 2498.24  857.67 2500.94  857.05 2503.32  856.75 2506.68  856.77
 2507.62  856.72 2511.91  856.76 2522.63  856.98 2528.34  856.82  2528.6  856.81
 2528.88   856.8 2552.05  856.17  2553.3  856.16 2554.47  856.16 2564.99     856
 2565.83     856 2572.35  855.69 2574.83  856.17 2579.29  856.22 2583.21  856.05
 2590.88  855.97 2599.26  855.83 2605.78  855.76 2612.94  855.56 2615.95  855.36
 2621.56  855.31 2624.08  855.34 2625.29  855.34 2641.07  854.56 2657.35  854.07
 2660.53  854.02 2676.62  853.82 2678.67  853.79 2679.36  853.76 2685.81   853.5
 2689.05  853.17 2689.74  852.75 2689.76  852.77 2689.85  852.69 2690.52  852.11
 2693.25  849.73 2698.59   845.1 2705.92  841.78 2709.94  839.92 2713.65  839.36
 2715.74  839.04 2718.41  838.03 2720.08   836.8    2738  836.15 2754.16  837.61
 2762.09  837.66 2765.03  838.35 2769.99  839.33  2779.8   840.3  2784.6  840.67
 2789.94   842.4 2794.65  843.46    2795  843.54 2800.68  844.79 2802.75  845.13
  2806.9  845.97  2812.6  847.04 2817.59  847.78  2827.5  849.62 2829.77  850.02
 2830.74  850.33 2837.22  850.85 2838.67  850.97  2838.8  850.91 2843.36  850.59
 2847.71  850.97 2851.21  851.01 2858.77     851 2860.67     851 2861.15     851
 2861.18  850.98  2861.3     851 2861.48  850.98 2865.01  851.02 2873.11  850.94
 2876.72  850.95 2887.58   851.2 2891.85  851.21 2896.65  851.23 2906.68  851.43
 2912.09  851.45 2920.59  851.53  2927.9  851.64 2935.45  851.71 2943.48  851.83
 2951.44  851.89 2957.54  852.08 2966.08  852.14 2971.43   852.3 2979.43  852.45
 2983.55   851.5 2989.27  850.12 2997.86  850.08 2999.31  850.01 3000.92  850.03
 3003.89     850 3022.28  849.76 3026.88  849.86  3038.9   849.9 3043.29  849.94
 3046.24  849.87 3053.52  847.94 3057.49  848.28 3063.23  852.08 3065.83  852.58
 3073.88  853.67 3085.83  853.97 3091.17  854.06 3105.33  854.07 3132.63  854.18
 3143.66  854.13  3159.8  854.13 3175.26  854.13 3212.17  854.76 3241.68  855.06
 3259.15  855.13 3275.73  855.18 3296.19  855.26 3308.25  855.27 3316.47  854.84
 3343.86  854.01 3347.47  853.68 3355.86  853.23 3366.25  853.97  3366.4  853.98
  3366.5  853.99 3368.57  853.97 3409.67  853.58 3420.64  853.46 3421.55  853.45
 3421.74  853.45 3423.46  853.43 3456.79  853.17 3463.58  853.12 3503.69  853.15
 3519.17  853.47 3528.81  854.52 3531.95  854.82 3540.92  855.45 3545.89  855.76
 3561.46  856.22 3562.52  856.25    3563  856.26 3580.68  855.99 3597.74  855.73
 3613.83  854.51 3621.94  855.62 3622.11  855.57 3622.27  855.52 3630.26  851.08
 3650.28   848.5 3650.37  848.48 3650.45  848.47 3652.24  848.24 3653.01  848.23
 3671.74     847 3673.85  847.23 3688.13  848.76 3690.32  848.76 3705.74  848.69
 3707.42  848.92 3714.61  850.07  3720.4  850.04 3724.57     850 3736.51  849.91
 3746.38   849.8 3751.88   849.2 3754.96   848.9 3757.56  848.83  3761.3  848.72
 3779.48  847.44 3788.54  846.92 3795.13  846.73 3802.81  846.76 3818.86  847.02
 3864.97  846.66 3878.46  846.47 3893.14  846.44 3918.51   846.5 3950.49  846.42
    3960  846.55 3970.51  846.18 3997.48  845.69 4011.08  845.86 4019.85  845.81
 4032.14  845.81 4032.62  845.81 4033.01  845.75 4059.87  841.61  4070.7  844.76
 4076.68  847.58 4087.93   853.9 4104.76  865.11 4105.17  865.37  4106.1  865.82
 4129.58  877.07 4134.41  877.56 4157.59  880.97 4173.12  882.72 4184.24  883.84
 4190.09  884.55 4221.11  890.63 4222.69  891.11 4230.72  893.61 4253.56  901.05
 4278.21  911.37 4278.58  911.52 4279.47  911.77 4305.73  919.31 4324.33   924.6
 4339.91  927.24 4349.05  928.35 4353.83   928.4  4375.1  928.06 4391.07  928.28
 4423.73  927.91

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .06 2689.05     .04 2830.74   .1255 3000.92    .075 3997.48     .12

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2689.05 2830.74             .3        .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
 1340.98 2502.64     865       F
    3525 4090.75  861.83       T
    3019    3300     856       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2300    2400     870
```

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2500	856.3	835	2689	856.3	835	2689.1	856.3	853.84
3019	856.3	853.84	3019.1	856.3	835	3300	855.25	835

Downstream Bridge Cross Section Data
Station Elevation Data num= 441

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	886.92	2.39	886.87	8.5	886.65	14.34	886.35	15.57	886.22
28.25	885.33	32.93	885.58	43.46	886.06	46.67	886.26	47.36	886.24
47.94	886.22	48.33	886.21	48.83	886.19	49.53	886.13	54.99	885.62
59.52	885.46	59.54	885.57	60.33	885.56	76.24	885.07	90.77	884.74
91.43	884.71	102.79	884.71	103.43	884.71	104.36	884.71	123.28	884.62
128.3	884.85	135.6	884.96	163.22	885.25	164.53	885.26	178.78	885.81
180.71	885.88	211.17	886.02	217.83	885.93	226.94	885.78	238.09	885.65
246.13	885.68	263.91	885.06	265.98	884.96	275.74	883.36	278.88	883.03
281.83	883.21	289.74	883.38	306.5	883.65	312.93	883.8	315.85	883.84
325.41	884.1	336.5	884.45	338.42	884.47	350.56	884.72	363.04	883.96
367.03	883.62	370.25	883.4	376.46	883.25	390.7	882.77	397.13	882.49
418.83	880.59	422.09	880.34	425.13	880.08	445.46	878.82	454.41	878.34
467.13	878.31	487.81	878.51	502.44	878.46	510.41	878.47	522.21	878.43
530.8	878.59	537.43	878.68	540.34	878.73	545.19	878.83	545.81	878.83
547.11	878.79	597.85	878.01	599.81	878.01	603.06	877.95	604.95	877.91
628.79	877.37	655.24	876.65	657.69	876.59	660.27	876.54	687.14	874.84
687.63	874.81	688.61	874.77	699.28	874.38	704.06	874.41	709.37	874.45
718.7	874.5	728.2	874.62	734.42	874.41	734.56	874.4	734.83	874.42
739.63	874.81	741.47	874.9	746.75	875.12	759.37	875.53	772.33	875.52
784.46	875.49	807.67	875.57	832.33	875.54	845.2	875.49	853.13	875.31
891.05	874.29	902.45	874.17	921.51	874.09	935.82	874.58	936.37	874.6
942.34	874.24	946.81	873.8	958.75	873.68	966.83	873.73	967.11	873.73
967.36	873.76	969.91	873.75	979.04	873.79	992.81	873.74	1013.91	873.71
1022.62	873.61	1026.46	873.65	1068.17	873.26	1120.95	872.38	1125.2	872.31
1127.32	872.35	1153.13	873.29	1160.49	873.56	1161.09	873.5	1176.08	872.01
1185.39	871.05	1194.1	870.05	1194.68	870.16	1199.15	871.04	1201.25	871.31
1205.3	871.87	1213.25	872.03	1215.36	872.08	1219.44	872.06	1220.89	872.06
1221.7	871.98	1226.34	871.44	1227.36	871.46	1232.27	871.63	1236.65	871.61
1237.75	871.61	1252.54	871.67	1254.98	871.69	1266.88	871.06	1270.04	870.96
1315.6	869.98	1318.47	869.99	1341.25	869.74	1344.73	869.74	1352.92	869.67
1381.21	868.84	1384.47	868.71	1385.02	868.66	1385.78	868.55	1393.33	867.34
1400.54	866.59	1403.11	865.95	1410.96	865.69	1442.8	864.11	1471.1	863.44
1488.9	863	1515.1	862.37	1539.77	861.94	1550.47	861.66	1561.85	861.37
1608.43	860.58	1634.8	860.16	1656.59	859.67	1677.09	859.57	1691.96	859.68
1707.76	859.34	1735.84	859.04	1758.51	858.41	1774.92	858.05	1785.84	857.61
1789.97	857.33	1811.14	856.38	1828.17	856.13	1840.12	856.36	1857.83	856.31
1891.16	856.23	1896.08	856.26	1902.38	856.35	1905.9	855.88	1910.07	855.34
1916.24	854.54	1920.37	854.85	1922.69	855.06	1933.25	854.88	1952.34	854.52
1959.17	855.24	1972.35	856.57	1985.64	857.88	1995.64	857.88	2009.18	858
2012.68	858.01	2017.46	858.03	2063.24	858.1	2073.35	858.24	2098.81	858.66
2132.79	859.39	2182.45	860.35	2189.47	860.43	2193.22	860.54	2289.1	861.16
2297.07	861.17	2299.86	861.18	2303.49	861.2	2306.53	861.27	2390.08	861.7
2394.55	861.69	2399.82	861.67	2412.35	861.63	2433.83	861.49	2441.09	861.54
2449.93	861.02	2450.3	861	2450.82	860.97	2452.01	860.89	2477.92	859.23
2490.08	858.41	2498.24	857.67	2500.94	857.05	2503.32	856.75	2506.68	856.77
2507.62	856.72	2511.91	856.76	2522.63	856.98	2528.34	856.82	2528.6	856.81
2528.88	856.8	2552.05	856.17	2553.3	856.16	2554.47	856.16	2564.99	856
2565.83	856	2572.35	855.69	2574.83	856.17	2579.29	856.22	2583.21	856.05
2590.88	855.97	2599.26	855.83	2605.78	855.76	2612.94	855.56	2615.95	855.36
2621.56	855.31	2624.08	855.34	2625.29	855.34	2641.07	854.56	2657.35	854.07
2660.53	854.02	2676.62	853.82	2678.67	853.79	2679.36	853.76	2685.81	853.5
2689.05	853.17	2689.74	852.75	2689.76	852.77	2689.85	852.69	2690.52	852.11
2693.25	849.73	2698.59	845.1	2705.92	841.78	2709.94	839.92	2713.65	839.36
2715.74	839.04	2718.41	838.03	2720.08	836.8	2738	836.15	2754.16	837.61
2762.09	837.66	2765.03	838.35	2769.99	839.33	2779.8	840.3	2784.6	840.67
2789.94	842.4	2794.65	843.46	2795	843.54	2800.68	844.79	2802.75	845.13
2806.9	845.97	2812.6	847.04	2817.59	847.78	2827.5	849.62	2829.77	850.02
2830.74	850.33	2837.22	850.85	2838.67	850.97	2838.8	850.91	2843.36	850.59
2847.71	850.97	2851.21	851.01	2858.77	851	2860.67	851	2861.15	851
2861.18	850.98	2861.3	851	2861.48	850.98	2865.01	851.02	2873.11	850.94
2876.72	850.95	2887.58	851.2	2891.85	851.21	2896.65	851.23	2906.68	851.43
2912.09	851.45	2920.59	851.53	2927.9	851.64	2935.45	851.71	2943.48	851.83
2951.44	851.89	2957.54	852.08	2966.08	852.14	2971.43	852.3	2979.43	852.45
2983.55	851.5	2989.27	850.12	2997.86	850.08	2999.31	850.01	3000.92	850.03
3003.89	850	3022.28	849.76	3026.88	849.86	3038.9	849.9	3043.29	849.94

```
 3046.24  849.87 3053.52  847.94 3057.49  848.28 3063.23  852.08 3065.83  852.58
 3073.88  853.67 3085.83  853.97 3091.17  854.06 3105.33  854.07 3132.63  854.18
 3143.66  854.13  3159.8  854.13 3175.26  854.13 3212.17  854.76 3241.68  855.06
 3259.15  855.13 3275.73  855.18 3296.19  855.26 3308.25  855.27 3316.47  854.84
 3343.86  854.01 3347.47  853.68 3355.86  853.23 3366.25  853.97  3366.4  853.98
  3366.5  853.99 3368.57  853.97 3409.67  853.58 3420.64  853.46 3421.55  853.45
 3421.74  853.45 3423.46  853.43 3456.79  853.17 3463.58  853.12 3503.69  853.15
 3519.17  853.47 3528.81  854.52 3531.95  854.82 3540.92  855.45 3545.89  855.76
 3561.46  856.22 3562.52  856.25    3563  856.26 3580.68  855.99 3597.74  855.73
 3613.83  854.51 3621.94  855.62 3622.11  855.57 3622.27  855.52 3630.26  851.08
 3650.28   848.5 3650.37  848.48 3650.45  848.47 3652.24  848.24 3653.01  848.23
 3671.74     847 3673.85  847.23 3688.13  848.76 3690.32  848.76 3705.74  848.69
 3707.42  848.92 3714.61  850.07  3720.4  850.04 3724.57     850 3736.51  849.91
 3746.38   849.8 3751.88   849.2 3754.96   848.9 3757.56  848.83  3761.3  848.72
 3779.48  847.44 3788.54  846.92 3795.13  846.73 3802.81  846.76 3818.86  847.02
 3864.97  846.66 3878.46  846.47 3893.14  846.44 3918.51   846.5 3950.49  846.42
    3960  846.55 3970.51  846.18 3997.48  845.69 4011.08  845.86 4019.85  845.81
 4032.14  845.81 4032.62  845.81 4033.01  845.75 4059.87  841.61  4070.7  844.76
 4076.68  847.58 4087.93   853.9 4104.76  865.11 4105.17  865.37  4106.1  865.82
 4129.58  877.07 4134.41  877.56 4157.59  880.97 4173.12  882.72 4184.24  883.84
 4190.09  884.55 4221.11  890.63 4222.69  891.11 4230.72  893.61 4253.56  901.05
 4278.21  911.37 4278.58  911.52 4279.47  911.77 4305.73  919.31 4324.33   924.6
 4339.91  927.24 4349.05  928.35 4353.83   928.4  4375.1  928.06 4391.07  928.28
 4423.73  927.91

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 2689.05     .04 2838.67   .1255 3000.92    .075 3997.48   .1036

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2689.05 2838.67              .3       .5
Ineffective Flow     num=        3
   Sta L   Sta R    Elev  Permanent
 1340.98 2502.64     865       F
    3525 4090.75  861.83       T
    3019    3300     856       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2300    2400     870

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  5

Pier Data
Pier Station     Upstream=  2742.8    Downstream=  2742.8
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     835       3     855
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     835       3     855

Pier Data
Pier Station     Upstream=  2798.3    Downstream=  2798.3
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     835       3     855
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     835       3     855

Pier Data
Pier Station     Upstream=  2853.8    Downstream=  2853.8
```

```
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       1     835       1     855
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       1     835       1     855

Pier Data
Pier Station     Upstream=  2909.3    Downstream=  2909.3
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       1     835       1     855
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       1     835       1     855

Pier Data
Pier Station     Upstream=  2964.8    Downstream=  2964.8
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       1     835       1     855
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       1     835       1     855

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =  853.84

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     848.28  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     847.59  * E.G. Elev (ft)         *     848.27  *     848.27  *
* Q Total (cfs)          *    5870.00  * W.S. Elev (ft)         *     847.48  *     847.48  *
* Q Bridge (cfs)         *    5870.00  * Crit W.S. (ft)         *     843.94  *     843.94  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      11.33  *      11.33  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.13  *       7.13  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     823.45  *     823.45  *
* Weir Submerg           *             * Froude # Chl           *       0.47  *       0.47  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    4938.20  *    4938.20  *
* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       7.24  *       7.24  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *     145.65  *     145.65  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *    97076.9  *    97076.9  *
* Delta WS (ft)          *       0.11  * Top Width (ft)         *     113.74  *     113.74  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       7.13  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.29  *       1.29  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       9.20  *       9.20  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     852.33  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     851.37  * E.G. Elev (ft)         *     852.28  *     852.28  *
* Q Total (cfs)          *   10900.00  * W.S. Elev (ft)         *     851.19  *     851.19  *
* Q Bridge (cfs)         *   10900.00  * Crit W.S. (ft)         *     846.70  *     846.70  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      15.04  *      15.04  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.13  *       8.13  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1341.28  *    1341.28  *
* Weir Submerg           *             * Froude # Chl           *       0.48  *       0.49  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   10390.19  *   10381.34  *
* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       6.03  *       6.03  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *     271.46  *     271.46  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *   177533.0  *   173466.7  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *     222.54  *     222.54  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.13  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.16  *       1.22  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       9.45  *       9.90  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     853.52  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     852.53  * E.G. Elev (ft)         *     853.46  *     853.32  *
* Q Total (cfs)          *   12600.00  * W.S. Elev (ft)         *     852.34  *     852.17  *
* Q Bridge (cfs)         *   12600.00  * Crit W.S. (ft)         *     847.50  *     847.50  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      16.19  *      16.02  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.60  *       7.85  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1656.81  *    1604.59  *
* Weir Submerg           *             * Froude # Chl           *       0.46  *       0.48  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   12569.74  *   12340.43  *
* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       5.29  *       5.24  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *     371.90  *     362.81  *
* Delta EG (ft)          *       0.28  * Conv. Total (cfs)      *   212391.6  *   204018.4  *
* Delta WS (ft)          *       0.34  * Top Width (ft)         *     313.28  *     305.96  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *       0.13  *       0.03  *
* BR Open Vel (ft/s)     *       7.85  * C & E Loss (ft)        *       0.01  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.98  *       1.05  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.44  *       8.27  *
*********************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     856.82  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     855.79  * E.G. Elev (ft)         *     856.82  *     856.82  *
* Q Total (cfs)          *   19100.00  * W.S. Elev (ft)         *     855.79  *     855.79  *
* Q Bridge (cfs)         *   14936.47  * Crit W.S. (ft)         *     850.15  *     850.15  *
* Q Weir (cfs)           *    4163.53  * Max Chl Dpth (ft)      *      19.64  *      19.64  *
* Weir Sta Lft (ft)      *    2502.80  * Vel Total (ft/s)       *       7.32  *       7.32  *
* Weir Sta Rgt (ft)      *    4092.31  * Flow Area (sq ft)      *    2610.99  *    2610.99  *
* Weir Submerg           *       0.53  * Froude # Chl           *       0.44  *       0.44  *
* Weir Max Depth (ft)    *       3.70  * Specif Force (cu ft)   *   22359.78  *   22293.60  *
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* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *      11.60  *      11.60  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *     941.61  *     941.61  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *     945.92  *     945.92  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.99  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*********************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     860.46  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     859.86  * E.G. Elev (ft)         *     860.35  *     860.19  *
* Q Total (cfs)          *   27300.00  * W.S. Elev (ft)         *     859.93  *     859.75  *
* Q Bridge (cfs)         *   11790.82  * Crit W.S. (ft)         *     853.38  *     853.36  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.78  *      23.60  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.21  *       4.34  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6477.53  *    6288.21  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   39098.34  *   38038.66  *
* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       6.30  *       6.12  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *    1750.52  *    1750.19  *
* Delta EG (ft)          *       0.35  * Conv. Total (cfs)      *   424028.7  *   407136.8  *
* Delta WS (ft)          *       0.40  * Top Width (ft)         *    2146.07  *    2125.21  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *       0.16  *       0.02  *
* BR Open Vel (ft/s)     *       5.51  * C & E Loss (ft)        *       0.01  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.96  *       1.01  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.04  *       4.38  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     862.53  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     861.91  * E.G. Elev (ft)         *     862.41  *     862.27  *
* Q Total (cfs)          *   32830.00  * W.S. Elev (ft)         *     862.01  *     861.86  *
* Q Bridge (cfs)         *   10558.42  * Crit W.S. (ft)         *     857.77  *     857.74  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.86  *      25.71  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.76  *       3.87  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8724.59  *    8484.46  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   55408.49  *   54240.45  *
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* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       5.46  *       5.31  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *    2325.57  *    2325.30  *
* Delta EG (ft)          *       0.30  * Conv. Total (cfs)      *   565103.8  *   546993.9  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *    2464.57  *    2457.19  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *       0.13  *       0.01  *
* BR Open Vel (ft/s)     *       4.94  * C & E Loss (ft)        *       0.01  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.79  *       0.82  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.97  *       3.18  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     864.69  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     864.27  * E.G. Elev (ft)         *     864.58  *     864.52  *
* Q Total (cfs)          *   38750.00  * W.S. Elev (ft)         *     864.36  *     864.30  *
* Q Bridge (cfs)         *    7385.38  * Crit W.S. (ft)         *     858.25  *     858.22  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      28.21  *      28.15  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.10  *       3.13  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12483.93  *   12384.75  *
* Weir Submerg           *             * Froude # Chl           *       0.13  *       0.13  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   79854.37  *   79099.98  *
* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       7.80  *       7.74  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *    2329.81  *    2329.70  *
* Delta EG (ft)          *       0.24  * Conv. Total (cfs)      *   938092.6  *   932198.7  *
* Delta WS (ft)          *       0.26  * Top Width (ft)         *    2565.97  *    2564.63  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *       0.06  *       0.01  *
* BR Open Vel (ft/s)     *       3.45  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.57  *       0.57  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.77  *       1.79  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     867.05  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     866.89  * E.G. Elev (ft)         *     867.00  *     866.98  *
* Q Total (cfs)          *   46700.00  * W.S. Elev (ft)         *     866.93  *     866.92  *
* Q Bridge (cfs)         *    3922.68  * Crit W.S. (ft)         *     858.82  *     858.76  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      30.78  *      30.77  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.95  *       1.95  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   23988.46  *   23943.84  *
* Weir Submerg           *             * Froude # Chl           *       0.08  *       0.08  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  146208.00  *  145796.10  *
* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       9.19  *       9.17  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *    3352.47  *    3352.23  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  2131081.0  *  2134504.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *    2611.18  *    2610.98  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       1.83  * C & E Loss (ft)        *       0.00  *       0.03  *
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* Coef of Q              *             * Shear Total (lb/sq ft) *       0.21  *       0.21  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.42  *       0.42  *
*******************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. US. (ft)          *     857.25  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     856.16  * E.G. Elev (ft)         *     857.24  *     857.18  *
* Q Total (cfs)          *   20100.00  * W.S. Elev (ft)         *     856.16  *     856.16  *
* Q Bridge (cfs)         *   14603.89  * Crit W.S. (ft)         *     850.52  *     850.63  *
* Q Weir (cfs)           *    5496.11  * Max Chl Dpth (ft)      *      20.01  *      20.01  *
* Weir Sta Lft (ft)      *    2502.64  * Vel Total (ft/s)       *       7.40  *       7.40  *
* Weir Sta Rgt (ft)      *    4092.95  * Flow Area (sq ft)      *    2714.60  *    2714.60  *
* Weir Submerg           *       0.57  * Froude # Chl           *       0.44  *       0.44  *
* Weir Max Depth (ft)    *       4.12  * Specif Force (cu ft)   *   24043.54  *   23968.38  *
* Min El Weir Flow (ft)  *     853.13  * Hydr Depth (ft)        *       5.79  *       5.79  *
* Min El Prs (ft)        *     853.84  * W.P. Total (ft)        *    1189.99  *    1189.99  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *    1093.13  *    1093.13  *
* BR Open Area (sq ft)   *    2138.09  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.83  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*******************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 28.505

INPUT
Description: Downstream side of Holmes Road, copied from upstream side
Station Elevation Data    num=     441
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  886.92    2.39  886.87     8.5  886.65   14.34  886.35   15.57  886.22
   28.25  885.33   32.93  885.58   43.46  886.06   46.67  886.26   47.36  886.24
   47.94  886.22   48.33  886.21   48.83  886.19   49.53  886.13   54.99  885.62
   59.52  885.46   59.54  885.57   60.33  885.56   76.24  885.07   90.77  884.74
   91.43  884.71  102.79  884.71  103.43  884.71  104.36  884.71  123.28  884.62
   128.3  884.85   135.6  884.96  163.22  885.25  164.53  885.26  178.78  885.81
  180.71  885.88  211.17  886.02  217.83  885.93  226.94  885.78  238.09  885.65
  246.13  885.68  263.91  885.06  265.98  884.96  275.74  883.36  278.88  883.03
```

281.83	883.21	289.74	883.38	306.5	883.65	312.93	883.8	315.85	883.84
325.41	884.1	336.5	884.45	338.42	884.47	350.56	884.72	363.04	883.96
367.03	883.62	370.25	883.4	376.46	883.25	390.7	882.77	397.13	882.49
418.83	880.59	422.09	880.34	425.13	880.08	445.46	878.82	454.41	878.34
467.13	878.31	487.81	878.51	502.44	878.46	510.41	878.47	522.21	878.43
530.8	878.59	537.43	878.68	540.34	878.73	545.19	878.83	545.81	878.83
547.11	878.79	597.85	878.01	599.81	878.01	603.06	877.95	604.95	877.91
628.79	877.37	655.24	876.65	657.69	876.59	660.27	876.54	687.14	874.84
687.63	874.81	688.61	874.77	699.28	874.38	704.06	874.41	709.37	874.45
718.7	874.5	728.2	874.62	734.42	874.41	734.56	874.4	734.83	874.42
739.63	874.81	741.47	874.9	746.75	875.12	759.37	875.53	772.33	875.52
784.46	875.49	807.67	875.57	832.33	875.54	845.2	875.49	853.13	875.31
891.05	874.29	902.45	874.17	921.51	874.09	935.82	874.58	936.37	874.6
942.34	874.24	946.81	873.8	958.75	873.68	966.83	873.73	967.11	873.73
967.36	873.76	969.91	873.75	979.04	873.79	992.81	873.74	1013.91	873.71
1022.62	873.61	1026.46	873.65	1068.17	873.26	1120.95	872.38	1125.2	872.31
1127.32	872.35	1153.13	873.29	1160.49	873.56	1161.09	873.5	1176.08	872.01
1185.39	871.05	1194.1	870.05	1194.68	870.16	1199.15	871.04	1201.25	871.31
1205.3	871.87	1213.25	872.03	1215.36	872.08	1219.44	872.06	1220.89	872.06
1221.7	871.98	1226.34	871.44	1227.36	871.46	1232.27	871.63	1236.65	871.61
1237.75	871.61	1252.54	871.67	1254.98	871.69	1266.88	871.06	1270.04	870.96
1315.6	869.98	1318.47	869.99	1341.25	869.74	1344.73	869.74	1352.92	869.67
1381.21	868.84	1384.47	868.71	1385.02	868.66	1385.78	868.55	1393.33	867.34
1400.54	866.59	1403.11	865.95	1410.96	865.69	1442.8	864.11	1471.1	863.44
1488.9	863	1515.1	862.37	1539.77	861.94	1550.47	861.66	1561.85	861.37
1608.43	860.58	1634.8	860.16	1656.59	859.67	1677.09	859.57	1691.96	859.68
1707.76	859.34	1735.84	859.04	1758.51	858.41	1774.92	858.05	1785.84	857.61
1789.97	857.33	1811.14	856.38	1828.17	856.13	1840.12	856.36	1857.83	856.31
1891.16	856.23	1896.08	856.26	1902.38	856.35	1905.9	855.88	1910.07	855.34
1916.24	854.54	1920.37	854.85	1922.69	855.06	1933.25	854.88	1952.34	854.52
1959.17	855.24	1972.35	856.57	1985.64	857.88	1995.64	857.88	2009.18	858
2012.68	858.01	2017.46	858.03	2063.24	858.1	2073.35	858.24	2098.81	858.66
2132.79	859.39	2182.45	860.35	2189.47	860.43	2193.22	860.54	2289.1	861.16
2297.07	861.17	2299.86	861.18	2303.49	861.2	2306.53	861.27	2390.08	861.7
2394.55	861.69	2399.82	861.67	2412.35	861.63	2433.83	861.49	2441.09	861.54
2449.93	861.02	2450.3	861	2450.82	860.97	2452.01	860.89	2477.92	859.23
2490.08	858.41	2498.24	857.67	2500.94	857.05	2503.32	856.75	2506.68	856.77
2507.62	856.72	2511.91	856.76	2522.63	856.98	2528.34	856.82	2528.6	856.81
2528.88	856.8	2552.05	856.17	2553.3	856.16	2554.47	856.16	2564.99	856
2565.83	856	2572.35	855.69	2574.83	856.17	2579.29	856.22	2583.21	856.05
2590.88	855.97	2599.26	855.83	2605.78	855.76	2612.94	855.56	2615.95	855.36
2621.56	855.31	2624.08	855.34	2625.29	855.34	2641.07	854.56	2657.35	854.07
2660.53	854.02	2676.62	853.82	2678.67	853.79	2679.36	853.76	2685.81	853.5
2689.05	853.17	2689.74	852.75	2689.76	852.77	2689.85	852.69	2690.52	852.11
2693.25	849.73	2698.59	845.1	2705.92	841.78	2709.94	839.92	2713.65	839.36
2715.74	839.04	2718.41	838.03	2720.08	836.8	2738	836.15	2754.16	837.61
2762.09	837.66	2765.03	838.35	2769.99	839.33	2779.8	840.3	2784.6	840.67
2789.94	842.4	2794.65	843.46	2795	843.54	2800.68	844.79	2802.75	845.13
2806.9	845.97	2812.6	847.04	2817.59	847.78	2827.5	849.62	2829.77	850.02
2830.74	850.33	2837.22	850.85	2838.67	850.97	2838.8	850.91	2843.36	850.59
2847.71	850.97	2851.21	851.01	2858.77	851	2860.67	851	2861.15	851
2861.18	850.98	2861.3	851	2861.48	850.98	2865.01	851.02	2873.11	850.94
2876.72	850.95	2887.58	851.2	2891.85	851.21	2896.65	851.23	2906.68	851.43
2912.09	851.45	2920.59	851.53	2927.9	851.64	2935.45	851.71	2943.48	851.83
2951.44	851.89	2957.54	852.08	2966.08	852.14	2971.43	852.3	2979.43	852.45
2983.55	851.5	2989.27	850.12	2997.86	850.08	2999.31	850.01	3000.92	850.03
3003.89	850	3022.28	849.76	3026.88	849.86	3038.9	849.9	3043.29	849.94
3046.24	849.87	3053.52	847.94	3057.49	848.28	3063.23	852.08	3065.83	852.58
3073.88	853.67	3085.83	853.97	3091.17	854.06	3105.33	854.07	3132.63	854.18
3143.66	854.13	3159.8	854.13	3175.26	854.13	3212.17	854.76	3241.68	855.06
3259.15	855.13	3275.73	855.18	3296.19	855.26	3308.25	855.27	3316.47	854.84
3343.86	854.01	3347.47	853.68	3355.86	853.23	3366.25	853.97	3366.4	853.98
3366.5	853.99	3368.57	853.97	3409.67	853.58	3420.64	853.46	3421.55	853.45
3421.74	853.45	3423.46	853.43	3456.79	853.17	3463.58	853.12	3503.69	853.15
3519.17	853.47	3528.81	854.52	3531.95	854.82	3540.92	855.45	3545.89	855.76
3561.46	856.22	3562.52	856.25	3563	856.26	3580.68	855.99	3597.74	855.73
3613.83	854.51	3621.94	855.62	3622.11	855.57	3622.27	855.52	3630.26	851.08
3650.28	848.5	3650.37	848.48	3650.45	848.47	3652.24	848.24	3653.01	848.23
3671.74	847	3673.85	847.23	3688.13	848.76	3690.32	848.76	3705.74	848.69
3707.42	848.92	3714.61	850.07	3720.4	850.04	3724.57	850	3736.51	849.91
3746.38	849.8	3751.88	849.2	3754.96	848.9	3757.56	848.83	3761.3	848.72
3779.48	847.44	3788.54	846.92	3795.13	846.73	3802.81	846.76	3818.86	847.02
3864.97	846.66	3878.46	846.47	3893.14	846.44	3918.51	846.5	3950.49	846.42
3960	846.55	3970.51	846.18	3997.48	845.69	4011.08	845.86	4019.85	845.81
4032.14	845.81	4032.62	845.81	4033.01	845.75	4059.87	841.61	4070.7	844.76
4076.68	847.58	4087.93	853.9	4104.76	865.11	4105.17	865.37	4106.1	865.82

```
 4129.58  877.07 4134.41  877.56 4157.59  880.97 4173.12  882.72 4184.24  883.84
 4190.09  884.55 4221.11  890.63 4222.69  891.11 4230.72  893.61 4253.56  901.05
 4278.21  911.37 4278.58  911.52 4279.47  911.77 4305.73  919.31 4324.33   924.6
 4339.91  927.24 4349.05  928.35 4353.83   928.4  4375.1  928.06 4391.07  928.28
 4423.73  927.91

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 2689.05     .04 2838.67   .1255 3000.92    .075 3997.48   .1036

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2689.05 2838.67          1059.45  1137.7467.1975             .3       .5
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
 1340.98 2502.64     865       F
    3525 4090.75  861.83       T
    3019    3300     856       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2300    2400     870

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  848.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.71  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)          *  847.48  * Reach Len. (ft)        * 1059.45  * 1137.70  *  467.20  *
* Crit W.S. (ft)          *  843.75  * Flow Area (sq ft)      *          *  865.79  *          *
* E.G. Slope (ft/ft)      *0.002483  * Area (sq ft)           *          *  865.79  *  419.73  *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *          * 5870.00  *          *
* Top Width (ft)          *  429.15  * Top Width (ft)         *          *  119.74  *  309.41  *
* Vel Total (ft/s)        *    6.78  * Avg. Vel. (ft/s)       *          *    6.78  *          *
* Max Chl Dpth (ft)       *   11.33  * Hydr. Depth (ft)       *          *    7.23  *          *
* Conv. Total (cfs)       *117804.8  * Conv. (cfs)            *          *117804.8  *          *
* Length Wtd. (ft)        * 1134.92  * Wetted Per. (ft)       *          *  123.51  *          *
* Min Ch El (ft)          *  836.15  * Shear (lb/sq ft)       *          *    1.09  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.37  *          *
* Frctn Loss (ft)         *    2.22  * Cum Volume (acre-ft)   *  980.69  * 7001.75  *  916.47  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  234.16  *  553.10  *  262.92  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  852.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.99  * Wt. n-Val.             *          *   0.040  *   0.090  *
* W.S. Elev (ft)          *  851.19  * Reach Len. (ft)        * 1059.45  * 1137.70  *  467.20  *
* Crit W.S. (ft)          *  846.46  * Flow Area (sq ft)      *          * 1357.21  *   48.81  *
* E.G. Slope (ft/ft)      *0.002518  * Area (sq ft)           *          * 1357.21  * 1991.72  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             *          *10862.39  *   37.61  *
* Top Width (ft)          *  725.42  * Top Width (ft)         *          *  147.09  *  578.33  *
* Vel Total (ft/s)        *    7.75  * Avg. Vel. (ft/s)       *          *    8.00  *    0.77  *
* Max Chl Dpth (ft)       *   15.04  * Hydr. Depth (ft)       *          *    9.23  *    0.59  *
* Conv. Total (cfs)       *217232.8  * Conv. (cfs)            *          *216483.3  *   749.5  *
* Length Wtd. (ft)        * 1129.48  * Wetted Per. (ft)       *          *  152.54  *   82.61  *
* Min Ch El (ft)          *  836.15  * Shear (lb/sq ft)       *          *    1.40  *    0.09  *
* Alpha                   *    1.06  * Stream Power (lb/ft s) *          *   11.19  *    0.07  *
* Frctn Loss (ft)         *    2.55  * Cum Volume (acre-ft)   * 2304.06  * 9370.35  * 2550.04  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *  394.49  *  596.40  *  528.24  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)          *  853.24  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    1.05  * Wt. n-Val.             *          *   0.040  *   0.102  *
* W.S. Elev (ft)         *  852.19  * Reach Len. (ft)        * 1059.45  * 1137.70  *  467.20  *
* Crit W.S. (ft)         *  847.21  * Flow Area (sq ft)      *          * 1505.88  *  178.54  *
* E.G. Slope (ft/ft)     *0.002371  * Area (sq ft)           *          * 1505.88  * 2623.31  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *          *12452.94  *  147.06  *
* Top Width (ft)         *  817.30  * Top Width (ft)         *          *  148.24  *  669.05  *
* Vel Total (ft/s)       *    7.48  * Avg. Vel. (ft/s)       *          *    8.27  *    0.82  *
* Max Chl Dpth (ft)      *   16.04  * Hydr. Depth (ft)       *          *   10.16  *    1.07  *
* Conv. Total (cfs)      *258741.5  * Conv. (cfs)            *          *255721.6  *  3019.8  *
* Length Wtd. (ft)       * 1125.67  * Wetted Per. (ft)       *          *  154.07  *  167.92  *
* Min Ch El (ft)         *  836.15  * Shear (lb/sq ft)       *          *    1.45  *    0.16  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *          *   11.97  *    0.13  *
* Frctn Loss (ft)        *    2.53  * Cum Volume (acre-ft)   * 3221.65  *11090.98  * 3754.25  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  466.00  *  624.61  *  659.64  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  856.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.060  *   0.040  *   0.102  *
* W.S. Elev (ft)         *  855.64  * Reach Len. (ft)        * 1059.45  * 1137.70  *  467.20  *
* Crit W.S. (ft)         *  849.72  * Flow Area (sq ft)      *   93.99  * 2020.58  * 1236.74  *
* E.G. Slope (ft/ft)     *0.001747  * Area (sq ft)           *  135.00  * 2020.58  * 5733.26  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *  109.31  *17319.49  * 1671.20  *
* Top Width (ft)         * 1480.65  * Top Width (ft)         *  134.21  *  149.62  * 1196.83  *
* Vel Total (ft/s)       *    5.70  * Avg. Vel. (ft/s)       *    1.16  *    8.57  *    1.35  *
* Max Chl Dpth (ft)      *   19.49  * Hydr. Depth (ft)       *    1.19  *   13.50  *    3.05  *
* Conv. Total (cfs)      *456948.1  * Conv. (cfs)            *  2615.0  *414351.3  * 39981.8  *
* Length Wtd. (ft)       * 1097.15  * Wetted Per. (ft)       *   78.93  *  155.79  *  405.79  *
* Min Ch El (ft)         *  836.15  * Shear (lb/sq ft)       *    0.13  *    1.41  *    0.33  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.15  *   12.13  *    0.45  *
* Frctn Loss (ft)        *    2.24  * Cum Volume (acre-ft)   * 4972.45  *13100.31  * 6124.91  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *  615.89  *  647.98  *  823.72  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  860.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.060  *   0.040  *   0.091  *
* W.S. Elev (ft)         *  859.45  * Reach Len. (ft)        * 1059.45  * 1137.70  *  467.20  *
* Crit W.S. (ft)         *  852.80  * Flow Area (sq ft)      *  734.74  * 2591.17  * 3762.30  *
* E.G. Slope (ft/ft)     *0.000985  * Area (sq ft)           * 1674.37  * 2591.17  *10499.28  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 1424.38  *19686.25  * 6189.38  *
* Top Width (ft)         * 2055.11  * Top Width (ft)         *  647.90  *  149.62  * 1257.59  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    1.94  *    7.60  *    1.65  *
* Max Chl Dpth (ft)      *   23.30  * Hydr. Depth (ft)       *    3.94  *   17.32  *    5.44  *
* Conv. Total (cfs)      *869764.6  * Conv. (cfs)            * 45379.9  *627194.1  *197190.5  *
* Length Wtd. (ft)       * 1046.48  * Wetted Per. (ft)       *  186.55  *  155.79  *  694.96  *
* Min Ch El (ft)         *  836.15  * Shear (lb/sq ft)       *    0.24  *    1.02  *    0.33  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    0.47  *    7.77  *    0.55  *
* Frctn Loss (ft)        *    1.60  * Cum Volume (acre-ft)   * 8198.56  *16054.14  *10267.07  *
* C & E Loss (ft)        *    0.55  * Cum SA (acres)         * 1012.60  *  676.15  * 1295.78  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	862.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.060	0.040	0.088
W.S. Elev (ft)	861.73	Reach Len. (ft)	1059.45	1137.70	467.20
Crit W.S. (ft)	854.81	Flow Area (sq ft)	1158.97	2931.67	5340.70
E.G. Slope (ft/ft)	0.000720	Area (sq ft)	3594.78	2931.67	13365.22
Q Total (cfs)	32830.00	Flow (cfs)	2602.21	20670.28	9557.51
Top Width (ft)	2451.76	Top Width (ft)	1041.13	149.62	1261.01
Vel Total (ft/s)	3.48	Avg. Vel. (ft/s)	2.25	7.05	1.79
Max Chl Dpth (ft)	25.58	Hydr. Depth (ft)	6.22	19.59	7.68
Conv. Total (cfs)	1223753.0	Conv. (cfs)	96998.7	770494.0	356260.5
Length Wtd. (ft)	1022.83	Wetted Per. (ft)	186.55	155.79	699.07
Min Ch El (ft)	836.15	Shear (lb/sq ft)	0.28	0.85	0.34
Alpha	2.69	Stream Power (lb/ft s)	0.63	5.96	0.61
Frctn Loss (ft)	1.31	Cum Volume (acre-ft)	11333.44	17851.33	14158.20
C & E Loss (ft)	0.73	Cum SA (acres)	1304.98	683.30	1743.96

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	864.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.060	0.040	0.088
W.S. Elev (ft)	864.01	Reach Len. (ft)	1059.45	1137.70	467.20
Crit W.S. (ft)	855.94	Flow Area (sq ft)	1584.38	3273.12	8163.87
E.G. Slope (ft/ft)	0.000583	Area (sq ft)	6089.76	3273.12	16246.88
Q Total (cfs)	38750.00	Flow (cfs)	3945.33	22362.54	12442.12
Top Width (ft)	2556.03	Top Width (ft)	1141.97	149.62	1264.44
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	2.49	6.83	1.52
Max Chl Dpth (ft)	27.86	Hydr. Depth (ft)	8.50	21.88	6.46
Conv. Total (cfs)	1604221.0	Conv. (cfs)	163333.8	925792.3	515094.5
Length Wtd. (ft)	1011.06	Wetted Per. (ft)	186.55	155.79	1274.48
Min Ch El (ft)	836.15	Shear (lb/sq ft)	0.31	0.77	0.23
Alpha	3.20	Stream Power (lb/ft s)	0.77	5.23	0.36
Frctn Loss (ft)	1.14	Cum Volume (acre-ft)	14344.22	19116.42	18084.74
C & E Loss (ft)	0.89	Cum SA (acres)	1503.98	684.24	2185.70

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	866.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.060	0.040	0.086
W.S. Elev (ft)	866.80	Reach Len. (ft)	1059.45	1137.70	467.20
Crit W.S. (ft)	858.07	Flow Area (sq ft)	9358.86	3690.76	11699.79
E.G. Slope (ft/ft)	0.000246	Area (sq ft)	9358.86	3690.76	19782.80
Q Total (cfs)	46700.00	Flow (cfs)	14399.38	17753.59	14547.02
Top Width (ft)	2609.63	Top Width (ft)	1190.53	149.62	1269.48
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	1.54	4.81	1.24
Max Chl Dpth (ft)	30.65	Hydr. Depth (ft)	7.86	24.67	9.22
Conv. Total (cfs)	2974860.0	Conv. (cfs)	917262.4	1130931.0	926667.3
Length Wtd. (ft)	1005.31	Wetted Per. (ft)	1202.22	155.79	1280.26
Min Ch El (ft)	836.15	Shear (lb/sq ft)	0.12	0.36	0.14
Alpha	2.81	Stream Power (lb/ft s)	0.18	1.75	0.17
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	19936.15	20987.92	24798.19

```
* C & E Loss (ft)        *    1.17  * Cum SA (acres)         * 1810.21  *  686.67  * 2609.06  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  857.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.06  * Wt. n-Val.              *   0.060  *   0.040  *   0.106  *
* W.S. Elev (ft)         *  856.12  * Reach Len. (ft)        * 1059.45  * 1137.70  *  467.20  *
* Crit W.S. (ft)         *  850.11  * Flow Area (sq ft)      *  141.06  * 2092.13  * 1463.09  *
* E.G. Slope (ft/ft)     *0.001715  * Area (sq ft)           *  210.54  * 2092.13  * 6314.13  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  168.68  *18181.78  * 1749.54  *
* Top Width (ft)         * 1575.87  * Top Width (ft)         *  188.21  *  149.62  * 1238.04  *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *    1.20  *    8.69  *    1.20  *
* Max Chl Dpth (ft)      *   19.97  * Hydr. Depth (ft)       *    1.13  *   13.98  *    2.13  *
* Conv. Total (cfs)      *485418.0  * Conv. (cfs)            *  4073.6  *439092.8  * 42251.7  *
* Length Wtd. (ft)       * 1096.87  * Wetted Per. (ft)       *  124.61  *  155.79  *  688.94  *
* Min Ch El (ft)         *  836.15  * Shear (lb/sq ft)       *    0.12  *    1.44  *    0.23  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.14  *   12.49  *    0.27  *
* Frctn Loss (ft)        *    2.23  * Cum Volume (acre-ft)   * 5811.26  *14049.09  * 7144.30  *
* C & E Loss (ft)        *    0.26  * Cum SA (acres)         *  715.87  *  658.30  *  904.21  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 28.289

INPUT
Description: Ineffective area due to expansion from bridge.
Station Elevation Data    num=     356
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  886.93   15.32  886.54   29.48  886.32   42.89  885.45   44.72  885.35
   45.67  885.35   46.46  885.35    57.8  885.21   82.07  884.98   82.09  884.98
   82.25  884.94   82.39  884.94   82.65  884.94   85.53  884.86   87.03  884.78
  112.53  883.94   121.8   883.5   125.7  883.23  142.24  883.13  143.29  883.14
  144.48   883.1  160.36  882.54  169.83  882.34  191.92  881.53  211.27   880.6
  216.02  880.38  219.34  880.28  226.14   880.1  257.02  879.22  291.91  878.15
  294.86  878.03  295.53  877.99  299.62  877.87  327.22  876.99  334.74  876.62
  340.93  876.88  354.05  876.52  358.89   876.4   359.7  876.36  392.03  875.22
  397.55  875.09  411.92  874.81  427.34  874.49  438.79  874.51  452.42  874.61
  463.91  875.42  468.86  875.28  478.09  876.03   480.1  876.11  485.07  876.22
  486.56  876.25   487.1  876.18   496.5   874.8  498.96  874.71  514.37  873.97
  517.21  873.61  527.42  872.67  528.17  872.48  530.98  871.59  534.53  871.17
  536.73  872.44  540.69  872.49  542.96  872.55  544.25  872.53  547.54  872.49
  548.88  872.49  560.65  872.65  561.09  872.62  567.15  872.09  571.65  869.87
  574.46  869.44  576.35  869.15  581.52  869.06  585.37  868.99  594.61  869.53
  600.21   869.3  611.41  868.64  617.81  868.55  623.69  868.74  631.95  868.27
  635.96  868.17  648.48   867.8  660.35  867.37  665.29  866.83  668.29  866.37
  680.96   864.4  681.68  864.38  682.37  864.36  701.15  863.84     713  864.01
  723.09  866.08  726.62   866.7  729.42  867.05  745.88  871.44   746.8  871.67
  747.72  871.85  756.68  873.24  759.54  872.73  765.03  871.29  766.69  870.85
  767.97  870.51   768.8   870.3  779.06  869.99  787.11   869.8  802.46  869.53
  819.32  869.23  869.93  867.61  870.09  867.61  870.32   867.6  870.69   867.6
  923.85  867.02  984.77  865.93  985.82  865.88  988.06  865.84 1030.83  864.87
 1042.34  864.91  1061.9  864.63 1088.22  864.38 1103.51  864.11 1132.23  863.63
 1136.62  863.43 1147.87  862.77 1152.17  862.36 1159.12  861.39 1159.53  861.27
```

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 1172.83  857.65 1174.79  857.17 1192.41  853.65 1196.86  853.53 1202.92  853.04
 1207.69  852.69 1210.48  852.58 1229.67   855.2 1234.82  855.83 1236.74  855.65
 1258.68  854.14 1266.65  853.84 1269.83  853.74 1300.64  853.08 1301.26  853.07
 1301.63  853.13 1315.86  855.39 1343.23  854.82 1357.91  854.48 1367.38   854.2
 1381.01  854.05 1404.05  853.51 1433.14  853.38 1441.21  853.42  1448.2  853.37
  1480.5  853.12 1484.41  852.86 1492.66  852.18 1495.72  851.93 1501.81   852.7
 1507.75  853.37 1512.23  853.67 1516.78  854.04 1520.93  854.38 1527.37  854.35
 1556.51  854.06 1557.61  854.05 1558.33  854.05 1563.36  853.98 1580.51  853.81
    1594  853.69  1636.3  853.73 1657.73  853.85 1664.31  853.86 1685.35  854.01
 1705.37  854.08 1723.35  854.17 1754.89  853.76 1783.19  853.19 1827.77  852.87
 1830.56  852.95 1838.41  853.13  1856.8  853.42 1863.14  853.69 1895.35  854.03
 1929.28  853.43 1937.95  851.17 1938.12  851.12 1938.31  851.13 1939.01  851.16
 1948.99  851.55  1953.7  851.81 2067.36  853.58  2079.7   853.8 2082.54  853.83
  2083.7  853.79 2085.51  853.73 2087.43  853.69 2109.53  853.24 2110.49  853.22
 2123.33  852.78 2124.66  852.72 2125.24  852.72 2131.38     853  2132.9  852.64
 2137.95  852.52 2145.66  852.35 2147.26   851.9 2148.31  851.72 2156.19  851.71
 2163.38   851.7 2165.13  851.69 2167.47  851.68 2183.51  851.56 2198.71  851.32
 2215.79  851.13 2229.14  851.05 2239.54  850.99 2260.67  850.87 2262.44  850.68
  2267.4  850.39 2318.06  850.38 2338.35  850.58 2398.52  850.22 2400.56   850.2
 2402.17  850.19 2436.15  850.02    2466  849.87 2471.73  849.91 2478.97  849.74
 2529.82   849.2 2559.42  849.01  2578.5  849.03 2593.64  849.03 2614.09  849.01
 2639.87  849.06 2657.46  848.81 2678.04  848.97 2680.44  849.03 2682.59  849.13
 2690.34  849.08 2695.65  848.96 2720.49  847.52 2721.14  847.48 2721.53  847.44
 2753.86  846.37 2768.84  846.16 2785.11  844.91 2791.16  844.58 2796.27  844.35
 2822.06  843.31 2829.18  843.25 2849.47  842.83 2851.14  842.83 2861.94  842.82
 2874.32  842.91 2888.82  842.92 2901.61   842.7 2911.09  842.44 2919.78  841.97
 2928.31  841.54 2933.56  840.88 2940.89  840.09 2941.03  840.09 2941.67  840.14
 2952.17  840.68 2955.76  841.09 2965.59  840.77 2971.05  840.67 2973.47  840.57
 2986.41  840.21 2991.61  839.81 3003.58  839.26 3009.08  838.39 3013.74  837.32
 3018.09  835.47 3019.57  835.47  3022.1  835.47 3038.02  835.47 3039.36  835.47
 3040.38  835.52 3048.44  835.96 3052.39  836.26 3056.01   837.1 3065.95   839.6
 3069.72  840.42 3075.86  841.88    3090  841.89 3113.44  842.31 3114.79  842.35
 3126.87  842.35 3139.13  842.35 3143.33  842.05 3150.77  841.53 3157.69  840.95
 3171.57  835.55 3171.93   835.4 3171.98  835.38  3181.5  834.67 3182.27  834.25
    3185     833    3205  832.09    3222     833 3227.61     835  3234.5  842.95
 3235.31     844 3237.02  843.98 3243.31  844.09 3244.65  844.12 3251.59  843.12
    3253  842.95 3257.36  842.11  3261.3  841.35 3263.18  841.01  3264.2  840.95
 3287.46  839.68 3304.94  839.68 3334.61   839.5 3334.63   839.5 3359.89  839.51
 3396.16   840.6 3403.99  840.86 3406.63  842.07 3408.31  842.74 3411.26   842.5
 3414.57  842.16 3420.25  838.55 3423.22  834.71 3426.31  834.03 3426.81  833.92
  3428.4  834.35 3434.11  835.64 3436.41  836.11 3444.56  837.63 3452.23  840.23
 3458.92   845.1 3466.85  847.59 3477.68  850.51 3485.69   853.9 3496.96  859.38
 3506.32  865.37 3507.98  867.88 3509.65  869.16  3513.3  869.73 3520.16  870.71
 3535.01  872.24 3538.89   872.6 3540.23  872.58 3545.88  872.63 3552.53  875.39
 3563.21  880.21 3569.15  883.44  3572.1  883.31 3580.21  883.41 3598.14  890.97
 3598.47  891.11 3619.45  899.41 3623.12  901.05 3644.35     911 3645.26   911.5
 3661.16  916.79

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06 2436.15      .1 3157.69     .04 3235.31     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3157.69 3235.31           1432.2 1476.741864.831             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3081.89     865       F
    3250 3661.16     865       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************
* E.G. Elev (ft)         *  845.95  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  845.28  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  840.14  * Flow Area (sq ft)      *  244.10  *  818.64  *   19.86  *
* E.G. Slope (ft/ft)     *0.001586  * Area (sq ft)           * 1529.97  *  818.64  * 1175.77  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  314.86  * 5543.20  *   11.94  *
* Top Width (ft)         *  679.18  * Top Width (ft)         *  377.38  *   77.62  *  224.18  *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)       *    1.29  *    6.77  *    0.60  *
* Max Chl Dpth (ft)      *   13.19  * Hydr. Depth (ft)       *    3.22  *   10.55  *    1.35  *
* Conv. Total (cfs)      *147387.7  * Conv. (cfs)            *  7905.7  *139182.1  *   299.8  *
* Length Wtd. (ft)       * 1495.51  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    0.32  *    0.97  *    0.13  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.41  *    6.57  *    0.08  *
* Frctn Loss (ft)        *    3.51  * Cum Volume (acre-ft)   *  962.09  * 6979.75  *  907.91  *
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* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  229.58  *  550.52  *  260.06  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  849.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  848.43  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  843.71  * Flow Area (sq ft)      *  482.61  * 1062.88  *   66.08  *
* E.G. Slope (ft/ft)     *0.002030  * Area (sq ft)           * 2838.02  * 1062.88  * 1897.12  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 1109.43  * 9690.36  *  100.21  *
* Top Width (ft)         *  765.07  * Top Width (ft)         *  452.81  *   77.62  *  234.64  *
* Vel Total (ft/s)       *    6.76  * Avg. Vel. (ft/s)       *    2.30  *    9.12  *    1.52  *
* Max Chl Dpth (ft)      *   16.34  * Hydr. Depth (ft)       *    6.37  *   13.69  *    4.50  *
* Conv. Total (cfs)      *241910.7  * Conv. (cfs)            * 24622.2  *215064.4  *  2224.1  *
* Length Wtd. (ft)       * 1507.67  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    0.81  *    1.61  *    0.57  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    1.85  *   14.69  *    0.86  *
* Frctn Loss (ft)        *    3.45  * Cum Volume (acre-ft)   * 2269.55  * 9338.75  * 2529.18  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  388.98  *  593.46  *  523.88  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  850.64  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  849.34  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  844.57  * Flow Area (sq ft)      *  551.84  * 1133.77  *   79.50  *
* E.G. Slope (ft/ft)     *0.002125  * Area (sq ft)           * 3311.63  * 1133.77  * 2112.97  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1419.27  *11041.20  *  139.53  *
* Top Width (ft)         *  956.55  * Top Width (ft)         *  640.91  *   77.62  *  238.02  *
* Vel Total (ft/s)       *    7.14  * Avg. Vel. (ft/s)       *    2.57  *    9.74  *    1.76  *
* Max Chl Dpth (ft)      *   17.25  * Hydr. Depth (ft)       *    7.28  *   14.61  *    5.41  *
* Conv. Total (cfs)      *273312.3  * Conv. (cfs)            * 30786.1  *239499.6  *  3026.5  *
* Length Wtd. (ft)       * 1509.91  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    0.97  *    1.80  *    0.72  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *    2.48  *   17.52  *    1.26  *
* Frctn Loss (ft)        *    3.45  * Cum Volume (acre-ft)   * 3181.38  *11056.51  * 3728.85  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  458.20  *  621.66  *  654.78  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  854.20  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.84  * Wt. n-Val.             *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  852.36  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  847.12  * Flow Area (sq ft)      *  780.80  * 1368.23  *  123.87  *
* E.G. Slope (ft/ft)     *0.002413  * Area (sq ft)           * 5959.50  * 1368.23  * 2846.56  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2696.60  *16092.08  *  311.32  *
* Top Width (ft)         * 1400.99  * Top Width (ft)         * 1076.63  *   77.62  *  246.74  *
* Vel Total (ft/s)       *    8.40  * Avg. Vel. (ft/s)       *    3.45  *   11.76  *    2.51  *
* Max Chl Dpth (ft)      *   20.27  * Hydr. Depth (ft)       *   10.30  *   17.63  *    8.43  *
* Conv. Total (cfs)      *388849.0  * Conv. (cfs)            * 54899.0  *327611.9  *  6338.1  *
* Length Wtd. (ft)       * 1514.98  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    1.55  *    2.46  *    1.27  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    5.35  *   28.99  *    3.18  *
* Frctn Loss (ft)        *    3.52  * Cum Volume (acre-ft)   * 4898.33  *13056.06  * 6078.90  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *  601.17  *  645.02  *  815.98  *
*****************************************************************************************************
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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  857.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.49  * Wt. n-Val.             *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  855.46  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  849.73  * Flow Area (sq ft)      * 1016.13  * 1609.21  *  169.48  *
* E.G. Slope (ft/ft)     *0.002702  * Area (sq ft)           *10907.24  * 1609.21  * 3623.59  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4426.98  *22317.46  *  555.56  *
* Top Width (ft)         * 2297.95  * Top Width (ft)         * 1966.73  *   77.62  *  253.60  *
* Vel Total (ft/s)       *    9.77  * Avg. Vel. (ft/s)       *    4.36  *   13.87  *    3.28  *
* Max Chl Dpth (ft)      *   23.37  * Hydr. Depth (ft)       *   13.41  *   20.73  *   11.54  *
* Conv. Total (cfs)      *525167.9  * Conv. (cfs)            * 85161.4  *429319.3  * 10687.2  *
* Length Wtd. (ft)       * 1518.14  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    2.26  *    3.25  *    1.94  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    9.85  *   45.03  *    6.36  *
* Frctn Loss (ft)        *    3.68  * Cum Volume (acre-ft)   * 8045.56  *15999.28  *10191.33  *
* C & E Loss (ft)        *    0.32  * Cum SA (acres)         *  980.81  *  673.19  * 1287.68  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  860.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.94  * Wt. n-Val.             *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  857.26  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  851.26  * Flow Area (sq ft)      * 1152.37  * 1748.72  *  195.88  *
* E.G. Slope (ft/ft)     *0.002880  * Area (sq ft)           *14462.75  * 1748.72  * 4082.73  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 5636.41  *26463.53  *  730.05  *
* Top Width (ft)         * 2318.18  * Top Width (ft)         * 1983.27  *   77.62  *  257.29  *
* Vel Total (ft/s)       *   10.60  * Avg. Vel. (ft/s)       *    4.89  *   15.13  *    3.73  *
* Max Chl Dpth (ft)      *   25.17  * Hydr. Depth (ft)       *   15.20  *   22.53  *   13.33  *
* Conv. Total (cfs)      *611765.9  * Conv. (cfs)            *105030.9  *493130.9  * 13604.0  *
* Length Wtd. (ft)       * 1519.46  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    2.73  *    3.76  *    2.39  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *   13.36  *   56.91  *    8.90  *
* Frctn Loss (ft)        *    3.82  * Cum Volume (acre-ft)   *11113.84  *17790.21  *14064.64  *
* C & E Loss (ft)        *    0.40  * Cum SA (acres)         * 1268.20  *  680.33  * 1735.82  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  862.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.41  * Wt. n-Val.             *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  859.01  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  852.81  * Flow Area (sq ft)      * 1284.77  * 1884.30  *  221.54  *
* E.G. Slope (ft/ft)     *0.003055  * Area (sq ft)           *17932.79  * 1884.30  * 4535.28  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 6958.84  *30868.02  *  923.13  *
* Top Width (ft)         * 2328.35  * Top Width (ft)         * 1989.85  *   77.62  *  260.88  *
* Vel Total (ft/s)       *   11.43  * Avg. Vel. (ft/s)       *    5.42  *   16.38  *    4.17  *
* Max Chl Dpth (ft)      *   26.92  * Hydr. Depth (ft)       *   16.95  *   24.28  *   15.08  *
* Conv. Total (cfs)      *701091.2  * Conv. (cfs)            *125904.1  *558485.1  * 16702.0  *
* Length Wtd. (ft)       * 1520.52  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    3.23  *    4.30  *    2.87  *
```

```
* Alpha                  *    1.68  * Stream Power (lb/ft s) *   17.50  *   70.41  *   11.94  *
* Frctn Loss (ft)        *    3.96  * Cum Volume (acre-ft)   *14052.09  *19049.07  *17973.29  *
* C & E Loss (ft)        *    0.48  * Cum SA (acres)         * 1465.90  *  681.28  * 2177.52  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  865.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    4.04  * Wt. n-Val.              *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  861.14  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  854.72  * Flow Area (sq ft)      * 1446.28  * 2049.69  *  252.84  *
* E.G. Slope (ft/ft)     *0.003269  * Area (sq ft)           *22180.85  * 2049.69  * 5095.04  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 8769.65  *36740.04  * 1190.30  *
* Top Width (ft)         * 2339.69  * Top Width (ft)         * 1997.68  *   77.62  *  264.40  *
* Vel Total (ft/s)       *   12.46  * Avg. Vel. (ft/s)       *    6.06  *   17.92  *    4.71  *
* Max Chl Dpth (ft)      *   29.05  * Hydr. Depth (ft)       *   19.08  *   26.41  *   17.21  *
* Conv. Total (cfs)      *816739.0  * Conv. (cfs)            *153373.0  *642548.8  * 20817.2  *
* Length Wtd. (ft)       * 1521.59  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    3.89  *    5.00  *    3.50  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *   23.60  *   89.69  *   16.47  *
* Frctn Loss (ft)        *    4.12  * Cum Volume (acre-ft)   *19552.60  *20912.95  *24664.78  *
* C & E Loss (ft)        *    0.60  * Cum SA (acres)         * 1771.44  *  683.70  * 2600.83  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  854.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.92  * Wt. n-Val.              *   0.100  *   0.040  *   0.120  *
* W.S. Elev (ft)         *  852.77  * Reach Len. (ft)        * 1432.20  * 1476.74  * 1864.83  *
* Crit W.S. (ft)         *  847.47  * Flow Area (sq ft)      *  812.29  * 1400.48  *  129.97  *
* E.G. Slope (ft/ft)     *0.002450  * Area (sq ft)           * 6418.55  * 1400.48  * 2949.27  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2902.43  *16857.68  *  339.90  *
* Top Width (ft)         * 1459.91  * Top Width (ft)         * 1134.57  *   77.62  *  247.72  *
* Vel Total (ft/s)       *    8.58  * Avg. Vel. (ft/s)       *    3.57  *   12.04  *    2.62  *
* Max Chl Dpth (ft)      *   20.68  * Hydr. Depth (ft)       *   10.72  *   18.04  *    8.85  *
* Conv. Total (cfs)      *406088.0  * Conv. (cfs)            * 58638.8  *340582.1  *  6867.1  *
* Length Wtd. (ft)       * 1515.50  * Wetted Per. (ft)       *   75.86  *   83.61  *   14.75  *
* Min Ch El (ft)         *  832.09  * Shear (lb/sq ft)       *    1.64  *    2.56  *    1.35  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    5.85  *   30.84  *    3.53  *
* Frctn Loss (ft)        *    3.53  * Cum Volume (acre-ft)   * 5730.64  *14003.48  * 7094.63  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *  699.79  *  655.33  *  896.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 28.010

INPUT
Description: Ineffective areas due to higher ground immediately upstream from
             mouth of tributary.
Station Elevation Data    num=     339
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
       0  881.45    7.55  881.42   23.49  881.25   73.89   879.9   91.95  879.42
   120.5  879.77   130.6  880.29  135.43  878.77  142.45  876.46  152.37  876.55
  156.84  876.59  159.13  876.86  166.03  877.64  171.63  877.64  172.27  877.64
  183.18  876.15  184.53  875.97  189.79     876   196.7  876.04  197.45  876.13
   204.7  876.84  212.92  878.89  221.03  880.62  231.78  880.69  247.59   880.8
  250.26  880.83  268.25  881.13  268.62  881.15  271.09  881.17  291.55  881.44
  294.03   881.6  308.55  882.95  323.58   883.2  336.89  883.42  349.18  883.54
  355.01  883.71  381.55  884.91  389.03  885.28  400.11   885.9  409.16  885.97
  414.89  885.78  422.75  885.76  440.47  886.03  470.96  886.38  482.53   886.2
  491.26  886.28  518.29  886.25  520.67  886.23  533.45  885.74  537.49  885.59
  551.65   885.6  554.39  885.61  556.27   885.6  587.31  885.42  589.67  885.38
  622.56  884.71  631.39  884.39  639.32   884.2   639.4  884.19  639.42   884.2
  639.46  884.19  639.51  884.19  639.59  884.19  640.26  884.18  649.07  883.79
   657.8  883.36  660.52   882.9  674.69  880.96  674.72  880.96  674.74  880.96
   685.7  881.48  690.82  881.63  691.86  881.54  697.01  881.45  702.75  881.23
  704.98  881.08  704.98  881.03  712.56  879.72  712.86  879.65  713.47  879.74
  714.52   879.8  725.19   880.6   730.9  880.34  744.32  879.87     747  879.78
  747.03   879.7  747.48  879.47  747.77   879.6  748.11  879.67  748.26  879.73
  766.36  879.58   769.4  879.61  771.55  879.55  812.12  878.92  814.65  878.88
  814.75  878.87  814.85  878.86  823.87  878.23  824.04  878.22  828.54  877.39
  829.51  877.21  829.56  877.21  836.15  877.98  844.27  878.66  844.67  878.68
  850.54  878.67  852.95  878.44  855.22  877.99  861.73  877.21  868.59   876.5
  871.34  876.36  873.17   876.2  876.51  876.23   879.6  876.25  881.76  876.31
  884.78  877.05  889.37  878.23  895.18  878.91   901.6  879.78  914.18  879.86
  931.05  880.07  936.65  879.78  949.73  878.59  958.39  877.77  968.98  876.83
  992.66  875.12 1015.16   872.9 1017.52  872.67 1018.87  872.52 1054.66  872.19
 1070.65  871.89 1096.15  873.13 1117.19  873.95  1163.1  874.42 1176.89  874.13
 1192.38   874.1 1229.89  873.99 1267.56  874.37 1283.25  874.51 1296.99  874.38
 1318.55  874.18 1342.76  874.38 1358.15  874.44 1363.99  874.55 1391.37  874.96
 1417.96  874.14 1422.26  874.08 1430.89  873.92 1446.63  873.37  1474.3  872.44
 1482.41  873.77 1488.32  874.46 1495.88  874.67 1505.57  874.99 1511.71  875.03
 1515.15  874.97 1519.96  873.91 1534.96  869.83 1537.33  869.65 1546.84  869.04
 1563.54  868.18 1568.27  867.93 1581.27  867.28 1604.87   866.1 1615.28  868.54
  1617.7  869.12 1617.93   869.1 1620.24  868.99 1624.89  868.78  1625.8  868.61
  1630.2  867.74  1634.2  866.78 1640.44  864.95  1654.5  863.91  1656.2  863.79
 1657.08  863.72 1658.78   863.6 1685.19  861.12 1699.47  858.25 1702.76  857.72
 1717.02  853.58 1757.33  841.92  1767.5  841.53  1793.9  840.65 1821.65  840.42
 1840.06  840.53 1855.57  840.64 1863.06  840.63 1877.73  839.88 1890.41  839.27
  1894.3  838.39 1898.76  836.85 1905.47  834.91 1908.74  833.49  1920.4  838.95
  1922.3   839.8 1923.03  839.83 1924.03  839.83 1928.28   839.9 1933.04  839.85
 1940.41   839.8 1944.66  838.54  1946.4  837.99 1947.59  837.75  1952.6  837.47
 1954.28  836.69 1962.34  833.43 1967.72  837.95 1967.83  838.06 1967.97  838.08
 1981.95  839.67  1983.8  839.54 1991.07  839.15 2001.07  838.55 2005.03  835.45
 2010.19  832.17 2014.49   834.9 2019.73  837.51 2024.58   838.3 2032.83  839.15
 2044.14  839.66 2054.33  840.74 2065.17   841.1 2090.15  841.67  2095.4  841.59
 2100.37  840.56 2107.72  838.61 2113.52  835.09 2114.68  834.46 2119.15  831.79
 2121.87  831.68 2124.26  833.05 2129.67  833.81  2134.2  833.88 2135.83  833.05
 2138.19   831.7 2157.42  832.05 2169.63  832.27  2171.6  835.48 2176.48  839.41
  2182.7  839.73 2185.66  839.89 2187.84  840.01  2195.5  840.14 2199.96  840.21
 2222.54  838.26 2223.97  838.14 2224.62  837.43 2229.03  832.18    2235   829.5
    2248  828.61    2262   829.5 2267.21  831.32 2274.03  835.82 2274.32  835.96
 2275.71  836.11 2275.99  836.49 2276.93  836.25 2285.29   836.6 2293.18  836.62
 2295.41  836.69  2295.7  836.69 2297.87  836.68  2303.6   836.5 2305.69  836.55
 2312.59  836.42 2321.46  837.66    2324  838.03 2324.84  838.16  2331.6  839.41
 2339.95  839.64 2347.33  840.37 2373.97  841.68 2392.35  841.57 2413.38  841.42
 2420.25  841.27 2424.64   841.2 2426.56  841.24 2441.87  840.79 2456.15  840.32
 2474.23  841.07 2505.57  842.27  2515.3  843.08 2524.89  843.94 2535.75  845.51
 2549.88  846.97 2570.88  847.29 2581.69  847.67 2617.53   849.3 2636.76  849.97
 2643.84  850.33 2659.19  851.15 2682.88  852.14 2687.57  852.54 2694.27  853.03
 2702.88   853.7 2742.86  856.04  2756.5  857.12 2766.29  857.56 2790.86  860.69
 2804.23  861.45 2828.62  864.84 2836.49  865.63 2842.62  867.08 2851.02  869.26
 2863.45  872.27 2863.98  872.37 2874.02  874.17 2890.76  875.85 2896.42  876.65
 2900.15  877.04 2903.37   877.3 2923.96  879.75 2929.95   880.2 2955.85  883.19
 2957.17  883.31 2984.83  886.23 2985.34  886.28 2985.37  886.28 3013.01  888.99
 3014.57  889.18 3016.72  889.38 3049.01   892.1 3049.11  892.11 3049.87  892.19
 3089.33  896.83  3102.1  898.83  3117.4  901.21 3126.74   902.6    3128  902.95
  3152.1  909.02 3165.04  912.44 3202.12  920.61 3217.93  922.68 3267.96  926.95
 3285.66   928.3 3300.33  929.33 3310.91  929.91 3311.17  929.92

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06 1640.44     .12 2199.96     .04 2275.99      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
```

```
      2199.96 2274.03          762.258  762.74884.0685             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
    1500    2085     863       F
    2085    2195     840       T
    2385    2900     863       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  842.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.120  *   0.040  *   0.093  *
* W.S. Elev (ft)         *  841.36  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  838.87  * Flow Area (sq ft)      *  133.51  *  588.91  *  289.53  *
* E.G. Slope (ft/ft)     *0.003817  * Area (sq ft)           * 1287.27  *  588.91  *  320.40  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  116.32  * 5148.47  *  605.21  *
* Top Width (ft)         *  640.51  * Top Width (ft)         *  407.38  *   74.07  *  159.06  *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)       *    0.87  *    8.74  *    2.09  *
* Max Chl Dpth (ft)      *   12.75  * Hydr. Depth (ft)       *    1.29  *    7.95  *    3.10  *
* Conv. Total (cfs)      * 95014.6  * Conv. (cfs)            *  1882.8  * 83335.6  *  9796.2  *
* Length Wtd. (ft)       *  769.16  * Wetted Per. (ft)       *  109.85  *   79.21  *   94.00  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    0.29  *    1.77  *    0.73  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    0.25  *   15.49  *    1.53  *
* Frctn Loss (ft)        *    1.14  * Cum Volume (acre-ft)   *  915.77  * 6955.89  *  875.89  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *  216.67  *  547.95  *  251.86  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  846.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.120  *   0.040  *   0.096  *
* W.S. Elev (ft)         *  845.07  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  842.31  * Flow Area (sq ft)      *  557.38  *  863.85  *  697.22  *
* E.G. Slope (ft/ft)     *0.002603  * Area (sq ft)           * 2939.60  *  863.85  * 1202.88  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  972.77  * 8051.34  * 1875.89  *
* Top Width (ft)         *  786.28  * Top Width (ft)         *  453.52  *   74.07  *  258.69  *
* Vel Total (ft/s)       *    5.15  * Avg. Vel. (ft/s)       *    1.75  *    9.32  *    2.69  *
* Max Chl Dpth (ft)      *   16.46  * Hydr. Depth (ft)       *    4.85  *   11.66  *    6.28  *
* Conv. Total (cfs)      *213649.5  * Conv. (cfs)            * 19067.2  *157813.2  * 36769.1  *
* Length Wtd. (ft)       *  776.75  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    0.75  *    1.77  *    1.02  *
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    1.30  *   16.52  *    2.73  *
* Frctn Loss (ft)        *    1.18  * Cum Volume (acre-ft)   * 2174.57  * 9306.09  * 2462.83  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  374.08  *  590.89  *  513.32  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  847.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.120  *   0.040  *   0.096  *
* W.S. Elev (ft)         *  846.07  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  842.88  * Flow Area (sq ft)      *  671.79  *  937.56  *  807.66  *
* E.G. Slope (ft/ft)     *0.002466  * Area (sq ft)           * 3392.65  *  937.56  * 1464.17  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1292.39  * 8982.31  * 2325.31  *
* Top Width (ft)         *  798.14  * Top Width (ft)         *  456.97  *   74.07  *  267.11  *
* Vel Total (ft/s)       *    5.21  * Avg. Vel. (ft/s)       *    1.92  *    9.58  *    2.88  *
* Max Chl Dpth (ft)      *   17.46  * Hydr. Depth (ft)       *    5.84  *   12.66  *    7.28  *
* Conv. Total (cfs)      *253744.2  * Conv. (cfs)            * 26026.7  *180889.6  * 46828.0  *
* Length Wtd. (ft)       *  778.54  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    0.85  *    1.82  *    1.11  *
```

```
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    1.64  *   17.46  *    3.21  *
* Frctn Loss (ft)        *    1.19  * Cum Volume (acre-ft)   * 3071.16  *11021.40  * 3652.28  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  440.15  *  619.09  *  643.97  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  850.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.120  *   0.040  *   0.096  *
* W.S. Elev (ft)         *  849.29  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  844.74  * Flow Area (sq ft)      * 1042.49  * 1176.41  * 1165.50  *
* E.G. Slope (ft/ft)     *0.002235  * Area (sq ft)           * 4884.19  * 1176.41  * 2443.60  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 2559.61  *12484.31  * 4056.08  *
* Top Width (ft)         *  885.49  * Top Width (ft)         *  468.11  *   74.07  *  343.31  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    2.46  *   10.61  *    3.48  *
* Max Chl Dpth (ft)      *   20.68  * Hydr. Depth (ft)       *    9.07  *   15.88  *   10.50  *
* Conv. Total (cfs)      *403970.0  * Conv. (cfs)            * 54136.4  *264046.4  * 85787.1  *
* Length Wtd. (ft)       *  783.16  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    1.20  *    2.07  *    1.46  *
* Alpha                  *    2.42  * Stream Power (lb/ft s) *    2.94  *   22.00  *    5.07  *
* Frctn Loss (ft)        *    1.23  * Cum Volume (acre-ft)   * 4720.07  *13012.92  * 5965.67  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  575.77  *  642.45  *  803.35  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  853.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.             *   0.120  *   0.040  *   0.097  *
* W.S. Elev (ft)         *  852.52  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  846.70  * Flow Area (sq ft)      * 1413.64  * 1415.55  * 1523.76  *
* E.G. Slope (ft/ft)     *0.002192  * Area (sq ft)           * 6413.48  * 1415.55  * 3673.71  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4210.80  *16828.86  * 6260.34  *
* Top Width (ft)         *  966.65  * Top Width (ft)         *  479.27  *   74.07  *  413.30  *
* Vel Total (ft/s)       *    6.27  * Avg. Vel. (ft/s)       *    2.98  *   11.89  *    4.11  *
* Max Chl Dpth (ft)      *   23.91  * Hydr. Depth (ft)       *   12.30  *   19.11  *   13.73  *
* Conv. Total (cfs)      *583079.8  * Conv. (cfs)            * 89935.3  *359434.7  *133709.8  *
* Length Wtd. (ft)       *  786.42  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    1.59  *    2.45  *    1.87  *
* Alpha                  *    2.35  * Stream Power (lb/ft s) *    4.75  *   29.08  *    7.68  *
* Frctn Loss (ft)        *    1.30  * Cum Volume (acre-ft)   * 7760.82  *15948.01  *10035.13  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  940.60  *  670.62  * 1273.40  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  855.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.61  * Wt. n-Val.             *   0.120  *   0.040  *   0.097  *
* W.S. Elev (ft)         *  854.37  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  847.83  * Flow Area (sq ft)      * 1626.46  * 1552.67  * 1729.19  *
* E.G. Slope (ft/ft)     *0.002213  * Area (sq ft)           * 7306.66  * 1552.67  * 4462.41  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 5345.06  *19726.92  * 7758.02  *
* Top Width (ft)         * 1000.05  * Top Width (ft)         *  485.66  *   74.07  *  440.31  *
* Vel Total (ft/s)       *    6.69  * Avg. Vel. (ft/s)       *    3.29  *   12.71  *    4.49  *
* Max Chl Dpth (ft)      *   25.76  * Hydr. Depth (ft)       *   14.15  *   20.96  *   15.58  *
* Conv. Total (cfs)      *697840.7  * Conv. (cfs)            *113615.6  *419319.2  *164905.8  *
* Length Wtd. (ft)       *  787.86  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    1.85  *    2.71  *    2.14  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    6.08  *   34.41  *    9.61  *
* Frctn Loss (ft)        *    1.35  * Cum Volume (acre-ft)   *10755.96  *17734.25  *13881.72  *
```

```
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1227.61  *  677.76  * 1720.89  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  857.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.79  * Wt. n-Val.             *   0.120  *   0.040  *   0.097  *
* W.S. Elev (ft)         *  856.18  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  848.96  * Flow Area (sq ft)      * 1834.77  * 1686.89  * 1930.28  *
* E.G. Slope (ft/ft)     *0.002243  * Area (sq ft)           * 8192.38  * 1686.89  * 5288.29  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 6577.24  *22799.77  * 9372.99  *
* Top Width (ft)         * 1036.61  * Top Width (ft)         *  491.91  *   74.07  *  470.64  *
* Vel Total (ft/s)       *    7.11  * Avg. Vel. (ft/s)       *    3.58  *   13.52  *    4.86  *
* Max Chl Dpth (ft)      *   27.57  * Hydr. Depth (ft)       *   15.96  *   22.77  *   17.39  *
* Conv. Total (cfs)      *818274.3  * Conv. (cfs)            *138890.0  *481457.2  *197927.1  *
* Length Wtd. (ft)       *  789.05  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    2.12  *    2.98  *    2.42  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    7.59  *   40.30  *   11.76  *
* Frctn Loss (ft)        *    1.40  * Cum Volume (acre-ft)   *13622.61  *18988.54  *17763.01  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1425.10  *  678.70  * 2161.86  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  860.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.03  * Wt. n-Val.             *   0.120  *   0.040  *   0.097  *
* W.S. Elev (ft)         *  858.42  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  850.41  * Flow Area (sq ft)      * 2092.10  * 1852.69  * 2178.68  *
* E.G. Slope (ft/ft)     *0.002281  * Area (sq ft)           * 9302.75  * 1852.69  * 6376.21  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 8256.13  *26885.79  *11558.08  *
* Top Width (ft)         * 1074.44  * Top Width (ft)         *  501.34  *   74.07  *  499.02  *
* Vel Total (ft/s)       *    7.63  * Avg. Vel. (ft/s)       *    3.95  *   14.51  *    5.31  *
* Max Chl Dpth (ft)      *   29.81  * Hydr. Depth (ft)       *   18.20  *   25.01  *   19.63  *
* Conv. Total (cfs)      *977712.8  * Conv. (cfs)            *172850.7  *562881.8  *241980.3  *
* Length Wtd. (ft)       *  790.29  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    2.45  *    3.33  *    2.78  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    9.69  *   48.34  *   14.76  *
* Frctn Loss (ft)        *    1.46  * Cum Volume (acre-ft)   *19035.03  *20846.80  *24419.23  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         * 1730.36  *  681.13  * 2584.49  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  850.95  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.             *   0.120  *   0.040  *   0.097  *
* W.S. Elev (ft)         *  849.73  * Reach Len. (ft)        *  762.26  *  762.74  *  884.07  *
* Crit W.S. (ft)         *  845.00  * Flow Area (sq ft)      * 1092.93  * 1208.91  * 1214.18  *
* E.G. Slope (ft/ft)     *0.002219  * Area (sq ft)           * 5089.89  * 1208.91  * 2596.96  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 2759.18  *13016.54  * 4324.29  *
* Top Width (ft)         *  899.54  * Top Width (ft)         *  469.63  *   74.07  *  355.84  *
* Vel Total (ft/s)       *    5.72  * Avg. Vel. (ft/s)       *    2.52  *   10.77  *    3.56  *
* Max Chl Dpth (ft)      *   21.12  * Hydr. Depth (ft)       *    9.51  *   16.32  *   10.94  *
* Conv. Total (cfs)      *426681.6  * Conv. (cfs)            * 58571.6  *276314.3  * 91795.7  *
* Length Wtd. (ft)       *  783.68  * Wetted Per. (ft)       *  121.39  *   79.21  *  111.55  *
* Min Ch El (ft)         *  828.61  * Shear (lb/sq ft)       *    1.25  *    2.11  *    1.51  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    3.15  *   22.77  *    5.37  *
* Frctn Loss (ft)        *    1.23  * Cum Volume (acre-ft)   * 5541.45  *13959.25  * 6975.91  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  673.41  *  652.76  *  883.33  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
```

section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 27.865

INPUT
Description:
Station Elevation Data num= 257

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	879.82	34.42	879.37	45.8	879.28	62.51	879.29	84.57	879.18
114.61	879.15	118.24	879.14	118.66	879	119.09	878.83	128.88	874.82
140.15	876.11	141.85	876.31	142.66	876.43	149.2	877.49	150.08	877.5
155.31	877.5	158.85	877.01	163.91	876.32	173.72	874.72	174.45	874.57
175.23	874.56	187.21	875.32	188.6	875.42	188.61	875.42	190.58	875.57
192.17	876.16	192.18	876.16	192.62	876.33	201.39	879.52	204.58	880.06
232.5	881.31	242.19	881.7	254.22	881.91	277.75	882.17	296.68	882.39
312.3	882.75	333.98	883.57	360.86	884.51	384.23	884.56	401.27	886.05
402.68	886.12	405.04	886.18	429.18	886.69	448.48	886.96	454.7	886.82
460.08	886.91	485.91	887.36	490.45	887.65	496.89	887.85	504.89	888.08
509.02	888.15	511.65	887.98	513.18	888.02	522.04	888.34	542.23	888.17
550.16	888.36	564.46	888.57	568.07	888.62	571.72	888.67	594.13	888.66
606.04	888.92	623.09	888.48	651.84	888.29	654.83	888.29	657.35	888.32
680.07	888.52	697.16	888.6	708.08	888.48	733.35	888	742.75	887.94
754.37	887.76	756.39	887.74	757.57	887.87	758.96	887.7	764.52	887.55
774.91	887.56	787.34	887.3	809.9	886.93	822.48	886.68	830.7	885.96
831.07	885.94	835.66	885.89	846.71	885.79	862.3	885.59	877	885.2
883.69	885.05	894.23	884.68	901.37	884.61	902.56	884.59	903.95	884.51
904.36	884.49	909.04	884.21	913.96	883.89	914.89	883.89	916.62	883.91
919.4	883.97	921.52	884	921.68	884.03	921.75	884.01	929.7	884.15
937.68	884.34	940.25	884.51	943.84	884.71	957.29	885.08	965.17	885.51
977.23	885.86	998.68	886.89	1004.49	887.27	1008.73	887.43	1011.18	887.52
1016.58	887.49	1039.23	887.33	1061.58	887.37	1067.67	887.31	1076.58	887.31
1078.46	887.3	1083.3	887.32	1103.7	887.39	1108.01	887.45	1131.24	887.9
1131.64	887.9	1170.12	887.64	1173.84	887.5	1176.85	887.29	1182.73	887.22
1193.8	886.97	1201.67	886.96	1204.86	886.92	1208.04	886.93	1224.47	886.74
1245.58	886.41	1260.25	886.14	1268.65	885.85	1290.99	885.32	1312.46	885.15
1323.56	884.78	1370.74	882.92	1387.74	882.33	1415.72	880.82	1450.49	878.97
1451.92	878.88	1457.79	878.52	1516.1	874.81	1525.88	874.28	1557.16	872.07
1560.11	871.87	1560.54	871.84	1562.24	872.03	1572.47	873.21	1578.81	873.24
1579.75	873.25	1580.94	873.14	1585.43	872.74	1589.19	871.92	1601.05	869.12
1612.01	868.2	1621.81	867.26	1646	864.84	1651.69	864.36	1665.58	863.27
1678.43	861.32	1683.66	860.5	1690.35	857.74	1705.33	850.75	1712.48	846.68
1721.29	841.06	1722.34	840.53	1733.12	838.67	1741.95	838.19	1745.49	837.99
1751.2	831.73	1757.72	829.16	1765	827.5	1795	826.79	1825	827.5
1832.28	830.22	1836.91	837.28	1838.81	838.56	1841.96	838.78	1854.6	839.67
1855.79	839.76	1856.23	839.8	1857.27	839.76	1863.33	839.33	1869.89	839.47
1890.3	839.96	1921.5	840.67	1922.66	840.69	1941.66	840.99	1950.94	840.99
1975.09	840.74	1989.64	840.58	1995.22	840.61	2007.78	840.62	2048.78	840.95
2081.28	842.08	2088.36	842.46	2096.17	841.48	2102.35	840.78	2114.53	841.03
2155.91	841.98	2183.12	842.71	2209.47	843.16	2253.97	843.47	2263.02	843.56
2268.69	843.63	2316.59	844.36	2355.66	844.59	2370.16	844.73	2373.81	844.72
2379.46	844.89	2384.93	845.02	2432.14	845.82	2464.12	846.37	2499.36	848.12
2507.64	848.43	2508.53	848.54	2541.58	851.05	2553.54	851.93	2578.72	853.83
2597.97	855.29	2611.96	856.93	2629.99	858.95	2656.29	861.08	2658.08	861.21
2661.2	861.54	2692.06	864.64	2704.49	866.99	2711.09	868.13	2720.4	869.28
2730.79	870.27	2736.45	870.76	2743.63	871.71	2794.64	877.35	2803.53	878.41
2843.04	883.54	2864.09	886.02	2904.97	891.44	2919.54	893.3	2947.43	896.56
2978.66	899.99	3005.59	903.96	3035.77	908.23	3067.88	913.81	3083.27	915.88
3090.17	916.46	3104.51	918.51	3116.93	919.99	3121.94	920.46	3145.97	922.44
3165.07	923.76	3175.08	924.28	3190.2	924.64	3198.75	924.84	3213.37	925.32
3226.89	925.99	3228.34	926.04						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1621.81	.12	1745.49	.04	1838.81	.1	2209.47	.075
2553.54	.1	2904.97	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1741.95	1854.6	1034.25	861.33	981.498	.1	.3

```
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 2006.34 3228.34  862.44       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  841.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  840.68  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  833.16  * Flow Area (sq ft)      *   31.45  * 1158.78  *   50.12  *
* E.G. Slope (ft/ft)     *0.000784  * Area (sq ft)           *   31.45  * 1158.78  *   50.39  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *   14.70  * 5838.94  *   16.36  *
* Top Width (ft)         *  233.60  * Top Width (ft)         *   19.90  *  112.65  *  101.05  *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)       *    0.47  *    5.04  *    0.33  *
* Max Chl Dpth (ft)      *   13.89  * Hydr. Depth (ft)       *    1.58  *   10.29  *    0.54  *
* Conv. Total (cfs)      *209598.6  * Conv. (cfs)            *   524.8  *208489.6  *   584.3  *
* Length Wtd. (ft)       *  863.85  * Wetted Per. (ft)       *   20.11  *  120.84  *   92.70  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.08  *    0.47  *    0.03  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *    0.04  *    2.37  *    0.01  *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   *  904.23  * 6940.59  *  872.12  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  212.94  *  546.32  *  249.22  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  844.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.120  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  844.17  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  835.94  * Flow Area (sq ft)      *  111.19  * 1552.91  *  570.22  *
* E.G. Slope (ft/ft)     *0.000992  * Area (sq ft)           *  111.19  * 1552.91  * 1140.26  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  112.09  *10143.12  *  644.80  *
* Top Width (ft)         *  588.02  * Top Width (ft)         *   25.54  *  112.65  *  449.83  *
* Vel Total (ft/s)       *    4.88  * Avg. Vel. (ft/s)       *    1.01  *    6.53  *    1.13  *
* Max Chl Dpth (ft)      *   17.38  * Hydr. Depth (ft)       *    4.35  *   13.79  *    3.76  *
* Conv. Total (cfs)      *346147.0  * Conv. (cfs)            *  3559.5  *322110.9  * 20476.6  *
* Length Wtd. (ft)       *  871.93  * Wetted Per. (ft)       *   26.75  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.26  *    0.80  *    0.23  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.26  *    5.20  *    0.26  *
* Frctn Loss (ft)        *    0.95  * Cum Volume (acre-ft)   * 2147.87  * 9284.93  * 2439.05  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  369.89  *  589.26  *  506.13  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  845.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.120  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  845.14  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  836.77  * Flow Area (sq ft)      *  136.49  * 1661.29  *  716.20  *
* E.G. Slope (ft/ft)     *0.001035  * Area (sq ft)           *  136.49  * 1661.29  * 1621.11  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  154.33  *11482.58  *  963.09  *
* Top Width (ft)         *  676.91  * Top Width (ft)         *   27.05  *  112.65  *  537.21  *
* Vel Total (ft/s)       *    5.01  * Avg. Vel. (ft/s)       *    1.13  *    6.91  *    1.34  *
* Max Chl Dpth (ft)      *   18.35  * Hydr. Depth (ft)       *    5.05  *   14.75  *    4.72  *
* Conv. Total (cfs)      *391694.6  * Conv. (cfs)            *  4797.6  *356957.6  * 29939.4  *
* Length Wtd. (ft)       *  874.09  * Wetted Per. (ft)       *   28.54  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.31  *    0.89  *    0.30  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.35  *    6.14  *    0.41  *
* Frctn Loss (ft)        *    1.01  * Cum Volume (acre-ft)   * 3040.28  *10998.65  * 3620.97  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  435.92  *  617.46  *  635.80  *
*************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  849.17  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  848.28  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  840.20  * Flow Area (sq ft)      *  229.51  * 2015.40  * 1193.20  *
* E.G. Slope (ft/ft)     *0.001159  * Area (sq ft)           *  229.51  * 2015.40  * 3529.53  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *  341.25  *16372.60  * 2386.15  *
* Top Width (ft)         *  793.97  * Top Width (ft)         *   32.28  *  112.65  *  649.04  *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *    1.49  *    8.12  *    2.00  *
* Max Chl Dpth (ft)      *   21.49  * Hydr. Depth (ft)       *    7.11  *   17.89  *    7.86  *
* Conv. Total (cfs)      *561097.3  * Conv. (cfs)            * 10024.8  *480975.0  * 70097.5  *
* Length Wtd. (ft)       *  880.11  * Wetted Per. (ft)       *   34.64  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.48  *    1.21  *    0.57  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.71  *    9.80  *    1.14  *
* Frctn Loss (ft)        *    1.19  * Cum Volume (acre-ft)   * 4675.33  *12984.98  * 5905.05  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  571.39  *  640.81  *  793.28  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  852.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.14  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  851.43  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  843.42  * Flow Area (sq ft)      *  339.92  * 2370.01  * 1670.85  *
* E.G. Slope (ft/ft)     *0.001290  * Area (sq ft)           *  339.92  * 2370.01  * 5642.45  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *  616.92  *22270.03  * 4413.06  *
* Top Width (ft)         *  842.84  * Top Width (ft)         *   38.07  *  112.65  *  692.12  *
* Vel Total (ft/s)       *    6.23  * Avg. Vel. (ft/s)       *    1.81  *    9.40  *    2.64  *
* Max Chl Dpth (ft)      *   24.64  * Hydr. Depth (ft)       *    8.93  *   21.04  *   11.01  *
* Conv. Total (cfs)      *760035.6  * Conv. (cfs)            * 17175.1  *620000.5  *122860.1  *
* Length Wtd. (ft)       *  884.71  * Wetted Per. (ft)       *   41.24  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.66  *    1.58  *    0.89  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    1.20  *   14.84  *    2.34  *
* Frctn Loss (ft)        *    1.39  * Cum Volume (acre-ft)   * 7701.73  *15914.87  * 9940.59  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  936.07  *  668.98  * 1262.18  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  854.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  853.23  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  844.78  * Flow Area (sq ft)      *  411.97  * 2572.92  * 1944.17  *
* E.G. Slope (ft/ft)     *0.001372  * Area (sq ft)           *  411.97  * 2572.92  * 6910.90  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *  820.95  *26150.42  * 5858.62  *
* Top Width (ft)         *  870.74  * Top Width (ft)         *   41.93  *  112.65  *  716.16  *
* Vel Total (ft/s)       *    6.66  * Avg. Vel. (ft/s)       *    1.99  *   10.16  *    3.01  *
* Max Chl Dpth (ft)      *   26.44  * Hydr. Depth (ft)       *    9.82  *   22.84  *   12.81  *
* Conv. Total (cfs)      *886235.9  * Conv. (cfs)            * 22161.4  *705922.8  *158151.7  *
* Length Wtd. (ft)       *  886.84  * Wetted Per. (ft)       *   45.50  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.78  *    1.82  *    1.10  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    1.55  *   18.54  *    3.31  *
* Frctn Loss (ft)        *    1.52  * Cum Volume (acre-ft)   *10688.43  *17698.13  *13766.31  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1222.99  *  676.12  * 1709.15  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  856.48  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    1.48  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  855.00  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  846.05  * Flow Area (sq ft)      *  489.57  * 2772.35  * 2212.80  *
* E.G. Slope (ft/ft)     *0.001447  * Area (sq ft)           *  489.57  * 2772.35  * 8199.46  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 1059.72  *30227.03  * 7463.25  *
* Top Width (ft)         *  897.92  * Top Width (ft)         *   45.73  *  112.65  *  739.54  *
* Vel Total (ft/s)       *    7.08  * Avg. Vel. (ft/s)       *    2.16  *   10.90  *    3.37  *
* Max Chl Dpth (ft)      *   28.21  * Hydr. Depth (ft)       *   10.71  *   24.61  *   14.58  *
* Conv. Total (cfs)      *1018820.0  * Conv. (cfs)            * 27862.3  *794732.7  *196224.6  *
* Length Wtd. (ft)       *  888.69  * Wetted Per. (ft)       *   49.69  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.89  *    2.07  *    1.32  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    1.93  *   22.59  *    4.44  *
* Frctn Loss (ft)        *    1.64  * Cum Volume (acre-ft)   *13546.64  *18949.50  *17626.14  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         * 1420.39  *  677.07  * 2149.58  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  858.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.69  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  857.20  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  847.63  * Flow Area (sq ft)      *  595.31  * 3020.09  * 2546.51  *
* E.G. Slope (ft/ft)     *0.001527  * Area (sq ft)           *  595.31  * 3020.09  * 9849.29  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 1411.52  *35597.59  * 9690.89  *
* Top Width (ft)         *  922.85  * Top Width (ft)         *   50.44  *  112.65  *  759.76  *
* Vel Total (ft/s)       *    7.58  * Avg. Vel. (ft/s)       *    2.37  *   11.79  *    3.81  *
* Max Chl Dpth (ft)      *   30.41  * Hydr. Depth (ft)       *   11.80  *   26.81  *   16.78  *
* Conv. Total (cfs)      *1195030.0  * Conv. (cfs)            * 36120.1  *910924.6  *247984.9  *
* Length Wtd. (ft)       *  890.70  * Wetted Per. (ft)       *   54.89  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    1.03  *    2.38  *    1.60  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    2.45  *   28.08  *    6.09  *
* Frctn Loss (ft)        *    1.78  * Cum Volume (acre-ft)   *18948.42  *20804.14  *24254.58  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         * 1725.53  *  679.50  * 2571.72  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  849.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  848.71  * Reach Len. (ft)        * 1034.25  *  861.33  *  981.50  *
* Crit W.S. (ft)         *  840.66  * Flow Area (sq ft)      *  243.54  * 2063.81  * 1258.40  *
* E.G. Slope (ft/ft)     *0.001174  * Area (sq ft)           *  243.54  * 2063.81  * 3810.22  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  373.02  *17102.27  * 2624.71  *
* Top Width (ft)         *  801.85  * Top Width (ft)         *   33.04  *  112.65  *  656.17  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    1.53  *    8.29  *    2.09  *
* Max Chl Dpth (ft)      *   21.92  * Hydr. Depth (ft)       *    7.37  *   18.32  *    8.29  *
* Conv. Total (cfs)      *586579.8  * Conv. (cfs)            * 10885.8  *499096.9  * 76597.1  *
* Length Wtd. (ft)       *  880.81  * Wetted Per. (ft)       *   35.51  *  120.84  *  151.78  *
* Min Ch El (ft)         *  826.79  * Shear (lb/sq ft)       *    0.50  *    1.25  *    0.61  *
* Alpha                  *    1.86  * Stream Power (lb/ft s) *    0.77  *   10.37  *    1.27  *
* Frctn Loss (ft)        *    1.21  * Cum Volume (acre-ft)   * 5494.79  *13930.60  * 6910.89  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  669.01  *  651.13  *  873.06  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION
```

RIVER: Blue River
REACH: Main RS: 27.702

INPUT
Description:
Station Elevation Data num= 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	877.7	6.4	877.53	8.33	877.53	9.01	877.46	10.1	877.74
19.15	880.65	37.24	882.04	38.14	882.09	38.45	882.11	40.68	882.17
76.81	883.13	83.08	883.23	117.63	883.64	121.34	883.69	155.5	884.38
170.71	884.58	202.75	884.85	251.14	886.27	257.7	886.44	265.54	886.2
282.94	885.59	287.4	886.22	288.25	886.33	301.77	886.42	308.24	886.47
308.84	886.48	309.47	886.51	320.57	887.01	324.78	887.15	339.26	887.44
341.09	887.46	341.5	887.47	358.2	887.68	361.16	887.74	369.55	887.6
395.44	886.99	410.29	886.42	430.91	885.8	462.95	884.65	464.92	884.58
466.18	884.48	510.68	882.37	513.83	882.32	518.65	882.11	544.59	881.18
566.98	880.87	583.52	880.88	608.78	880.9	612.3	880.95	621.95	881.04
638.46	881.2	642.17	881.22	659.8	881.73	678.84	882.23	686.99	882.48
721.13	883.34	739.14	883.93	762.66	885.11	785.45	885.65	812.52	884.51
822.25	884.02	828.87	883.67	847.62	882.09	853.28	881.68	855.1	881.59
905.42	879.76	922.18	879.25	946.55	877.92	959.8	877.47	993.75	875.03
995.68	874.88	996.35	874.86	998.71	874.82	1040.67	873.89	1059.97	873.7
1078.14	873.57	1118.07	872.12	1118.31	872.11	1119.22	872.1	1163.99	872.24
1180.03	871.43	1198.53	869.81	1215.94	868.16	1222.33	867.53	1228.24	866.7
1241.57	865.27	1253.17	861.04	1253.88	860.82	1254.92	860.78	1266.57	860.27
1271.71	859.3	1272.68	859.13	1274.28	858.26	1310.47	838.55	1318.19	838.13
1322.25	838.01	1341.94	837.45	1349.18	828.66	1349.23	828.58	1349.83	828.58
1355	827.5	1386	826.51	1417	827.5	1423.86	828.4	1424.7	828.4
1431.19	836.58	1431.62	837.13	1432.15	837.14	1440.94	837.42	1443.81	837.45
1450.02	837.63	1481.74	837.96	1490.92	837.45	1507.89	837.9	1512.93	837.86
1516.95	838.2	1539.57	837.9	1543.44	837.78	1546.93	837.6	1557.74	837.3
1568.29	838.25	1569.41	838.4	1574.14	838.46	1597.39	838.85	1615.9	840.1
1626.54	841.15	1641.26	841.61	1688.66	841.44	1695.61	841.52	1699.69	841.53
1740.61	842.18	1753.09	842.37	1768.49	842.74	1825.79	844.07	1828.96	844.1
1842.61	842.79	1860.91	843.47	1863.57	843.45	1873.43	844.07	1888.8	845.03
1893.57	845.06	1897.87	845.12	1903.17	845.19	1920.41	845.26	1928.33	845.32
1943.05	845.61	1956.56	845.58	1986.94	846.57	1988.23	846.58	1988.84	846.58
2006.6	847.53	2022.57	848.09	2034.17	848.56	2048.41	848.65	2054.47	848.75
2057.97	848.72	2071.15	848.85	2081.98	849.2	2086.56	849.73	2090.44	849.82
2103.66	850.57	2111.9	851.16	2114.11	851.32	2120.24	851.59	2138	852.89
2149.75	853.49	2155.18	853.68	2175.89	854.42	2186.69	854.78	2189.73	855.07
2215.43	855.92	2217.33	855.99	2247.51	858.38	2275.38	860.2	2276.68	860.29
2291.23	861.26	2307.48	862.21	2310.36	862.37	2315.16	862.63	2331.99	863.46
2345.22	864.65	2361.34	866.11	2368.68	866.93	2376.92	868.54	2409.29	871.12
2421.98	872.2	2447.42	874.97	2477.17	878.44	2501.14	881.53	2522.38	884.09
2531.24	885.06	2533.97	885.36	2548.81	886.89	2565.7	889.33	2586.22	892.55
2609.42	896.23	2628.56	899.47	2661.81	906.84	2682.81	911.21	2701.96	915.32
2718.03	918.5	2725.59	919.86	2745.64	923.72				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	998.71	.12	1341.94	.04	1431.19	.1	1740.61	.075
2477.17	.12								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1341.94	1431.19	929.0085	1012.51	019.518	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1529.41	2745.64	863.66	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	840.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.	0.120	0.040	0.100
W.S. Elev (ft)	839.92	Reach Len. (ft)	929.01	1012.50	1019.52
Crit W.S. (ft)	832.89	Flow Area (sq ft)	64.59	1059.33	214.20
E.G. Slope (ft/ft)	0.000866	Area (sq ft)	64.59	1059.33	346.02
Q Total (cfs)	5870.00	Flow (cfs)	35.85	5676.97	157.18
Top Width (ft)	305.30	Top Width (ft)	33.99	89.25	182.06
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	0.56	5.36	0.73
Max Chl Dpth (ft)	13.41	Hydr. Depth (ft)	1.90	11.87	2.18
Conv. Total (cfs)	199475.7	Conv. (cfs)	1218.3	192916.2	5341.2
Length Wtd. (ft)	1010.32	Wetted Per. (ft)	34.36	97.60	98.53
Min Ch El (ft)	826.51	Shear (lb/sq ft)	0.10	0.59	0.12

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* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.06  *    3.14  *    0.09  *
* Frctn Loss (ft)        *    1.36  * Cum Volume (acre-ft)   *  903.09  * 6918.66  *  867.66  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  212.30  *  544.32  *  246.03  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  843.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  843.06  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  835.73  * Flow Area (sq ft)      *  180.38  * 1339.62  *  522.66  *
* E.G. Slope (ft/ft)     *0.001198  * Area (sq ft)           *  180.38  * 1339.62  * 1137.25  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  207.84  * 9874.57  *  817.60  *
* Top Width (ft)         *  490.30  * Top Width (ft)         *   39.75  *   89.25  *  361.30  *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)       *    1.15  *    7.37  *    1.56  *
* Max Chl Dpth (ft)      *   16.55  * Hydr. Depth (ft)       *    4.54  *   15.01  *    5.32  *
* Conv. Total (cfs)      *314915.3  * Conv. (cfs)            *  6004.7  *285289.2  * 23621.4  *
* Length Wtd. (ft)       * 1005.84  * Wetted Per. (ft)       *   40.92  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    0.33  *    1.03  *    0.40  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.38  *    7.57  *    0.62  *
* Frctn Loss (ft)        *    1.69  * Cum Volume (acre-ft)   * 2144.41  * 9256.33  * 2413.39  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  369.12  *  587.26  *  496.99  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  844.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  843.91  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  836.55  * Flow Area (sq ft)      *  214.83  * 1415.47  *  606.13  *
* E.G. Slope (ft/ft)     *0.001290  * Area (sq ft)           *  214.83  * 1415.47  * 1473.61  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  280.57  *11233.23  * 1086.20  *
* Top Width (ft)         *  558.32  * Top Width (ft)         *   41.31  *   89.25  *  427.76  *
* Vel Total (ft/s)       *    5.63  * Avg. Vel. (ft/s)       *    1.31  *    7.94  *    1.79  *
* Max Chl Dpth (ft)      *   17.40  * Hydr. Depth (ft)       *    5.20  *   15.86  *    6.17  *
* Conv. Total (cfs)      *350764.6  * Conv. (cfs)            *  7810.7  *312715.9  * 30238.0  *
* Length Wtd. (ft)       * 1004.86  * Wetted Per. (ft)       *   42.70  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    0.41  *    1.17  *    0.50  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.53  *    9.27  *    0.89  *
* Frctn Loss (ft)        *    1.78  * Cum Volume (acre-ft)   * 3036.11  *10968.23  * 3586.11  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  435.11  *  615.46  *  624.93  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  847.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  846.66  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  840.12  * Flow Area (sq ft)      *  335.14  * 1660.43  *  875.70  *
* E.G. Slope (ft/ft)     *0.001591  * Area (sq ft)           *  335.14  * 1660.43  * 2825.85  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *  600.94  *16272.46  * 2226.60  *
* Top Width (ft)         *  694.68  * Top Width (ft)         *   46.35  *   89.25  *  559.07  *
* Vel Total (ft/s)       *    6.65  * Avg. Vel. (ft/s)       *    1.79  *    9.80  *    2.54  *
```

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* Max Chl Dpth (ft)      *   20.15  * Hydr. Depth (ft)       *    7.23  *   18.60  *    8.92  *
* Conv. Total (cfs)      *478916.6  * Conv. (cfs)            * 15068.0  *408018.3  * 55830.2  *
* Length Wtd. (ft)       * 1002.46  * Wetted Per. (ft)       *   48.44  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    0.69  *    1.69  *    0.88  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    1.23  *   16.56  *    2.24  *
* Frctn Loss (ft)        *    2.01  * Cum Volume (acre-ft)   * 4668.63  *12948.64  * 5833.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  570.46  *  638.82  *  779.67  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  851.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.82  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  849.29  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  842.73  * Flow Area (sq ft)      *  463.79  * 1895.84  * 1134.77  *
* E.G. Slope (ft/ft)     *0.001945  * Area (sq ft)           *  463.79  * 1895.84  * 4396.38  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 1062.83  *22444.70  * 3792.46  *
* Top Width (ft)         *  792.05  * Top Width (ft)         *   51.20  *   89.25  *  651.60  *
* Vel Total (ft/s)       *    7.81  * Avg. Vel. (ft/s)       *    2.29  *   11.84  *    3.34  *
* Max Chl Dpth (ft)      *   22.78  * Hydr. Depth (ft)       *    9.06  *   21.24  *   11.55  *
* Conv. Total (cfs)      *619008.8  * Conv. (cfs)            * 24099.0  *508918.2  * 85991.5  *
* Length Wtd. (ft)       * 1000.95  * Wetted Per. (ft)       *   53.95  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    1.04  *    2.36  *    1.40  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    2.39  *   27.93  *    4.67  *
* Frctn Loss (ft)        *    2.32  * Cum Volume (acre-ft)   * 7692.19  *15872.70  * 9827.49  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  935.01  *  666.99  * 1247.05  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  852.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.20  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  850.73  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  844.17  * Flow Area (sq ft)      *  539.31  * 2024.18  * 1276.01  *
* E.G. Slope (ft/ft)     *0.002187  * Area (sq ft)           *  539.31  * 2024.18  * 5348.96  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 1397.60  *26543.01  * 4889.39  *
* Top Width (ft)         *  817.82  * Top Width (ft)         *   53.84  *   89.25  *  674.73  *
* Vel Total (ft/s)       *    8.55  * Avg. Vel. (ft/s)       *    2.59  *   13.11  *    3.83  *
* Max Chl Dpth (ft)      *   24.22  * Hydr. Depth (ft)       *   10.02  *   22.68  *   12.99  *
* Conv. Total (cfs)      *702071.7  * Conv. (cfs)            * 29887.7  *567624.0  *104559.9  *
* Length Wtd. (ft)       * 1000.42  * Wetted Per. (ft)       *   56.96  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    1.29  *    2.83  *    1.77  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    3.35  *   37.13  *    6.77  *
* Frctn Loss (ft)        *    2.54  * Cum Volume (acre-ft)   *10677.14  *17652.68  *13628.19  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1221.86  *  674.13  * 1693.48  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  854.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.61  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  852.12  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  845.61  * Flow Area (sq ft)      *  615.61  * 2147.74  * 1412.00  *
* E.G. Slope (ft/ft)     *0.002428  * Area (sq ft)           *  615.61  * 2147.74  * 6298.01  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 1776.47  *30873.88  * 6099.65  *
* Top Width (ft)         *  841.87  * Top Width (ft)         *   56.38  *   89.25  *  696.24  *
* Vel Total (ft/s)       *    9.28  * Avg. Vel. (ft/s)       *    2.89  *   14.38  *    4.32  *
* Max Chl Dpth (ft)      *   25.61  * Hydr. Depth (ft)       *   10.92  *   24.06  *   14.38  *
* Conv. Total (cfs)      *786379.0  * Conv. (cfs)            * 36051.1  *626543.8  *123784.2  *
* Length Wtd. (ft)       * 1000.02  * Wetted Per. (ft)       *   59.86  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    1.56  *    3.34  *    2.17  *
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* Alpha                  *    1.95  * Stream Power (lb/ft s) *    4.50  *   47.95  *    9.38  *
* Frctn Loss (ft)        *    2.74  * Cum Volume (acre-ft)   *13533.52  *18900.86  *17462.81  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         * 1419.18  *  675.07  * 2133.41  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  856.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.16  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  853.81  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  847.35  * Flow Area (sq ft)      *  713.72  * 2298.89  * 1578.34  *
* E.G. Slope (ft/ft)     *0.002722  * Area (sq ft)           *  713.72  * 2298.89  * 7499.67  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 2315.97  *36609.27  * 7774.77  *
* Top Width (ft)         *  876.36  * Top Width (ft)         *   59.49  *   89.25  *  727.62  *
* Vel Total (ft/s)       *   10.17  * Avg. Vel. (ft/s)       *    3.24  *   15.92  *    4.93  *
* Max Chl Dpth (ft)      *   27.30  * Hydr. Depth (ft)       *   12.00  *   25.76  *   16.07  *
* Conv. Total (cfs)      *895167.3  * Conv. (cfs)            * 44393.5  *701743.4  *149030.4  *
* Length Wtd. (ft)       *  999.64  * Wetted Per. (ft)       *   63.40  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    1.91  *    4.00  *    2.72  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    6.21  *   63.73  *   13.41  *
* Frctn Loss (ft)        *    2.92  * Cum Volume (acre-ft)   *18932.88  *20751.55  *24059.13  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         * 1724.23  *  677.50  * 2554.96  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  848.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.35  * Wt. n-Val.             *   0.120  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  847.03  * Reach Len. (ft)        *  929.01  * 1012.50  * 1019.52  *
* Crit W.S. (ft)         *  840.49  * Flow Area (sq ft)      *  352.48  * 1693.57  *  912.18  *
* E.G. Slope (ft/ft)     *0.001631  * Area (sq ft)           *  352.48  * 1693.57  * 3034.78  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  654.99  *17031.37  * 2413.64  *
* Top Width (ft)         *  702.30  * Top Width (ft)         *   47.04  *   89.25  *  566.01  *
* Vel Total (ft/s)       *    6.79  * Avg. Vel. (ft/s)       *    1.86  *   10.06  *    2.65  *
* Max Chl Dpth (ft)      *   20.52  * Hydr. Depth (ft)       *    7.49  *   18.98  *    9.29  *
* Conv. Total (cfs)      *497661.0  * Conv. (cfs)            * 16217.0  *421684.1  * 59760.0  *
* Length Wtd. (ft)       * 1002.20  * Wetted Per. (ft)       *   49.22  *   97.60  *   98.53  *
* Min Ch El (ft)         *  826.51  * Shear (lb/sq ft)       *    0.73  *    1.77  *    0.94  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    1.36  *   17.77  *    2.49  *
* Frctn Loss (ft)        *    2.04  * Cum Volume (acre-ft)   * 5487.71  *13893.45  * 6833.77  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  668.06  *  649.13  *  859.29  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 27.510

INPUT
Description:
Station Elevation Data    num=     226
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  871.41     .29   871.5    9.27  873.19   10.62  873.19   16.77  873.18
   19.85   872.7   31.17  871.15   32.23  870.84   40.23  870.98   43.88  871.14
   49.66  872.71   52.84  872.47   71.06  872.99   81.01  873.18  105.25   874.2
  115.96  874.23  155.42  874.82  161.71  875.03  172.13  875.23  181.71  875.42
  199.95   875.8  216.44  876.14  224.74  876.26  253.11  876.65  289.06  877.04
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  296.44  877.11   308.6  877.33  360.28  876.97  362.03  876.95  383.77  876.53
   397.5   876.3  426.52  876.98  427.25  876.98  467.59   876.6  471.99  876.54
  507.06  876.32  532.64  875.97  540.15   875.9  552.57  875.71  577.03  875.35
  588.18  875.09  601.38  874.92  618.26   874.7  633.92  874.29  666.48  873.36
  672.09  873.11  689.71  871.98  693.57  871.68  705.22   870.6  715.89  869.51
  722.19  868.82  728.77  868.08  735.46  867.38  742.93   867.9  747.72  868.23
  749.54  868.33  774.27  868.93  799.43  869.66  818.63  870.69  840.93  871.65
  864.08  872.29  880.77  872.59  896.31     873  936.86  873.69  953.19  873.98
  967.29  874.07  994.01  873.85 1024.74  873.58 1036.92  873.41 1094.65  872.66
 1096.99  872.62 1097.41  872.62 1131.91  871.41  1163.2  869.47  1169.9  869.03
 1210.22   866.1 1213.49  865.89 1216.37  865.77 1237.15   864.9 1254.72  863.84
 1260.81  863.64 1283.12  862.12  1290.4  861.72 1301.79  861.13 1321.86  859.66
 1349.56  856.22  1370.2  853.85 1394.02   848.1 1407.75  844.64 1425.79  839.54
 1432.38  838.33 1455.95  837.93  1464.7  837.84 1476.42  837.72 1490.22  837.69
 1520.69  837.45 1562.05  836.96 1563.93  836.94 1565.82  836.77 1567.99  836.68
 1584.22  835.75 1603.59  835.35  1605.4  835.28 1606.41  835.27 1607.11  835.26
 1608.93  835.19 1631.29  828.93 1633.09  828.37 1648.17  828.37 1652.69  828.37
 1657.64  830.61 1678.41   837.2 1705.45  837.99 1710.34  838.16 1727.69  837.91
  1744.1  837.81 1744.65  837.81 1745.22  837.81 1760.27  837.72  1766.8   837.7
  1787.8  837.37 1791.97  837.31 1815.46  836.94  1829.2  836.84 1841.87  836.74
 1843.14   836.6 1853.11  835.02 1864.06  836.43  1868.3  836.96 1903.61  837.24
 1905.29  837.27 1910.26  837.33  1922.6  837.52 1927.47  837.58 1929.88  836.98
 1936.14  835.09 1953.91  835.59 1962.63  835.97 1966.82   835.9 1970.96  835.58
 1980.84  834.47 1982.16  834.32  1985.2  833.41 1998.18  830.08 2003.61  829.83
 2007.67  829.57 2009.55  829.02 2013.65  827.81 2046.15   827.2 2057.85  827.81
 2060.17  830.68  2066.3  838.49 2068.59  840.99 2069.36  841.83 2073.37  842.35
 2081.48   843.5 2083.15  843.73 2086.56   844.3 2094.08  845.91 2094.23  845.92
 2094.27  845.92 2103.42  845.73 2107.46  845.89 2115.53  845.76 2131.86  846.78
 2131.88  846.78 2132.18  846.56 2150.98  843.09 2154.33  843.32 2161.75  843.63
 2165.04  844.23 2172.74  845.81 2173.94  846.03 2187.67  846.03 2189.02  846.36
  2202.7  847.06 2205.37  847.36 2211.61  847.61 2214.39  847.81 2227.32  848.91
 2243.63  850.26 2254.16  851.02 2265.84  851.93 2287.47  853.16 2301.32  853.43
 2308.81  853.82 2316.98  854.32 2335.81  855.91 2337.91  856.11 2352.68  850.48
 2359.27  848.94 2371.77  848.51 2380.26  848.91 2384.82   848.8 2387.99  849.85
 2405.88  855.12 2416.16   860.5 2423.78  861.84  2424.9  862.05  2439.1  861.91
  2439.4  861.91 2440.59  862.21 2447.13  863.86 2448.19  864.06 2450.17  864.42
 2474.03  868.13 2477.18  868.62  2477.5  868.67  2502.4  870.83 2532.63  872.41
 2545.75  873.18 2561.53  873.96 2573.44  874.63 2617.79  877.54 2651.27  879.79
  2669.7  880.94 2710.94   883.7 2715.11  883.99 2717.34  884.17 2769.08  888.03
  2815.2  889.83 2835.03  891.45 2854.98  891.71 2864.52  891.98  2888.1  893.69
 2891.78  893.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  705.22      .1 1970.96     .04 2069.36      .1 2710.94     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1970.96 2069.36         710.2725  989.091213.884             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 1795.85     855        F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  838.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.75  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)          *  838.22  * Reach Len. (ft)        *  710.27  *  989.09  * 1213.88  *
* Crit W.S. (ft)          *  834.52  * Flow Area (sq ft)      *  284.58  *  786.69  *          *
* E.G. Slope (ft/ft)      *0.002369  * Area (sq ft)           * 1010.72  *  786.69  *          *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *  283.79  * 5586.21  *          *
* Top Width (ft)          *  626.98  * Top Width (ft)         *  531.86  *   95.13  *          *
* Vel Total (ft/s)        *    5.48  * Avg. Vel. (ft/s)       *    1.00  *    7.10  *          *
* Max Chl Dpth (ft)       *   11.02  * Hydr. Depth (ft)       *    1.63  *    8.27  *          *
* Conv. Total (cfs)       *120606.9  * Conv. (cfs)            *  5830.8  *114776.2  *          *
* Length Wtd. (ft)        *  961.61  * Wetted Per. (ft)       *  175.75  *  101.07  *          *
* Min Ch El (ft)          *  827.20  * Shear (lb/sq ft)       *    0.24  *    1.15  *          *
* Alpha                   *    1.60  * Stream Power (lb/ft s) *    0.24  *    8.17  *          *
* Frctn Loss (ft)         *    2.54  * Cum Volume (acre-ft)   *  891.63  * 6897.21  *  863.61  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *  206.26  *  542.18  *  243.90  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	842.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.100	0.040	
W.S. Elev (ft)	841.09	Reach Len. (ft)	710.27	989.09	1213.88
Crit W.S. (ft)	838.04	Flow Area (sq ft)	788.47	1064.12	
E.G. Slope (ft/ft)	0.002522	Area (sq ft)	2578.62	1064.12	
Q Total (cfs)	10900.00	Flow (cfs)	1600.45	9299.55	
Top Width (ft)	648.39	Top Width (ft)	550.66	97.72	
Vel Total (ft/s)	5.88	Avg. Vel. (ft/s)	2.03	8.74	
Max Chl Dpth (ft)	13.89	Hydr. Depth (ft)	4.50	10.89	
Conv. Total (cfs)	217045.8	Conv. (cfs)	31868.8	185177.0	
Length Wtd. (ft)	948.42	Wetted Per. (ft)	175.75	104.95	
Min Ch El (ft)	827.20	Shear (lb/sq ft)	0.71	1.60	
Alpha	1.90	Stream Power (lb/ft s)	1.43	13.95	
Frctn Loss (ft)	2.40	Cum Volume (acre-ft)	2114.99	9228.40	2400.08
C & E Loss (ft)	0.05	Cum SA (acres)	362.82	585.09	492.77

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	842.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	841.89	Reach Len. (ft)	710.27	989.09	1213.88
Crit W.S. (ft)	838.73	Flow Area (sq ft)	927.66	1142.08	0.01
E.G. Slope (ft/ft)	0.002564	Area (sq ft)	3017.44	1142.08	0.01
Q Total (cfs)	12600.00	Flow (cfs)	2116.10	10483.90	0.00
Top Width (ft)	652.33	Top Width (ft)	553.48	98.40	0.45
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)	2.28	9.18	0.07
Max Chl Dpth (ft)	14.69	Hydr. Depth (ft)	5.30	11.61	0.03
Conv. Total (cfs)	248812.0	Conv. (cfs)	41786.7	207025.3	0.0
Length Wtd. (ft)	947.17	Wetted Per. (ft)	175.75	105.95	0.45
Min Ch El (ft)	827.20	Shear (lb/sq ft)	0.85	1.73	0.00
Alpha	1.92	Stream Power (lb/ft s)	1.93	15.84	0.00
Frctn Loss (ft)	2.37	Cum Volume (acre-ft)	3001.65	10938.50	3568.86
C & E Loss (ft)	0.07	Cum SA (acres)	428.76	613.28	619.92

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	845.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	844.52	Reach Len. (ft)	710.27	989.09	1213.88
Crit W.S. (ft)	840.75	Flow Area (sq ft)	1389.03	1401.34	46.00
E.G. Slope (ft/ft)	0.002611	Area (sq ft)	4488.00	1401.34	46.00
Q Total (cfs)	19100.00	Flow (cfs)	4184.61	14876.89	38.50
Top Width (ft)	702.69	Top Width (ft)	562.80	98.40	41.49
Vel Total (ft/s)	6.73	Avg. Vel. (ft/s)	3.01	10.62	0.84
Max Chl Dpth (ft)	17.32	Hydr. Depth (ft)	7.93	14.24	1.11
Conv. Total (cfs)	373786.4	Conv. (cfs)	81892.7	291140.3	753.4
Length Wtd. (ft)	945.30	Wetted Per. (ft)	175.75	105.95	41.93
Min Ch El (ft)	827.20	Shear (lb/sq ft)	1.29	2.16	0.18
Alpha	1.98	Stream Power (lb/ft s)	3.88	22.89	0.15
Frctn Loss (ft)	2.28	Cum Volume (acre-ft)	4617.19	12913.05	5799.84
C & E Loss (ft)	0.13	Cum SA (acres)	563.96	636.63	772.64

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

```
* E.G. Elev (ft)         *  848.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.78  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  846.99  * Reach Len. (ft)        *  710.27  *  989.09  * 1213.88  *
* Crit W.S. (ft)         *  842.70  * Flow Area (sq ft)      * 1821.32  * 1644.26  *  243.81  *
* E.G. Slope (ft/ft)     *0.002820  * Area (sq ft)           * 5889.34  * 1644.26  *  243.81  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 6831.17  *20180.79  *  288.04  *
* Top Width (ft)         *  802.95  * Top Width (ft)         *  572.54  *   98.40  *  132.01  *
* Vel Total (ft/s)       *    7.36  * Avg. Vel. (ft/s)       *    3.75  *   12.27  *    1.18  *
* Max Chl Dpth (ft)      *   19.79  * Hydr. Depth (ft)       *   10.40  *   16.71  *    1.85  *
* Conv. Total (cfs)      *514088.5  * Conv. (cfs)            *128638.4  *380026.1  *  5424.1  *
* Length Wtd. (ft)       *  945.07  * Wetted Per. (ft)       *  175.75  *  105.95  *  133.09  *
* Min Ch El (ft)         *  827.20  * Shear (lb/sq ft)       *    1.82  *    2.73  *    0.32  *
* Alpha                  *    2.12  * Stream Power (lb/ft s) *    6.84  *   33.53  *    0.38  *
* Frctn Loss (ft)        *    2.49  * Cum Volume (acre-ft)   * 7624.44  *15831.55  * 9773.19  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  928.36  *  664.80  * 1237.88  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  850.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.04  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  848.30  * Reach Len. (ft)        *  710.27  *  989.09  * 1213.88  *
* Crit W.S. (ft)         *  843.90  * Flow Area (sq ft)      * 2050.06  * 1772.80  *  428.96  *
* E.G. Slope (ft/ft)     *0.002992  * Area (sq ft)           * 6640.63  * 1772.80  *  428.96  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 8569.56  *23563.93  *  696.52  *
* Top Width (ft)         *  826.93  * Top Width (ft)         *  577.76  *   98.40  *  150.77  *
* Vel Total (ft/s)       *    7.72  * Avg. Vel. (ft/s)       *    4.18  *   13.29  *    1.62  *
* Max Chl Dpth (ft)      *   21.10  * Hydr. Depth (ft)       *   11.71  *   18.02  *    2.85  *
* Conv. Total (cfs)      *600229.9  * Conv. (cfs)            *156676.9  *430818.6  * 12734.5  *
* Length Wtd. (ft)       *  945.97  * Wetted Per. (ft)       *  175.75  *  105.95  *  151.90  *
* Min Ch El (ft)         *  827.20  * Shear (lb/sq ft)       *    2.18  *    3.12  *    0.53  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    9.11  *   41.54  *    0.86  *
* Frctn Loss (ft)        *    2.72  * Cum Volume (acre-ft)   *10600.57  *17608.55  *13560.58  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         * 1215.12  *  671.95  * 1683.82  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  851.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.27  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  849.61  * Reach Len. (ft)        *  710.27  *  989.09  * 1213.88  *
* Crit W.S. (ft)         *  845.12  * Flow Area (sq ft)      * 2280.59  * 1902.34  *  661.94  *
* E.G. Slope (ft/ft)     *0.003108  * Area (sq ft)           * 7404.82  * 1902.34  *  661.94  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *10432.25  *27013.55  * 1304.20  *
* Top Width (ft)         *  878.98  * Top Width (ft)         *  583.21  *   98.40  *  197.37  *
* Vel Total (ft/s)       *    8.00  * Avg. Vel. (ft/s)       *    4.57  *   14.20  *    1.97  *
* Max Chl Dpth (ft)      *   22.41  * Hydr. Depth (ft)       *   13.02  *   19.33  *    3.35  *
* Conv. Total (cfs)      *695075.5  * Conv. (cfs)            *187127.8  *484553.7  * 23394.0  *
* Length Wtd. (ft)       *  947.34  * Wetted Per. (ft)       *  175.75  *  105.95  *  198.78  *
* Min Ch El (ft)         *  827.20  * Shear (lb/sq ft)       *    2.52  *    3.48  *    0.65  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *   11.52  *   49.47  *    1.27  *
* Frctn Loss (ft)        *    2.90  * Cum Volume (acre-ft)   *13448.00  *18853.79  *17381.36  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         * 1412.36  *  672.89  * 2122.95  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	853.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.50	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	851.35	Reach Len. (ft)	710.27	989.09	1213.88
Crit W.S. (ft)	846.76	Flow Area (sq ft)	2584.93	2073.36	1035.02
E.G. Slope (ft/ft)	0.003143	Area (sq ft)	8424.69	2073.36	1035.02
Q Total (cfs)	46700.00	Flow (cfs)	12926.98	31357.55	2415.47
Top Width (ft)	920.58	Top Width (ft)	590.41	98.40	231.77
Vel Total (ft/s)	8.20	Avg. Vel. (ft/s)	5.00	15.12	2.33
Max Chl Dpth (ft)	24.15	Hydr. Depth (ft)	14.76	21.07	4.47
Conv. Total (cfs)	832964.9	Conv. (cfs)	230572.1	559309.1	43083.6
Length Wtd. (ft)	949.71	Wetted Per. (ft)	175.75	105.95	233.76
Min Ch El (ft)	827.20	Shear (lb/sq ft)	2.89	3.84	0.87
Alpha	2.39	Stream Power (lb/ft s)	14.43	58.08	2.03
Frctn Loss (ft)	3.00	Cum Volume (acre-ft)	18835.44	20700.74	23959.25
C & E Loss (ft)	0.17	Cum SA (acres)	1717.30	675.32	2543.73

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	846.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.43	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	844.89	Reach Len. (ft)	710.27	989.09	1213.88
Crit W.S. (ft)	841.02	Flow Area (sq ft)	1453.22	1437.42	62.21
E.G. Slope (ft/ft)	0.002614	Area (sq ft)	4694.56	1437.42	62.21
Q Total (cfs)	20100.00	Flow (cfs)	4514.01	15527.97	58.02
Top Width (ft)	709.58	Top Width (ft)	564.20	98.40	46.98
Vel Total (ft/s)	6.81	Avg. Vel. (ft/s)	3.11	10.80	0.93
Max Chl Dpth (ft)	17.69	Hydr. Depth (ft)	8.30	14.61	1.32
Conv. Total (cfs)	393169.1	Conv. (cfs)	88296.9	303737.3	1134.9
Length Wtd. (ft)	945.22	Wetted Per. (ft)	175.75	105.95	47.52
Min Ch El (ft)	827.20	Shear (lb/sq ft)	1.35	2.21	0.21
Alpha	1.99	Stream Power (lb/ft s)	4.19	23.91	0.20
Frctn Loss (ft)	2.27	Cum Volume (acre-ft)	5433.89	13857.06	6797.53
C & E Loss (ft)	0.14	Cum SA (acres)	661.55	646.95	852.11

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 27.323

INPUT
Description:
Station Elevation Data num= 212

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.64	1.09	867.64	22.08	867.64	31.97	867.73	35.76	867.73
41.99	867.92	55.64	868.35	77.29	868.76	114.15	869.44	129.53	869.46
164.78	869.71	176.83	869.11	209.68	867.58	218.07	867.15	219.67	867.06
239.44	865.57	240.78	865.47	242.04	865.9	251.55	869.01	256.94	869.65
262.14	870.26	263.24	870.26	269.43	870.23	270.81	870.1	279.28	869.46
281.74	868.79	288.66	866.87	305.28	860.1	308.89	858.59	319.86	861.78
327.22	863.88	328.96	863.94	340.51	864.43	368.59	865.72	373.94	865.9
393.23	866.71	397.32	866.88	406.18	867	444.46	867.4	465.28	867.39
478.7	867.43	515.93	867.1	532.86	867.03	565.17	866.89	605.77	866.75
621.57	866.61	633.17	866.65	669.89	866.05	699.66	865.67	721.88	865.29
745.41	864.98	774.17	864.4	800.93	863.45	835.4	861.7	848.22	860.86
860.51	860.14	868.94	859.78	881.14	858.67	883.96	858.21	895.53	856.44

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  900.25   855.8  908.27  855.07  927.69  853.73  931.38  853.56  931.52  853.43
  947.11   854.5  960.09  855.26  975.32  855.45  991.23  855.56 1036.35   855.3
 1038.27  855.29 1040.65   855.3 1095.05  855.69 1103.24  855.68 1151.95  855.25
 1172.13  855.26 1197.14  855.62 1208.34  855.66 1235.26  856.42 1237.51  856.54
 1238.63  856.42 1253.36  854.89 1264.54  854.62 1294.55  854.23 1334.36  852.89
 1336.01  852.85 1337.25  852.89 1344.67  853.08 1363.67  851.53 1368.13  851.26
 1394.82  850.48 1428.09  849.72 1457.86  848.52  1489.5  847.63 1523.35  846.29
 1530.92  845.98 1560.32  844.78 1597.55  842.86 1599.95  842.75 1603.23  842.45
 1605.19  842.39 1629.83  840.75  1642.9  839.72 1671.48  838.37 1688.82  837.52
 1696.25  837.24 1754.87  835.63 1759.21  835.38 1781.27  835.24 1787.23     835
 1810.78  834.49 1815.51   831.6 1821.07  827.94 1834.48  827.94 1841.25  827.94
 1844.84  827.94 1852.84  830.54 1857.88  831.85 1859.55  832.35 1861.23  832.93
 1871.89  832.83 1881.28  833.89 1882.03  833.99 1883.78  833.96 1898.33  833.69
 1902.55  833.54 1909.53  833.29 1915.29  829.58 1918.32  827.75    1945   826.5
 1955.74  826.09    1965   826.5 1973.96  827.75 1976.18  827.75 1983.81  827.75
 1985.05  829.27 1991.87  835.35 2005.29  835.85  2012.7  836.12 2035.58  836.98
 2070.56  836.42 2085.38  836.07 2094.57  836.01 2116.27  835.98 2118.41  835.98
 2120.53  835.98 2121.89  835.98 2122.22  835.97 2122.38  835.97 2122.46  835.97
 2122.54  835.97  2122.7  835.97 2122.86  835.97 2123.03  835.97  2123.2  835.97
 2123.68  835.97 2124.14  835.97 2125.45  835.97 2126.68  835.97 2136.17  835.91
 2182.93  836.11 2205.22  836.25 2218.73  836.27 2264.37  836.42 2285.64  836.38
 2295.41   836.5 2304.87  838.96 2325.88  850.45 2355.83  864.45 2359.47  866.14
 2373.23  875.79 2373.65  876.17 2374.52  876.23 2410.63  878.73 2424.72  879.87
 2447.91  881.46  2473.8  883.85 2485.21  883.82 2489.54  883.77 2496.39  884.65
 2531.53  888.71 2531.96  888.74 2556.31  889.99 2607.02   892.6 2622.37  893.55
 2629.17  893.89 2635.82  894.22 2684.64  894.83 2704.61  895.15 2740.12  894.55
 2763.61  893.66 2803.36  892.15  2841.6   889.1 2845.41  888.89  2881.3  886.95
 2886.19  886.84 2901.11  886.42 2902.58  886.37 2913.14  886.14 2941.92  884.53
  2942.9  884.47 2943.64  884.45 2947.24  884.42 2980.36  883.91 2997.94  884.06
 3027.05  883.73 3038.48  883.93  3070.9  884.65 3071.49  884.65 3071.77  884.71
 3080.73  886.56 3082.26  887.25

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06 1810.78      .1 1909.53     .04 1991.87      .1 2845.41     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1902.55 2005.29         943.7715  758.78710.1675             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1803.96  850.64       F
 2169.29 3082.26  851.18       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  836.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  835.67  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)         *  832.62  * Flow Area (sq ft)      *  412.29  *  664.11  *          *
* E.G. Slope (ft/ft)     *0.002955  * Area (sq ft)           *  438.25  *  664.11  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  873.17  * 4996.83  *          *
* Top Width (ft)         *  246.74  * Top Width (ft)         *  148.96  *   97.78  *          *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    2.12  *    7.52  *          *
* Max Chl Dpth (ft)      *    9.58  * Hydr. Depth (ft)       *    4.18  *    6.79  *          *
* Conv. Total (cfs)      *107977.7  * Conv. (cfs)            * 16061.7  * 91916.0  *          *
* Length Wtd. (ft)       *  772.54  * Wetted Per. (ft)       *  101.32  *  102.56  *          *
* Min Ch El (ft)         *  826.09  * Shear (lb/sq ft)       *    0.75  *    1.19  *          *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    1.59  *    8.99  *          *
* Frctn Loss (ft)        *    2.33  * Cum Volume (acre-ft)   *  879.81  * 6880.74  *  863.61  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  200.71  *  539.99  *  243.90  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  839.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.098  *   0.041  *   0.100  *
* W.S. Elev (ft)         *  838.82  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)         *  835.56  * Flow Area (sq ft)      *  722.95  *  987.39  *  422.47  *
* E.G. Slope (ft/ft)     *0.002540  * Area (sq ft)           * 1071.05  *  987.39  *  750.79  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 2058.39  * 8247.14  *  594.48  *
```

```
* Top Width (ft)          *  642.28  * Top Width (ft)          *  240.52  *  102.74  *  299.03  *
* Vel Total (ft/s)        *    5.11  * Avg. Vel. (ft/s)        *    2.85  *    8.35  *    1.41  *
* Max Chl Dpth (ft)       *   12.73  * Hydr. Depth (ft)        *    7.33  *    9.61  *    2.58  *
* Conv. Total (cfs)       *216273.2  * Conv. (cfs)             * 40841.7  *163636.2  * 11795.3  *
* Length Wtd. (ft)        *  774.92  * Wetted Per. (ft)        *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)          *  826.09  * Shear (lb/sq ft)        *    1.13  *    1.46  *    0.41  *
* Alpha                   *    2.08  * Stream Power (lb/ft s) *    3.22  *   12.16  *    0.57  *
* Frctn Loss (ft)         *    2.08  * Cum Volume (acre-ft)   * 2085.24  * 9205.11  * 2389.62  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  356.37  *  582.81  *  488.60  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)          *  840.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.86  * Wt. n-Val.             *   0.098  *   0.041  *   0.100  *
* W.S. Elev (ft)          *  839.68  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)          *  836.37  * Flow Area (sq ft)      *  808.55  * 1076.59  *  564.86  *
* E.G. Slope (ft/ft)      *0.002444  * Area (sq ft)           * 1287.85  * 1076.59  * 1011.33  *
* Q Total (cfs)           *12600.00  * Flow (cfs)             * 2435.52  * 9218.19  *  946.29  *
* Top Width (ft)          *  662.54  * Top Width (ft)          *  258.90  *  102.74  *  300.90  *
* Vel Total (ft/s)        *    5.14  * Avg. Vel. (ft/s)        *    3.01  *    8.56  *    1.68  *
* Max Chl Dpth (ft)       *   13.59  * Hydr. Depth (ft)        *    8.20  *   10.48  *    3.44  *
* Conv. Total (cfs)       *254855.7  * Conv. (cfs)             * 49262.4  *186453.0  * 19140.3  *
* Length Wtd. (ft)        *  774.83  * Wetted Per. (ft)        *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)          *  826.09  * Shear (lb/sq ft)        *    1.22  *    1.53  *    0.53  *
* Alpha                   *    2.10  * Stream Power (lb/ft s) *    3.67  *   13.08  *    0.88  *
* Frctn Loss (ft)         *    2.04  * Cum Volume (acre-ft)   * 2966.55  *10913.32  * 3554.77  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  422.14  *  611.00  *  615.72  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)          *  843.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.95  * Wt. n-Val.             *   0.097  *   0.042  *   0.100  *
* W.S. Elev (ft)          *  842.56  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)          *  838.41  * Flow Area (sq ft)      * 1091.85  * 1371.82  * 1036.12  *
* E.G. Slope (ft/ft)      *0.002227  * Area (sq ft)           * 2088.99  * 1371.82  * 1883.54  *
* Q Total (cfs)           *19100.00  * Flow (cfs)             * 3847.56  *12769.67  * 2482.77  *
* Top Width (ft)          *  709.40  * Top Width (ft)          *  300.50  *  102.74  *  306.16  *
* Vel Total (ft/s)        *    5.46  * Avg. Vel. (ft/s)        *    3.52  *    9.31  *    2.40  *
* Max Chl Dpth (ft)       *   16.47  * Hydr. Depth (ft)        *   11.07  *   13.35  *    6.32  *
* Conv. Total (cfs)       *404725.4  * Conv. (cfs)             * 81529.1  *270587.0  * 52609.4  *
* Length Wtd. (ft)        *  774.18  * Wetted Per. (ft)        *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)          *  826.09  * Shear (lb/sq ft)        *    1.50  *    1.77  *    0.88  *
* Alpha                   *    2.05  * Stream Power (lb/ft s) *    5.28  *   16.51  *    2.10  *
* Frctn Loss (ft)         *    2.00  * Cum Volume (acre-ft)   * 4563.57  *12881.57  * 5772.96  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         *  556.92  *  634.35  *  767.80  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)          *  846.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.21  * Wt. n-Val.             *   0.097  *   0.042  *   0.100  *
* W.S. Elev (ft)          *  844.90  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)          *  840.14  * Flow Area (sq ft)      * 1323.21  * 1612.91  * 1420.97  *
* E.G. Slope (ft/ft)      *0.002462  * Area (sq ft)           * 2844.49  * 1612.91  * 2607.02  *
* Q Total (cfs)           *27300.00  * Flow (cfs)             * 5584.53  *17296.26  * 4419.21  *
* Top Width (ft)          *  758.47  * Top Width (ft)          *  345.28  *  102.74  *  310.45  *
* Vel Total (ft/s)        *    6.27  * Avg. Vel. (ft/s)        *    4.22  *   10.72  *    3.11  *
```

```
* Max Chl Dpth (ft)      *   18.81  * Hydr. Depth (ft)       *   13.42  *   15.70  *    8.66  *
* Conv. Total (cfs)      *550178.0  * Conv. (cfs)            *112545.2  *348572.3  * 89060.5  *
* Length Wtd. (ft)       *  782.35  * Wetted Per. (ft)       *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)         *  826.09  * Shear (lb/sq ft)       *    2.01  *    2.31  *    1.33  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    8.47  *   24.73  *    4.14  *
* Frctn Loss (ft)        *    1.99  * Cum Volume (acre-ft)   * 7553.23  *15794.57  * 9733.47  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  920.88  *  662.52  * 1231.71  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  847.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.              *   0.097  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  845.99  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)         *  841.15  * Flow Area (sq ft)      * 1430.08  * 1724.29  * 1598.75  *
* E.G. Slope (ft/ft)     *0.002769  * Area (sq ft)           * 3233.18  * 1724.29  * 2944.63  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 6746.46  *20379.48  * 5704.06  *
* Top Width (ft)         *  787.01  * Top Width (ft)         *  371.84  *  102.74  *  312.43  *
* Vel Total (ft/s)       *    6.91  * Avg. Vel. (ft/s)       *    4.72  *   11.82  *    3.57  *
* Max Chl Dpth (ft)      *   19.90  * Hydr. Depth (ft)       *   14.51  *   16.78  *    9.75  *
* Conv. Total (cfs)      *623878.1  * Conv. (cfs)            *128205.0  *387277.1  *108396.0  *
* Length Wtd. (ft)       *  787.57  * Wetted Per. (ft)       *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)         *  826.09  * Shear (lb/sq ft)       *    2.44  *    2.77  *    1.68  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *   11.51  *   32.77  *    6.01  *
* Frctn Loss (ft)        *    2.08  * Cum Volume (acre-ft)   *10520.08  *17568.85  *13513.57  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1207.38  *  669.66  * 1677.37  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  848.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.69  * Wt. n-Val.              *   0.097  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  847.12  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)         *  842.12  * Flow Area (sq ft)      * 1541.81  * 1840.72  * 1784.61  *
* E.G. Slope (ft/ft)     *0.003020  * Area (sq ft)           * 3670.56  * 1840.72  * 3299.89  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 7992.60  *23602.31  * 7155.10  *
* Top Width (ft)         *  817.46  * Top Width (ft)         *  400.22  *  102.74  *  314.50  *
* Vel Total (ft/s)       *    7.50  * Avg. Vel. (ft/s)       *    5.18  *   12.82  *    4.01  *
* Max Chl Dpth (ft)      *   21.03  * Hydr. Depth (ft)       *   15.64  *   17.92  *   10.88  *
* Conv. Total (cfs)      *705138.8  * Conv. (cfs)            *145442.3  *429494.2  *130202.2  *
* Length Wtd. (ft)       *  792.94  * Wetted Per. (ft)       *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)         *  826.09  * Shear (lb/sq ft)       *    2.87  *    3.23  *    2.05  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *   14.87  *   41.38  *    8.22  *
* Frctn Loss (ft)        *    2.06  * Cum Volume (acre-ft)   *13357.70  *18811.29  *17326.16  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1404.34  *  670.61  * 2115.82  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  850.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.93  * Wt. n-Val.              *   0.097  *   0.043  *   0.100  *
* W.S. Elev (ft)         *  848.75  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)         *  843.30  * Flow Area (sq ft)      * 1701.90  * 2007.55  * 2050.91  *
* E.G. Slope (ft/ft)     *0.003175  * Area (sq ft)           * 4359.86  * 2007.55  * 3812.98  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 9670.81  *27779.30  * 9249.89  *
* Top Width (ft)         *  870.50  * Top Width (ft)         *  450.29  *  102.74  *  317.47  *
* Vel Total (ft/s)       *    8.11  * Avg. Vel. (ft/s)       *    5.68  *   13.84  *    4.51  *
* Max Chl Dpth (ft)      *   22.66  * Hydr. Depth (ft)       *   17.26  *   19.54  *   12.51  *
* Conv. Total (cfs)      *828839.6  * Conv. (cfs)            *171639.2  *493031.8  *164168.6  *
* Length Wtd. (ft)       *  799.34  * Wetted Per. (ft)       *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)         *  826.09  * Shear (lb/sq ft)       *    3.33  *    3.70  *    2.48  *
```

```
* Alpha                  *    1.90  * Stream Power (lb/ft s) *   18.92  *   51.20  *   11.18  *
* Frctn Loss (ft)        *    1.90  * Cum Volume (acre-ft)   *18731.21  *20654.41  *23891.70  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         * 1708.81  *  673.04  * 2536.08  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  843.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *   0.097  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  842.95  * Reach Len. (ft)        *  943.77  *  758.78  *  710.17  *
* Crit W.S. (ft)         *  838.65  * Flow Area (sq ft)      * 1130.48  * 1412.07  * 1100.37  *
* E.G. Slope (ft/ft)     *0.002209  * Area (sq ft)           * 2207.77  * 1412.07  * 2003.63  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 4062.31  *13304.03  * 2733.66  *
* Top Width (ft)         *  716.36  * Top Width (ft)         *  306.74  *  102.74  *  306.88  *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)       *    3.59  *    9.42  *    2.48  *
* Max Chl Dpth (ft)      *   16.86  * Hydr. Depth (ft)       *   11.47  *   13.74  *    6.71  *
* Conv. Total (cfs)      *427627.0  * Conv. (cfs)            * 86425.6  *283043.0  * 58158.4  *
* Length Wtd. (ft)       *  774.22  * Wetted Per. (ft)       *  101.32  *  107.53  *  164.03  *
* Min Ch El (ft)         *  826.09  * Shear (lb/sq ft)       *    1.54  *    1.81  *    0.93  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    5.53  *   17.07  *    2.30  *
* Frctn Loss (ft)        *    2.00  * Cum Volume (acre-ft)   * 5377.62  *13824.71  * 6768.75  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  654.45  *  644.67  *  847.18  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 27.179

INPUT
Description: Upstream side of 131st Street
Station Elevation Data     num=     284
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   860.94     7.39   861.21    12.27   861.08    25.37   859.61    36.45   858.37
   41.65   857.73    53.97   856.43     57.7   856.05    65.47    856.4    86.12   857.24
   99.96   855.92   106.38   855.48   107.51   855.49   111.98   855.45    116.6   855.01
   116.8   854.99   117.36   855.02   135.95   856.87   140.46   856.93   152.04   857.28
  160.18    857.2   187.27   856.63   198.35   857.99   201.97   858.21   214.67   859.01
  230.22   859.55   237.15   860.31   239.93   860.14   257.26   860.13   268.76   859.95
  278.42   860.11   286.35   862.67   289.91   863.28   296.43   862.81   301.41   862.53
  338.43   862.09    345.7   862.27   351.32   861.93   371.62   861.69   392.36   861.44
  396.42    861.7   401.16   860.58   410.64   856.72   417.98   855.14   438.77   852.25
  446.02   851.36   453.46   849.73   471.13   845.14   489.61   845.37   498.96   845.58
  502.36   845.94   520.75   848.03   524.84   848.38   548.02   849.55   554.02   848.64
  573.76    845.2   586.84    846.3   588.98    846.4    591.5    847.2   612.89    856.6
  613.68   856.97   614.81   857.69   621.84   861.42   625.04   860.54   634.77   857.27
  646.94   855.61   660.58   850.11   660.91   850.08   661.64   849.87    675.6   844.65
  677.24   844.02   689.65   838.36   708.84   835.15   713.22   834.74   721.59   834.66
  727.02   834.74   741.53   834.74   761.86   835.02      787   835.07   804.71   835.21
  822.69   835.25   838.44   835.06   839.05   835.06   839.55   835.06   857.22   835.31
   872.5   835.56   885.43   835.53   908.08   835.84   911.59   835.86   930.84   835.99
  957.61    836.2  1001.69   836.13  1003.63   836.11  1006.16   836.07     1035   835.57
 1059.06   835.52  1067.25   835.41  1078.37   835.44  1096.34   835.29  1108.56   835.14
 1143.03   834.88  1147.87   834.89  1150.57   834.89  1171.93   835.09  1171.97   835.09
 1172.02   835.09  1189.27   837.85  1194.69   840.19   1199.1    840.5   1207.8   841.08
 1229.46   835.59   1231.1   835.23  1252.58   835.15  1266.32   834.85  1278.04   834.73
 1304.98      834  1305.61   833.99  1306.79   833.95  1336.55   835.09  1339.01   835.22
 1341.48   835.34  1372.73   836.36  1375.11    836.5  1389.38   842.16  1398.76   844.77
 1408.82   847.73  1415.41   847.82  1418.77    847.8  1422.71   847.79     1430   846.16
 1450.01   840.27  1459.87   839.96  1467.78   839.85  1480.24   839.67   1489.2   839.67
```

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 1503.51  839.66 1511.18  839.54 1513.16  838.92 1523.74  836.53 1537.55  833.07
 1547.58  830.56 1560.34  831.52 1572.83  830.52 1578.32  829.41  1580.3  828.89
 1583.09  828.14 1596.84  824.43    1625  824.18 1654.51  824.42 1658.34  824.42
 1661.29  826.41 1664.29  828.28 1669.56   830.3 1678.69  833.31 1683.66  834.12
 1685.53  835.04 1688.48  836.51  1697.1  837.34 1705.81  838.16 1706.02  838.25
 1709.52  838.62 1713.23  839.01 1713.81  839.07 1720.77  840.02 1738.45  840.24
 1741.07  840.25  1759.5  838.91  1760.4  838.87 1760.69  838.85 1778.58   838.1
 1784.02  837.37 1786.97  837.34 1810.32  836.05 1815.34  836.03  1821.3     836
 1828.26  835.97 1838.68  835.92 1846.95  835.93 1868.54   835.7 1875.11  835.55
 1896.96  835.33 1927.98  834.82 1930.75  834.79 1951.07  834.44 1959.81  834.59
 1962.36  834.63 1964.18  834.66 1988.85  835.02 1992.48  835.07 1996.85  835.13
 2016.67  835.42 2022.54  835.51 2028.98   835.6 2043.04   835.8  2060.5  836.08
  2075.3  836.28 2082.51  836.66  2091.1  837.16 2096.14  837.43 2103.78  838.35
 2106.92  838.87 2114.28  839.46 2117.47  839.62 2129.08  840.28 2137.53  841.07
 2143.24  841.58 2150.68   841.4 2157.57  841.59 2170.66  846.43  2171.4  846.67
 2171.69  846.75    2172   846.9 2187.87  851.67 2193.51  852.18 2204.69  856.06
 2205.23  856.14 2206.68  856.56 2216.13  857.33 2219.41   857.6 2226.54  858.46
 2236.75  859.51 2255.66  862.15 2256.75  862.28 2262.77  862.47  2294.4  863.22
 2299.89  863.46  2327.6  863.93 2329.26  863.95 2358.75  863.27 2368.02  863.02
 2368.62  863.02 2396.52  861.89 2413.34  861.02 2435.35  860.05 2455.65   859.9
 2470.98  859.26 2471.67  859.25 2473.06  858.69  2480.6  855.21  2483.7  856.38
 2487.71  858.81 2492.92  859.42 2515.81  861.34 2526.59  862.18  2547.8  864.22
 2572.33  866.39 2580.37  866.78 2591.68  865.38    2595  864.81 2597.14  865.19
 2615.52  867.22 2618.69  867.76  2620.8  868.07 2626.35  868.81 2647.14  872.02
 2665.25  874.35 2677.39  875.52 2701.54  877.77  2732.1   881.3 2747.89  882.85
 2753.06  883.05 2758.68  883.35 2786.31   886.1 2798.19  887.18 2839.77  891.14
  2845.9  891.49 2895.51  895.58 2906.08  896.08 2955.06  898.58 2968.11  899.26
 2985.79  900.28 3009.75  901.84 3016.29  902.05 3022.54  902.22 3030.58  902.61
 3045.01  903.68 3047.82   903.9 3072.84  909.18 3086.05  912.08 3097.64  914.37
 3111.57  916.99 3138.28   921.9 3174.58  925.44 3192.28  926.98

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0    .075 1006.16     .06 1560.34     .04 1685.53     .12 2747.89     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1523.74 1685.53               60      60      60              .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
    1700    2200     853       F
    1208    1525     850       F
     650    1208     840       T

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  834.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.75  * Wt. n-Val.             *          *   0.040  *         *
* W.S. Elev (ft)          *  833.34  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  830.39  * Flow Area (sq ft)      *          *  842.52  *          *
* E.G. Slope (ft/ft)      *0.003084  * Area (sq ft)           *          *  842.52  *          *
* Q Total (cfs)           * 5870.00  * Flow (cfs)             *          * 5870.00  *          *
* Top Width (ft)          *  142.36  * Top Width (ft)         *          *  142.36  *          *
* Vel Total (ft/s)        *    6.97  * Avg. Vel. (ft/s)       *          *    6.97  *          *
* Max Chl Dpth (ft)       *    9.16  * Hydr. Depth (ft)       *          *    5.92  *          *
* Conv. Total (cfs)       *105696.4  * Conv. (cfs)            *          *105696.4  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)       *          *  145.55  *          *
* Min Ch El (ft)          *  824.18  * Shear (lb/sq ft)       *          *    1.11  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.77  *          *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)   *  875.07  * 6867.61  *  863.61  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  199.10  *  537.90  *  243.90  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  837.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.04  * Wt. n-Val.             *          *   0.041  *   0.120  *
* W.S. Elev (ft)          *  836.53  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  833.05  * Flow Area (sq ft)      *          * 1334.53  *    2.23  *
* E.G. Slope (ft/ft)      *0.002832  * Area (sq ft)           *  752.90  * 1334.73  *  303.12  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             *          *10898.91  *    1.09  *
* Top Width (ft)          * 1073.21  * Top Width (ft)         *  629.86  *  161.79  *  281.56  *
* Vel Total (ft/s)        *    8.15  * Avg. Vel. (ft/s)       *          *    8.17  *    0.49  *
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* Max Chl Dpth (ft)      *   12.35  * Hydr. Depth (ft)       *          *    8.31  *    0.71  *
* Conv. Total (cfs)      *204811.3  * Conv. (cfs)            *          *204790.8  *    20.4  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  164.35  *    3.50  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *          *    1.44  *    0.11  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   11.73  *    0.05  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2065.48  * 9184.88  * 2381.03  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  346.94  *  580.51  *  483.87  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  838.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.15  * Wt. n-Val.              *          *   0.041  *   0.120  *
* W.S. Elev (ft)         *  837.32  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  833.69  * Flow Area (sq ft)      *          * 1461.96  *    8.01  *
* E.G. Slope (ft/ft)     *0.002853  * Area (sq ft)           * 1260.19  * 1463.16  *  541.21  *
* Q Total (cfs)          *12600.00  * Flow (cfs)              *          *12595.91  *    4.09  *
* Top Width (ft)         * 1128.29  * Top Width (ft)         *  648.21  *  161.79  *  318.29  *
* Vel Total (ft/s)       *    8.57  * Avg. Vel. (ft/s)       *          *    8.62  *    0.51  *
* Max Chl Dpth (ft)      *   13.14  * Hydr. Depth (ft)       *          *    9.11  *    0.70  *
* Conv. Total (cfs)      *235893.9  * Conv. (cfs)            *          *235817.3  *    76.6  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  164.35  *   11.78  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *          *    1.58  *    0.12  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *   13.65  *    0.06  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2938.94  *10891.20  * 3542.11  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  412.31  *  608.69  *  610.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  841.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.62  * Wt. n-Val.              *          *   0.041  *   0.120  *
* W.S. Elev (ft)         *  839.82  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  835.80  * Flow Area (sq ft)      *          * 1863.04  *   43.71  *
* E.G. Slope (ft/ft)     *0.003042  * Area (sq ft)           * 2945.69  * 1867.39  * 1446.19  *
* Q Total (cfs)          *19100.00  * Flow (cfs)              *          *19038.73  *   61.27  *
* Top Width (ft)         * 1301.79  * Top Width (ft)         *  732.15  *  161.79  *  407.86  *
* Vel Total (ft/s)       *   10.02  * Avg. Vel. (ft/s)       *          *   10.22  *    1.40  *
* Max Chl Dpth (ft)      *   15.64  * Hydr. Depth (ft)       *          *   11.61  *    3.02  *
* Conv. Total (cfs)      *346284.6  * Conv. (cfs)            *          *345173.7  *  1110.9  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *          *    2.15  *    0.56  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *          *   22.00  *    0.78  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 4509.03  *12853.36  * 5745.82  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  545.74  *  632.05  *  761.98  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  844.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.62  * Wt. n-Val.              *   0.068  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  842.47  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  837.89  * Flow Area (sq ft)      * 1284.02  * 2288.62  *   82.08  *
* E.G. Slope (ft/ft)     *0.002624  * Area (sq ft)           * 4996.39  * 2296.31  * 2649.16  *
* Q Total (cfs)          *27300.00  * Flow (cfs)              * 2576.94  *24560.44  *  162.62  *
* Top Width (ft)         * 1427.31  * Top Width (ft)         *  791.09  *  161.79  *  474.43  *
* Vel Total (ft/s)       *    7.47  * Avg. Vel. (ft/s)       *    2.01  *   10.73  *    1.98  *
* Max Chl Dpth (ft)      *   18.29  * Hydr. Depth (ft)       *    2.43  *   14.26  *    5.67  *
* Conv. Total (cfs)      *532902.5  * Conv. (cfs)            * 50302.5  *479425.6  *  3174.3  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  529.31  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.40  *    2.28  *    0.90  *
* Alpha                  *    1.86  * Stream Power (lb/ft s) *    0.80  *   24.48  *    1.79  *
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* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 7468.29  *15760.53  * 9690.62  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  908.57  *  660.22  * 1225.31  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  845.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.62  * Wt. n-Val.             *   0.068  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  843.73  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  839.18  * Flow Area (sq ft)      * 1944.73  * 2489.90  *  100.22  *
* E.G. Slope (ft/ft)     *0.002523  * Area (sq ft)           * 5995.51  * 2499.17  * 3246.15  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 5029.95  *27577.65  *  222.40  *
* Top Width (ft)         * 1442.21  * Top Width (ft)         *  802.60  *  161.79  *  477.82  *
* Vel Total (ft/s)       *    7.24  * Avg. Vel. (ft/s)       *    2.59  *   11.08  *    2.22  *
* Max Chl Dpth (ft)      *   19.55  * Hydr. Depth (ft)       *    3.67  *   15.51  *    6.93  *
* Conv. Total (cfs)      *653656.6  * Conv. (cfs)            *100148.0  *549080.5  *  4428.0  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  532.33  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.58  *    2.39  *    1.06  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    1.49  *   26.42  *    2.36  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *10420.10  *17532.06  *13463.10  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1194.66  *  667.36  * 1670.92  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  846.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.52  * Wt. n-Val.             *   0.068  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  845.18  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  842.41  * Flow Area (sq ft)      * 2715.65  * 2722.71  *  121.20  *
* E.G. Slope (ft/ft)     *0.002264  * Area (sq ft)           * 7169.47  * 2733.81  * 3941.95  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 8274.10  *30186.64  *  289.26  *
* Top Width (ft)         * 1463.03  * Top Width (ft)         *  819.50  *  161.79  *  481.74  *
* Vel Total (ft/s)       *    6.97  * Avg. Vel. (ft/s)       *    3.05  *   11.09  *    2.39  *
* Max Chl Dpth (ft)      *   21.00  * Hydr. Depth (ft)       *    5.06  *   16.96  *    8.38  *
* Conv. Total (cfs)      *814341.1  * Conv. (cfs)            *173882.3  *634379.9  *  6078.9  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  539.44  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.71  *    2.34  *    1.15  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    2.17  *   25.96  *    2.75  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *13240.27  *18771.45  *17267.13  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1391.13  *  668.30  * 2109.33  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  848.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.             *   0.068  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  847.27  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  843.52  * Flow Area (sq ft)      * 3947.45  * 3058.11  *  151.44  *
* E.G. Slope (ft/ft)     *0.001854  * Area (sq ft)           * 9007.08  * 3071.84  * 4954.46  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *13339.91  *32980.69  *  379.40  *
* Top Width (ft)         * 1567.65  * Top Width (ft)         *  918.17  *  161.79  *  487.69  *
* Vel Total (ft/s)       *    6.53  * Avg. Vel. (ft/s)       *    3.38  *   10.78  *    2.51  *
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* Max Chl Dpth (ft)      *   23.09  * Hydr. Depth (ft)       *    6.36  *   19.05  *   10.47  *
* Conv. Total (cfs)      *1084506.0  * Conv. (cfs)            *309790.4  *765904.6  *  8810.7  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  623.84  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.73  *    2.15  *    1.18  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    2.48  *   23.23  *    2.95  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *18586.40  *20610.17  *23820.23  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         * 1693.99  *  670.73  * 2529.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  841.85  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.68  * Wt. n-Val.            *   0.069  *   0.041  *   0.120  *
* W.S. Elev (ft)         *  840.17  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  836.09  * Flow Area (sq ft)     *   84.27  * 1918.43  *   48.71  *
* E.G. Slope (ft/ft)     *0.003058  * Area (sq ft)          * 3202.35  * 1923.21  * 1590.01  *
* Q Total (cfs)          *20100.00  * Flow (cfs)            *   30.34  *19996.10  *   73.56  *
* Top Width (ft)         * 1346.10  * Top Width (ft)        *  752.36  *  161.79  *  431.95  *
* Vel Total (ft/s)       *    9.80  * Avg. Vel. (ft/s)      *    0.36  *   10.42  *    1.51  *
* Max Chl Dpth (ft)      *   15.99  * Hydr. Depth (ft)      *    0.17  *   11.95  *    3.37  *
* Conv. Total (cfs)      *363492.9  * Conv. (cfs)           *   548.6  *361614.0  *  1330.3  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)      *  510.35  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)      *    0.03  *    2.23  *    0.63  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *    0.01  *   23.23  *    0.94  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 5319.01  *13795.67  * 6739.45  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  642.97  *  642.36  *  841.16  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 27.173

INPUT
Description: 131st ST Bridge / Blue Ridge
Distance from Upstream XS =       5
Deck/Roadway Width        =    52.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
      450     840     820     650     838     820    1110     840     820
     1375     850     820    1500     852     820    1525   852.1     820
   1525.1   852.1     847    1700   852.4     847  1700.1   852.4     820
     1820     852     820    1960   850.4     820    2100     852     820
     2210     856     820

Upstream Bridge Cross Section Data
Station Elevation Data    num=     284
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  860.94    7.39  861.21   12.27  861.08   25.37  859.61   36.45  858.37
   41.65  857.73   53.97  856.43    57.7  856.05   65.47   856.4   86.12  857.24
   99.96  855.92  106.38  855.48  107.51  855.49  111.98  855.45   116.6  855.01
   116.8  854.99  117.36  855.02  135.95  856.87  140.46  856.93  152.04  857.28
  160.18   857.2  187.27  856.63  198.35  857.99  201.97  858.21  214.67  859.01
  230.22  859.55  237.15  860.31  239.93  860.14  257.26  860.13  268.76  859.95
  278.42  860.11  286.35  862.67  289.91  863.28  296.43  862.81  301.41  862.53
  338.43  862.09   345.7  862.27  351.32  861.93  371.62  861.69  392.36  861.44
  396.42   861.7  401.16  860.58  410.64  856.72  417.98  855.14  438.77  852.25
```

```
  446.02  851.36  453.46  849.73  471.13  845.14  489.61  845.37  498.96  845.58
  502.36  845.94  520.75  848.03  524.84  848.38  548.02  849.55  554.02  848.64
  573.76   845.2  586.84   846.3  588.98   846.4   591.5   847.2  612.89   856.6
  613.68  856.97  614.81  857.69  621.84  861.42  625.04  860.54  634.77  857.27
  646.94  855.61  660.58  850.11  660.91  850.08  661.64  849.87   675.6  844.65
  677.24  844.02  689.65  838.36  708.84  835.15  713.22  834.74  721.59  834.66
  727.02  834.74  741.53  834.74  761.86  835.02     787  835.07  804.71  835.21
  822.69  835.25  838.44  835.06  839.05  835.06  839.55  835.06  857.22  835.31
   872.5  835.56  885.43  835.53  908.08  835.84  911.59  835.86  930.84  835.99
  957.61   836.2 1001.69  836.13 1003.63  836.11 1006.16  836.07    1035  835.57
 1059.06  835.52 1067.25  835.41 1078.37  835.44 1096.34  835.29 1108.56  835.14
 1143.03  834.88 1147.87  834.89 1150.57  834.89 1171.93  835.09 1171.97  835.09
 1172.02  835.09 1189.27  837.85 1194.69  840.19  1199.1   840.5  1207.8  841.08
 1229.46  835.59  1231.1  835.23 1252.58  835.15 1266.32  834.85 1278.04  834.73
 1304.98     834 1305.61  833.99 1306.79  833.95 1336.55  835.09 1339.01  835.22
 1341.48  835.34 1372.73  836.36 1375.11   836.5 1389.38  842.16 1398.76  844.77
 1408.82  847.73 1415.41  847.82 1418.77   847.8 1422.71  847.79    1430  846.16
 1450.01  840.27 1459.87  839.96 1467.78  839.85 1480.24  839.67  1489.2  839.67
 1503.51  839.66 1511.18  839.54 1513.16  838.92 1523.74  836.53 1537.55  833.07
 1547.58  830.56 1560.34  831.52 1572.83  830.52 1578.32  829.41  1580.3  828.89
 1583.09  828.14 1596.84  824.43    1625  824.18 1654.51  824.42 1658.34  824.42
 1661.29  826.41 1664.29  828.28 1669.56   830.3 1678.69  833.31 1683.66  834.12
 1685.53  835.04 1688.48  836.51  1697.1  837.34 1705.81  838.16 1706.02  838.25
 1709.52  838.62 1713.23  839.01 1713.81  839.07 1720.77  840.02 1738.45  840.24
 1741.07  840.25  1759.5  838.91  1760.4  838.87 1760.69  838.85 1778.58   838.1
 1784.02  837.37 1786.97  837.34 1810.32  836.05 1815.34  836.03  1821.3     836
 1828.26  835.97 1838.68  835.92 1846.95  835.93 1868.54   835.7 1875.11  835.55
 1896.96  835.33 1927.98  834.82 1930.75  834.79 1951.07  834.44 1959.81  834.59
 1962.36  834.63 1964.18  834.66 1988.85  835.02 1992.48  835.07 1996.85  835.13
 2016.67  835.42 2022.54  835.51 2028.98   835.6 2043.04   835.8  2060.5  836.08
  2075.3  836.28 2082.51  836.66  2091.1  837.16 2096.14  837.43 2103.78  838.35
 2106.92  838.87 2114.28  839.46 2117.47  839.62 2129.08  840.28 2137.53  841.07
 2143.24  841.58 2150.68   841.4 2157.57  841.59 2170.66  846.43  2171.4  846.67
 2171.69  846.75    2172   846.9 2187.87  851.67 2193.51  852.18 2204.69  856.06
 2205.23  856.14 2206.68  856.56 2216.13  857.33 2219.41   857.6 2226.54  858.46
 2236.75  859.51 2255.66  862.15 2256.75  862.28 2262.77  862.47  2294.4  863.22
 2299.89  863.46  2327.6  863.93 2329.26  863.95 2358.75  863.27 2368.02  863.02
 2368.62  863.02 2396.52  861.89 2413.34  861.02 2435.35  860.05 2455.65   859.9
 2470.98  859.26 2471.67  859.25 2473.06  858.69  2480.6  855.21  2483.7  856.38
 2487.71  858.81 2492.92  859.42 2515.81  861.34 2526.59  862.18  2547.8  864.22
 2572.33  866.39 2580.37  866.78 2591.68  865.38    2595  864.81 2597.14  865.19
 2615.52  867.22 2618.69  867.76  2620.8  868.07 2626.35  868.81 2647.14  872.02
 2665.25  874.35 2677.39  875.52 2701.54  877.77  2732.1   881.3 2747.89  882.85
 2753.06  883.05 2758.68  883.35 2786.31   886.1 2798.19  887.18 2839.77  891.14
  2845.9  891.49 2895.51  895.58 2906.08  896.08 2955.06  898.58 2968.11  899.26
 2985.79  900.28 3009.75  901.84 3016.29  902.05 3022.54  902.22 3030.58  902.61
 3045.01  903.68 3047.82   903.9 3072.84  909.18 3086.05  912.08 3097.64  914.37
 3111.57  916.99 3138.28   921.9 3174.58  925.44 3192.28  926.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075 1006.16     .06 1560.34     .04 1685.53     .12 2747.89     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1523.74 1685.53            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
    1700    2200     853       F
    1208    1525     850       F
     650    1208     840       T

Downstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
     450     840     820     650     838     820    1110     840     820
    1375     850     820    1500     852     820    1525   852.1     820
  1525.1   852.1     847    1700   852.4     847  1700.1   852.4     820
    1820     852     820    1960   850.4     820    2100     852     820
    2210     856     820

Downstream Bridge Cross Section Data
Station Elevation Data    num=     284
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

0	860.94	7.39	861.21	12.27	861.08	25.37	859.61	36.45	858.37
41.65	857.73	53.97	856.43	57.7	856.05	65.47	856.4	86.12	857.24
99.96	855.92	106.38	855.48	107.51	855.49	111.98	855.45	116.6	855.01
116.8	854.99	117.36	855.02	135.95	856.87	140.46	856.93	152.04	857.28
160.18	857.2	187.27	856.63	198.35	857.99	201.97	858.21	214.67	859.01
230.22	859.55	237.15	860.31	239.93	860.14	257.26	860.13	268.76	859.95
278.42	860.11	286.35	862.67	289.91	863.28	296.43	862.81	301.41	862.53
338.43	862.09	345.7	862.27	351.32	861.93	371.62	861.69	392.36	861.44
396.42	861.7	401.16	860.58	410.64	856.72	417.98	855.14	438.77	852.25
446.02	851.36	453.46	849.73	471.13	845.14	489.61	845.37	498.96	845.58
502.36	845.94	520.75	848.03	524.84	848.38	548.02	849.55	554.02	848.64
573.76	845.2	586.84	846.3	588.98	846.4	591.5	847.2	612.89	856.6
613.68	856.97	614.81	857.69	621.84	861.42	625.04	860.54	634.77	857.27
646.94	855.61	660.58	850.11	660.91	850.08	661.64	849.87	675.6	844.65
677.24	844.02	689.65	838.36	708.84	835.15	713.22	834.74	721.59	834.66
727.02	834.74	741.53	834.74	761.86	835.02	787	835.07	804.71	835.21
822.69	835.25	838.44	835.06	839.05	835.06	839.55	835.06	857.22	835.31
872.5	835.56	885.43	835.53	908.08	835.84	911.59	835.86	930.84	835.99
957.61	836.2	1001.69	836.13	1003.63	836.11	1006.16	836.07	1035	835.57
1059.06	835.52	1067.25	835.41	1078.37	835.44	1096.34	835.29	1108.56	835.14
1143.03	834.88	1147.87	834.89	1150.57	834.89	1171.93	835.09	1171.97	835.09
1172.02	835.09	1189.27	837.85	1194.69	840.19	1199.1	840.5	1207.8	841.08
1229.46	835.59	1231.1	835.23	1252.58	835.15	1266.32	834.85	1278.04	834.73
1304.98	834	1305.61	833.99	1306.79	833.95	1336.55	835.09	1339.01	835.22
1341.48	835.34	1372.73	836.36	1375.11	836.5	1389.38	842.16	1398.76	844.77
1408.82	847.73	1415.41	847.82	1418.77	847.8	1422.71	847.79	1430	846.16
1450.01	840.27	1459.87	839.96	1467.78	839.85	1480.24	839.67	1489.2	839.67
1503.51	839.66	1511.18	839.54	1513.16	838.92	1523.74	836.53	1537.55	833.07
1547.58	830.56	1560.34	831.52	1572.83	830.52	1578.32	829.41	1580.3	828.89
1583.09	828.14	1596.84	824.43	1625	824.18	1654.51	824.42	1658.34	824.42
1661.29	826.41	1664.29	828.28	1669.56	830.3	1678.69	833.31	1683.66	834.12
1685.53	835.04	1688.48	836.51	1697.1	837.34	1705.81	838.16	1706.02	838.25
1709.52	838.62	1713.23	839.01	1713.81	839.07	1720.77	840.02	1738.45	840.24
1741.07	840.25	1759.5	838.91	1760.4	838.87	1760.69	838.85	1778.58	838.1
1784.02	837.37	1786.97	837.34	1810.32	836.05	1815.34	836.03	1821.3	836
1828.26	835.97	1838.68	835.92	1846.95	835.93	1868.54	835.7	1875.11	835.55
1896.96	835.33	1927.98	834.82	1930.75	834.79	1951.07	834.44	1959.81	834.59
1962.36	834.63	1964.18	834.66	1988.85	835.02	1992.48	835.07	1996.85	835.13
2016.67	835.42	2022.54	835.51	2028.98	835.6	2043.04	835.8	2060.5	836.08
2075.3	836.28	2082.51	836.66	2091.1	837.16	2096.14	837.43	2103.78	838.35
2106.92	838.87	2114.28	839.46	2117.47	839.62	2129.08	840.28	2137.53	841.07
2143.24	841.58	2150.68	841.4	2157.57	841.59	2170.66	846.43	2171.4	846.67
2171.69	846.75	2172	846.9	2187.87	851.67	2193.51	852.18	2204.69	856.06
2205.23	856.14	2206.68	856.56	2216.13	857.33	2219.41	857.6	2226.54	858.46
2236.75	859.51	2255.66	862.15	2256.75	862.28	2262.77	862.47	2294.4	863.22
2299.89	863.46	2327.6	863.93	2329.26	863.95	2358.75	863.27	2368.02	863.02
2368.62	863.02	2396.52	861.89	2413.34	861.02	2435.35	860.05	2455.65	859.9
2470.98	859.26	2471.67	859.25	2473.06	858.69	2480.6	855.21	2483.7	856.38
2487.71	858.81	2492.92	859.42	2515.81	861.34	2526.59	862.18	2547.8	864.22
2572.33	866.39	2580.37	866.78	2591.68	865.38	2595	864.81	2597.14	865.19
2615.52	867.22	2618.69	867.76	2620.8	868.07	2626.35	868.81	2647.14	872.02
2665.25	874.35	2677.39	875.52	2701.54	877.77	2732.1	881.3	2747.89	882.85
2753.06	883.05	2758.68	883.35	2786.31	886.1	2798.19	887.18	2839.77	891.14
2845.9	891.49	2895.51	895.58	2906.08	896.08	2955.06	898.58	2968.11	899.26
2985.79	900.28	3009.75	901.84	3016.29	902.05	3022.54	902.22	3030.58	902.61
3045.01	903.68	3047.82	903.9	3072.84	909.18	3086.05	912.08	3097.64	914.37
3111.57	916.99	3138.28	921.9	3174.58	925.44	3192.28	926.98		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	1006.16	.06	1560.34	.04	1685.53	.12	2747.89	.06

Bank Sta: Left Right Coeff Contr. Expan.
1523.74 1685.53 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
1700	2200	853	F
1208	1525	850	F
650	1208	840	T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =

```
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=    1582    Downstream=    1582
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     820       2     850
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     820       2     850

Pier Data
Pier Station     Upstream=    1642    Downstream=    1642
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     820       2     850
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     820       2     850

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     834.09  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     833.34  * E.G. Elev (ft)         *     834.06  *     833.78  *
* Q Total (cfs)          *    5870.00  * W.S. Elev (ft)         *     833.23  *     832.82  *
* Q Bridge (cfs)         *    5870.00  * Crit W.S. (ft)         *     830.50  *     830.50  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       9.05  *       8.64  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.34  *       7.89  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     799.45  *     743.91  *
* Weir Submerg           *             * Froude # Chl           *       0.54  *       0.59  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    4368.06  *    4153.07  *
* Min El Weir Flow (ft)  *     840.01  * Hydr Depth (ft)        *       5.81  *       5.53  *
* Min El Prs (ft)        *     847.00  * W.P. Total (ft)        *     167.99  *     163.38  *
* Delta EG (ft)          *       0.34  * Conv. Total (cfs)      *    86528.4  *    78634.8  *
* Delta WS (ft)          *       0.48  * Top Width (ft)         *     137.50  *     134.63  *
* BR Open Area (sq ft)   *    3079.53  * Frctn Loss (ft)        *       0.27  *       0.01  *
* BR Open Vel (ft/s)     *       7.89  * C & E Loss (ft)        *       0.01  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.37  *       1.58  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      10.04  *      12.50  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     837.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     836.53  * E.G. Elev (ft)         *     837.54  *     837.27  *
```

```
* Q Total (cfs)          *   10900.00  * W.S. Elev (ft)         *     836.40  *     836.02  *
* Q Bridge (cfs)         *   10900.00  * Crit W.S. (ft)         *     833.22  *     833.22  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      12.22  *      11.84  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.55  *       8.97  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1275.53  *    1215.03  *
* Weir Submerg           *             * Froude # Chl           *       0.55  *       0.57  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    9202.32  *    8869.98  *
* Min El Weir Flow (ft)  *     840.01  * Hydr Depth (ft)        *       8.01  *       7.70  *
* Min El Prs (ft)        *     847.00  * W.P. Total (ft)        *     203.57  *     200.25  *
* Delta EG (ft)          *       0.33  * Conv. Total (cfs)      *   161626.5  *   151087.2  *
* Delta WS (ft)          *       0.46  * Top Width (ft)         *     159.20  *     157.72  *
* BR Open Area (sq ft)   *    3079.53  * Frctn Loss (ft)        *       0.26  *       0.01  *
* BR Open Vel (ft/s)     *       8.97  * C & E Loss (ft)        *       0.01  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.78  *       1.97  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      15.20  *      17.69  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     838.48  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     837.32  * E.G. Elev (ft)         *     838.45  *     838.17  *
* Q Total (cfs)          *   12600.00  * W.S. Elev (ft)         *     837.18  *     836.79  *
* Q Bridge (cfs)         *   12600.00  * Crit W.S. (ft)         *     833.90  *     833.90  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      13.00  *      12.61  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.98  *       9.42  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1402.62  *    1337.83  *
* Weir Submerg           *             * Froude # Chl           *       0.55  *       0.59  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   10882.77  *   10506.92  *
* Min El Weir Flow (ft)  *     840.01  * Hydr Depth (ft)        *       8.43  *       8.24  *
* Min El Prs (ft)        *     847.00  * W.P. Total (ft)        *     214.76  *     208.67  *
* Delta EG (ft)          *       0.34  * Conv. Total (cfs)      *   184170.8  *   172683.5  *
* Delta WS (ft)          *       0.47  * Top Width (ft)         *     166.41  *     162.31  *
* BR Open Area (sq ft)   *    3079.53  * Frctn Loss (ft)        *       0.26  *       0.01  *
* BR Open Vel (ft/s)     *       9.42  * C & E Loss (ft)        *       0.01  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.91  *       2.13  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      17.14  *      20.07  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     841.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     839.82  * E.G. Elev (ft)         *     841.40  *     841.09  *
* Q Total (cfs)          *   19100.00  * W.S. Elev (ft)         *     839.64  *     839.16  *
* Q Bridge (cfs)         *   19100.00  * Crit W.S. (ft)         *     835.98  *     835.98  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      15.46  *      14.98  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.49  *      10.98  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1820.82  *    1739.03  *
* Weir Submerg           *             * Froude # Chl           *       0.57  *       0.61  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   17625.87  *   17061.52  *
* Min El Weir Flow (ft)  *     840.01  * Hydr Depth (ft)        *      10.65  *      10.17  *
* Min El Prs (ft)        *     847.00  * W.P. Total (ft)        *     231.56  *     229.19  *
* Delta EG (ft)          *       0.40  * Conv. Total (cfs)      *   261251.6  *   245517.1  *
* Delta WS (ft)          *       0.58  * Top Width (ft)         *     170.95  *     170.96  *
* BR Open Area (sq ft)   *    3079.53  * Frctn Loss (ft)        *       0.30  *       0.01  *
* BR Open Vel (ft/s)     *      10.98  * C & E Loss (ft)        *       0.02  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.62  *       2.87  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      27.52  *      31.49  *
*********************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	844.09	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	842.47	E.G. Elev (ft)	844.06	843.70
Q Total (cfs)	27300.00	W.S. Elev (ft)	842.33	841.31
Q Bridge (cfs)	24685.39	Crit W.S. (ft)	838.13	838.13
Q Weir (cfs)		Max Chl Dpth (ft)	18.15	17.13
Weir Sta Lft (ft)		Vel Total (ft/s)	8.17	10.18
Weir Sta Rgt (ft)		Flow Area (sq ft)	3341.44	2681.98
Weir Submerg		Froude # Chl	0.39	0.51
Weir Max Depth (ft)		Specif Force (cu ft)	26698.06	25300.34
Min El Weir Flow (ft)	840.01	Hydr Depth (ft)	5.05	4.24
Min El Prs (ft)	847.00	W.P. Total (ft)	736.71	702.02
Delta EG (ft)	0.45	Conv. Total (cfs)	392559.5	332491.4
Delta WS (ft)	1.06	Top Width (ft)	661.67	632.35
BR Open Area (sq ft)	3079.53	Frctn Loss (ft)	0.30	0.01
BR Open Vel (ft/s)	11.72	C & E Loss (ft)	0.07	0.05
Coef of Q		Shear Total (lb/sq ft)	1.37	1.61
Br Sel Method	Energy only	Power Total (lb/ft s)	11.19	16.37

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	845.34	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	843.73	E.G. Elev (ft)	845.32	845.02
Q Total (cfs)	32830.00	W.S. Elev (ft)	843.72	843.01
Q Bridge (cfs)	27186.60	Crit W.S. (ft)	841.59	841.59
Q Weir (cfs)		Max Chl Dpth (ft)	19.54	18.83
Weir Sta Lft (ft)		Vel Total (ft/s)	7.66	8.65
Weir Sta Rgt (ft)		Flow Area (sq ft)	4287.51	3796.35
Weir Submerg		Froude # Chl	0.35	0.41
Weir Max Depth (ft)		Specif Force (cu ft)	33199.62	31592.59
Min El Weir Flow (ft)	840.01	Hydr Depth (ft)	6.12	5.57
Min El Prs (ft)	847.00	W.P. Total (ft)	783.35	759.74
Delta EG (ft)	0.34	Conv. Total (cfs)	490825.7	438228.9
Delta WS (ft)	0.72	Top Width (ft)	701.59	681.16
BR Open Area (sq ft)	3079.53	Frctn Loss (ft)	0.26	0.01
BR Open Vel (ft/s)	11.34	C & E Loss (ft)	0.04	0.01
Coef of Q		Shear Total (lb/sq ft)	1.53	1.75
Br Sel Method	Energy only	Power Total (lb/ft s)	11.71	15.14

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	846.70	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	845.18	E.G. Elev (ft)	846.64	846.40
Q Total (cfs)	38750.00	W.S. Elev (ft)	845.27	844.84
Q Bridge (cfs)	28888.59	Crit W.S. (ft)	842.71	842.71
Q Weir (cfs)		Max Chl Dpth (ft)	21.09	20.66
Weir Sta Lft (ft)		Vel Total (ft/s)	7.21	7.63
Weir Sta Rgt (ft)		Flow Area (sq ft)	5375.36	5077.35
Weir Submerg		Froude # Chl	0.31	0.34
Weir Max Depth (ft)		Specif Force (cu ft)	41488.18	40005.27
Min El Weir Flow (ft)	840.01	Hydr Depth (ft)	7.50	7.21
Min El Prs (ft)	847.00	W.P. Total (ft)	807.22	792.01
Delta EG (ft)	0.33	Conv. Total (cfs)	624799.8	586175.1
Delta WS (ft)	0.57	Top Width (ft)	758.39	734.22
BR Open Area (sq ft)	3079.53	Frctn Loss (ft)	0.22	0.01
BR Open Vel (ft/s)	10.66	C & E Loss (ft)	0.02	0.02

```
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.60  *       1.75  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      11.53  *      13.35  *
*******************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*******************************************************************************************
* E.G. US. (ft)          *     848.59  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     847.27  * E.G. Elev (ft)         *     848.43  *     848.19  *
* Q Total (cfs)          *   46700.00  * W.S. Elev (ft)         *     847.59  *     846.96  *
* Q Bridge (cfs)         *   26059.00  * Crit W.S. (ft)         *     843.89  *     843.89  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.41  *      22.78  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.62  *       7.01  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7057.94  *    6660.22  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.29  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   55660.92  *   53148.39  *
* Min El Weir Flow (ft)  *     840.01  * Hydr Depth (ft)        *      11.24  *       8.50  *
* Min El Prs (ft)        *     847.00  * W.P. Total (ft)        *    1069.98  *     883.57  *
* Delta EG (ft)          *       0.44  * Conv. Total (cfs)      *   697620.0  *   796418.6  *
* Delta WS (ft)          *       0.67  * Top Width (ft)         *     731.02  *     870.29  *
* BR Open Area (sq ft)   *    3079.53  * Frctn Loss (ft)        *       0.21  *       0.01  *
* BR Open Vel (ft/s)     *       8.48  * C & E Loss (ft)        *       0.04  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.85  *       1.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      12.21  *      11.35  *
*******************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Warning: The sluice gate calculations did not converge during pressure/weir flow calculations.
Note:    The downstream water surface is below the minimum elevation for pressure flow.  The sluice
         gate equations were used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. US. (ft)          *     841.85  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     840.17  * E.G. Elev (ft)         *     841.81  *     841.49  *
* Q Total (cfs)          *   20100.00  * W.S. Elev (ft)         *     839.96  *     839.47  *
* Q Bridge (cfs)         *   20100.00  * Crit W.S. (ft)         *     836.28  *     836.28  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      15.78  *      15.29  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.71  *      11.21  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1876.84  *    1792.52  *
* Weir Submerg           *             * Froude # Chl           *       0.57  *       0.61  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   18707.98  *   18112.99  *
* Min El Weir Flow (ft)  *     840.01  * Hydr Depth (ft)        *      10.98  *      10.49  *
* Min El Prs (ft)        *     847.00  * W.P. Total (ft)        *     233.21  *     230.74  *
* Delta EG (ft)          *       0.41  * Conv. Total (cfs)      *   272195.7  *   255773.9  *
* Delta WS (ft)          *       0.61  * Top Width (ft)         *     170.95  *     170.96  *
* BR Open Area (sq ft)   *    3079.53  * Frctn Loss (ft)        *       0.30  *       0.01  *
* BR Open Vel (ft/s)     *      11.21  * C & E Loss (ft)        *       0.02  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.74  *       3.00  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      29.34  *      33.59  *
*******************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 27.168

INPUT
Description: Downstream side of 131st Street, copied from upstream side
Station Elevation Data num= 284

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860.94	7.39	861.21	12.27	861.08	25.37	859.61	36.45	858.37
41.65	857.73	53.97	856.43	57.7	856.05	65.47	856.4	86.12	857.24
99.96	855.92	106.38	855.48	107.51	855.49	111.98	855.45	116.6	855.01
116.8	854.99	117.36	855.02	135.95	856.87	140.46	856.93	152.04	857.28
160.18	857.2	187.27	856.63	198.35	857.99	201.97	858.21	214.67	859.01
230.22	859.55	237.15	860.31	239.93	860.14	257.26	860.13	268.76	859.95
278.42	860.11	286.35	862.67	289.91	863.28	296.43	862.81	301.41	862.53
338.43	862.09	345.7	862.27	351.32	861.93	371.62	861.69	392.36	861.44
396.42	861.7	401.16	860.58	410.64	856.72	417.98	855.14	438.77	852.25
446.02	851.36	453.46	849.73	471.13	845.14	489.61	845.37	498.96	845.58
502.36	845.94	520.75	848.03	524.84	848.38	548.02	849.55	554.02	848.64
573.76	845.2	586.84	846.3	588.98	846.4	591.5	847.2	612.89	856.6
613.68	856.97	614.81	857.69	621.84	861.42	625.04	860.54	634.77	857.27
646.94	855.61	660.58	850.11	660.91	850.08	661.64	849.87	675.6	844.65
677.24	844.02	689.65	838.36	708.84	835.15	713.22	834.74	721.59	834.66
727.02	834.74	741.53	834.74	761.86	835.02	787	835.07	804.71	835.21
822.69	835.25	838.44	835.06	839.05	835.06	839.55	835.06	857.22	835.31
872.5	835.56	885.43	835.53	908.08	835.84	911.59	835.86	930.84	835.99
957.61	836.2	1001.69	836.13	1003.63	836.11	1006.16	836.07	1035	835.57
1059.06	835.52	1067.25	835.41	1078.37	835.44	1096.34	835.29	1108.56	835.14
1143.03	834.88	1147.87	834.89	1150.57	834.89	1171.93	835.09	1171.97	835.09
1172.02	835.09	1189.27	837.85	1194.69	840.19	1199.1	840.5	1207.8	841.08
1229.46	835.59	1231.1	835.23	1252.58	835.15	1266.32	834.85	1278.04	834.73
1304.98	834	1305.61	833.99	1306.79	833.95	1336.55	835.09	1339.01	835.22
1341.48	835.34	1372.73	836.36	1375.11	836.5	1389.38	842.16	1398.76	844.77
1408.82	847.73	1415.41	847.82	1418.77	847.8	1422.71	847.79	1430	846.16
1450.01	840.27	1459.87	839.96	1467.78	839.85	1480.24	839.67	1489.2	839.67
1503.51	839.66	1511.18	839.54	1513.16	838.92	1523.74	836.53	1537.55	833.07
1547.58	830.56	1560.34	831.52	1572.83	830.52	1578.32	829.41	1580.3	828.89
1583.09	828.14	1596.84	824.43	1625	824.18	1654.51	824.42	1658.34	824.42
1661.29	826.41	1664.29	828.28	1669.56	830.3	1678.69	833.31	1683.66	834.12
1685.53	835.04	1688.48	836.51	1697.1	837.34	1705.81	838.16	1706.02	838.25
1709.52	838.62	1713.23	839.01	1713.81	839.07	1720.77	840.02	1738.45	840.24
1741.07	840.25	1759.5	838.91	1760.4	838.87	1760.69	838.85	1778.58	838.1
1784.02	837.37	1786.97	837.34	1810.32	836.05	1815.34	836.03	1821.3	836
1828.26	835.97	1838.68	835.92	1846.95	835.93	1868.54	835.7	1875.11	835.55
1896.96	835.33	1927.98	834.82	1930.75	834.79	1951.07	834.44	1959.81	834.59
1962.36	834.63	1964.18	834.66	1988.85	835.02	1992.48	835.07	1996.85	835.13
2016.67	835.42	2022.54	835.51	2028.98	835.6	2043.04	835.8	2060.5	836.08
2075.3	836.28	2082.51	836.66	2091.1	837.16	2096.14	837.43	2103.78	838.35
2106.92	838.87	2114.28	839.46	2117.47	839.62	2129.08	840.28	2137.53	841.07
2143.24	841.58	2150.68	841.4	2157.57	841.59	2170.66	846.43	2171.4	846.67
2171.69	846.75	2172	846.9	2187.87	851.67	2193.51	852.18	2204.69	856.06
2205.23	856.14	2206.68	856.56	2216.13	857.33	2219.41	857.6	2226.54	858.46
2236.75	859.51	2255.66	862.15	2256.75	862.28	2262.77	862.47	2294.4	863.22
2299.89	863.46	2327.6	863.93	2329.26	863.95	2358.75	863.27	2368.02	863.02
2368.62	863.02	2396.52	861.89	2413.34	861.02	2435.35	860.05	2455.65	859.9
2470.98	859.26	2471.67	859.25	2473.06	858.69	2480.6	855.21	2483.7	856.38
2487.71	858.81	2492.92	859.42	2515.81	861.34	2526.59	862.18	2547.8	864.22
2572.33	866.39	2580.37	866.78	2591.68	865.38	2595	864.81	2597.14	865.19
2615.52	867.22	2618.69	867.76	2620.8	868.07	2626.35	868.81	2647.14	872.02
2665.25	874.35	2677.39	875.52	2701.54	877.77	2732.1	881.3	2747.89	882.85
2753.06	883.05	2758.68	883.35	2786.31	886.1	2798.19	887.18	2839.77	891.14
2845.9	891.49	2895.51	895.58	2906.08	896.08	2955.06	898.58	2968.11	899.26
2985.79	900.28	3009.75	901.84	3016.29	902.05	3022.54	902.22	3030.58	902.61
3045.01	903.68	3047.82	903.9	3072.84	909.18	3086.05	912.08	3097.64	914.37
3111.57	916.99	3138.28	921.9	3174.58	925.44	3192.28	926.98		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	1006.16	.06	1560.34	.04	1685.53	.12	2747.89	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
      1523.74 1685.53              877    1225    1316             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
    1700    2200     853       F
    1208    1525     850       F
     650    1208     840       T

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  833.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  832.86  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  830.39  * Flow Area (sq ft)      *          *  775.59  *          *
* E.G. Slope (ft/ft)     *0.003894  * Area (sq ft)           *          *  775.59  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *          * 5870.00  *          *
* Top Width (ft)         *  138.93  * Top Width (ft)         *          *  138.93  *          *
* Vel Total (ft/s)       *    7.57  * Avg. Vel. (ft/s)       *          *    7.57  *          *
* Max Chl Dpth (ft)      *    8.68  * Hydr. Depth (ft)       *          *    5.58  *          *
* Conv. Total (cfs)      * 94065.5  * Conv. (cfs)            *          * 94065.5  *          *
* Length Wtd. (ft)       * 1224.97  * Wetted Per. (ft)       *          *  141.99  *          *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *          *    1.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.05  *          *
* Frctn Loss (ft)        *    2.16  * Cum Volume (acre-ft)   *  875.07  * 6866.55  *  863.61  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  199.10  *  537.71  *  243.90  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  837.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *          *   0.041  *   0.120  *
* W.S. Elev (ft)         *  836.07  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  833.05  * Flow Area (sq ft)      *          * 1261.28  *    1.07  *
* E.G. Slope (ft/ft)     *0.003366  * Area (sq ft)           *  474.38  * 1261.28  *  179.90  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *          *10899.54  *    0.46  *
* Top Width (ft)         *  958.95  * Top Width (ft)         *  546.73  *  159.97  *  252.25  *
* Vel Total (ft/s)       *    8.63  * Avg. Vel. (ft/s)       *          *    8.64  *    0.43  *
* Max Chl Dpth (ft)      *   11.89  * Hydr. Depth (ft)       *          *    7.88  *    0.52  *
* Conv. Total (cfs)      *187888.6  * Conv. (cfs)            *          *187880.6  *     7.9  *
* Length Wtd. (ft)       * 1225.03  * Wetted Per. (ft)       *          *  163.77  *    2.32  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *          *    1.62  *    0.10  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   13.98  *    0.04  *
* Frctn Loss (ft)        *    2.26  * Cum Volume (acre-ft)   * 2065.42  * 9183.16  * 2381.01  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  346.89  *  580.29  *  483.84  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  838.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *          *   0.041  *   0.120  *
* W.S. Elev (ft)         *  836.85  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  833.69  * Flow Area (sq ft)      *          * 1385.73  *    3.76  *
* E.G. Slope (ft/ft)     *0.003369  * Area (sq ft)           *  954.99  * 1386.33  *  395.31  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *          *12598.18  *    1.82  *
* Top Width (ft)         * 1095.38  * Top Width (ft)         *  637.23  *  161.79  *  296.36  *
* Vel Total (ft/s)       *    9.07  * Avg. Vel. (ft/s)       *          *    9.09  *    0.48  *
* Max Chl Dpth (ft)      *   12.67  * Hydr. Depth (ft)       *          *    8.63  *    0.58  *
* Conv. Total (cfs)      *217065.2  * Conv. (cfs)            *          *217033.9  *    31.3  *
```

```
* Length Wtd. (ft)       * 1225.46  * Wetted Per. (ft)       *          *  164.35  *    6.83  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *          *    1.77  *    0.12  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *   16.12  *    0.06  *
* Frctn Loss (ft)        *    2.34  * Cum Volume (acre-ft)   * 2938.84  *10889.31  * 3542.07  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  412.26  *  608.48  *  610.64  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  841.04  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.80  * Wt. n-Val.             *          *   0.041  *   0.120  *
* W.S. Elev (ft)         *  839.24  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  835.80  * Flow Area (sq ft)      *          * 1769.68  *   35.30  *
* E.G. Slope (ft/ft)     *0.003586  * Area (sq ft)           * 2539.91  * 1773.30  * 1215.53  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *          *19053.42  *   46.58  *
* Top Width (ft)         * 1231.25  * Top Width (ft)         *  683.34  *  161.79  *  386.12  *
* Vel Total (ft/s)       *   10.58  * Avg. Vel. (ft/s)       *          *   10.77  *    1.32  *
* Max Chl Dpth (ft)      *   15.06  * Hydr. Depth (ft)       *          *   11.02  *    2.44  *
* Conv. Total (cfs)      *318961.8  * Conv. (cfs)            *          *318183.9  *   777.9  *
* Length Wtd. (ft)       * 1226.85  * Wetted Per. (ft)       *          *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *          *    2.41  *    0.53  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *          *   25.95  *    0.70  *
* Frctn Loss (ft)        *    2.67  * Cum Volume (acre-ft)   * 4508.79  *12850.95  * 5745.65  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *  545.68  *  631.83  *  761.92  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  843.63  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.22  * Wt. n-Val.             *   0.069  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  841.42  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  837.89  * Flow Area (sq ft)      *  729.62  * 2118.91  *   66.78  *
* E.G. Slope (ft/ft)     *0.003753  * Area (sq ft)           * 4164.89  * 2125.27  * 2150.33  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 1203.79  *25958.32  *  137.89  *
* Top Width (ft)         * 1401.08  * Top Width (ft)         *  782.18  *  161.79  *  457.11  *
* Vel Total (ft/s)       *    9.36  * Avg. Vel. (ft/s)       *    1.65  *   12.25  *    2.06  *
* Max Chl Dpth (ft)      *   17.24  * Hydr. Depth (ft)       *    1.39  *   13.20  *    4.61  *
* Conv. Total (cfs)      *445629.6  * Conv. (cfs)            * 19650.0  *423728.8  *  2250.9  *
* Length Wtd. (ft)       * 1212.34  * Wetted Per. (ft)       *  526.76  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.32  *    3.02  *    1.05  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.54  *   37.01  *    2.17  *
* Frctn Loss (ft)        *    2.73  * Cum Volume (acre-ft)   * 7466.32  *15757.59  * 9690.31  *
* C & E Loss (ft)        *    0.34  * Cum SA (acres)         *  907.88  *  660.00  * 1225.25  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  845.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.99  * Wt. n-Val.             *   0.068  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  843.01  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  839.18  * Flow Area (sq ft)      * 1564.89  * 2374.32  *   89.80  *
* E.G. Slope (ft/ft)     *0.003180  * Area (sq ft)           * 5419.99  * 2382.68  * 2902.80  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 3939.37  *28682.66  *  207.97  *
* Top Width (ft)         * 1433.65  * Top Width (ft)         *  795.99  *  161.79  *  475.87  *
* Vel Total (ft/s)       *    8.15  * Avg. Vel. (ft/s)       *    2.52  *   12.08  *    2.32  *
* Max Chl Dpth (ft)      *   18.83  * Hydr. Depth (ft)       *    2.96  *   14.79  *    6.21  *
* Conv. Total (cfs)      *582151.1  * Conv. (cfs)            * 69854.0  *508609.3  *  3687.7  *
* Length Wtd. (ft)       * 1198.88  * Wetted Per. (ft)       *  530.60  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.59  *    2.87  *    1.20  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    1.47  *   34.65  *    2.78  *
* Frctn Loss (ft)        *    2.53  * Cum Volume (acre-ft)   *10417.04  *17528.79  *13462.71  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         * 1193.91  *  667.14  * 1670.86  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  846.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.77  * Wt. n-Val.             *   0.068  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  844.60  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  842.41  * Flow Area (sq ft)      * 2409.48  * 2630.52  *  112.89  *
* E.G. Slope (ft/ft)     *0.002683  * Area (sq ft)           * 6702.16  * 2640.90  * 3665.74  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 7393.21  *31077.09  *  279.71  *
* Top Width (ft)         * 1452.87  * Top Width (ft)         *  810.89  *  161.79  *  480.19  *
* Vel Total (ft/s)       *    7.52  * Avg. Vel. (ft/s)       *    3.07  *   11.81  *    2.48  *
* Max Chl Dpth (ft)      *   20.42  * Hydr. Depth (ft)       *    4.53  *   16.39  *    7.80  *
* Conv. Total (cfs)      *748145.3  * Conv. (cfs)            *142740.4  *600004.6  *  5400.3  *
* Length Wtd. (ft)       * 1186.30  * Wetted Per. (ft)       *  534.66  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.75  *    2.68  *    1.27  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    2.32  *   31.67  *    3.15  *
* Frctn Loss (ft)        *    2.33  * Cum Volume (acre-ft)   *13235.92  *18767.82  *17266.64  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         * 1390.32  *  668.09  * 2109.27  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  848.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.55  * Wt. n-Val.             *   0.068  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  846.60  * Reach Len. (ft)        *  877.00  * 1225.00  * 1316.00  *
* Crit W.S. (ft)         *  843.52  * Flow Area (sq ft)      * 3538.40  * 2950.85  *  141.77  *
* E.G. Slope (ft/ft)     *0.002212  * Area (sq ft)           * 8400.73  * 2963.74  * 4629.31  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *12339.14  *33989.65  *  371.21  *
* Top Width (ft)         * 1544.23  * Top Width (ft)         *  896.79  *  161.79  *  485.65  *
* Vel Total (ft/s)       *    7.04  * Avg. Vel. (ft/s)       *    3.49  *   11.52  *    2.62  *
* Max Chl Dpth (ft)      *   22.42  * Hydr. Depth (ft)       *    5.86  *   18.38  *    9.80  *
* Conv. Total (cfs)      *993026.3  * Conv. (cfs)            *262378.8  *722754.2  *  7893.3  *
* Length Wtd. (ft)       * 1173.20  * Wetted Per. (ft)       *  607.31  *  164.35  *   14.87  *
* Min Ch El (ft)         *  824.18  * Shear (lb/sq ft)       *    0.80  *    2.48  *    1.32  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    2.81  *   28.55  *    3.45  *
* Frctn Loss (ft)        *    2.10  * Cum Volume (acre-ft)   *18580.02  *20606.13  *23819.62  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1692.99  *  670.62  * 2529.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	841.43	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.88	Wt. n-Val.		0.041	0.120	
W.S. Elev (ft)	839.56	Reach Len. (ft)	877.00	1225.00	1316.00	
Crit W.S. (ft)	836.09	Flow Area (sq ft)		1820.49	39.88	
E.G. Slope (ft/ft)	0.003628	Area (sq ft)	2756.89	1824.50	1339.44	
Q Total (cfs)	20100.00	Flow (cfs)		20042.59	57.41	
Top Width (ft)	1248.11	Top Width (ft)	688.86	161.79	397.46	
Vel Total (ft/s)	10.80	Avg. Vel. (ft/s)		11.01	1.44	
Max Chl Dpth (ft)	15.38	Hydr. Depth (ft)		11.34	2.76	
Conv. Total (cfs)	333711.7	Conv. (cfs)		332758.5	953.2	
Length Wtd. (ft)	1227.03	Wetted Per. (ft)		164.35	14.87	
Min Ch El (ft)	824.18	Shear (lb/sq ft)		2.51	0.61	
Alpha	1.04	Stream Power (lb/ft s)		27.62	0.87	
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	5318.75	13793.19	6739.27	
C & E Loss (ft)	0.26	Cum SA (acres)	642.91	642.15	841.11	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 26.936

INPUT
Description: Upstream side of MOPAC13. Left overbank adjusted to model flow through opening in RR at 131st ST.
Station Elevation Data num= 210

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	862.21	4.33	862.56	26.81	864.59	42.35	864.8	131.73	864.16
143.55	864.02	162.18	863.93	171.77	863.84	190.74	863.16	211.22	862.46
240.73	861.74	241.51	861.72	242.81	861.02	266.95	848.54	267.74	848.05
283.96	838.04	293.23	835.25	319.65	828.64	319.96	828.58	321	828.59
339.25	828.79	352.21	829.05	361.96	829.14	385.58	829.69	391.79	829.85
393.36	829.88	396.4	829.28	423.29	824.73	426.4	824.72	428.58	824.72
432.4	828.29	433.93	829.37	439.84	829.21	474.99	828.34	504.66	828.44
515.5	828.54	534.07	828.82	543.84	830.28	552.45	831.92	572.48	834.31
572.8	834.35	573.19	834.48	598.49	842.45	607.67	846.69	629.77	856.03
634.19	858.04	635.76	858.57	639.91	859.36	647.85	860.91	653.67	860.9
656.67	860.89	664.8	859.89	668.48	859.42	678.84	855.15	684.84	855.24
698.58	855.03	711.85	853.65	723.53	850.26	750.15	839.49	754.41	838.63
760.47	836.76	776.98	830.57	797.83	830.77	801.38	830.75	810.72	826.86
822.69	824.41	822.78	824.39	830	820	870	819.27	913	820
918.62	824.32	920.79	826.08	925.52	828.14	931.35	830.67	943.15	830.37
947.99	830.24	956.64	834.5	961.56	836.93	977.31	844.7	983.21	846.73
984.9	846.93	985.14	846.96	988.08	846.97	1007.7	850.51	1028.18	850.31
1042.17	850.37	1047.81	850.32	1063.32	840.61	1068.97	837.04	1071.51	836.12
1084	831.75	1096.85	831.71	1133.51	831.79	1142.23	831.98	1157.57	832.44
1183.73	832.6	1203.34	832.53	1238.57	832.7	1255.47	832.72	1278.68	832.93
1323.23	834.06	1337.19	834.71	1357.55	834.51	1407.1	834.06	1407.68	834.06
1465.64	834.87	1476.86	835.12	1508.98	835.88	1537.16	838.33	1550.09	840.22
1573.68	845.64	1590.63	847.02	1606.64	848.93	1643.21	851.89	1658.52	853.1
1675.04	853.97	1704.16	855.38	1724.68	856.44	1834.54	858.3	1875.22	858.32
1907.59	857.86	1939.94	856.86	1948.49	856.49	1955.37	856.24	1970.46	856.69
1991.47	857.57	2021.73	858.4	2058.61	859.5	2078.9	859.82	2133.77	860.87
2139.13	860.94	2162.09	861.46	2192.61	862.06	2197.84	862.06	2249.61	861.8
2293.03	861.38	2315.27	861.33	2367.18	860.26	2374.94	860.1	2379.13	860.08
2419.46	859.7	2421.13	859.76	2423.94	859.83	2457.78	860.58	2478.87	861.05
2486.32	861.12	2504.2	861.29	2511.36	861.33	2527.87	861.2	2538.36	861.38
2547.84	861.47	2548.17	861.48	2548.54	861.58	2555.05	863.37	2566.59	863.45
2572.01	863.47	2576.04	862.51	2577.18	862.23	2579.62	863.67	2580.31	864.05
2590.43	864.86	2594.46	865.3	2597.21	865.4	2606.63	865.69	2618.43	866.14

```
 2624.89  866.12 2640.34  866.68 2647.61  867.33 2654.73  867.45  2665.3  867.52
 2689.61     868 2695.95   868.3  2706.4  868.35 2731.06  868.72 2765.75  869.66
 2772.19  869.79 2802.57  870.57 2807.14  870.77 2829.66  871.22 2844.02  871.27
    2852  871.28 2864.39  871.23 2877.17  871.08 2883.31  871.11 2894.12  870.98
 2895.25  870.98  2908.1  871.06 2912.99  871.03 2915.75  871.12 2916.76  871.13
 2925.04   871.4 2930.94   871.6 2935.51  871.64  2956.1  871.82 2964.95  871.94
 2971.96  872.25 2975.63  872.13 2991.23  873.74 2995.57   874.5 2997.46  874.58
 3031.48  877.14 3036.13   877.4 3055.88   878.7 3072.33  879.54 3077.61  879.76
 3085.82  879.94 3095.89  879.94 3115.59  880.44 3130.56  881.13 3137.15  881.35

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  240.73      .1  797.83     .04  931.35      .1 1724.68     .07
  2504.2     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        797.83  931.35               32      32      32              .1       .3
Ineffective Flow     num=        3
   Sta L   Sta R    Elev  Permanent
     250     350     838       F
     350     728     863       F
 1301.57 1858.46  861.18       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
    2100    2150     870    2200    2250     870    2300    2350     870
    2400    2450     870

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  831.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  831.06  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  824.90  * Flow Area (sq ft)      *    8.45  * 1191.02  *   10.71  *
* E.G. Slope (ft/ft)     *0.001000  * Area (sq ft)           *  588.67  * 1191.02  *   10.71  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *    2.08  * 5864.42  *    3.50  *
* Top Width (ft)         *  411.94  * Top Width (ft)         *  260.12  *  133.52  *   18.31  *
* Vel Total (ft/s)       *    4.85  * Avg. Vel. (ft/s)       *    0.25  *    4.92  *    0.33  *
* Max Chl Dpth (ft)      *   11.79  * Hydr. Depth (ft)       *    0.38  *    8.92  *    0.59  *
* Conv. Total (cfs)      *185583.7  * Conv. (cfs)            *    65.9  *185407.3  *   110.5  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *   22.25  *  138.84  *   18.50  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.02  *    0.54  *    0.04  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.01  *    2.64  *    0.01  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  869.14  * 6838.89  *  863.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  196.48  *  533.88  *  243.62  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  834.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  834.18  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  827.50  * Flow Area (sq ft)      *   90.63  * 1607.89  *  465.99  *
* E.G. Slope (ft/ft)     *0.001166  * Area (sq ft)           * 1466.88  * 1607.89  *  476.18  *
* Q Total (cfs)          *10900.00  * Flow (cfs)              *   93.74  *10440.02  *  366.24  *
* Top Width (ft)         *  734.16  * Top Width (ft)         *  304.40  *  133.52  *  296.24  *
* Vel Total (ft/s)       *    5.04  * Avg. Vel. (ft/s)       *    1.03  *    6.49  *    0.79  *
* Max Chl Dpth (ft)      *   14.91  * Hydr. Depth (ft)       *    2.97  *   12.04  *    1.87  *
* Conv. Total (cfs)      *319215.1  * Conv. (cfs)            *  2745.2  *305744.3  * 10725.6  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *   31.14  *  138.84  *  250.52  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.21  *    0.84  *    0.14  *
* Alpha                  *    1.59  * Stream Power (lb/ft s) *    0.22  *    5.47  *    0.11  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2045.88  * 9142.82  * 2371.10  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  338.32  *  576.17  *  475.56  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	835.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	834.92	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	828.23	Flow Area (sq ft)	113.69	1705.75	649.92
E.G. Slope (ft/ft)	0.001229	Area (sq ft)	1693.16	1705.75	745.87
Q Total (cfs)	12600.00	Flow (cfs)	134.47	11826.83	638.71
Top Width (ft)	864.81	Top Width (ft)	312.44	133.52	418.84
Vel Total (ft/s)	5.10	Avg. Vel. (ft/s)	1.18	6.93	0.98
Max Chl Dpth (ft)	15.65	Hydr. Depth (ft)	3.50	12.78	2.57
Conv. Total (cfs)	359438.6	Conv. (cfs)	3835.9	337382.5	18220.3
Length Wtd. (ft)	8.00	Wetted Per. (ft)	33.23	138.84	254.40
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.26	0.94	0.20
Alpha	1.74	Stream Power (lb/ft s)	0.31	6.54	0.19
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	2912.19	10845.83	3524.83
C & E Loss (ft)	0.02	Cum SA (acres)	402.70	604.32	599.84

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	838.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	837.14	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	830.67	Flow Area (sq ft)	192.65	2003.31	1225.26
E.G. Slope (ft/ft)	0.001461	Area (sq ft)	2412.73	2003.31	1772.89
Q Total (cfs)	19100.00	Flow (cfs)	313.18	16859.33	1927.49
Top Width (ft)	952.18	Top Width (ft)	333.31	133.52	485.35
Vel Total (ft/s)	5.58	Avg. Vel. (ft/s)	1.63	8.42	1.57
Max Chl Dpth (ft)	17.87	Hydr. Depth (ft)	4.99	15.00	4.65
Conv. Total (cfs)	499693.0	Conv. (cfs)	8193.4	441072.8	50426.8
Length Wtd. (ft)	8.00	Wetted Per. (ft)	39.78	138.84	265.97
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.44	1.32	0.42
Alpha	2.02	Stream Power (lb/ft s)	0.72	11.08	0.66
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	4458.94	12797.85	5700.51
C & E Loss (ft)	0.02	Cum SA (acres)	535.44	627.68	748.76

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	840.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	839.47	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	834.08	Flow Area (sq ft)	843.28	2313.60	1847.14
E.G. Slope (ft/ft)	0.001499	Area (sq ft)	3212.48	2313.60	2938.60
Q Total (cfs)	27300.00	Flow (cfs)	1807.70	21712.74	3779.56
Top Width (ft)	1003.64	Top Width (ft)	354.95	133.52	515.17
Vel Total (ft/s)	5.46	Avg. Vel. (ft/s)	2.14	9.38	2.05
Max Chl Dpth (ft)	20.20	Hydr. Depth (ft)	7.27	17.33	6.80
Conv. Total (cfs)	705003.7	Conv. (cfs)	46682.7	560716.6	97604.4
Length Wtd. (ft)	8.00	Wetted Per. (ft)	119.05	138.84	275.58
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.66	1.56	0.63
Alpha	2.38	Stream Power (lb/ft s)	1.42	14.64	1.28
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	7392.06	15695.18	9613.44
C & E Loss (ft)	0.01	Cum SA (acres)	896.44	655.85	1210.57

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	842.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	841.03	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	835.39	Flow Area (sq ft)	1029.39	2522.12	2276.01
E.G. Slope (ft/ft)	0.001505	Area (sq ft)	3775.74	2522.12	3755.07
Q Total (cfs)	32830.00	Flow (cfs)	2426.25	25118.56	5285.18
Top Width (ft)	1029.35	Top Width (ft)	366.35	133.52	529.48
Vel Total (ft/s)	5.63	Avg. Vel. (ft/s)	2.36	9.96	2.32
Max Chl Dpth (ft)	21.76	Hydr. Depth (ft)	8.41	18.89	8.20
Conv. Total (cfs)	846216.9	Conv. (cfs)	62538.4	647449.1	136229.4
Length Wtd. (ft)	8.00	Wetted Per. (ft)	126.24	138.84	282.04
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.77	1.71	0.76
Alpha	2.43	Stream Power (lb/ft s)	1.81	17.00	1.76
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	10324.47	17459.83	13362.14
C & E Loss (ft)	0.03	Cum SA (acres)	1182.21	662.99	1655.68

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	843.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	842.61	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	836.55	Flow Area (sq ft)	1228.44	2733.69	2720.19
E.G. Slope (ft/ft)	0.001495	Area (sq ft)	4365.37	2733.69	4604.10
Q Total (cfs)	38750.00	Flow (cfs)	3126.30	28633.51	6990.19
Top Width (ft)	1053.34	Top Width (ft)	377.70	133.52	542.12
Vel Total (ft/s)	5.80	Avg. Vel. (ft/s)	2.54	10.47	2.57
Max Chl Dpth (ft)	23.34	Hydr. Depth (ft)	9.53	20.47	9.61
Conv. Total (cfs)	1002098.0	Conv. (cfs)	80847.9	740479.3	180770.5
Length Wtd. (ft)	8.00	Wetted Per. (ft)	133.48	138.84	288.60
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.86	1.84	0.88
Alpha	2.46	Stream Power (lb/ft s)	2.19	19.25	2.26
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	13124.51	18692.25	17141.72
C & E Loss (ft)	0.05	Cum SA (acres)	1378.35	663.94	2093.83

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	846.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	844.62	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	838.01	Flow Area (sq ft)	1494.75	3001.15	3294.71
E.G. Slope (ft/ft)	0.001473	Area (sq ft)	5134.49	3001.15	5706.03
Q Total (cfs)	46700.00	Flow (cfs)	4114.65	33202.36	9383.00
Top Width (ft)	1081.85	Top Width (ft)	390.23	133.52	558.10
Vel Total (ft/s)	5.99	Avg. Vel. (ft/s)	2.75	11.06	2.85
Max Chl Dpth (ft)	25.35	Hydr. Depth (ft)	10.91	22.48	11.34
Conv. Total (cfs)	1216813.0	Conv. (cfs)	107211.1	865119.1	244482.9
Length Wtd. (ft)	8.00	Wetted Per. (ft)	142.64	138.84	296.91
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.96	1.99	1.02
Alpha	2.49	Stream Power (lb/ft s)	2.65	21.99	2.91
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	18443.77	20522.25	23663.50
C & E Loss (ft)	0.07	Cum SA (acres)	1680.03	666.47	2513.70

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	838.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	837.44	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	831.16	Flow Area (sq ft)	204.36	2043.32	1304.34
E.G. Slope (ft/ft)	0.001491	Area (sq ft)	2513.03	2043.32	1918.99
Q Total (cfs)	20100.00	Flow (cfs)	343.27	17602.70	2154.03
Top Width (ft)	959.63	Top Width (ft)	336.23	133.52	489.88
Vel Total (ft/s)	5.66	Avg. Vel. (ft/s)	1.68	8.61	1.65
Max Chl Dpth (ft)	18.17	Hydr. Depth (ft)	5.16	15.30	4.93
Conv. Total (cfs)	520522.2	Conv. (cfs)	8889.6	455850.5	55782.1
Length Wtd. (ft)	8.00	Wetted Per. (ft)	40.80	138.84	267.21
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.47	1.37	0.45
Alpha	2.04	Stream Power (lb/ft s)	0.78	11.80	0.75
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	5265.70	13738.80	6690.05
C & E Loss (ft)	0.02	Cum SA (acres)	632.59	638.00	827.70

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 26.933

INPUT
Description: MOPAC131 - RR Bridge just North of 131 ST
Distance from Upstream XS = 8
Deck/Roadway Width = 16
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
168	863.6	853	240	863	853	350	862.75	853
350.1	862.75	820	728.5	860.7	820	728.6	860.7	850
1002.5	859.1	850	1002.6	859.1	820	1040	859.1	820
1047.8	850	820						

Upstream Bridge Cross Section Data
Station Elevation Data num= 210

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	862.21	4.33	862.56	26.81	864.59	42.35	864.8	131.73	864.16
143.55	864.02	162.18	863.93	171.77	863.84	190.74	863.16	211.22	862.46
240.73	861.74	241.51	861.72	242.81	861.02	266.95	848.54	267.74	848.05
283.96	838.04	293.23	835.25	319.65	828.64	319.96	828.58	321	828.59
339.25	828.79	352.21	829.05	361.96	829.14	385.58	829.69	391.79	829.85
393.36	829.88	396.4	829.28	423.29	824.73	426.4	824.72	428.58	824.72
432.4	828.29	433.93	829.37	439.84	829.21	474.99	828.34	504.66	828.44
515.5	828.54	534.07	828.82	543.84	830.28	552.45	831.92	572.48	834.31
572.8	834.35	573.19	834.48	598.49	842.45	607.67	846.69	629.77	856.03
634.19	858.04	635.76	858.57	639.91	859.36	647.85	860.91	653.67	860.9
656.67	860.89	664.8	859.89	668.48	859.42	678.84	855.15	684.84	855.24
698.58	855.03	711.85	853.65	723.53	850.26	750.15	839.49	754.41	838.63
760.47	836.76	776.98	830.57	797.83	830.77	801.38	830.75	810.72	826.86
822.69	824.41	822.78	824.39	830	820	870	819.27	913	820
918.62	824.32	920.79	826.08	925.52	828.14	931.35	830.67	943.15	830.37
947.99	830.24	956.64	834.5	961.56	836.93	977.31	844.7	983.21	846.73
984.9	846.93	985.14	846.96	988.08	846.97	1007.7	850.51	1028.18	850.31
1042.17	850.37	1047.81	850.32	1063.32	840.61	1068.97	837.04	1071.51	836.12
1084	831.75	1096.85	831.71	1133.51	831.79	1142.23	831.98	1157.57	832.44
1183.73	832.6	1203.34	832.53	1238.57	832.7	1255.47	832.72	1278.68	832.93
1323.23	834.06	1337.19	834.71	1357.55	834.51	1407.1	834.06	1407.68	834.06
1465.64	834.87	1476.86	835.12	1508.98	835.88	1537.16	838.33	1550.09	840.22
1573.68	845.64	1590.63	847.02	1606.64	848.93	1643.21	851.89	1658.52	853.1
1675.04	853.97	1704.16	855.38	1724.68	856.44	1834.54	858.3	1875.22	858.32
1907.59	857.86	1939.94	856.86	1948.49	856.49	1955.37	856.24	1970.46	856.69
1991.47	857.57	2021.73	858.4	2058.61	859.5	2078.9	859.82	2133.77	860.87

2139.13	860.94	2162.09	861.46	2192.61	862.06	2197.84	862.06	2249.61	861.8
2293.03	861.38	2315.27	861.33	2367.18	860.26	2374.94	860.1	2379.13	860.08
2419.46	859.7	2421.13	859.76	2423.94	859.83	2457.78	860.58	2478.87	861.05
2486.32	861.12	2504.2	861.29	2511.36	861.33	2527.87	861.2	2538.36	861.38
2547.84	861.47	2548.17	861.48	2548.54	861.58	2555.05	863.37	2566.59	863.45
2572.01	863.47	2576.04	862.51	2577.18	862.23	2579.62	863.67	2580.31	864.05
2590.43	864.86	2594.46	865.3	2597.21	865.4	2606.63	865.69	2618.43	866.14
2624.89	866.12	2640.34	866.68	2647.61	867.33	2654.73	867.45	2665.3	867.52
2689.61	868	2695.95	868.3	2706.4	868.35	2731.06	868.72	2765.75	869.66
2772.19	869.79	2802.57	870.57	2807.14	870.77	2829.66	871.22	2844.02	871.27
2852	871.28	2864.39	871.23	2877.17	871.08	2883.31	871.11	2894.12	870.98
2895.25	870.98	2908.1	871.06	2912.99	871.03	2915.75	871.12	2916.76	871.13
2925.04	871.4	2930.94	871.6	2935.51	871.64	2956.1	871.82	2964.95	871.94
2971.96	872.25	2975.63	872.13	2991.23	873.74	2995.57	874.5	2997.46	874.58
3031.48	877.14	3036.13	877.4	3055.88	878.7	3072.33	879.54	3077.61	879.76
3085.82	879.94	3095.89	879.94	3115.59	880.44	3130.56	881.13	3137.15	881.35

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	240.73	.1	797.83	.04	931.35	.1	1724.68	.07
2504.2	.09								

Bank Sta: Left Right Coeff Contr. Expan.

797.83	931.35	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
250	350	838	F
350	728	863	F
1301.57	1858.46	861.18	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
2100	2150	870	2200	2250	870	2300	2350	870
2400	2450	870						

Downstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
168	863.6	853	240	863	853	350	862.75	853
350.1	862.75	820	728.5	860.7	820	728.6	860.7	850
1002.5	859.1	850	1002.6	859.1	820	1040	859.1	820
1047.8	850	820						

Downstream Bridge Cross Section Data
Station Elevation Data num= 210

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	862.21	4.33	862.56	26.81	864.59	42.35	864.8	131.73	864.16
143.55	864.02	162.18	863.93	171.77	863.84	190.74	863.16	211.22	862.46
240.73	861.74	241.51	861.72	242.81	861.02	266.95	848.54	267.74	848.05
283.96	838.04	293.23	835.25	319.65	828.64	319.96	828.58	321	828.59
339.25	828.79	352.21	829.05	361.96	829.14	385.58	829.69	391.79	829.85
393.36	829.88	396.4	829.28	423.29	824.73	426.4	824.72	428.58	824.72
432.4	828.29	433.93	829.37	439.84	829.21	474.99	828.34	504.66	828.44
515.5	828.54	534.07	828.82	543.84	830.28	552.45	831.92	572.48	834.31
572.8	834.35	573.19	834.48	598.49	842.45	607.67	846.69	629.77	856.03
634.19	858.04	635.76	858.57	639.91	859.36	647.85	860.91	653.67	860.9
656.67	860.89	664.8	859.89	668.48	859.42	678.84	855.15	684.84	855.24
698.58	855.03	711.85	853.65	723.53	850.26	750.15	839.49	754.41	838.63
760.47	836.76	776.98	830.57	797.83	830.77	801.38	830.75	810.72	826.86
822.69	824.41	822.78	824.39	830	820	870	819.27	913	820
918.62	824.32	920.79	826.08	925.52	828.14	931.35	830.67	943.15	830.37
947.99	830.24	956.64	834.5	961.56	836.93	977.31	844.7	983.21	846.73
984.9	846.93	985.14	846.96	988.08	846.97	1007.7	850.51	1028.18	850.31
1042.17	850.37	1047.81	850.32	1063.32	840.61	1068.97	837.04	1071.51	836.12
1084	831.75	1096.85	831.71	1133.51	831.79	1142.23	831.98	1157.57	832.44
1183.73	832.6	1203.34	832.53	1238.57	832.7	1255.47	832.72	1278.68	832.93
1323.23	834.06	1345.82	834.54	1357.55	834.51	1407.1	834.06	1407.68	834.06
1465.64	834.87	1476.86	835.12	1508.98	835.88	1537.16	838.33	1550.09	840.22
1573.68	845.64	1590.63	847.02	1606.64	848.93	1643.21	851.89	1658.52	853.1
1675.04	853.97	1704.16	855.38	1724.68	856.44	1834.54	858.3	1875.22	858.32
1907.59	857.86	1939.94	856.86	1948.49	856.49	1955.37	856.24	1970.46	856.69
1991.47	857.57	2021.73	858.4	2058.61	859.5	2078.9	859.82	2133.77	860.87
2139.13	860.94	2162.09	861.46	2192.61	862.06	2197.84	862.06	2249.61	861.8

```
 2293.03  861.38 2315.27  861.33 2367.18  860.26 2374.94   860.1 2379.13  860.08
 2419.46   859.7 2421.13  859.76 2423.94  859.83 2457.78  860.58 2478.87  861.05
 2486.32  861.12  2504.2  861.29 2511.36  861.33 2527.87   861.2 2538.36  861.38
 2547.84  861.47 2548.17  861.48 2548.54  861.58 2555.05  863.37 2566.59  863.45
 2572.01  863.47 2576.04  862.51 2577.18  862.23 2579.62  863.67 2580.31  864.05
 2590.43  864.86 2594.46   865.3 2597.21   865.4 2606.63  865.69 2618.43  866.14
 2624.89  866.12 2640.34  866.68 2647.61  867.33 2654.73  867.45  2665.3  867.52
 2689.61     868 2695.95   868.3  2706.4  868.35 2731.06  868.72 2765.75  869.66
 2772.19  869.79 2802.57  870.57 2807.14  870.77 2829.66  871.22 2844.02  871.27
    2852  871.28 2864.39  871.23 2877.17  871.08 2883.31  871.11 2894.12  870.98
 2895.25  870.98  2908.1  871.06 2912.99  871.03 2915.75  871.12 2916.76  871.13
 2925.04   871.4 2930.94   871.6 2935.51  871.64  2956.1  871.82 2964.95  871.94
 2971.96  872.25 2975.63  872.13 2991.23  873.74 2995.57   874.5 2997.46  874.58
 3031.48  877.14 3036.13   877.4 3055.88   878.7 3072.33  879.54 3077.61  879.76
 3085.82  879.94 3095.89  879.94 3115.59  880.44 3130.56  881.13 3137.15  881.35

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  240.73      .1  797.83     .04  931.35      .1 1724.68     .07
  2504.2     .09

Bank Sta: Left   Right    Coeff Contr.   Expan.
        797.83  931.35             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
     250     350     838       F
     350     728     863       F
 1301.57 1851.99  863.42       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
    2100    2150     870    2200    2250     870    2300    2350     870
    2400    2450     870

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  6

Pier Data
Pier Station     Upstream=     750    Downstream=     750
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     820     2.5     850
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     820     2.5     850

Pier Data
Pier Station     Upstream=     772    Downstream=     772
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     7.4     820     7.4     850
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     7.4     820     7.4     850

Pier Data
Pier Station     Upstream=     833    Downstream=     833
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     820       8     850
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
```

```
       8     820       8     850

Pier Data
Pier Station     Upstream=     904    Downstream=     904
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       8     820       8     850
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       8     820       8     850

Pier Data
Pier Station     Upstream=     965    Downstream=     965
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     7.4     820     7.4     850
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     7.4     820     7.4     850

Pier Data
Pier Station     Upstream=     987    Downstream=     987
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     820     2.5     850
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     820     2.5     850

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     831.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     831.06  * E.G. Elev (ft)         *     831.33  *     831.29  *
* Q Total (cfs)          *    5870.00  * W.S. Elev (ft)         *     830.77  *     830.73  *
* Q Bridge (cfs)         *    5870.00  * Crit W.S. (ft)         *     825.63  *     825.63  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      11.50  *      11.46  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.95  *       5.99  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     986.84  *     979.99  *
* Weir Submerg           *             * Froude # Chl           *       0.37  *       0.36  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    6045.60  *    6007.34  *
* Min El Weir Flow (ft)  *     831.72  * Hydr Depth (ft)        *       6.30  *       6.60  *
* Min El Prs (ft)        *     853.00  * W.P. Total (ft)        *     204.87  *     196.57  *
* Delta EG (ft)          *       0.17  * Conv. Total (cfs)       *   118969.6  *   119741.5  *
* Delta WS (ft)          *       0.19  * Top Width (ft)          *     195.59  *     187.31  *
* BR Open Area (sq ft)   *    6303.13  * Frctn Loss (ft)         *             *             *
* BR Open Vel (ft/s)     *       5.99  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.73  *       0.75  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       4.35  *       4.48  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	834.81	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	834.18	E.G. Elev (ft)	834.77	834.72
Q Total (cfs)	10900.00	W.S. Elev (ft)	833.90	833.84
Q Bridge (cfs)	10567.34	Crit W.S. (ft)	828.44	828.44
Q Weir (cfs)		Max Chl Dpth (ft)	14.63	14.57
Weir Sta Lft (ft)		Vel Total (ft/s)	6.01	6.09
Weir Sta Rgt (ft)		Flow Area (sq ft)	1814.38	1789.38
Weir Submerg		Froude # Chl	0.72	0.74
Weir Max Depth (ft)		Specif Force (cu ft)	11569.70	11478.55
Min El Weir Flow (ft)	831.72	Hydr Depth (ft)	4.68	4.62
Min El Prs (ft)	853.00	W.P. Total (ft)	452.51	451.59
Delta EG (ft)	0.17	Conv. Total (cfs)	203167.8	200964.0
Delta WS (ft)	0.20	Top Width (ft)	454.54	451.25
BR Open Area (sq ft)	6303.13	Frctn Loss (ft)	0.05	0.01
BR Open Vel (ft/s)	7.15	C & E Loss (ft)	0.00	0.07
Coef of Q		Shear Total (lb/sq ft)	0.72	0.73
Br Sel Method	Energy only	Power Total (lb/ft s)	4.33	4.43

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	835.62	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	834.92	E.G. Elev (ft)	835.58	835.53
Q Total (cfs)	12600.00	W.S. Elev (ft)	834.64	834.57
Q Bridge (cfs)	11929.53	Crit W.S. (ft)	829.23	829.23
Q Weir (cfs)		Max Chl Dpth (ft)	15.37	15.30
Weir Sta Lft (ft)		Vel Total (ft/s)	6.00	6.07
Weir Sta Rgt (ft)		Flow Area (sq ft)	2101.60	2074.28
Weir Submerg		Froude # Chl	0.62	0.63
Weir Max Depth (ft)		Specif Force (cu ft)	13487.90	13374.60
Min El Weir Flow (ft)	831.72	Hydr Depth (ft)	5.34	5.28
Min El Prs (ft)	853.00	W.P. Total (ft)	462.91	461.92
Delta EG (ft)	0.17	Conv. Total (cfs)	229591.7	226996.2
Delta WS (ft)	0.21	Top Width (ft)	586.13	589.27
BR Open Area (sq ft)	6303.13	Frctn Loss (ft)	0.05	0.02
BR Open Vel (ft/s)	7.46	C & E Loss (ft)	0.00	0.07
Coef of Q		Shear Total (lb/sq ft)	0.85	0.86
Br Sel Method	Energy only	Power Total (lb/ft s)	5.12	5.25

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	838.12	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	837.14	E.G. Elev (ft)	838.08	838.02
Q Total (cfs)	19100.00	W.S. Elev (ft)	836.92	836.83
Q Bridge (cfs)	16744.70	Crit W.S. (ft)	832.27	832.27
Q Weir (cfs)		Max Chl Dpth (ft)	17.65	17.56

```
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.33  *       6.40  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3017.57  *    2983.26  *
* Weir Submerg           *             * Froude # Chl           *       0.49  *       0.50  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   21252.65  *   21057.23  *
* Min El Weir Flow (ft)  *     831.72  * Hydr Depth (ft)        *       7.36  *       7.28  *
* Min El Prs (ft)        *     853.00  * W.P. Total (ft)        *     495.00  *     493.88  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *   324990.6  *   321144.1  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *     691.92  *     690.18  *
* BR Open Area (sq ft)   *    6303.13  * Frctn Loss (ft)        *       0.06  *       0.02  *
* BR Open Vel (ft/s)     *       8.42  * C & E Loss (ft)        *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.31  *       1.33  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       8.32  *       8.54  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     840.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     839.47  * E.G. Elev (ft)         *     840.54  *     840.49  *
* Q Total (cfs)          *   27300.00  * W.S. Elev (ft)         *     839.47  *     839.40  *
* Q Bridge (cfs)         *   22487.02  * Crit W.S. (ft)         *     835.36  *     835.36  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      20.20  *      20.13  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.89  *       5.94  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4632.65  *    4598.28  *
* Weir Submerg           *             * Froude # Chl           *       0.37  *       0.38  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   34543.47  *   34274.64  *
* Min El Weir Flow (ft)  *     831.72  * Hydr Depth (ft)        *       9.43  *       9.36  *
* Min El Prs (ft)        *     853.00  * W.P. Total (ft)        *     597.00  *     596.17  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *   485880.5  *   481662.1  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *     734.91  *     734.21  *
* BR Open Area (sq ft)   *    6303.13  * Frctn Loss (ft)        *       0.05  *       0.02  *
* BR Open Vel (ft/s)     *       7.49  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.53  *       1.55  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.01  *       9.18  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     842.23  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     841.03  * E.G. Elev (ft)         *     842.18  *     842.13  *
* Q Total (cfs)          *   32830.00  * W.S. Elev (ft)         *     841.08  *     841.02  *
* Q Bridge (cfs)         *   26055.55  * Crit W.S. (ft)         *     836.51  *     836.51  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.81  *      21.75  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.04  *       6.08  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5431.71  *    5398.28  *
* Weir Submerg           *             * Froude # Chl           *       0.35  *       0.35  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   44053.39  *   43746.51  *
* Min El Weir Flow (ft)  *     831.72  * Hydr Depth (ft)        *      10.85  *      10.80  *
* Min El Prs (ft)        *     853.00  * W.P. Total (ft)        *     621.83  *     620.58  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *   587661.9  *   583281.8  *
* Delta WS (ft)          *       0.16  * Top Width (ft)         *     752.79  *     751.99  *
* BR Open Area (sq ft)   *    6303.13  * Frctn Loss (ft)        *       0.05  *       0.02  *
* BR Open Vel (ft/s)     *       7.62  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.70  *       1.72  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      10.29  *      10.46  *
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*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*******************************************************************************************
* E.G. US. (ft)          *     843.90  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     842.61  * E.G. Elev (ft)         *     843.83  *     843.78  *
* Q Total (cfs)          *   38750.00  * W.S. Elev (ft)         *     842.72  *     842.65  *
* Q Bridge (cfs)         *   29758.91  * Crit W.S. (ft)         *     837.56  *     837.56  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.45  *      23.38  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.19  *       6.22  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6258.66  *    6225.86  *
* Weir Submerg           *             * Froude # Chl           *       0.33  *       0.33  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   55092.61  *   54749.11  *
* Min El Weir Flow (ft)  *     831.72  * Hydr Depth (ft)        *      12.20  *      12.15  *
* Min El Prs (ft)        *     853.00  * W.P. Total (ft)        *     652.37  *     651.18  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)       *   698915.2  *   694401.3  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *     772.49  *     771.72  *
* BR Open Area (sq ft)   *    6303.13  * Frctn Loss (ft)        *       0.05  *       0.02  *
* BR Open Vel (ft/s)     *       7.72  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.84  *       1.86  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      11.40  *      11.57  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*******************************************************************************************
* E.G. US. (ft)          *     846.00  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     844.62  * E.G. Elev (ft)         *     845.91  *     845.87  *
* Q Total (cfs)          *   46700.00  * W.S. Elev (ft)         *     844.77  *     844.72  *
* Q Bridge (cfs)         *   34599.51  * Crit W.S. (ft)         *     838.38  *     838.37  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.50  *      25.45  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.37  *       6.40  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7331.11  *    7300.16  *
* Weir Submerg           *             * Froude # Chl           *       0.31  *       0.31  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   71125.91  *   70752.25  *
* Min El Weir Flow (ft)  *     831.72  * Hydr Depth (ft)        *      13.86  *      13.81  *
* Min El Prs (ft)        *     853.00  * W.P. Total (ft)        *     690.96  *     689.82  *
* Delta EG (ft)          *       0.18  * Conv. Total (cfs)       *   850664.9  *   846179.7  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *     797.40  *     796.64  *
* BR Open Area (sq ft)   *    6303.13  * Frctn Loss (ft)        *       0.05  *       0.02  *
* BR Open Vel (ft/s)     *       7.82  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.00  *       2.01  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      12.72  *      12.87  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. US. (ft)          *     838.46  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     837.44  * E.G. Elev (ft)         *     838.42  *     838.36  *
* Q Total (cfs)          *   20100.00  * W.S. Elev (ft)         *     837.23  *     837.14  *
```

* Q Bridge (cfs)	* 17442.80	* Crit W.S. (ft)	* 833.15	* 833.15	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 17.96	* 17.87	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 6.39	* 6.46	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 3146.10	* 3111.05	*
* Weir Submerg	*	* Froude # Chl	* 0.48	* 0.49	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 22521.52	* 22314.11	*
* Min El Weir Flow (ft)	* 831.72	* Hydr Depth (ft)	* 7.64	* 7.56	*
* Min El Prs (ft)	* 853.00	* W.P. Total (ft)	* 498.96	* 497.92	*
* Delta EG (ft)	* 0.16	* Conv. Total (cfs)	* 339595.8	* 335582.2	*
* Delta WS (ft)	* 0.21	* Top Width (ft)	* 698.21	* 696.54	*
* BR Open Area (sq ft)	* 6303.13	* Frctn Loss (ft)	* 0.06	* 0.02	*
* BR Open Vel (ft/s)	* 8.53	* C & E Loss (ft)	* 0.00	* 0.05	*
* Coef of Q	*	* Shear Total (lb/sq ft)	* 1.38	* 1.40	*
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	* 8.81	* 9.04	*

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 26.930

INPUT
Description: Downstream side of MOPAC13, copied from upstream side. Left overbank adjusted to model flow through opening in RR at 131st ST.
Station Elevation Data num= 210

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	862.21	4.33	862.56	26.81	864.59	42.35	864.8	131.73	864.16
143.55	864.02	162.18	863.93	171.77	863.84	190.74	863.16	211.22	862.46
240.73	861.74	241.51	861.72	242.81	861.02	266.95	848.54	267.74	848.05
283.96	838.04	293.23	835.25	319.65	828.64	319.96	828.58	321	828.59
339.25	828.79	352.21	829.05	361.96	829.14	385.58	829.69	391.79	829.85
393.36	829.88	396.4	829.28	423.29	824.73	426.4	824.72	428.58	824.72
432.4	828.29	433.93	829.37	439.84	829.21	474.99	828.34	504.66	828.44
515.5	828.54	534.07	828.82	543.84	830.28	552.45	831.92	572.48	834.31
572.8	834.35	573.19	834.48	598.49	842.45	607.67	846.69	629.77	856.03
634.19	858.04	635.76	858.57	639.91	859.36	647.85	860.91	653.67	860.9
656.67	860.89	664.8	859.89	668.48	859.42	678.84	855.15	684.84	855.24
698.58	855.03	711.85	853.65	723.53	850.26	750.15	839.49	754.41	838.63
760.47	836.76	776.98	830.57	797.83	830.77	801.38	830.75	810.72	826.86
822.69	824.41	822.78	824.39	830	820	870	819.27	913	820
918.62	824.32	920.79	826.08	925.52	828.14	931.35	830.67	943.15	830.37
947.99	830.24	956.64	834.5	961.56	836.93	977.31	844.7	983.21	846.73
984.9	846.93	985.14	846.96	988.08	846.97	1007.7	850.51	1028.18	850.31
1042.17	850.37	1047.81	850.32	1063.32	840.61	1068.97	837.04	1071.51	836.12
1084	831.75	1096.85	831.71	1133.51	831.79	1142.23	831.98	1157.57	832.44
1183.73	832.6	1203.34	832.53	1238.57	832.7	1255.47	832.72	1278.68	832.93
1323.23	834.06	1345.82	834.54	1357.55	834.51	1407.1	834.06	1407.68	834.06
1465.64	834.87	1476.86	835.12	1508.98	835.88	1537.16	838.33	1550.09	840.22
1573.68	845.64	1590.63	847.02	1606.64	848.93	1643.21	851.89	1658.52	853.1
1675.04	853.97	1704.16	855.38	1724.68	856.44	1834.54	858.3	1875.22	858.32
1907.59	857.86	1939.94	856.86	1948.49	856.49	1955.37	856.24	1970.46	856.69
1991.47	857.57	2021.73	858.4	2058.61	859.5	2078.9	859.82	2133.77	860.87
2139.13	860.94	2162.09	861.46	2192.61	862.06	2197.84	862.06	2249.61	861.8
2293.03	861.38	2315.27	861.33	2367.18	860.26	2374.94	860.1	2379.13	860.08
2419.46	859.7	2421.13	859.76	2423.94	859.83	2457.78	860.58	2478.87	861.05
2486.32	861.12	2504.2	861.29	2511.36	861.33	2527.87	861.2	2538.36	861.38
2547.84	861.47	2548.17	861.48	2548.54	861.58	2555.05	863.37	2566.59	863.45
2572.01	863.47	2576.04	862.51	2577.18	862.23	2579.62	863.67	2580.31	864.05
2590.43	864.86	2594.46	865.3	2597.21	865.4	2606.63	865.69	2618.43	866.14
2624.89	866.12	2640.34	866.68	2647.61	867.33	2654.73	867.45	2665.3	867.52
2689.61	868	2695.95	868.3	2706.4	868.35	2731.06	868.72	2765.75	869.66
2772.19	869.79	2802.57	870.57	2807.14	870.77	2829.66	871.22	2844.02	871.27
2852	871.28	2864.39	871.23	2877.17	871.08	2883.31	871.11	2894.12	870.98

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 2895.25  870.98  2908.1  871.06 2912.99  871.03 2915.75  871.12 2916.76  871.13
 2925.04   871.4 2930.94   871.6 2935.51  871.64  2956.1  871.82 2964.95  871.94
 2971.96  872.25 2975.63  872.13 2991.23  873.74 2995.57   874.5 2997.46  874.58
 3031.48  877.14 3036.13   877.4 3055.88   878.7 3072.33  879.54 3077.61  879.76
 3085.82  879.94 3095.89  879.94 3115.59  880.44 3130.56  881.13 3137.15  881.35

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  240.73      .1  797.83     .04  931.35      .1 1724.68     .07
  2504.2     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         797.83  931.35          1422.3    1018   628.1             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
     250     350     838       F
     350     728     863       F
 1301.57 1851.99  863.42       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
    2100    2150     870    2200    2250     870    2300    2350     870
    2400    2450     870

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  831.27  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  830.87  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  824.90  * Flow Area (sq ft)      *    4.34  * 1165.94  *    7.31  *
* E.G. Slope (ft/ft)     *0.001075  * Area (sq ft)           *  540.03  * 1165.94  *    7.31  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    0.72  * 5867.33  *    1.95  *
* Top Width (ft)         *  409.32  * Top Width (ft)         *  257.88  *  133.52  *   17.92  *
* Vel Total (ft/s)       *    4.98  * Avg. Vel. (ft/s)       *    0.17  *    5.03  *    0.27  *
* Max Chl Dpth (ft)      *   11.60  * Hydr. Depth (ft)       *    0.20  *    8.73  *    0.41  *
* Conv. Total (cfs)      *179028.5  * Conv. (cfs)            *    22.0  *178947.1  *    59.4  *
* Length Wtd. (ft)       * 1015.99  * Wetted Per. (ft)       *   21.71  *  138.84  *   18.08  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.01  *    0.56  *    0.03  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.00  *    2.84  *    0.01  *
* Frctn Loss (ft)        *    1.19  * Cum Volume (acre-ft)   *  869.00  * 6838.14  *  863.44  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  196.40  *  533.79  *  243.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  834.64  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  833.98  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  827.50  * Flow Area (sq ft)      *   84.56  * 1581.06  *  416.03  *
* E.G. Slope (ft/ft)     *0.001246  * Area (sq ft)           * 1406.02  * 1581.06  *  420.39  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *   87.42  *10495.84  *  316.74  *
* Top Width (ft)         *  701.64  * Top Width (ft)         *  301.37  *  133.52  *  266.74  *
* Vel Total (ft/s)       *    5.24  * Avg. Vel. (ft/s)       *    1.03  *    6.64  *    0.76  *
* Max Chl Dpth (ft)      *   14.71  * Hydr. Depth (ft)       *    2.82  *   11.84  *    1.68  *
* Conv. Total (cfs)      *308737.0  * Conv. (cfs)            *  2476.0  *297289.4  *  8971.6  *
* Length Wtd. (ft)       *  985.21  * Wetted Per. (ft)       *   30.57  *  138.84  *  249.46  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.22  *    0.89  *    0.13  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.22  *    5.88  *    0.10  *
* Frctn Loss (ft)        *    1.22  * Cum Volume (acre-ft)   * 2045.46  * 9141.78  * 2370.80  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  338.23  *  576.08  *  475.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
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*****************************************************************************************
* E.G. Elev (ft)         *  835.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  834.71  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  828.23  * Flow Area (sq ft)      *  107.03  * 1678.09  *  597.67  *
* E.G. Slope (ft/ft)     *0.001313  * Area (sq ft)           * 1628.65  * 1678.09  *  665.38  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  127.18  *11895.51  *  577.30  *
* Top Width (ft)         *  848.14  * Top Width (ft)         *  310.40  *  133.52  *  404.21  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *    1.19  *    7.09  *    0.97  *
* Max Chl Dpth (ft)      *   15.44  * Hydr. Depth (ft)       *    3.36  *   12.57  *    2.37  *
* Conv. Total (cfs)      *347757.8  * Conv. (cfs)            *  3510.3  *328314.0  * 15933.5  *
* Length Wtd. (ft)       *  976.00  * Wetted Per. (ft)       *   32.64  *  138.84  *  253.30  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.27  *    0.99  *    0.19  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *    0.32  *    7.02  *    0.19  *
* Frctn Loss (ft)        *    1.25  * Cum Volume (acre-ft)   * 2911.70  *10844.73  * 3524.36  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  402.60  *  604.23  *  599.54  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  837.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  836.94  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  830.67  * Flow Area (sq ft)      *  184.68  * 1975.51  * 1170.50  *
* E.G. Slope (ft/ft)     *0.001548  * Area (sq ft)           * 2343.55  * 1975.51  * 1677.03  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *  304.04  *16952.79  * 1843.18  *
* Top Width (ft)         *  946.89  * Top Width (ft)         *  331.28  *  133.52  *  482.08  *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)       *    1.65  *    8.58  *    1.57  *
* Max Chl Dpth (ft)      *   17.67  * Hydr. Depth (ft)       *    4.87  *   14.80  *    4.46  *
* Conv. Total (cfs)      *485499.3  * Conv. (cfs)            *  7728.3  *430919.6  * 46851.4  *
* Length Wtd. (ft)       *  951.60  * Wetted Per. (ft)       *   39.08  *  138.84  *  265.00  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.46  *    1.37  *    0.43  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    0.75  *   11.80  *    0.67  *
* Frctn Loss (ft)        *    1.39  * Cum Volume (acre-ft)   * 4458.21  *12796.55  * 5699.28  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  535.33  *  627.59  *  748.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  840.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  839.34  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  834.08  * Flow Area (sq ft)      *  828.53  * 2296.55  * 1812.46  *
* E.G. Slope (ft/ft)     *0.001547  * Area (sq ft)           * 3167.24  * 2296.55  * 2877.76  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 1791.26  *21784.48  * 3724.27  *
* Top Width (ft)         * 1001.06  * Top Width (ft)         *  353.70  *  133.52  *  513.83  *
* Vel Total (ft/s)       *    5.53  * Avg. Vel. (ft/s)       *    2.16  *    9.49  *    2.05  *
* Max Chl Dpth (ft)      *   20.07  * Hydr. Depth (ft)       *    7.20  *   17.20  *    6.68  *
* Conv. Total (cfs)      *694073.5  * Conv. (cfs)            * 45540.8  *553847.2  * 94685.6  *
* Length Wtd. (ft)       *  942.29  * Wetted Per. (ft)       *  118.16  *  138.84  *  275.05  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.68  *    1.60  *    0.64  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *    1.46  *   15.15  *    1.31  *
* Frctn Loss (ft)        *    1.40  * Cum Volume (acre-ft)   * 7391.04  *15693.65  * 9611.30  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  896.31  *  655.76  * 1210.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
```

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* E.G. Elev (ft)         *  842.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  840.87  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  835.39  * Flow Area (sq ft)      * 1009.54  * 2500.39  * 2230.91  *
* E.G. Slope (ft/ft)     *0.001561  * Area (sq ft)           * 3716.23  * 2500.39  * 3673.88  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 2401.62  *25214.72  * 5213.67  *
* Top Width (ft)         * 1026.87  * Top Width (ft)         *  365.17  *  133.52  *  528.18  *
* Vel Total (ft/s)       *    5.72  * Avg. Vel. (ft/s)       *    2.38  *   10.08  *    2.34  *
* Max Chl Dpth (ft)      *   21.60  * Hydr. Depth (ft)       *    8.30  *   18.73  *    8.06  *
* Conv. Total (cfs)      *830921.8  * Conv. (cfs)            * 60784.5  *638180.3  *131957.0  *
* Length Wtd. (ft)       *  933.76  * Wetted Per. (ft)       *  125.50  *  138.84  *  281.36  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.78  *    1.76  *    0.77  *
* Alpha                  *    2.43  * Stream Power (lb/ft s) *    1.87  *   17.70  *    1.81  *
* Frctn Loss (ft)        *    1.38  * Cum Volume (acre-ft)   *10323.25  *17458.16  *13359.39  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         * 1182.08  *  662.90  * 1655.29  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  843.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  842.42  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  836.55  * Flow Area (sq ft)      * 1203.39  * 2707.66  * 2665.03  *
* E.G. Slope (ft/ft)     *0.001556  * Area (sq ft)           * 4291.83  * 2707.66  * 4503.39  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 3095.84  *28750.09  * 6904.07  *
* Top Width (ft)         * 1050.53  * Top Width (ft)         *  376.45  *  133.52  *  540.57  *
* Vel Total (ft/s)       *    5.89  * Avg. Vel. (ft/s)       *    2.57  *   10.62  *    2.59  *
* Max Chl Dpth (ft)      *   23.15  * Hydr. Depth (ft)       *    9.40  *   20.28  *    9.43  *
* Conv. Total (cfs)      *982241.5  * Conv. (cfs)            * 78474.0  *728762.1  *175005.4  *
* Length Wtd. (ft)       *  926.69  * Wetted Per. (ft)       *  132.59  *  138.84  *  287.80  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.88  *    1.89  *    0.90  *
* Alpha                  *    2.46  * Stream Power (lb/ft s) *    2.27  *   20.12  *    2.33  *
* Frctn Loss (ft)        *    1.34  * Cum Volume (acre-ft)   *13123.08  *18690.44  *17138.34  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         * 1378.22  *  663.85  * 2093.43  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  845.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  844.39  * Reach Len. (ft)        * 1422.30  * 1018.00  *  628.10  *
* Crit W.S. (ft)         *  838.01  * Flow Area (sq ft)      * 1463.48  * 2970.58  * 3228.31  *
* E.G. Slope (ft/ft)     *0.001537  * Area (sq ft)           * 5045.32  * 2970.58  * 5583.33  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 4077.50  *33339.98  * 9282.52  *
* Top Width (ft)         * 1078.59  * Top Width (ft)         *  388.80  *  133.52  *  556.27  *
* Vel Total (ft/s)       *    6.09  * Avg. Vel. (ft/s)       *    2.79  *   11.22  *    2.88  *
* Max Chl Dpth (ft)      *   25.12  * Hydr. Depth (ft)       *   10.75  *   22.25  *   11.15  *
* Conv. Total (cfs)      *1191289.0  * Conv. (cfs)            *104014.5  *850482.7  *236791.5  *
* Length Wtd. (ft)       *  919.49  * Wetted Per. (ft)       *  141.59  *  138.84  *  295.96  *
* Min Ch El (ft)         *  819.27  * Shear (lb/sq ft)       *    0.99  *    2.05  *    1.05  *
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    2.76  *   23.04  *    3.01  *
* Frctn Loss (ft)        *    1.30  * Cum Volume (acre-ft)   *18442.06  *20520.26  *23659.31  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         * 1679.89  *  666.38  * 2513.29  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	838.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	837.24	Reach Len. (ft)	1422.30	1018.00	628.10
Crit W.S. (ft)	831.16	Flow Area (sq ft)	196.31	2015.92	1250.14
E.G. Slope (ft/ft)	0.001577	Area (sq ft)	2444.24	2015.92	1823.64
Q Total (cfs)	20100.00	Flow (cfs)	333.91	17697.74	2068.35
Top Width (ft)	954.53	Top Width (ft)	334.23	133.52	486.78
Vel Total (ft/s)	5.81	Avg. Vel. (ft/s)	1.70	8.78	1.65
Max Chl Dpth (ft)	17.97	Hydr. Depth (ft)	5.05	15.10	4.74
Conv. Total (cfs)	506208.5	Conv. (cfs)	8409.4	445708.8	52090.3
Length Wtd. (ft)	948.77	Wetted Per. (ft)	40.10	138.84	266.36
Min Ch El (ft)	819.27	Shear (lb/sq ft)	0.48	1.43	0.46
Alpha	2.02	Stream Power (lb/ft s)	0.82	12.55	0.76
Frctn Loss (ft)	1.41	Cum Volume (acre-ft)	5264.93	13737.47	6688.71
C & E Loss (ft)	0.14	Cum SA (acres)	632.48	637.91	827.35

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 26.737

INPUT
Description: Ineffective area on right due to bluff line immediately upstream.
Station Elevation Data num= 234

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	883.51	19.9	876.85	22.91	876.7	32.17	876.21	45.9	872.83
52.97	871.03	66.4	870.29	90.19	869.01	99.89	868.7	117.47	867.59
130.45	868.9	132.43	869.07	134.48	869.04	156.3	869.34	157.37	869.35
157.47	869.35	157.73	869.33	180.97	868.02	189.42	868.29	194.34	868.75
210.75	867.12	219.07	866.17	229.28	864.18	237.55	862.63	238.4	862.61
249.13	862.53	258.46	862.62	272.36	862.66	281.09	862.3	285.11	862.04
287.23	862.26	297.69	862	316.23	861.7	325.3	860.36	346.47	856.36
359.97	856.89	363.96	856.88	376.03	855.28	385.5	853.96	391.51	854
403.86	854.13	416.46	853.01	431.93	851.73	456	850.44	462.52	850.12
464.43	850.05	489.64	849.63	489.69	849.63	489.73	849.64	511.31	854.4
513.38	854.58	517.1	854.86	543.19	847.46	545.34	846.89	547.7	846.27
557.93	846.38	569.79	846.48	572.66	846.41	594.81	845.78	620.54	845.63
620.84	845.63	622.54	845.57	671.89	843.72	678.95	837.2	681.55	835.08
688	828.99	700	818.5	735.99	817.41	770	818.5	782.45	825.73
791.73	827.78	807.29	828.42	814.26	828.62	817.46	829	837.36	831.16
843.22	830.84	845.82	830.69	847.95	830.57	851.27	830.38	851.28	830.38
870.11	829.53	883.85	829.39	904.2	829.42	930.07	828.4	935.7	828.26
936.96	828.22	950.15	828.23	1001.64	828.38	1007.54	828.6	1041.96	830.18
1045.44	830.29	1086.37	830.81	1119.33	830.98	1143.89	831	1172.87	830.14
1211.67	830.09	1212.92	830.1	1229.67	836.2	1232.33	837.12	1234.94	838.32
1251	845.53	1255.29	847.48	1268.65	853.54	1274.57	856.23	1275.8	856.36
1276.93	856.48	1282.29	857.07	1284.67	857.07	1287.83	857.07	1299.19	856.28
1299.46	856.26	1299.56	856.25	1300.07	855.94	1335.3	833.82	1348.11	831.11
1353.52	829.93	1378.45	829.98	1384.23	829.99	1397.66	830.25	1422.19	830.5
1450.84	830.13	1474.75	830.04	1499.35	829.85	1525.4	829.62	1544.45	829.42
1580.96	831.15	1590.44	831.42	1640.17	831.52	1664.6	831.68	1687.88	831.6
1708.69	831.38	1752.33	830.96	1767.04	830.76	1797.38	830.03	1822.64	830.42
1839.23	830.59	1888.4	831.01	1898.05	831.23	1913.84	831.04	1956.39	831.44
1963.63	831.59	1975.15	831.82	1983.79	832	1994.84	832.09	2002.46	832.54
2027.38	834.26	2060.57	836.5	2066.45	836.78	2075.98	837.67	2129.55	840.56
2148.7	840.93	2158.21	840.74	2175.07	839.48	2191.66	838.01	2198.58	837.1
2218.3	833.98	2224.6	834.69	2250.15	838.7	2258.14	839.99	2258.94	840.16
2295.85	844.11	2307.47	845.36	2307.97	845.38	2338.01	846.64	2370.26	847.55
2388.14	847.94	2416.13	848.02	2435.97	847.45	2451.66	847.15	2465.85	847.16
2486.41	846.93	2494.59	847.08	2506.91	847.09	2523.97	847.41	2536.05	847.88
2549.72	848.14	2574.84	848.59	2605.33	848.97	2611.25	849.08	2617.23	849.31
2655.32	850.47	2656.97	850.51	2663.64	850.53	2683.16	850.52	2689.1	850.57

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  2702.9  851.01 2721.84  851.66 2725.75  851.69 2748.16  851.22 2755.31   851.7
 2767.05  852.56 2776.54   852.7 2818.57  853.29 2842.09  853.49 2866.57  854.09
 2873.93  854.87 2881.89  856.28 2882.75  856.38 2882.82  856.39 2884.69  856.39
 2890.05  856.39 2942.22  856.48 2952.57  856.53 2998.97  857.11 3002.09  857.14
 3018.81  857.35 3047.64  857.64 3051.91  857.67 3100.97   857.2 3101.59  857.17
 3103.63  857.16  3127.1  856.91 3136.11  856.64 3144.79  856.63 3158.03  856.19
 3160.49  856.17 3170.28   855.9 3173.68   856.5 3178.04  857.04 3181.51  856.86
 3184.72  856.69 3202.94  856.82 3211.71   856.9 3213.28  856.89 3222.73  856.57
 3232.11  854.84 3235.03  854.53 3247.26  856.28 3250.05  856.68 3250.39  856.72
 3251.05  856.76 3289.74  858.83 3302.86  859.55 3313.49  859.94

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09  258.46      .1  681.55     .04  791.73    .105 1282.29      .1
 2307.97      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        681.55  837.36          1566.07 1158.48  616.54             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
 1285.38    1575     832       F
    1575 3313.49  848.12       F
    1042    1280     848       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2150 3313.49   840.9

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  830.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.040  *   0.105  *
* W.S. Elev (ft)         *  829.59  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  823.82  * Flow Area (sq ft)      *          * 1038.52  *  132.87  *
* E.G. Slope (ft/ft)     *0.001276  * Area (sq ft)           *          * 1038.52  *  134.49  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *          * 5810.72  *   59.28  *
* Top Width (ft)         *  315.16  * Top Width (ft)         *          *  135.50  *  179.66  *
* Vel Total (ft/s)       *    5.01  * Avg. Vel. (ft/s)       *          *    5.60  *    0.45  *
* Max Chl Dpth (ft)      *   12.18  * Hydr. Depth (ft)       *          *    7.66  *    0.83  *
* Conv. Total (cfs)      *164309.7  * Conv. (cfs)            *          *162650.3  *  1659.4  *
* Length Wtd. (ft)       * 1155.75  * Wetted Per. (ft)       *          *  141.95  *  160.26  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *          *    0.58  *    0.07  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *          *    3.26  *    0.03  *
* Frctn Loss (ft)        *    1.85  * Cum Volume (acre-ft)   *  860.18  * 6812.38  *  862.42  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  192.19  *  530.65  *  242.19  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  833.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.041  *   0.103  *
* W.S. Elev (ft)         *  832.88  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  826.70  * Flow Area (sq ft)      *          * 1526.55  * 1429.17  *
* E.G. Slope (ft/ft)     *0.001228  * Area (sq ft)           *          * 1526.55  * 2567.39  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *          * 9292.48  * 1607.53  *
* Top Width (ft)         * 1204.29  * Top Width (ft)         *          *  153.48  * 1050.81  *
* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *          *    6.09  *    1.12  *
* Max Chl Dpth (ft)      *   15.47  * Hydr. Depth (ft)       *          *    9.95  *    3.25  *
* Conv. Total (cfs)      *311062.1  * Conv. (cfs)            *          *265186.8  * 45875.2  *
* Length Wtd. (ft)       * 1117.44  * Wetted Per. (ft)       *          *  161.32  *  440.35  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *          *    0.73  *    0.25  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *          *    4.42  *    0.28  *
* Frctn Loss (ft)        *    1.92  * Cum Volume (acre-ft)   * 2022.51  * 9105.47  * 2349.26  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  333.31  *  572.72  *  465.86  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
```

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  834.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.042  *   0.103  *
* W.S. Elev (ft)         *  833.61  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  827.55  * Flow Area (sq ft)      *          * 1639.64  * 1753.76  *
* E.G. Slope (ft/ft)     *0.001257  * Area (sq ft)           *          * 1639.64  * 3345.65  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *          *10330.58  * 2269.42  *
* Top Width (ft)         * 1221.21  * Top Width (ft)         *          *  154.26  * 1066.95  *
* Vel Total (ft/s)       *    3.71  * Avg. Vel. (ft/s)       *          *    6.30  *    1.29  *
* Max Chl Dpth (ft)      *   16.20  * Hydr. Depth (ft)       *          *   10.63  *    3.96  *
* Conv. Total (cfs)      *355387.9  * Conv. (cfs)            *          *291378.0  * 64009.9  *
* Length Wtd. (ft)       * 1090.66  * Wetted Per. (ft)       *          *  162.39  *  443.90  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *          *    0.79  *    0.31  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *          *    4.99  *    0.40  *
* Frctn Loss (ft)        *    1.75  * Cum Volume (acre-ft)   * 2885.11  *10805.96  * 3495.44  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  397.53  *  600.87  *  588.94  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  836.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.100  *   0.043  *   0.103  *
* W.S. Elev (ft)         *  835.84  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  831.13  * Flow Area (sq ft)      *    0.36  * 1985.63  * 2746.83  *
* E.G. Slope (ft/ft)     *0.001384  * Area (sq ft)           *    0.36  * 1985.63  * 5771.15  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *    0.09  *14122.22  * 4977.69  *
* Top Width (ft)         * 1266.80  * Top Width (ft)         *    0.93  *  155.81  * 1110.06  *
* Vel Total (ft/s)       *    4.04  * Avg. Vel. (ft/s)       *    0.25  *    7.11  *    1.81  *
* Max Chl Dpth (ft)      *   18.43  * Hydr. Depth (ft)       *    0.38  *   12.74  *    6.14  *
* Conv. Total (cfs)      *513352.3  * Conv. (cfs)            *     2.3  *379564.1  *133785.8  *
* Length Wtd. (ft)       * 1047.52  * Wetted Per. (ft)       *    1.20  *  164.53  *  448.70  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *    0.03  *    1.04  *    0.53  *
* Alpha                  *    2.35  * Stream Power (lb/ft s) *    0.01  *    7.42  *    0.96  *
* Frctn Loss (ft)        *    1.86  * Cum Volume (acre-ft)   * 4419.94  *12750.26  * 5645.59  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  529.91  *  624.21  *  736.93  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  838.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.100  *   0.043  *   0.103  *
* W.S. Elev (ft)         *  838.26  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  833.14  * Flow Area (sq ft)      *    6.11  * 2361.83  * 3832.10  *
* E.G. Slope (ft/ft)     *0.001428  * Area (sq ft)           *    6.11  * 2361.83  * 8506.72  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *    3.96  *18557.15  * 8738.89  *
* Top Width (ft)         * 1315.60  * Top Width (ft)         *    3.74  *  155.81  * 1156.05  *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)       *    0.65  *    7.86  *    2.28  *
* Max Chl Dpth (ft)      *   20.85  * Hydr. Depth (ft)       *    1.63  *   15.16  *    8.49  *
* Conv. Total (cfs)      *722527.3  * Conv. (cfs)            *   104.9  *491137.2  *231285.3  *
* Length Wtd. (ft)       * 1009.70  * Wetted Per. (ft)       *    4.91  *  164.53  *  453.24  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *    0.11  *    1.28  *    0.75  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    0.07  *   10.05  *    1.72  *
* Frctn Loss (ft)        *    1.74  * Cum Volume (acre-ft)   * 7339.23  *15639.22  * 9529.23  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  890.48  *  652.38  * 1198.15  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  840.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.100  *   0.044  *   0.102  *
* W.S. Elev (ft)         *  839.86  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  834.02  * Flow Area (sq ft)      *   13.48  * 2611.24  * 4556.74  *
* E.G. Slope (ft/ft)     *0.001394  * Area (sq ft)           *   13.48  * 2611.24  *10385.93  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *   11.29  *21344.17  *11474.53  *
* Top Width (ft)         * 1353.12  * Top Width (ft)         *    5.48  *  155.81  * 1191.83  *
* Vel Total (ft/s)       *    4.57  * Avg. Vel. (ft/s)       *    0.84  *    8.17  *    2.52  *
* Max Chl Dpth (ft)      *   22.45  * Hydr. Depth (ft)       *    2.46  *   16.76  *   10.04  *
* Conv. Total (cfs)      *879180.7  * Conv. (cfs)            *   302.5  *571592.5  *307285.7  *
* Length Wtd. (ft)       *  990.45  * Wetted Per. (ft)       *    7.27  *  164.53  *  456.25  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *    0.16  *    1.38  *    0.87  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.14  *   11.29  *    2.19  *
* Frctn Loss (ft)        *    1.60  * Cum Volume (acre-ft)   *10262.36  *17398.43  *13258.03  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1176.03  *  659.52  * 1642.89  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  842.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.100  *   0.044  *   0.102  *
* W.S. Elev (ft)         *  841.49  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  834.80  * Flow Area (sq ft)      *   23.84  * 2864.94  * 5297.99  *
* E.G. Slope (ft/ft)     *0.001356  * Area (sq ft)           *   23.84  * 2864.94  *12432.49  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *   23.80  *24246.04  *14480.17  *
* Top Width (ft)         * 1515.91  * Top Width (ft)         *    7.24  *  155.81  * 1352.86  *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)       *    1.00  *    8.46  *    2.73  *
* Max Chl Dpth (ft)      *   24.08  * Hydr. Depth (ft)       *    3.29  *   18.39  *   11.60  *
* Conv. Total (cfs)      *1052455.0  * Conv. (cfs)            *   646.4  *658525.7  *393283.4  *
* Length Wtd. (ft)       *  975.26  * Wetted Per. (ft)       *    9.67  *  164.53  *  459.31  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *    0.21  *    1.47  *    0.98  *
* Alpha                  *    2.12  * Stream Power (lb/ft s) *    0.21  *   12.47  *    2.67  *
* Frctn Loss (ft)        *    1.48  * Cum Volume (acre-ft)   *13052.62  *18625.32  *17016.24  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1371.95  *  660.47  * 2079.78  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  844.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *   0.100  *   0.045  *   0.102  *
* W.S. Elev (ft)         *  843.54  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  835.75  * Flow Area (sq ft)      *   41.04  * 3185.73  * 6241.33  *
* E.G. Slope (ft/ft)     *0.001309  * Area (sq ft)           *   41.04  * 3185.73  *15245.71  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *   48.21  *28058.13  *18593.67  *
* Top Width (ft)         * 1545.24  * Top Width (ft)         *    9.47  *  155.81  * 1379.96  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *    1.17  *    8.81  *    2.98  *
* Max Chl Dpth (ft)      *   26.13  * Hydr. Depth (ft)       *    4.33  *   20.45  *   13.57  *
* Conv. Total (cfs)      *1290864.0  * Conv. (cfs)            *  1332.5  *775572.3  *513959.2  *
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* Length Wtd. (ft)       *  960.29  * Wetted Per. (ft)       *   12.71  *  164.53  *  463.19  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *    0.26  *    1.58  *    1.10  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.31  *   13.93  *    3.28  *
* Frctn Loss (ft)        *    1.37  * Cum Volume (acre-ft)   *18359.02  *20448.32  *23509.14  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1673.39  *  663.00  * 2499.33  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  836.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.              *   0.100  *   0.043  *   0.103  *
* W.S. Elev (ft)         *  836.15  * Reach Len. (ft)        * 1566.07  * 1158.48  *  616.54  *
* Crit W.S. (ft)         *  831.39  * Flow Area (sq ft)      *    0.70  * 2033.58  * 2884.64  *
* E.G. Slope (ft/ft)     *0.001395  * Area (sq ft)           *    0.70  * 2033.58  * 6113.67  *
* Q Total (cfs)          *20100.00  * Flow (cfs)              *    0.22  *14683.50  * 5416.29  *
* Top Width (ft)         * 1273.07  * Top Width (ft)         *    1.31  *  155.81  * 1115.95  *
* Vel Total (ft/s)       *    4.09  * Avg. Vel. (ft/s)       *    0.31  *    7.22  *    1.88  *
* Max Chl Dpth (ft)      *   18.74  * Hydr. Depth (ft)       *    0.53  *   13.05  *    6.44  *
* Conv. Total (cfs)      *538124.1  * Conv. (cfs)             *     5.8  *393111.6  *145006.7  *
* Length Wtd. (ft)       * 1042.09  * Wetted Per. (ft)       *    1.69  *  164.53  *  449.28  *
* Min Ch El (ft)         *  817.41  * Shear (lb/sq ft)       *    0.04  *    1.08  *    0.56  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    0.01  *    7.77  *    1.05  *
* Frctn Loss (ft)        *    1.85  * Cum Volume (acre-ft)   * 5225.02  *13690.15  * 6631.49  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  627.00  *  634.52  *  815.79  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 26.518

INPUT
Description: Upstream side of MOPAC127.  Low area blocked in overbank belongs
             to small tributary.
Station Elevation Data    num=     232
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   882.7    4.66  882.74   32.05  883.15    39.6  882.66   54.54   881.8
   73.08     882   99.46  882.51  100.68  882.55  103.22   882.7  128.74  883.81
  133.98  884.17  164.94  884.98  167.42  885.05   168.2     885  188.14  883.45
  189.35   883.6  194.19  883.81  207.25  884.49  211.04  884.45  229.84  884.41
  245.49  884.76  265.95  884.96  267.35  884.97  274.96  885.87  281.11  886.01
  300.68  883.59  300.87  883.54  302.81  883.41  312.82  882.74  320.96  881.97
  335.52  880.85  349.49  880.36  370.78  878.14  381.52  877.13  398.41  875.55
  403.17  875.95  413.66  875.83  421.08  875.92  425.36  875.75  444.04  874.26
  462.02  872.58  487.02  866.44  498.52  861.13  502.43  859.43  516.32  854.96
   516.9  854.93  517.53  854.91  522.81  854.24   532.6     853  540.35  853.34
  541.28  853.33  547.29  853.21   559.3  853.13  563.75  853.05  576.79  852.97
  583.29  852.13   601.5  848.28  608.07  844.18  611.37  841.87  632.84   826.8
  633.49  826.34  634.43  825.87  645.13   817.5  674.72  816.48     703   817.5
  710.51  820.88  711.35  820.94  724.33  821.98  729.26   822.1  732.23  822.73
  764.54  828.62  766.11  828.62  770.03   828.7  777.99  828.76  802.23  829.13
  804.46  829.87  812.13  832.11  812.43  832.19  815.36  833.71  819.96  836.09
  820.27  836.27  825.27  837.98  836.86  841.12  848.18  843.31  865.13  846.86
  867.92  846.98  872.93  848.11  877.93  848.34  890.03  848.99  901.27  849.02
  904.36  849.03   914.8  854.53  919.21  855.78  922.94  856.74  925.74  856.74
  928.86  856.73  935.16  855.72  941.54  854.58  952.15  848.99  986.28  832.65
  992.92  831.38 1004.68  829.13 1006.15  829.22  1039.8  830.56 1049.45  830.47
 1059.73  830.69 1075.71  830.13    1093  829.05 1141.35  827.35 1149.87  826.97
 1154.87  826.63  1172.1  828.89 1192.63  830.66 1194.93  830.59 1196.97  830.59
 1234.92  829.94  1266.9  829.99 1299.17  829.53 1327.89  829.03 1344.04  828.93
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  1374.8  828.78 1417.21  827.74 1419.35  827.68 1421.83   827.6 1462.91  826.07
 1472.05  825.63 1483.83   825.3  1511.9  824.54  1541.1  823.71 1549.11  824.32
  1554.8  824.44  1595.1  825.98 1602.23  826.25 1627.11  827.17  1629.5  827.14
 1632.42  827.14 1674.55  826.53 1684.22  828.06 1686.05  828.05 1702.09  826.28
 1731.47  823.32 1737.31   823.4 1748.15  823.52    1751  823.58 1762.89  822.54
 1765.59  822.36 1783.63  822.36 1792.82  822.36  1812.3  822.36 1816.89  822.62
 1822.57  822.89 1836.27  823.34 1850.88  823.88 1862.35  824.14 1886.68   824.7
 1905.52  824.75 1920.06  824.71  1931.8  824.67 1953.85  824.77 1982.01  824.54
 1997.84  823.77  2005.8   823.4 2013.42  823.19 2031.46  822.34 2043.49  822.35
 2064.72  822.36 2068.85  822.97  2080.8  829.61 2087.29  832.34 2101.11  836.08
 2114.52  837.06 2114.68  837.07 2114.98  837.11 2133.89  839.64  2173.9  844.07
 2191.69     846 2218.55  847.25 2238.13  847.85  2298.6  848.85 2305.76  848.95
 2308.56  848.99 2365.15  848.64 2382.47  848.33 2409.12  847.86 2429.16   848.4
 2454.96  849.11  2488.4  849.26 2506.96  849.35 2514.13  849.51 2521.81  849.54
 2528.32  849.62 2542.98  850.12 2571.17  850.55 2572.41  850.57 2573.32   850.6
  2595.5  851.42 2630.28  852.01 2643.86  852.22 2665.49  852.49 2701.01  852.85
 2714.55  853.01 2739.62  853.49 2769.29  854.03  2823.8  854.05 2828.01   854.1
  2842.6  854.06 2875.51  853.84 2906.12  853.39 2909.86  853.42 2920.66  853.17
 2929.62  853.01  2933.9  852.79 2938.24  852.62 2941.81  852.62 2948.12  852.89
 2949.81  852.94 2962.07  853.16 2972.11  852.95 2988.49   852.7 2993.39  852.52
 2997.32  852.15 3000.67   852.1 3003.47  852.16 3006.24  852.24 3010.83  852.38
 3026.22  853.64 3028.03  853.74 3029.27  853.82 3033.17  854.09 3049.08  855.13
 3054.71  855.73 3063.11  856.61

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09  403.17      .1  632.84     .04  764.54    .105 1299.17      .1
 2191.69     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        632.84  764.54               30      30      30              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  913.04    1375     831       F
    1375 3063.11     845       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1400    1684     828

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  828.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.61  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)          *  827.59  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)          *  823.51  * Flow Area (sq ft)      *    0.44  *  934.45  *          *
* E.G. Slope (ft/ft)      *0.002072  * Area (sq ft)           *    0.44  *  934.45  * 1478.59  *
* Q Total (cfs)           * 5870.00  * Flow (cfs)              *    0.14  * 5869.86  *          *
* Top Width (ft)          *  541.79  * Top Width (ft)         *    1.13  *  126.05  *  414.61  *
* Vel Total (ft/s)        *    6.28  * Avg. Vel. (ft/s)       *    0.32  *    6.28  *          *
* Max Chl Dpth (ft)       *   11.11  * Hydr. Depth (ft)       *    0.40  *    7.41  *          *
* Conv. Total (cfs)       *128959.4  * Conv. (cfs)             *     3.1  *128956.3  *          *
* Length Wtd. (ft)        *    9.00  * Wetted Per. (ft)       *    1.38  *  130.50  *          *
* Min Ch El (ft)          *  816.48  * Shear (lb/sq ft)       *    0.04  *    0.93  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *    0.01  *    5.82  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *  860.17  * 6786.15  *  851.00  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  192.17  *  527.17  *  237.98  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  831.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.09  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)          *  830.30  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)          *  826.13  * Flow Area (sq ft)      *    8.72  * 1288.31  *   56.47  *
* E.G. Slope (ft/ft)      *0.002567  * Area (sq ft)           *    8.72  * 1288.31  * 3651.78  *
* Q Total (cfs)           *10900.00  * Flow (cfs)              *    8.34  *10842.00  *   49.65  *
* Top Width (ft)          * 1198.78  * Top Width (ft)         *    4.98  *  131.70  * 1062.10  *
* Vel Total (ft/s)        *    8.05  * Avg. Vel. (ft/s)       *    0.96  *    8.42  *    0.88  *
* Max Chl Dpth (ft)       *   13.82  * Hydr. Depth (ft)       *    1.75  *    9.78  *    1.36  *
* Conv. Total (cfs)       *215146.4  * Conv. (cfs)             *   164.6  *214001.7  *   980.1  *
```

```
* Length Wtd. (ft)       *    9.00  * Wetted Per. (ft)       *    6.09  *  136.25  *   41.57  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.23  *    1.52  *    0.22  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    0.22  *   12.75  *    0.19  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 2022.35  * 9068.04  * 2305.25  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  333.22  *  568.93  *  450.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  832.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.              *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)         *  831.36  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)         *  826.87  * Flow Area (sq ft)      *   14.84  * 1428.58  *  854.42  *
* E.G. Slope (ft/ft)     *0.002114  * Area (sq ft)           *   14.84  * 1428.58  * 4843.93  *
* Q Total (cfs)          *12600.00  * Flow (cfs)              *   15.38  *11688.71  *  895.92  *
* Top Width (ft)         * 1275.21  * Top Width (ft)         *    6.50  *  131.70  * 1137.00  *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *    1.04  *    8.18  *    1.05  *
* Max Chl Dpth (ft)      *   14.88  * Hydr. Depth (ft)       *    2.28  *   10.85  *    2.00  *
* Conv. Total (cfs)      *274048.6  * Conv. (cfs)            *   334.4  *254228.0  * 19486.1  *
* Length Wtd. (ft)       *    9.00  * Wetted Per. (ft)       *    7.94  *  136.25  *  427.95  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.25  *    1.38  *    0.26  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.26  *   11.32  *    0.28  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 2884.84  *10765.17  * 3437.48  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  397.41  *  597.07  *  573.34  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  834.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.              *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)         *  833.29  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)         *  829.31  * Flow Area (sq ft)      *   30.02  * 1682.45  * 1692.15  *
* E.G. Slope (ft/ft)     *0.002349  * Area (sq ft)           *   30.02  * 1682.45  * 7055.26  *
* Q Total (cfs)          *19100.00  * Flow (cfs)              *   41.47  *16183.63  * 2874.90  *
* Top Width (ft)         * 1296.83  * Top Width (ft)         *    9.25  *  131.70  * 1155.88  *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)       *    1.38  *    9.62  *    1.70  *
* Max Chl Dpth (ft)      *   16.81  * Hydr. Depth (ft)       *    3.25  *   12.77  *    3.85  *
* Conv. Total (cfs)      *394075.2  * Conv. (cfs)            *   855.7  *333904.0  * 59315.5  *
* Length Wtd. (ft)       *    9.00  * Wetted Per. (ft)       *   11.30  *  136.25  *  441.64  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.39  *    1.81  *    0.56  *
* Alpha                  *    2.50  * Stream Power (lb/ft s) *    0.54  *   17.42  *    0.95  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 4419.39  *12701.48  * 5554.81  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  529.72  *  620.39  *  720.89  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  837.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.              *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)         *  835.84  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)         *  832.41  * Flow Area (sq ft)      *   58.19  * 2017.79  * 2825.70  *
* E.G. Slope (ft/ft)     *0.002133  * Area (sq ft)           *   58.19  * 2017.79  *10023.38  *
* Q Total (cfs)          *27300.00  * Flow (cfs)              *   95.52  *20879.30  * 6325.18  *
* Top Width (ft)         * 1320.10  * Top Width (ft)         *   12.88  *  131.70  * 1175.53  *
* Vel Total (ft/s)       *    5.57  * Avg. Vel. (ft/s)       *    1.64  *   10.35  *    2.24  *
* Max Chl Dpth (ft)      *   19.36  * Hydr. Depth (ft)       *    4.52  *   15.32  *    6.27  *
```

```
* Conv. Total (cfs)      *591047.5  * Conv. (cfs)            *  2067.9  *452038.9  *136940.7  *
* Length Wtd. (ft)       *    9.00  * Wetted Per. (ft)       *   15.73  *  136.25  *  453.08  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.49  *    1.97  *    0.83  *
* Alpha                  *    2.68  * Stream Power (lb/ft s) *    0.81  *   20.41  *    1.86  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 7338.07  *15580.98  * 9398.09  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  890.18  *  648.56  * 1181.65  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  838.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)         *  837.65  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)         *  833.42  * Flow Area (sq ft)      *   83.90  * 2256.76  * 3650.31  *
* E.G. Slope (ft/ft)     *0.001890  * Area (sq ft)           *   83.90  * 2256.76  *12181.30  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *  146.43  *23681.79  * 9001.78  *
* Top Width (ft)         * 1350.14  * Top Width (ft)         *   15.46  *  131.70  * 1202.98  *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *    1.75  *   10.49  *    2.47  *
* Max Chl Dpth (ft)      *   21.17  * Hydr. Depth (ft)       *    5.43  *   17.14  *    7.95  *
* Conv. Total (cfs)      *755176.3  * Conv. (cfs)            *  3368.4  *544743.4  *207064.5  *
* Length Wtd. (ft)       *    9.00  * Wetted Per. (ft)       *   18.89  *  136.25  *  462.46  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.52  *    1.95  *    0.93  *
* Alpha                  *    2.70  * Stream Power (lb/ft s) *    0.91  *   20.51  *    2.30  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *10260.61  *17333.70  *13098.32  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1175.66  *  655.70  * 1625.94  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  840.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)         *  839.43  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)         *  834.33  * Flow Area (sq ft)      *  113.69  * 2491.32  * 4476.45  *
* E.G. Slope (ft/ft)     *0.001720  * Area (sq ft)           *  113.69  * 2491.32  *14344.42  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *  209.52  *26643.20  *11897.28  *
* Top Width (ft)         * 1376.03  * Top Width (ft)         *   18.00  *  131.70  * 1226.33  *
* Vel Total (ft/s)       *    5.47  * Avg. Vel. (ft/s)       *    1.84  *   10.69  *    2.66  *
* Max Chl Dpth (ft)      *   22.95  * Hydr. Depth (ft)       *    6.32  *   18.92  *    9.54  *
* Conv. Total (cfs)      *934222.6  * Conv. (cfs)            *  5051.3  *642340.2  *286831.1  *
* Length Wtd. (ft)       *    9.00  * Wetted Per. (ft)       *   21.99  *  136.25  *  473.15  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.56  *    1.96  *    1.02  *
* Alpha                  *    2.70  * Stream Power (lb/ft s) *    1.02  *   21.00  *    2.70  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *13050.15  *18554.10  *16826.74  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1371.50  *  656.64  * 2061.53  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  842.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)         *  841.63  * Reach Len. (ft)        *    9.00  *    9.00  *    9.00  *
* Crit W.S. (ft)         *  835.44  * Flow Area (sq ft)      *  156.62  * 2780.30  * 5519.60  *
* E.G. Slope (ft/ft)     *0.001570  * Area (sq ft)           *  156.62  * 2780.30  *17070.42  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *  306.80  *30562.38  *15830.82  *
* Top Width (ft)         * 1412.08  * Top Width (ft)         *   21.12  *  131.70  * 1259.26  *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)       *    1.96  *   10.99  *    2.87  *
* Max Chl Dpth (ft)      *   25.15  * Hydr. Depth (ft)       *    7.41  *   21.11  *   11.44  *
* Conv. Total (cfs)      *1178505.0  * Conv. (cfs)            *  7742.3  *771261.3  *399500.9  *
* Length Wtd. (ft)       *    9.00  * Wetted Per. (ft)       *   25.81  *  136.25  *  487.36  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.59  *    2.00  *    1.11  *
* Alpha                  *    2.69  * Stream Power (lb/ft s) *    1.17  *   21.99  *    3.18  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *18355.46  *20368.99  *23280.44  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1672.84  *  659.17  * 2480.66  *
*****************************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	834.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.	0.100	0.040	0.104
W.S. Elev (ft)	833.60	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	829.64	Flow Area (sq ft)	32.91	1722.70	1826.83
E.G. Slope (ft/ft)	0.002340	Area (sq ft)	32.91	1722.70	7408.86
Q Total (cfs)	20100.00	Flow (cfs)	46.79	16800.88	3252.33
Top Width (ft)	1299.62	Top Width (ft)	9.68	131.70	1158.24
Vel Total (ft/s)	5.61	Avg. Vel. (ft/s)	1.42	9.75	1.78
Max Chl Dpth (ft)	17.12	Hydr. Depth (ft)	3.40	13.08	4.14
Conv. Total (cfs)	415525.0	Conv. (cfs)	967.3	347322.6	67235.1
Length Wtd. (ft)	9.00	Wetted Per. (ft)	11.83	136.25	443.01
Min Ch El (ft)	816.48	Shear (lb/sq ft)	0.41	1.85	0.60
Alpha	2.54	Stream Power (lb/ft s)	0.58	18.01	1.07
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	5224.41	13640.21	6535.79
C & E Loss (ft)	0.02	Cum SA (acres)	626.80	630.70	799.70

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 26.514

INPUT
Description: MOPAC127
Distance from Upstream XS = 9
Deck/Roadway Width = 16
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
450	856.4	810	595.4	856.4	810	595.5	856.4	846.4
869.5	856.8	846.8	869.6	856.8	810	925	856.8	810
930	856	810						

Upstream Bridge Cross Section Data
Station Elevation Data num= 232

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	882.7	4.66	882.74	32.05	883.15	39.6	882.66	54.54	881.8
73.08	882	99.46	882.51	100.68	882.55	103.22	882.7	128.74	883.81
133.98	884.17	164.94	884.98	167.42	885.05	168.2	885	188.14	883.45
189.35	883.6	194.19	883.81	207.25	884.49	211.04	884.45	229.84	884.41
245.49	884.76	265.95	884.96	267.35	884.97	274.96	885.87	281.11	886.01
300.68	883.59	300.87	883.54	302.81	883.41	312.82	882.74	320.96	881.97
335.52	880.85	349.49	880.36	370.78	878.14	381.52	877.13	398.41	875.55
403.17	875.95	413.66	875.83	421.08	875.92	425.36	875.75	444.04	874.26
462.02	872.58	487.02	866.44	498.52	861.13	502.43	859.43	516.32	854.96
516.9	854.93	517.53	854.91	522.81	854.24	532.6	853	540.35	853.34
541.28	853.33	547.29	853.21	559.3	853.13	563.75	853.05	576.79	852.97
583.29	852.13	601.5	848.28	608.07	844.18	611.37	841.87	632.84	826.8
633.49	826.34	634.43	825.87	645.13	817.5	674.72	816.48	703	817.5
710.51	820.88	711.35	820.94	724.33	821.98	729.26	822.1	732.23	822.73
764.54	828.62	766.11	828.62	770.03	828.7	777.99	828.76	802.23	829.13
804.46	829.87	812.13	832.11	812.43	832.19	815.36	833.71	819.96	836.09
820.27	836.27	825.27	837.98	836.86	841.12	848.18	843.31	865.13	846.86
867.92	846.98	872.93	848.11	877.93	848.34	890.03	848.99	901.27	849.02
904.36	849.03	914.8	854.53	919.21	855.78	922.94	856.74	925.74	856.74
928.86	856.73	935.16	855.72	941.54	854.58	952.15	848.99	986.28	832.65
992.92	831.38	1004.68	829.13	1006.15	829.22	1039.8	830.56	1049.45	830.47
1059.73	830.69	1075.71	830.13	1093	829.05	1141.35	827.35	1149.87	826.97
1154.87	826.63	1172.1	828.89	1192.63	830.66	1194.93	830.59	1196.97	830.59
1234.92	829.94	1266.9	829.99	1299.17	829.53	1327.89	829.03	1344.04	828.93
1374.8	828.78	1417.21	827.74	1419.35	827.68	1421.83	827.6	1462.91	826.07

```
 1472.05  825.63 1483.83   825.3  1511.9  824.54  1541.1  823.71 1549.11  824.32
  1554.8  824.44  1595.1  825.98 1602.23  826.25 1627.11  827.17  1629.5  827.14
 1632.42  827.14 1674.55  826.53 1684.22  828.06 1686.05  828.05 1702.09  826.28
 1731.47  823.32 1737.31   823.4 1748.15  823.52    1751  823.58 1762.89  822.54
 1765.59  822.36 1783.63  822.36 1792.82  822.36  1812.3  822.36 1816.89  822.62
 1822.57  822.89 1836.27  823.34 1850.88  823.88 1862.35  824.14 1886.68   824.7
 1905.52  824.75 1920.06  824.71  1931.8  824.67 1953.85  824.77 1982.01  824.54
 1997.84  823.77  2005.8   823.4 2013.42  823.19 2031.46  822.34 2043.49  822.35
 2064.72  822.36 2068.85  822.97  2080.8  829.61 2087.29  832.34 2101.11  836.08
 2114.52  837.06 2114.68  837.07 2114.98  837.11 2133.89  839.64  2173.9  844.07
 2191.69     846 2218.55  847.25 2238.13  847.85  2298.6  848.85 2305.76  848.95
 2308.56  848.99 2365.15  848.64 2382.47  848.33 2409.12  847.86 2429.16   848.4
 2454.96  849.11  2488.4  849.26 2506.96  849.35 2514.13  849.51 2521.81  849.54
 2528.32  849.62 2542.98  850.12 2571.17  850.55 2572.41  850.57 2573.32   850.6
  2595.5  851.42 2630.28  852.01 2643.86  852.22 2665.49  852.49 2701.01  852.85
 2714.55  853.01 2739.62  853.49 2769.29  854.03  2823.8  854.05 2828.01   854.1
  2842.6  854.06 2875.51  853.84 2906.12  853.39 2909.86  853.42 2920.66  853.17
 2929.62  853.01  2933.9  852.79 2938.24  852.62 2941.81  852.62 2948.12  852.89
 2949.81  852.94 2962.07  853.16 2972.11  852.95 2988.49   852.7 2993.39  852.52
 2997.32  852.15 3000.67   852.1 3003.47  852.16 3006.24  852.24 3010.83  852.38
 3026.22  853.64 3028.03  853.74 3029.27  853.82 3033.17  854.09 3049.08  855.13
 3054.71  855.73 3063.11  856.61

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09  403.17      .1  632.84     .04  764.54    .105 1299.17      .1
 2191.69     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        632.84  764.54             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  913.04    1375     831       F
    1375 3063.11     845       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1400    1684     828

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
     450   856.4     810   595.4   856.4     810   595.5   856.4   846.4
   869.5   856.8   846.8   869.6   856.8     810     925   856.8     810
     930     856     810

Downstream Bridge Cross Section Data
Station Elevation Data    num=     232
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   882.7    4.66  882.74   32.05  883.15    39.6  882.66   54.54   881.8
   73.08     882   99.46  882.51  100.68  882.55  103.22   882.7  128.74  883.81
  133.98  884.17  164.94  884.98  167.42  885.05   168.2     885  188.14  883.45
  189.35   883.6  194.19  883.81  207.25  884.49  211.04  884.45  229.84  884.41
  245.49  884.76  265.95  884.96  267.35  884.97  274.96  885.87  281.11  886.01
  300.68  883.59  300.87  883.54  302.81  883.41  312.82  882.74  320.96  881.97
  335.52  880.85  349.49  880.36  370.78  878.14  381.52  877.13  398.41  875.55
  403.17  875.95  413.66  875.83  421.08  875.92  425.36  875.75  444.04  874.26
  462.02  872.58  487.02  866.44  498.52  861.13  502.43  859.43  516.32  854.96
   516.9  854.93  517.53  854.91  522.81  854.24   532.6     853  540.35  853.34
  541.28  853.33  547.29  853.21   559.3  853.13  563.75  853.05  576.79  852.97
  583.29  852.13   601.5  848.28  608.07  844.18  611.37  841.87  632.84   826.8
  633.49  826.34  634.43  825.87  645.13   817.5  674.72  816.48     703   817.5
  710.51  820.88  711.35  820.94  724.33  821.98  729.26   822.1  732.23  822.73
  764.54  828.62  766.11  828.62  770.03   828.7  777.99  828.76  802.23  829.13
  804.46  829.87  812.13  832.11  812.43  832.19  815.36  833.71  819.96  836.09
  820.27  836.27  825.27  837.98  836.86  841.12  848.18  843.31  865.13  846.86
  867.92  846.98  872.93  848.11  877.93  848.34  890.03  848.99  901.27  849.02
  904.36  849.03   914.8  854.53  919.21  855.78  922.94  856.74  925.74  856.74
  928.86  856.73  935.16  855.72  941.54  854.58  952.15  848.99  986.28  832.65
  997.22  831.06 1004.68  829.13 1006.15  829.22  1039.8  830.56 1049.45  830.47
 1059.73  830.69 1075.71  830.13    1093  829.05 1141.35  827.35 1149.87  826.97
 1154.87  826.63  1172.1  828.89 1192.63  830.66 1194.93  830.59 1196.97  830.59
 1234.92  829.94  1266.9  829.99 1299.17  829.53 1327.89  829.03 1344.04  828.93
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  1374.8  828.78 1417.21  827.74 1419.35  827.68 1421.83   827.6 1462.91  826.07
 1472.05  825.63 1483.83   825.3  1511.9  824.54  1541.1  823.71 1549.11  824.32
  1554.8  824.44  1595.1  825.98 1602.23  826.25 1627.11  827.17  1629.5  827.14
 1632.42  827.14 1674.55  826.53 1684.22  828.06 1686.05  828.05 1702.09  826.28
 1731.47  823.32 1737.31   823.4 1748.15  823.52    1751  823.58 1762.89  822.54
 1765.59  822.36 1783.63  822.36 1792.82  822.36  1812.3  822.36 1816.89  822.62
 1822.57  822.89 1836.27  823.34 1850.88  823.88 1862.35  824.14 1886.68   824.7
 1905.52  824.75 1920.06  824.71  1931.8  824.67 1953.85  824.77 1982.01  824.54
 1997.84  823.77  2005.8   823.4 2013.42  823.19 2031.46  822.34 2043.49  822.35
 2064.72  822.36 2068.85  822.97  2080.8  829.61 2087.29  832.34 2101.11  836.08
 2114.52  837.06 2114.68  837.07 2114.98  837.11 2133.89  839.64  2173.9  844.07
 2191.69     846 2218.55  847.25 2238.13  847.85  2298.6  848.85 2305.76  848.95
 2308.56  848.99 2365.15  848.64 2382.47  848.33 2409.12  847.86 2429.16   848.4
 2454.96  849.11  2488.4  849.26 2506.96  849.35 2514.13  849.51 2521.81  849.54
 2528.32  849.62 2542.98  850.12 2571.17  850.55 2572.41  850.57 2573.32   850.6
  2595.5  851.42 2630.28  852.01 2643.86  852.22 2665.49  852.49 2701.01  852.85
 2714.55  853.01 2739.62  853.49 2769.29  854.03  2823.8  854.05 2828.01   854.1
  2842.6  854.06 2875.51  853.84 2906.12  853.39 2909.86  853.42 2920.66  853.17
 2929.62  853.01  2933.9  852.79 2938.24  852.62 2941.81  852.62 2948.12  852.89
 2949.81  852.94 2962.07  853.16 2972.11  852.95 2988.49   852.7 2993.39  852.52
 2997.32  852.15 3000.67   852.1 3003.47  852.16 3006.24  852.24 3010.83  852.38
 3026.22  853.64 3028.03  853.74 3029.27  853.82 3033.17  854.09 3049.08  855.13
 3054.71  855.73 3063.11  856.61

Manning's n Values        num=       6
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0     .09  403.17      .1  632.84     .04  764.54    .105 1299.17      .1
 2191.69     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        632.84  764.54              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  913.04    1375     831       F
    1375 3063.11     845       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1400    1684     828

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  6

Pier Data
Pier Station     Upstream=     614    Downstream=     614
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     810     2.5     850
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     810     2.5     850

Pier Data
Pier Station     Upstream=     636    Downstream=     636
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     7.4     810     7.4     850
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     7.4     810     7.4     850

Pier Data
Pier Station     Upstream=     697    Downstream=     697
Upstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
       8     810       8     850
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     810       8     850

Pier Data
Pier Station     Upstream=     768    Downstream=     768
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     810       8     850
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     810       8     850

Pier Data
Pier Station     Upstream=     829    Downstream=     829
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     7.4     810     7.4     850
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     7.4     810     7.4     850

Pier Data
Pier Station     Upstream=     851    Downstream=     851
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     810     2.5     850
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     810     2.5     850

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
       Yarnell                 KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. US. (ft)          *     828.20  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     827.59  * E.G. Elev (ft)         *     828.13  *     828.13  *
* Q Total (cfs)          *    5870.00  * W.S. Elev (ft)         *     827.29  *     827.29  *
* Q Bridge (cfs)         *    5870.00  * Crit W.S. (ft)         *     823.95  *     823.95  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      10.81  *      10.81  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.36  *       7.36  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     797.06  *     797.06  *
* Weir Submerg           *             * Froude # Chl           *       0.48  *       0.48  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    4857.19  *    4857.19  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *       7.26  *       7.26  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     138.16  *     138.16  *
* Delta EG (ft)          *       0.25  * Conv. Total (cfs)      *    95380.6  *    95380.6  *
* Delta WS (ft)          *       0.30  * Top Width (ft)         *     109.71  *     109.71  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       7.36  * C & E Loss (ft)        *             *             *
```

```
* Coef of Q              *            * Shear Total (lb/sq ft) *       1.36  *       1.36  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *      10.05  *      10.05  *
*******************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. US. (ft)          *     831.39  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     830.30  * E.G. Elev (ft)         *     831.31  *     831.21  *
* Q Total (cfs)          *   10900.00  * W.S. Elev (ft)         *     829.73  *     829.58  *
* Q Bridge (cfs)         *   10900.00  * Crit W.S. (ft)         *     826.70  *     826.70  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      13.25  *      13.10  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.85  *      10.06  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1106.60  *    1083.55  *
* Weir Submerg           *             * Froude # Chl           *       0.59  *       0.60  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    9221.72  *    9116.13  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *       7.28  *       7.16  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     193.38  *     191.72  *
* Delta EG (ft)          *       0.33  * Conv. Total (cfs)       *   147031.0  *   143321.5  *
* Delta WS (ft)          *       0.44  * Top Width (ft)         *     151.97  *     151.30  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *       0.09  *       0.02  *
* BR Open Vel (ft/s)     *      10.06  * C & E Loss (ft)        *       0.01  *       0.13  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.96  *       2.04  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      19.34  *      20.53  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. US. (ft)          *     832.33  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     831.36  * E.G. Elev (ft)         *     832.22  *     832.11  *
* Q Total (cfs)          *   12600.00  * W.S. Elev (ft)         *     830.39  *     830.22  *
* Q Bridge (cfs)         *   12600.00  * Crit W.S. (ft)         *     827.46  *     827.46  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      13.91  *      13.74  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.43  *      10.67  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1208.48  *    1181.17  *
* Weir Submerg           *             * Froude # Chl           *       0.61  *       0.62  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   10807.41  *   10680.23  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *       7.79  *       7.66  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     200.83  *     198.83  *
* Delta EG (ft)          *       0.39  * Conv. Total (cfs)       *   163646.2  *   159160.9  *
* Delta WS (ft)          *       0.81  * Top Width (ft)         *     155.13  *     154.27  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *       0.10  *       0.02  *
* BR Open Vel (ft/s)     *      10.67  * C & E Loss (ft)        *       0.01  *       0.15  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.23  *       2.32  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      23.22  *      24.79  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*******************************************************************************************
* E.G. US. (ft)          *     834.52  * Element                *Inside BR US *Inside BR DS *
```

```
* W.S. US. (ft)          *     833.29  * E.G. Elev (ft)         *     834.46  *     834.37  *
* Q Total (cfs)          *   19100.00  * W.S. Elev (ft)         *     832.97  *     832.76  *
* Q Bridge (cfs)         *   15995.68  * Crit W.S. (ft)         *     831.32  *     831.30  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      16.48  *      16.28  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.38  *       6.64  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2993.06  *    2876.96  *
* Weir Submerg           *             * Froude # Chl           *       0.54  *       0.56  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   18309.39  *   17927.81  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *       5.38  *       5.19  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     619.00  *     616.57  *
* Delta EG (ft)          *       0.23  * Conv. Total (cfs)      *   279309.0  *   269083.0  *
* Delta WS (ft)          *       0.38  * Top Width (ft)         *    1270.44  *    1268.61  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *       0.08  *       0.02  *
* BR Open Vel (ft/s)     *      10.06  * C & E Loss (ft)        *       0.01  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.41  *       1.47  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.01  *       9.74  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     837.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     835.84  * E.G. Elev (ft)         *     837.10  *     837.03  *
* Q Total (cfs)          *   27300.00  * W.S. Elev (ft)         *     835.82  *     835.72  *
* Q Bridge (cfs)         *   19815.06  * Crit W.S. (ft)         *     833.08  *     833.09  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.34  *      19.24  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.93  *       6.02  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4603.95  *    4538.46  *
* Weir Submerg           *             * Froude # Chl           *       0.48  *       0.49  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   30735.14  *   30341.89  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *       8.06  *       7.95  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     653.96  *     652.68  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *   442808.5  *   435674.8  *
* Delta WS (ft)          *       0.17  * Top Width (ft)         *    1296.57  *    1295.59  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *       0.06  *       0.01  *
* BR Open Vel (ft/s)     *       9.46  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.67  *       1.70  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.91  *      10.25  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*******************************************************************************************
* E.G. US. (ft)          *     838.91  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     837.65  * E.G. Elev (ft)         *     838.86  *     838.80  *
* Q Total (cfs)          *   32830.00  * W.S. Elev (ft)         *     837.71  *     837.63  *
* Q Bridge (cfs)         *   22078.82  * Crit W.S. (ft)         *     833.98  *     833.98  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.23  *      21.15  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.77  *       5.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5693.19  *    5641.83  *
* Weir Submerg           *             * Froude # Chl           *       0.44  *       0.45  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   41393.12  *   40993.27  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *       9.76  *       9.68  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     678.33  *     677.30  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *   570416.3  *   564259.2  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *    1327.55  *    1326.43  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *       0.05  *       0.01  *
* BR Open Vel (ft/s)     *       9.06  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.74  *       1.76  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      10.01  *      10.24  *
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*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     840.69  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     839.43  * E.G. Elev (ft)         *     840.61  *     840.56  *
* Q Total (cfs)          *   38750.00  * W.S. Elev (ft)         *     839.55  *     839.48  *
* Q Bridge (cfs)         *   24486.09  * Crit W.S. (ft)         *     834.84  *     834.81  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.07  *      23.00  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.72  *       5.76  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6770.45  *    6726.48  *
* Weir Submerg           *             * Froude # Chl           *       0.42  *       0.42  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   53925.04  *   53506.84  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *      11.48  *      11.41  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     698.91  *     698.25  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)       *   708662.6  *   702908.8  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *    1347.96  *    1347.32  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *       0.05  *       0.01  *
* BR Open Vel (ft/s)     *       8.81  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.81  *       1.83  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      10.35  *      10.53  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     842.90  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     841.63  * E.G. Elev (ft)         *     842.80  *     842.76  *
* Q Total (cfs)          *   46700.00  * W.S. Elev (ft)         *     841.79  *     841.74  *
* Q Bridge (cfs)         *   27662.48  * Crit W.S. (ft)         *     835.86  *     835.86  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.31  *      25.26  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.76  *       5.79  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8107.57  *    8069.74  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.40  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   72221.76  *   71786.79  *
* Min El Weir Flow (ft)  *     831.01  * Hydr Depth (ft)        *      13.44  *      13.39  *
* Min El Prs (ft)        *     846.79  * W.P. Total (ft)        *     734.18  *     733.14  *
* Delta EG (ft)          *       0.18  * Conv. Total (cfs)       *   894588.0  *   889247.8  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *    1381.70  *    1380.73  *
* BR Open Area (sq ft)   *    4227.68  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       8.62  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.88  *       1.90  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      10.82  *      10.97  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     834.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     833.60  * E.G. Elev (ft)         *     834.79  *     834.70  *
* Q Total (cfs)          *   20100.00  * W.S. Elev (ft)         *     833.32  *     833.14  *
```

* Q Bridge (cfs)	* 16504.63	* Crit W.S. (ft)	* 831.57	* 831.56	*
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 16.84	* 16.66	*
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 6.30	* 6.51	*
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 3191.43	* 3085.27	*
* Weir Submerg	*	* Froude # Chl	* 0.53	* 0.55	*
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 19620.99	* 19236.63	*
* Min El Weir Flow (ft)	* 831.01	* Hydr Depth (ft)	* 5.72	* 5.54	*
* Min El Prs (ft)	* 846.79	* W.P. Total (ft)	* 623.36	* 621.15	*
* Delta EG (ft)	* 0.21	* Conv. Total (cfs)	* 297546.7	* 287881.8	*
* Delta WS (ft)	* 0.34	* Top Width (ft)	* 1273.70	* 1272.04	*
* BR Open Area (sq ft)	* 4227.68	* Frctn Loss (ft)	* 0.08	* 0.02	*
* BR Open Vel (ft/s)	* 9.99	* C & E Loss (ft)	* 0.01	* 0.06	*
* Coef of Q	*	* Shear Total (lb/sq ft)	* 1.46	* 1.51	*
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	* 9.19	* 9.85	*

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 26.512

INPUT
Description: Downstream side of MOPAC127, copied from upstream side. Low area blocked in overbank belongs to small tributary.
Station Elevation Data num= 232

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	882.7	4.66	882.74	32.05	883.15	39.6	882.66	54.54	881.8
73.08	882	99.46	882.51	100.68	882.55	103.22	882.7	128.74	883.81
133.98	884.17	164.94	884.98	167.42	885.05	168.2	885	188.14	883.45
189.35	883.6	194.19	883.81	207.25	884.49	211.04	884.45	229.84	884.41
245.49	884.76	265.95	884.96	267.35	884.97	274.96	885.87	281.11	886.01
300.68	883.59	300.87	883.54	302.81	883.41	312.82	882.74	320.96	881.97
335.52	880.85	349.49	880.36	370.78	878.14	381.52	877.13	398.41	875.55
403.17	875.95	413.66	875.83	421.08	875.92	425.36	875.75	444.04	874.26
462.02	872.58	487.02	866.44	498.52	861.13	502.43	859.43	516.32	854.96
516.9	854.93	517.53	854.91	522.81	854.24	532.6	853	540.35	853.34
541.28	853.33	547.29	853.21	559.3	853.13	563.75	853.05	576.79	852.97
583.29	852.13	601.5	848.28	608.07	844.18	611.37	841.87	632.84	826.8
633.49	826.34	634.43	825.87	645.13	817.5	674.72	816.48	703	817.5
710.51	820.88	711.35	820.94	724.33	821.98	729.26	822.1	732.23	822.73
764.54	828.62	766.11	828.62	770.03	828.7	777.99	828.76	802.23	829.13
804.46	829.87	812.13	832.11	812.43	832.19	815.36	833.71	819.96	836.09
820.27	836.27	825.27	837.98	836.86	841.12	848.18	843.31	865.13	846.86
867.92	846.98	872.93	848.11	877.93	848.34	890.03	848.99	901.27	849.02
904.36	849.03	914.8	854.53	919.21	855.78	922.94	856.74	925.74	856.74
928.86	856.73	935.16	855.72	941.54	854.58	952.15	848.99	986.28	832.65
997.22	831.06	1004.68	829.13	1006.15	829.22	1039.8	830.56	1049.45	830.47
1059.73	830.69	1075.71	830.13	1093	829.05	1141.35	827.35	1149.87	826.97
1154.87	826.63	1172.1	828.89	1192.63	830.66	1194.93	830.59	1196.97	830.59
1234.92	829.94	1266.9	829.99	1299.17	829.53	1327.89	829.03	1344.04	828.93
1374.8	828.78	1417.21	827.74	1419.35	827.68	1421.83	827.6	1462.91	826.07
1472.05	825.63	1483.83	825.3	1511.9	824.54	1541.1	823.71	1549.11	824.32
1554.8	824.44	1595.1	825.98	1602.23	826.25	1627.11	827.17	1629.5	827.14
1632.42	827.14	1674.55	826.53	1684.22	828.06	1686.05	828.05	1702.09	826.28
1731.47	823.32	1737.31	823.4	1748.15	823.52	1751	823.58	1762.89	822.54
1765.59	822.36	1783.63	822.36	1792.82	822.36	1812.3	822.36	1816.89	822.62
1822.57	822.89	1836.27	823.34	1850.88	823.88	1862.35	824.14	1886.68	824.7
1905.52	824.75	1920.06	824.71	1931.8	824.67	1953.85	824.77	1982.01	824.54
1997.84	823.77	2005.8	823.4	2013.42	823.19	2031.46	822.34	2043.49	822.35
2064.72	822.36	2068.85	822.97	2080.8	829.61	2087.29	832.34	2101.11	836.08
2114.52	837.06	2114.68	837.07	2114.98	837.11	2133.89	839.64	2173.9	844.07
2191.69	846	2218.55	847.25	2238.13	847.85	2298.6	848.85	2305.76	848.95
2308.56	848.99	2365.15	848.64	2382.47	848.33	2409.12	847.86	2429.16	848.4
2454.96	849.11	2488.4	849.26	2506.96	849.35	2514.13	849.51	2521.81	849.54
2528.32	849.62	2542.98	850.12	2571.17	850.55	2572.41	850.57	2573.32	850.6

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  2595.5  851.42 2630.28  852.01 2643.86  852.22 2665.49  852.49 2701.01  852.85
 2714.55  853.01 2739.62  853.49 2769.29  854.03  2823.8  854.05 2828.01   854.1
  2842.6  854.06 2875.51  853.84 2906.12  853.39 2909.86  853.42 2920.66  853.17
 2929.62  853.01  2933.9  852.79 2938.24  852.62 2941.81  852.62 2948.12  852.89
 2949.81  852.94 2962.07  853.16 2972.11  852.95 2988.49   852.7 2993.39  852.52
 2997.32  852.15 3000.67   852.1 3003.47  852.16 3006.24  852.24 3010.83  852.38
 3026.22  853.64 3028.03  853.74 3029.27  853.82 3033.17  854.09 3049.08  855.13
 3054.71  855.73 3063.11  856.61

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09  403.17      .1  632.84     .04  764.54    .105 1299.17      .1
 2191.69     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         632.84  764.54           1126.4    1146    1023              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  913.04    1375     831       F
    1375 3063.11     845       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1400    1684     828

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  827.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  827.29  * Reach Len. (ft)        * 1126.40  * 1146.00  * 1023.00  *
* Crit W.S. (ft)         *  823.51  * Flow Area (sq ft)      *    0.17  *  897.05  *          *
* E.G. Slope (ft/ft)     *0.002334  * Area (sq ft)           *    0.17  *  897.05  * 1356.85  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    0.04  * 5869.96  *          *
* Top Width (ft)         *  526.06  * Top Width (ft)         *    0.70  *  124.41  *  400.95  *
* Vel Total (ft/s)       *    6.54  * Avg. Vel. (ft/s)       *    0.25  *    6.54  *          *
* Max Chl Dpth (ft)      *   10.81  * Hydr. Depth (ft)       *    0.25  *    7.21  *          *
* Conv. Total (cfs)      *121506.2  * Conv. (cfs)            *     0.9  *121505.4  *          *
* Length Wtd. (ft)       * 1144.93  * Wetted Per. (ft)       *    0.86  *  128.84  *          *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.03  *    1.01  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.01  *    6.64  *          *
* Frctn Loss (ft)        *    3.18  * Cum Volume (acre-ft)   *  860.17  * 6785.58  *  850.77  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  192.17  *  527.09  *  237.91  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  831.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  829.86  * Reach Len. (ft)        * 1126.40  * 1146.00  * 1023.00  *
* Crit W.S. (ft)         *  826.13  * Flow Area (sq ft)      *    6.66  * 1230.16  *   38.53  *
* E.G. Slope (ft/ft)     *0.003006  * Area (sq ft)           *    6.66  * 1230.16  * 3198.99  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *    6.30  *10864.54  *   29.16  *
* Top Width (ft)         * 1104.67  * Top Width (ft)         *    4.36  *  131.70  *  968.61  *
* Vel Total (ft/s)       *    8.55  * Avg. Vel. (ft/s)       *    0.95  *    8.83  *    0.76  *
* Max Chl Dpth (ft)      *   13.38  * Hydr. Depth (ft)       *    1.53  *    9.34  *    0.97  *
* Conv. Total (cfs)      *198793.0  * Conv. (cfs)            *   114.9  *198146.4  *   531.7  *
* Length Wtd. (ft)       * 1139.83  * Wetted Per. (ft)       *    5.32  *  136.25  *   40.00  *
* Min Ch El (ft)         *  816.48  * Shear (lb/sq ft)       *    0.23  *    1.69  *    0.18  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.22  *   14.97  *    0.14  *
* Frctn Loss (ft)        *    3.40  * Cum Volume (acre-ft)   * 2022.34  * 9067.27  * 2304.67  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  333.21  *  568.85  *  450.73  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	831.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.38	Wt. n-Val.	0.100	0.040	0.105
W.S. Elev (ft)	830.55	Reach Len. (ft)	1126.40	1146.00	1023.00
Crit W.S. (ft)	826.87	Flow Area (sq ft)	10.02	1321.52	67.02
E.G. Slope (ft/ft)	0.003143	Area (sq ft)	10.02	1321.52	3923.06
Q Total (cfs)	12600.00	Flow (cfs)	11.11	12516.83	72.06
Top Width (ft)	1243.67	Top Width (ft)	5.34	131.70	1106.63
Vel Total (ft/s)	9.01	Avg. Vel. (ft/s)	1.11	9.47	1.08
Max Chl Dpth (ft)	14.07	Hydr. Depth (ft)	1.88	10.03	1.59
Conv. Total (cfs)	224759.3	Conv. (cfs)	198.2	223275.8	1285.3
Length Wtd. (ft)	1138.46	Wetted Per. (ft)	6.53	136.25	42.47
Min Ch El (ft)	816.48	Shear (lb/sq ft)	0.30	1.90	0.31
Alpha	1.10	Stream Power (lb/ft s)	0.33	18.02	0.33
Frctn Loss (ft)	3.39	Cum Volume (acre-ft)	2884.83	10764.34	3436.73
C & E Loss (ft)	0.09	Cum SA (acres)	397.41	596.99	573.14

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	834.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.	0.100	0.040	0.104
W.S. Elev (ft)	832.91	Reach Len. (ft)	1126.40	1146.00	1023.00
Crit W.S. (ft)	829.31	Flow Area (sq ft)	26.58	1631.96	1519.09
E.G. Slope (ft/ft)	0.002697	Area (sq ft)	26.58	1631.96	6608.02
Q Total (cfs)	19100.00	Flow (cfs)	37.78	16480.83	2581.39
Top Width (ft)	1293.33	Top Width (ft)	8.70	131.70	1152.92
Vel Total (ft/s)	6.01	Avg. Vel. (ft/s)	1.42	10.10	1.70
Max Chl Dpth (ft)	16.43	Hydr. Depth (ft)	3.05	12.39	3.46
Conv. Total (cfs)	367805.6	Conv. (cfs)	727.5	317368.8	49709.4
Length Wtd. (ft)	1127.47	Wetted Per. (ft)	10.63	136.25	439.95
Min Ch El (ft)	816.48	Shear (lb/sq ft)	0.42	2.02	0.58
Alpha	2.45	Stream Power (lb/ft s)	0.60	20.36	0.99
Frctn Loss (ft)	2.91	Cum Volume (acre-ft)	4419.38	12700.45	5550.25
C & E Loss (ft)	0.05	Cum SA (acres)	529.72	620.30	720.10

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	837.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.34	Wt. n-Val.	0.100	0.040	0.104
W.S. Elev (ft)	835.67	Reach Len. (ft)	1126.40	1146.00	1023.00
Crit W.S. (ft)	832.42	Flow Area (sq ft)	56.07	1995.95	2746.46
E.G. Slope (ft/ft)	0.002241	Area (sq ft)	56.07	1995.95	9823.92
Q Total (cfs)	27300.00	Flow (cfs)	93.19	21016.75	6190.06
Top Width (ft)	1318.59	Top Width (ft)	12.64	131.70	1174.25
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)	1.66	10.53	2.25
Max Chl Dpth (ft)	19.19	Hydr. Depth (ft)	4.44	15.16	6.11
Conv. Total (cfs)	576627.8	Conv. (cfs)	1968.3	443913.7	130745.9
Length Wtd. (ft)	1119.70	Wetted Per. (ft)	15.44	136.25	452.36
Min Ch El (ft)	816.48	Shear (lb/sq ft)	0.51	2.05	0.85
Alpha	2.67	Stream Power (lb/ft s)	0.84	21.59	1.91
Frctn Loss (ft)	2.47	Cum Volume (acre-ft)	7338.04	15579.72	9391.27
C & E Loss (ft)	0.00	Cum SA (acres)	890.17	648.47	1180.85

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

```
*****************************************************************************************
* E.G. Elev (ft)          *  838.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.31  * Wt. n-Val.              *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)          *  837.46  * Reach Len. (ft)        * 1126.40  * 1146.00  * 1023.00  *
* Crit W.S. (ft)          *  833.42  * Flow Area (sq ft)      *   80.96  * 2231.49  * 3557.71  *
* E.G. Slope (ft/ft)      *0.001987  * Area (sq ft)           *   80.96  * 2231.49  *11946.06  *
* Q Total (cfs)           *32830.00  * Flow (cfs)             *  143.17  *23831.07  * 8855.76  *
* Top Width (ft)          * 1347.47  * Top Width (ft)         *   15.19  *  131.70  * 1200.58  *
* Vel Total (ft/s)        *    5.59  * Avg. Vel. (ft/s)       *    1.77  *   10.68  *    2.49  *
* Max Chl Dpth (ft)       *   20.98  * Hydr. Depth (ft)       *    5.33  *   16.94  *    7.77  *
* Conv. Total (cfs)       *736491.6  * Conv. (cfs)            *  3211.9  *534614.2  *198665.6  *
* Length Wtd. (ft)        * 1116.14  * Wetted Per. (ft)       *   18.56  *  136.25  *  461.45  *
* Min Ch El (ft)          *  816.48  * Shear (lb/sq ft)       *    0.54  *    2.03  *    0.96  *
* Alpha                   *    2.70  * Stream Power (lb/ft s) *    0.96  *   21.70  *    2.38  *
* Frctn Loss (ft)         *    2.26  * Cum Volume (acre-ft)   *10260.56  *17332.28  *13089.97  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         * 1175.65  *  655.61  * 1625.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  840.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.30  * Wt. n-Val.              *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)          *  839.22  * Reach Len. (ft)        * 1126.40  * 1146.00  * 1023.00  *
* Crit W.S. (ft)          *  834.33  * Flow Area (sq ft)      *  109.93  * 2463.59  * 4373.20  *
* E.G. Slope (ft/ft)      *0.001807  * Area (sq ft)           *  109.93  * 2463.59  *14081.86  *
* Q Total (cfs)           *38750.00  * Flow (cfs)             *  205.30  *26798.45  *11746.26  *
* Top Width (ft)          * 1372.94  * Top Width (ft)         *   17.70  *  131.70  * 1223.54  *
* Vel Total (ft/s)        *    5.58  * Avg. Vel. (ft/s)       *    1.87  *   10.88  *    2.69  *
* Max Chl Dpth (ft)       *   22.74  * Hydr. Depth (ft)       *    6.21  *   18.71  *    9.35  *
* Conv. Total (cfs)       *911642.9  * Conv. (cfs)            *  4829.9  *630467.4  *276345.6  *
* Length Wtd. (ft)        * 1113.39  * Wetted Per. (ft)       *   21.62  *  136.25  *  471.89  *
* Min Ch El (ft)          *  816.48  * Shear (lb/sq ft)       *    0.57  *    2.04  *    1.05  *
* Alpha                   *    2.70  * Stream Power (lb/ft s) *    1.07  *   22.19  *    2.81  *
* Frctn Loss (ft)         *    2.12  * Cum Volume (acre-ft)   *13050.07  *18552.53  *16816.87  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         * 1371.49  *  656.56  * 2060.69  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  842.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.32  * Wt. n-Val.              *   0.100  *   0.040  *   0.104  *
* W.S. Elev (ft)          *  841.40  * Reach Len. (ft)        * 1126.40  * 1146.00  * 1023.00  *
* Crit W.S. (ft)          *  835.45  * Flow Area (sq ft)      *  151.85  * 2750.34  * 5405.43  *
* E.G. Slope (ft/ft)      *0.001645  * Area (sq ft)           *  151.85  * 2750.34  *16779.77  *
* Q Total (cfs)           *46700.00  * Flow (cfs)             *  301.32  *30719.61  *15679.08  *
* Top Width (ft)          * 1408.05  * Top Width (ft)         *   20.80  *  131.70  * 1255.55  *
* Vel Total (ft/s)        *    5.62  * Avg. Vel. (ft/s)       *    1.98  *   11.17  *    2.90  *
* Max Chl Dpth (ft)       *   24.92  * Hydr. Depth (ft)       *    7.30  *   20.88  *   11.24  *
* Conv. Total (cfs)       *1151492.0  * Conv. (cfs)            *  7429.6  *757460.0  *386602.4  *
* Length Wtd. (ft)        * 1110.70  * Wetted Per. (ft)       *   25.41  *  136.25  *  485.66  *
* Min Ch El (ft)          *  816.48  * Shear (lb/sq ft)       *    0.61  *    2.07  *    1.14  *
* Alpha                   *    2.69  * Stream Power (lb/ft s) *    1.22  *   23.15  *    3.32  *
* Frctn Loss (ft)         *    2.00  * Cum Volume (acre-ft)   *18355.36  *20367.24  *23268.67  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         * 1672.82  *  659.09  * 2479.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
```

* E.G. Elev (ft)	* 834.63	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 1.37	* Wt. n-Val.	* 0.100	* 0.040	* 0.104	*
* W.S. Elev (ft)	* 833.25	* Reach Len. (ft)	* 1126.40	* 1146.00	* 1023.00	*
* Crit W.S. (ft)	* 829.64	* Flow Area (sq ft)	* 29.67	* 1677.52	* 1671.04	*
* E.G. Slope (ft/ft)	*0.002640	* Area (sq ft)	* 29.67	* 1677.52	* 7007.33	*
* Q Total (cfs)	*20100.00	* Flow (cfs)	* 43.29	*17071.21	* 2985.50	*
* Top Width (ft)	* 1296.49	* Top Width (ft)	* 9.20	* 131.70	* 1155.59	*
* Vel Total (ft/s)	* 5.95	* Avg. Vel. (ft/s)	* 1.46	* 10.18	* 1.79	*
* Max Chl Dpth (ft)	* 16.77	* Hydr. Depth (ft)	* 3.23	* 12.74	* 3.80	*
* Conv. Total (cfs)	*391225.2	* Conv. (cfs)	* 842.6	*332273.0	* 58109.7	*
* Length Wtd. (ft)	* 1126.32	* Wetted Per. (ft)	* 11.23	* 136.25	* 441.50	*
* Min Ch El (ft)	* 816.48	* Shear (lb/sq ft)	* 0.44	* 2.03	* 0.62	*
* Alpha	* 2.50	* Stream Power (lb/ft s)	* 0.63	* 20.65	* 1.11	*
* Frctn Loss (ft)	* 2.85	* Cum Volume (acre-ft)	* 5224.40	*13639.15	* 6530.95	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	* 626.80	* 630.62	* 798.90	*

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 26.295

INPUT
Description:
Station Elevation Data num= 223

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	877.4	6.45	876.32	6.5	876.32	13.58	877.07	33.95	877.3
59.01	877.84	62.72	878.09	69.23	879.09	73.4	879.08	86.16	879.64
105.25	877.59	115.43	875.99	117.36	876.56	121.51	875.88	131.04	875.56
150.99	868.94	164	864.77	173.24	863.9	176.22	863.67	190.56	856.11
193.94	854.35	194.64	854.5	197.24	855.03	202.78	856.17	203.78	856.17
207.8	856.18	218.98	854.56	220.18	854.38	235.6	864.47	236.5	865.05
238.41	865.02	246.23	864.89	247.24	865.31	249.87	866.39	275.13	877.66
278.77	877.69	288.75	877.78	308.53	877.18	331.41	876.49	367.3	875.59
376.36	875.32	421.68	873.71	432.32	873.49	460.96	872.81	471.06	871.67
484.98	871.46	497.16	872.41	505.29	872.93	508.16	873.1	540.3	874.38
570.63	875.28	584.11	875.71	588.95	875.71	620.1	876.01	623.23	876.01
664.45	875.32	711.61	873.46	712.23	873.43	712.85	873.4	752.81	871.64
798.09	868.87	800.9	868.72	803.01	868.61	853.48	864.3	877.3	862.15
935.49	857.52	949.51	856.22	971.2	854.48	973.92	854.24	980.25	853.63
1031.35	848.96	1043.3	848.16	1079.2	846.77	1098.47	845.98	1104.78	845.98
1118.54	845.16	1125.63	844.46	1144.26	844.12	1145.23	844.42	1147.07	844.95
1169.72	851.71	1170.55	852.53	1173.14	853.3	1188.28	847.66	1203.01	842.08
1204.21	842.03	1206.34	841.95	1222.43	840.88	1234.5	830.61	1239.2	826.12
1240.88	825.38	1244.37	824.65	1251.19	823.22	1259.29	821.59	1272.64	822.71
1282.09	822.98	1297.89	822.68	1307.89	823.03	1315.24	821.65	1315.39	821.62
1339.62	816.56	1375	815.14	1409.54	816.48	1414.66	818.76	1415.45	819
1429.85	823.25	1441.55	823.11	1452.83	823.16	1468.09	823.18	1476.48	823.43
1489.32	822.36	1491.7	822.28	1499	822.43	1525.53	822.76	1531.48	823.06
1572.97	823.77	1593.17	824.06	1610.44	824.28	1650.77	823.54	1653.62	823.29
1664.31	822.77	1702.44	825.05	1705.77	825.2	1707.64	825.24	1713.65	825.39
1730.61	825.8	1745.44	825.38	1751.58	825.18	1759.69	825.23	1787.77	825.57
1813.45	826.24	1814.62	826.26	1856	825.74	1862.81	825.75	1892.24	825.68
1919.87	825	1933.57	824.81	1940.77	824.87	1976.75	825.07	2006.93	824.41
2013.02	824.21	2016.65	824.18	2025.52	823.94	2025.63	823.94	2026.03	823.94
2043.39	823.84	2050.52	823.2	2060.33	822.34	2078.15	822.36	2079	822.36
2081.43	822.75	2097.88	825.53	2105.72	825.63	2114.87	825.74	2135.11	825.99
2141.7	826.48	2143.2	826.57	2153.44	826.71	2178.13	827.03	2203.75	826.9
2205.89	826.84	2220.62	826.69	2225.9	826.64	2249.63	830.64	2250.43	830.77
2255.63	831.3	2286.45	834.61	2292.46	835.22	2298.04	835.13	2311.33	835.56
2329.04	835.85	2341.71	836.22	2343.73	836.26	2347.54	836.44	2366.71	837.27
2380.35	837.47	2408.02	836.69	2418.79	836.54	2439.67	837	2450.75	837.45
2468.01	838.01	2475.35	838.15	2495.73	838.4	2510.02	839.22	2522.89	839.65
2535.4	839.45	2538.45	839.43	2542.61	840.2	2547.26	841.05	2557.27	841.34
2574.64	842.02	2583.97	841.54	2601.7	840.82	2603.16	840.94	2603.54	840.96
2612.5	841.65	2617.49	842.13	2646.27	845.43	2646.83	845.43	2649.02	845.45
2655.43	845.47	2659.34	845.51	2678.04	845.18	2682.85	845.1	2688.85	845.02
2693.57	844.64	2705.61	843.78	2714.85	846.25	2726.18	848.79	2736.52	849.33

```
 2737.83  849.42 2741.21  849.52 2769.91  850.95 2781.24  851.38 2807.37  852.08
 2816.62   852.4 2822.97  852.51 2850.68  853.49 2859.32  853.76 2870.84  854.28
 2917.58  855.51 2925.95  855.68 2930.12   855.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .09  1079.2      .1 1315.24     .04 1429.85    .105 2178.13     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1315.24 1429.85           759.37   741.1 1104.72             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1595.16 2930.12     840       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  824.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  823.91  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  821.51  * Flow Area (sq ft)      *   86.01  *  758.30  *  123.81  *
* E.G. Slope (ft/ft)     *0.003356  * Area (sq ft)           *   86.01  *  758.30  *  199.95  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *   86.80  * 5695.02  *   88.18  *
* Top Width (ft)         *  444.50  * Top Width (ft)         *   67.34  *  114.61  *  262.55  *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *    1.01  *    7.51  *    0.71  *
* Max Chl Dpth (ft)      *    8.77  * Hydr. Depth (ft)       *    1.28  *    6.62  *    0.81  *
* Conv. Total (cfs)      *101320.2  * Conv. (cfs)            *  1498.2  * 98299.9  *  1522.1  *
* Length Wtd. (ft)       *  752.43  * Wetted Per. (ft)       *   67.76  *  116.32  *  152.91  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    0.27  *    1.37  *    0.17  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.27  *   10.26  *    0.12  *
* Frctn Loss (ft)        *    2.45  * Cum Volume (acre-ft)   *  859.06  * 6763.80  *  832.49  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  191.29  *  523.95  *  230.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  827.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  826.57  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  824.37  * Flow Area (sq ft)      *  279.94  * 1062.89  *  562.03  *
* E.G. Slope (ft/ft)     *0.002960  * Area (sq ft)           *  279.94  * 1062.89  * 1516.63  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  533.16  * 9388.73  *  978.11  *
* Top Width (ft)         *  904.42  * Top Width (ft)         *   76.51  *  114.61  *  713.30  *
* Vel Total (ft/s)       *    5.72  * Avg. Vel. (ft/s)       *    1.90  *    8.83  *    1.74  *
* Max Chl Dpth (ft)      *   11.43  * Hydr. Depth (ft)       *    3.66  *    9.27  *    3.40  *
* Conv. Total (cfs)      *200349.6  * Conv. (cfs)            *  9799.9  *172571.3  * 17978.4  *
* Length Wtd. (ft)       *  782.07  * Wetted Per. (ft)       *   77.42  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    0.67  *    1.69  *    0.63  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    1.27  *   14.91  *    1.09  *
* Frctn Loss (ft)        *    2.17  * Cum Volume (acre-ft)   * 2018.64  * 9037.11  * 2249.30  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  332.17  *  565.61  *  430.98  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  828.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.09  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  827.36  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  825.00  * Flow Area (sq ft)      *  341.16  * 1154.10  *  693.59  *
* E.G. Slope (ft/ft)     *0.002827  * Area (sq ft)           *  341.16  * 1154.10  * 2129.21  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *  717.42  *10525.32  * 1357.26  *
* Top Width (ft)         *  992.29  * Top Width (ft)         *   77.34  *  114.61  *  800.34  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *    2.10  *    9.12  *    1.96  *
* Max Chl Dpth (ft)      *   12.22  * Hydr. Depth (ft)       *    4.41  *   10.07  *    4.20  *
* Conv. Total (cfs)      *236971.5  * Conv. (cfs)            * 13492.6  *197952.5  * 25526.4  *
```

```
* Length Wtd. (ft)       *  788.67  * Wetted Per. (ft)       *   78.57  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    0.77  *    1.75  *    0.74  *
* Alpha                  *    2.12  * Stream Power (lb/ft s) *    1.61  *   15.97  *    1.45  *
* Frctn Loss (ft)        *    2.09  * Cum Volume (acre-ft)   * 2880.29  *10731.77  * 3365.66  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  396.34  *  593.75  *  550.75  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  831.33  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  830.11  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  826.74  * Flow Area (sq ft)      *  557.40  * 1468.70  * 1147.36  *
* E.G. Slope (ft/ft)     *0.002468  * Area (sq ft)           *  557.40  * 1468.70  * 4348.44  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 1469.98  *14695.95  * 2934.07  *
* Top Width (ft)         * 1011.45  * Top Width (ft)         *   80.21  *  114.61  *  816.62  *
* Vel Total (ft/s)       *    6.02  * Avg. Vel. (ft/s)       *    2.64  *   10.01  *    2.56  *
* Max Chl Dpth (ft)      *   14.97  * Hydr. Depth (ft)       *    6.95  *   12.81  *    6.94  *
* Conv. Total (cfs)      *384483.4  * Conv. (cfs)            * 29590.8  *295829.8  * 59062.9  *
* Length Wtd. (ft)       *  805.09  * Wetted Per. (ft)       *   82.54  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    1.04  *    1.95  *    1.07  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    2.74  *   19.46  *    2.73  *
* Frctn Loss (ft)        *    1.90  * Cum Volume (acre-ft)   * 4411.83  *12659.67  * 5421.60  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  528.57  *  617.06  *  696.97  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  834.54  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.36  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  833.18  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  828.48  * Flow Area (sq ft)      *  808.97  * 1820.49  * 1654.77  *
* E.G. Slope (ft/ft)     *0.002178  * Area (sq ft)           *  808.97  * 1820.49  * 6893.41  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 2476.47  *19748.43  * 5075.10  *
* Top Width (ft)         * 1041.63  * Top Width (ft)         *   83.76  *  114.61  *  843.26  *
* Vel Total (ft/s)       *    6.37  * Avg. Vel. (ft/s)       *    3.06  *   10.85  *    3.07  *
* Max Chl Dpth (ft)      *   18.04  * Hydr. Depth (ft)       *    9.66  *   15.88  *   10.01  *
* Conv. Total (cfs)      *584921.5  * Conv. (cfs)            * 53060.1  *423123.9  *108737.5  *
* Length Wtd. (ft)       *  816.46  * Wetted Per. (ft)       *   87.23  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    1.26  *    2.13  *    1.36  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    3.86  *   23.09  *    4.17  *
* Frctn Loss (ft)        *    1.75  * Cum Volume (acre-ft)   * 7326.85  *15529.52  * 9194.97  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  888.92  *  645.23  * 1157.16  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  836.50  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  835.04  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  829.49  * Flow Area (sq ft)      *  966.99  * 2033.93  * 1962.63  *
* E.G. Slope (ft/ft)     *0.002060  * Area (sq ft)           *  966.99  * 2033.93  * 8480.01  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 3172.64  *23099.42  * 6557.94  *
* Top Width (ft)         * 1061.39  * Top Width (ft)         *   85.95  *  114.61  *  860.83  *
* Vel Total (ft/s)       *    6.61  * Avg. Vel. (ft/s)       *    3.28  *   11.36  *    3.34  *
* Max Chl Dpth (ft)      *   19.90  * Hydr. Depth (ft)       *   11.25  *   17.75  *   11.87  *
* Conv. Total (cfs)      *723407.7  * Conv. (cfs)            * 69908.9  *508994.8  *144504.0  *
* Length Wtd. (ft)       *  821.32  * Wetted Per. (ft)       *   90.11  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    1.38  *    2.25  *    1.53  *
* Alpha                  *    2.15  * Stream Power (lb/ft s) *    4.53  *   25.53  *    5.10  *
* Frctn Loss (ft)        *    1.68  * Cum Volume (acre-ft)   *10247.01  *17276.17  *12850.12  *
```

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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1174.34  *  652.37  * 1600.91  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  838.38  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.59  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  836.80  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  830.51  * Flow Area (sq ft)      * 1119.69  * 2235.13  * 2252.84  *
* E.G. Slope (ft/ft)     *0.002007  * Area (sq ft)           * 1119.69  * 2235.13  *10059.36  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 3920.38  *26683.51  * 8146.11  *
* Top Width (ft)         * 1154.61  * Top Width (ft)         *   88.01  *  114.61  *  951.99  *
* Vel Total (ft/s)       *    6.91  * Avg. Vel. (ft/s)       *    3.50  *   11.94  *    3.62  *
* Max Chl Dpth (ft)      *   21.66  * Hydr. Depth (ft)       *   12.72  *   19.50  *   13.63  *
* Conv. Total (cfs)      *865010.8  * Conv. (cfs)            * 87514.1  *595652.2  *181844.5  *
* Length Wtd. (ft)       *  824.94  * Wetted Per. (ft)       *   92.81  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    1.51  *    2.41  *    1.71  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    5.29  *   28.74  *    6.17  *
* Frctn Loss (ft)        *    1.68  * Cum Volume (acre-ft)   *13034.17  *18490.72  *16533.40  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1370.12  *  653.32  * 2035.14  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  840.67  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.77  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  838.91  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  831.78  * Flow Area (sq ft)      * 1308.12  * 2477.11  * 2601.86  *
* E.G. Slope (ft/ft)     *0.001982  * Area (sq ft)           * 1308.12  * 2477.11  *12232.07  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 4934.29  *31473.55  *10292.16  *
* Top Width (ft)         * 1279.81  * Top Width (ft)         *   90.49  *  114.61  * 1074.71  *
* Vel Total (ft/s)       *    7.31  * Avg. Vel. (ft/s)       *    3.77  *   12.71  *    3.96  *
* Max Chl Dpth (ft)      *   23.77  * Hydr. Depth (ft)       *   14.46  *   21.61  *   15.74  *
* Conv. Total (cfs)      *1048981.0  * Conv. (cfs)            *110834.7  *706962.8  *231183.8  *
* Length Wtd. (ft)       *  828.44  * Wetted Per. (ft)       *   96.07  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    1.68  *    2.63  *    1.95  *
* Alpha                  *    2.13  * Stream Power (lb/ft s) *    6.36  *   33.48  *    7.70  *
* Frctn Loss (ft)        *    1.69  * Cum Volume (acre-ft)   *18336.48  *20298.47  *22928.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1671.38  *  655.85  * 2452.43  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  831.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  830.50  * Reach Len. (ft)        *  759.37  *  741.10  * 1104.72  *
* Crit W.S. (ft)         *  826.97  * Flow Area (sq ft)      *  588.80  * 1513.45  * 1211.90  *
* E.G. Slope (ft/ft)     *0.002427  * Area (sq ft)           *  588.80  * 1513.45  * 4667.73  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 1590.02  *15322.23  * 3187.75  *
* Top Width (ft)         * 1014.17  * Top Width (ft)         *   80.62  *  114.61  *  818.94  *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *    2.70  *   10.12  *    2.63  *
* Max Chl Dpth (ft)      *   15.36  * Hydr. Depth (ft)       *    7.30  *   13.21  *    7.33  *
* Conv. Total (cfs)      *407981.4  * Conv. (cfs)            * 32273.6  *311004.2  * 64703.7  *
* Length Wtd. (ft)       *  806.84  * Wetted Per. (ft)       *   83.11  *  116.32  *  165.38  *
* Min Ch El (ft)         *  815.14  * Shear (lb/sq ft)       *    1.07  *    1.97  *    1.11  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    2.90  *   19.96  *    2.92  *
* Frctn Loss (ft)        *    1.88  * Cum Volume (acre-ft)   * 5216.40  *13597.17  * 6393.86  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  625.63  *  627.38  *  775.72  *
*****************************************************************************************
```

```
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 26.154

INPUT
Description:
Station Elevation Data    num=     213
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  875.98     8.7     876   35.14  875.94    76.7  875.71   77.01  875.71
   77.33  875.69  101.96  874.29  115.15  874.96  122.44  875.06  131.77  873.34
  150.65  869.86  172.48  857.97  179.16  854.39  181.98  854.17  190.18  853.47
  195.76  855.19  196.57  855.45  200.56  855.45  201.41  855.45  201.76   855.4
  215.47  853.47  222.76  855.74  232.55  860.25  244.92   864.6  256.85  869.11
  271.04   868.1  271.61  868.04  273.46  867.99  309.91  867.12  341.12  866.34
  354.89   866.2  364.37  865.87  411.75  864.97   443.5  865.05  456.36  865.06
  471.69  864.81  501.26  863.72  517.52  863.02  538.35  862.71   556.4  862.11
  582.36  860.86  596.82  860.22  637.07  857.88  645.57  857.46  663.83  856.55
  665.61  856.57  667.78  856.56  696.68  856.37   708.5  855.88  725.76   855.9
  736.64  855.45  755.97  854.84  767.87  854.42  781.07  853.96  800.98     854
  811.29  854.32  832.94  855.13  835.67  855.18  836.39  855.17  837.25  855.13
  837.54  855.12  901.04  853.87  906.26  853.71  917.04   853.6   992.4  852.05
 1037.34  851.23 1061.88  850.62 1077.18  849.71 1087.27  849.21  1099.6  850.33
 1102.97   850.6 1112.83  850.79 1183.53  852.07  1214.2  852.67 1302.78   854.6
  1315.8  854.86 1331.51   855.4 1380.52  854.97 1433.77  854.15 1460.74   854.2
 1461.78  854.22 1462.75  854.21 1463.92  854.34 1487.85  859.24 1515.13  850.47
 1529.68  846.84 1544.02  848.42 1544.44  848.47 1554.79  847.59 1560.02  847.23
  1568.9  851.53 1571.07  852.51 1579.92  854.28 1589.74  856.26 1601.99  852.62
 1610.02  850.47 1620.72  849.69 1669.31   846.7 1694.82  844.91  1709.8  843.05
 1734.78  840.46 1755.02  838.35 1773.85  829.29 1774.13  829.02 1776.16  827.98
 1788.59  821.25 1793.67   818.5 1801.02  815.56 1803.42  814.65 1804.48  814.22
    1840  812.47 1875.29  814.28 1882.54  815.96 1889.28  817.06 1907.02  819.96
 1912.94   819.8 1930.74  819.53 1943.68  819.85 1948.55  819.98 1956.97     820
 1996.28  819.85 2021.74  819.95 2030.37  819.95 2044.82  820.01 2047.17  820.03
 2053.01  820.51  2053.3  820.54 2053.62  820.57 2066.55  821.66 2072.34  822.36
 2079.83  822.37 2105.32  822.42 2133.64  822.46 2140.89  822.62 2153.05   822.8
 2156.92  822.68 2172.63  822.75 2184.52  822.81  2202.8  822.77 2218.59  822.74
  2235.4  822.75 2237.58  822.77 2243.32  822.63 2256.11  822.46 2265.96  822.27
 2283.06  822.69 2291.42  822.84 2309.77  824.29 2332.31  825.85 2339.01   826.3
 2365.26  826.25 2377.66   826.2  2380.2  826.23 2402.31  827.49 2405.85  827.98
  2409.5  828.07 2424.89  828.48 2431.86  828.85    2443  829.14  2465.7  829.03
 2482.24  828.94 2516.48  828.81 2520.87  828.74 2563.77  828.81 2568.52  828.81
 2592.41  829.12 2604.71  829.51 2623.15  830.19 2628.85  830.39 2637.48  830.75
 2652.51  831.34 2673.43  832.22 2686.42  832.86 2691.62  833.36 2720.11  835.07
 2733.71  836.66 2747.61  837.84 2751.41  838.23 2752.61  838.72 2770.96  846.34
 2772.83  847.09 2784.63  853.83 2798.16  859.88  2812.1  862.22 2813.09  862.36
 2813.72  862.39 2815.95   862.5 2832.18  863.21 2839.35  863.56 2849.31  862.61
 2851.08   862.5 2857.33  863.91 2866.53   868.6 2883.76  878.21 2887.78  881.03
 2892.45  881.11 2899.65  881.42 2923.19  887.83 2929.29   889.3 2932.59  889.85
 2941.14  890.91 2957.11  893.01 2964.17  895.77    2976  901.03  2986.3  904.34
 2998.86  908.31 3004.35  909.78 3012.55  911.83 3029.63  914.23 3050.47  917.92
 3064.35  919.02 3072.73  919.79  3091.3  920.55

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .09 1302.78      .1 1788.59     .04 1907.02      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1788.59 1907.02           809.44  937.68 1118.74             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 2062.86  3091.3     840       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  822.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  821.52  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
```

```
* Crit W.S. (ft)         *  819.04  * Flow Area (sq ft)      *    0.07  *  775.65  *  243.46  *
* E.G. Slope (ft/ft)     *0.003152  * Area (sq ft)           *    0.07  *  775.65  *  243.63  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    0.01  * 5596.59  *  273.39  *
* Top Width (ft)         *  276.80  * Top Width (ft)         *    0.50  *  118.43  *  157.87  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *    0.20  *    7.22  *    1.12  *
* Max Chl Dpth (ft)      *    9.05  * Hydr. Depth (ft)       *    0.14  *    6.55  *    1.56  *
* Conv. Total (cfs)      *104546.8  * Conv. (cfs)            *     0.2  * 99677.3  *  4869.2  *
* Length Wtd. (ft)       *  936.70  * Wetted Per. (ft)       *    0.57  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.02  *    1.27  *    0.31  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.00  *    9.14  *    0.35  *
* Frctn Loss (ft)        *    2.73  * Cum Volume (acre-ft)   *  858.31  * 6750.75  *  826.87  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  190.70  *  521.96  *  224.79  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  825.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  824.46  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  821.72  * Flow Area (sq ft)      *    9.53  * 1124.04  *  701.90  *
* E.G. Slope (ft/ft)     *0.002604  * Area (sq ft)           *    9.53  * 1124.04  * 1152.10  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *    9.09  * 9439.74  * 1451.17  *
* Top Width (ft)         *  529.59  * Top Width (ft)         *    5.93  *  118.43  *  405.23  *
* Vel Total (ft/s)       *    5.94  * Avg. Vel. (ft/s)       *    0.95  *    8.40  *    2.07  *
* Max Chl Dpth (ft)      *   11.99  * Hydr. Depth (ft)       *    1.61  *    9.49  *    4.50  *
* Conv. Total (cfs)      *213596.1  * Conv. (cfs)            *   178.2  *184980.9  * 28437.0  *
* Length Wtd. (ft)       *  941.73  * Wetted Per. (ft)       *    6.75  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.23  *    1.52  *    0.73  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.22  *   12.73  *    1.51  *
* Frctn Loss (ft)        *    2.09  * Cum Volume (acre-ft)   * 2016.12  * 9018.51  * 2215.46  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  331.45  *  563.62  *  416.79  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  826.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  825.33  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  822.29  * Flow Area (sq ft)      *   15.35  * 1226.45  *  836.67  *
* E.G. Slope (ft/ft)     *0.002493  * Area (sq ft)           *   15.35  * 1226.45  * 1507.92  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *   16.80  *10680.55  * 1902.65  *
* Top Width (ft)         *  543.69  * Top Width (ft)         *    7.53  *  118.43  *  417.73  *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *    1.09  *    8.71  *    2.27  *
* Max Chl Dpth (ft)      *   12.86  * Hydr. Depth (ft)       *    2.04  *   10.36  *    5.37  *
* Conv. Total (cfs)      *252359.0  * Conv. (cfs)            *   336.5  *213915.2  * 38107.2  *
* Length Wtd. (ft)       *  942.99  * Wetted Per. (ft)       *    8.56  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.28  *    1.58  *    0.84  *
* Alpha                  *    1.77  * Stream Power (lb/ft s) *    0.31  *   13.79  *    1.90  *
* Frctn Loss (ft)        *    2.02  * Cum Volume (acre-ft)   * 2877.19  *10711.52  * 3319.54  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  395.60  *  591.76  *  535.30  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  829.43  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  828.21  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  824.06  * Flow Area (sq ft)      *   44.75  * 1568.02  * 1286.12  *
* E.G. Slope (ft/ft)     *0.002262  * Area (sq ft)           *   44.75  * 1568.02  * 2859.93  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *   66.60  *15322.50  * 3710.90  *
* Top Width (ft)         *  639.07  * Top Width (ft)         *   12.88  *  118.43  *  507.76  *
```

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* Vel Total (ft/s)       *    6.59  * Avg. Vel. (ft/s)       *    1.49  *    9.77  *    2.89  *
* Max Chl Dpth (ft)      *   15.74  * Hydr. Depth (ft)       *    3.47  *   13.24  *    8.25  *
* Conv. Total (cfs)      *401585.8  * Conv. (cfs)            *  1400.2  *322162.3  * 78023.4  *
* Length Wtd. (ft)       *  946.10  * Wetted Per. (ft)       *   14.64  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.43  *    1.84  *    1.16  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.64  *   17.95  *    3.36  *
* Frctn Loss (ft)        *    1.90  * Cum Volume (acre-ft)   * 4406.58  *12633.83  * 5330.19  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  527.76  *  615.08  *  680.18  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  832.78  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  831.34  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  825.89  * Flow Area (sq ft)      *   94.28  * 1938.25  * 1773.32  *
* E.G. Slope (ft/ft)     *0.002100  * Area (sq ft)           *   94.28  * 1938.25  * 4955.64  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *  171.85  *21020.61  * 6107.54  *
* Top Width (ft)         *  882.83  * Top Width (ft)         *   18.99  *  118.43  *  745.41  *
* Vel Total (ft/s)       *    7.17  * Avg. Vel. (ft/s)       *    1.82  *   10.85  *    3.44  *
* Max Chl Dpth (ft)      *   18.87  * Hydr. Depth (ft)       *    4.96  *   16.37  *   11.38  *
* Conv. Total (cfs)      *595697.8  * Conv. (cfs)            *  3749.9  *458678.8  *133269.1  *
* Length Wtd. (ft)       *  949.55  * Wetted Per. (ft)       *   21.53  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.57  *    2.11  *    1.49  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    1.05  *   22.86  *    5.14  *
* Frctn Loss (ft)        *    1.88  * Cum Volume (acre-ft)   * 7318.98  *15497.54  * 9044.71  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *  888.03  *  643.25  * 1137.01  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  834.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.60  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  833.20  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  827.03  * Flow Area (sq ft)      *  133.24  * 2158.75  * 2063.46  *
* E.G. Slope (ft/ft)     *0.002043  * Area (sq ft)           *  133.24  * 2158.75  * 6382.43  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *  267.22  *24808.80  * 7753.98  *
* Top Width (ft)         *  924.22  * Top Width (ft)         *   22.86  *  118.43  *  782.92  *
* Vel Total (ft/s)       *    7.54  * Avg. Vel. (ft/s)       *    2.01  *   11.49  *    3.76  *
* Max Chl Dpth (ft)      *   20.73  * Hydr. Depth (ft)       *    5.83  *   18.23  *   13.24  *
* Conv. Total (cfs)      *726372.8  * Conv. (cfs)            *  5912.3  *548901.6  *171558.9  *
* Length Wtd. (ft)       *  950.34  * Wetted Per. (ft)       *   25.82  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.66  *    2.28  *    1.69  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    1.32  *   26.25  *    6.34  *
* Frctn Loss (ft)        *    1.84  * Cum Volume (acre-ft)   *10237.42  *17240.51  *12661.65  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         * 1173.39  *  650.39  * 1580.07  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  836.68  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.80  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  834.89  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  828.14  * Flow Area (sq ft)      *  174.84  * 2358.87  * 2326.80  *
* E.G. Slope (ft/ft)     *0.002057  * Area (sq ft)           *  174.84  * 2358.87  * 7727.59  *
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* Q Total (cfs)          *38750.00  * Flow (cfs)             *  384.04  *28860.22  * 9505.75  *
* Top Width (ft)         *  954.87  * Top Width (ft)         *   26.38  *  118.43  *  810.07  *
* Vel Total (ft/s)       *    7.97  * Avg. Vel. (ft/s)       *    2.20  *   12.23  *    4.09  *
* Max Chl Dpth (ft)      *   22.42  * Hydr. Depth (ft)       *    6.63  *   19.92  *   14.93  *
* Conv. Total (cfs)      *854353.6  * Conv. (cfs)            *  8467.2  *636305.3  *209581.1  *
* Length Wtd. (ft)       *  950.95  * Wetted Per. (ft)       *   29.72  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.76  *    2.51  *    1.92  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    1.66  *   30.75  *    7.83  *
* Frctn Loss (ft)        *    1.88  * Cum Volume (acre-ft)   *13022.89  *18451.64  *16307.85  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         * 1369.12  *  651.34  * 2012.80  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  838.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.07  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  836.88  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  829.52  * Flow Area (sq ft)      *  231.47  * 2594.62  * 2637.02  *
* E.G. Slope (ft/ft)     *0.002112  * Area (sq ft)           *  231.47  * 2594.62  * 9359.93  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *  564.31  *34271.05  *11864.64  *
* Top Width (ft)         *  978.21  * Top Width (ft)         *   30.51  *  118.43  *  829.27  *
* Vel Total (ft/s)       *    8.55  * Avg. Vel. (ft/s)       *    2.44  *   13.21  *    4.50  *
* Max Chl Dpth (ft)      *   24.41  * Hydr. Depth (ft)       *    7.59  *   21.91  *   16.92  *
* Conv. Total (cfs)      *1016257.0  * Conv. (cfs)           * 12280.2  *745785.9  *258191.2  *
* Length Wtd. (ft)       *  951.05  * Wetted Per. (ft)       *   34.31  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.89  *    2.84  *    2.23  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    2.17  *   37.48  *   10.03  *
* Frctn Loss (ft)        *    1.92  * Cum Volume (acre-ft)   *18323.06  *20255.33  *22654.20  *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)         * 1670.33  *  653.87  * 2428.29  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  829.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  828.61  * Reach Len. (ft)        *  809.44  *  937.68  * 1118.74  *
* Crit W.S. (ft)         *  824.30  * Flow Area (sq ft)      *   50.03  * 1615.22  * 1348.25  *
* E.G. Slope (ft/ft)     *0.002242  * Area (sq ft)           *   50.03  * 1615.22  * 3065.16  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *   76.84  *16026.77  * 3996.39  *
* Top Width (ft)         *  652.39  * Top Width (ft)         *   13.66  *  118.43  *  520.31  *
* Vel Total (ft/s)       *    6.67  * Avg. Vel. (ft/s)       *    1.54  *    9.92  *    2.96  *
* Max Chl Dpth (ft)      *   16.14  * Hydr. Depth (ft)       *    3.66  *   13.64  *    8.65  *
* Conv. Total (cfs)      *424517.6  * Conv. (cfs)            *  1622.9  *338489.8  * 84405.0  *
* Length Wtd. (ft)       *  946.43  * Wetted Per. (ft)       *   15.52  *  120.55  *  155.91  *
* Min Ch El (ft)         *  812.47  * Shear (lb/sq ft)       *    0.45  *    1.88  *    1.21  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.69  *   18.61  *    3.59  *
* Frctn Loss (ft)        *    1.89  * Cum Volume (acre-ft)   * 5210.83  *13570.56  * 6295.80  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *  624.81  *  625.40  *  758.74  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 25.977
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INPUT
Description:
Station Elevation Data    num=     213
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  881.55     .05  881.55   15.23  880.25   22.92  880.34   27.18  880.39
   31.68  880.73   56.33  881.52   72.02  881.94   91.01   882.2   97.17  881.78
  121.44  880.63  126.44  880.43  130.58  880.41  145.44  880.53  159.41  875.02
  167.41  872.05  182.88  878.64  183.44  878.89     184  878.71     212  870.55
  223.32  869.53  226.36  869.26  238.11   858.9  244.93  852.78  247.08  853.18
  254.58  854.61  255.94  854.61  259.47   854.6  263.37  853.96  270.55  852.76
  276.04  854.86  287.36  867.13  290.48  869.79  291.96  871.07  293.92  871.12
  304.66  871.33  315.95  874.92   323.3  877.25  326.47  877.05  336.44  876.61
  370.17  875.47   399.5  874.43  412.34  873.89  447.78  871.98  457.75  871.31
  487.57  869.58  536.95  867.39   559.6  866.66  566.76  866.17   587.3  864.46
  601.01  862.84  618.26  862.33  639.69  861.58  654.39  860.97  688.76  859.86
  708.91  858.88  756.73  856.44  764.28  856.03  793.57  854.36  811.41  854.04
  829.94  853.43  875.57  851.37  904.21  850.01  925.86  849.24  965.03  848.57
  979.45  848.15 1002.59  847.25 1024.63  846.23 1028.95  846.14 1041.27  845.99
 1092.48  845.02 1111.07  844.93 1156.28  844.56 1159.21  844.48 1160.51  844.44
 1213.05  842.91 1237.13   841.6 1273.82  840.22 1280.65  839.98 1286.51  839.72
 1319.56  837.68  1343.7  836.64 1361.39     837 1372.24  837.37 1373.95  837.45
 1378.35  837.47 1391.09  837.84 1403.64   837.7 1423.93  836.92 1424.08  836.92
 1424.19  836.92 1442.08  836.71 1448.64  836.59 1470.89  835.95 1509.38  836.09
 1514.51  836.16 1540.49  836.03 1565.77  834.94 1574.83  834.63 1589.98   834.4
 1604.11   834.6  1630.2  835.01 1631.95  834.98 1632.95   834.9 1635.51  834.59
 1652.01  832.62 1675.11  840.46 1681.71  842.63 1692.78  842.64 1693.56  842.64
 1694.16   842.4 1723.79  830.87 1734.15  835.78 1736.96   837.2 1760.77   835.9
 1770.37  835.32 1779.89  835.46 1788.88  835.61 1789.59  835.64 1798.08  835.83
 1820.31  835.21  1842.5  834.53 1862.54  832.59 1867.08  832.24 1870.11  832.34
 1881.56  832.77 1881.65  832.77 1959.34  828.35 1985.37   827.6 1992.37  827.36
 2002.72  824.02 2027.41  816.79 2037.47  816.12 2045.03  816.34 2045.81  816.29
 2048.97  816.14    2061  815.13 2063.91  815.34 2076.45  816.28 2083.12  816.22
 2088.25   815.8 2093.28  815.36 2098.32  815.54  2103.3  815.55 2112.12  816.55
 2125.19  816.11  2138.5   815.1  2145.6  814.69 2154.08  813.88  2166.7  812.75
 2171.55  812.42 2172.03  812.39 2186.66  812.23    2196     812 2214.95  811.98
    2220     810    2235  809.11    2250     810 2255.38   811.9 2259.81   813.5
 2271.95   817.4 2272.96  817.48 2279.83  818.02 2305.36  820.18 2328.76  830.66
 2341.32  836.04 2352.01   837.3 2352.86  837.41 2354.11  837.47  2376.3  838.56
 2381.27  838.66 2386.26  838.79 2392.33  841.97 2394.16  842.77 2397.88  853.84
  2399.8  859.48  2401.7  860.87 2416.62  870.83 2430.97  872.95 2437.43  873.95
 2455.67  876.38 2463.29  877.39 2464.49  877.43 2480.28  878.32 2494.15  883.03
 2501.36  886.12 2518.68  893.69 2529.56  897.68 2537.84  901.03 2551.86  905.73
 2558.98  908.31 2577.05  912.98 2578.66  913.38 2580.71  914.03 2595.82   919.1
 2612.19  924.29 2641.31   933.1 2642.26  933.21 2664.22  938.12 2665.56  938.41
 2665.69  938.43 2682.38  942.77 2694.49   946.6 2694.89   946.7 2706.41  952.58
 2713.27  956.12 2727.94  960.12 2736.21  962.63 2746.74  963.01 2748.03  963.05
 2761.62  964.03 2769.28  964.68 2780.04  964.93

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09  618.26      .1 1652.01      .1 2186.66     .04 2271.95      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2125.19 2279.83           938.22  913.06 1027.93             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1690     845       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  819.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.100  *   0.048  *   0.100  *
* W.S. Elev (ft)         *  819.02  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  816.21  * Flow Area (sq ft)      *  306.06  *  966.49  *    5.89  *
* E.G. Slope (ft/ft)     *0.002703  * Area (sq ft)           *  306.06  *  966.49  *    5.89  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  479.65  * 5387.50  *    2.86  *
* Top Width (ft)         *  271.83  * Top Width (ft)         *  105.39  *  154.64  *   11.80  *
* Vel Total (ft/s)       *    4.59  * Avg. Vel. (ft/s)       *    1.57  *    5.57  *    0.49  *
* Max Chl Dpth (ft)      *    9.91  * Hydr. Depth (ft)       *    2.90  *    6.25  *    0.50  *
* Conv. Total (cfs)      *112903.5  * Conv. (cfs)            *  9225.5  *103623.1  *    55.0  *
* Length Wtd. (ft)       *  914.12  * Wetted Per. (ft)       *  105.93  *  156.46  *   11.84  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    0.49  *    1.04  *    0.08  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.76  *    5.81  *    0.04  *
```

```
* Frctn Loss (ft)        *    1.94  * Cum Volume (acre-ft)   *  855.47  * 6732.00  *  823.66  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  189.72  *  519.03  *  222.61  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  823.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.100  *   0.050  *   0.100  *
* W.S. Elev (ft)         *  822.70  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  818.18  * Flow Area (sq ft)      *  717.32  * 1535.96  *   99.03  *
* E.G. Slope (ft/ft)     *0.001918  * Area (sq ft)           *  717.32  * 1535.96  *   99.03  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             * 1545.68  * 9216.88  *  137.44  *
* Top Width (ft)         *  303.76  * Top Width (ft)         *  117.97  *  154.64  *   31.16  *
* Vel Total (ft/s)       *    4.63  * Avg. Vel. (ft/s)       *    2.15  *    6.00  *    1.39  *
* Max Chl Dpth (ft)      *   13.59  * Hydr. Depth (ft)       *    6.08  *    9.93  *    3.18  *
* Conv. Total (cfs)      *248910.5  * Conv. (cfs)            * 35296.9  *210475.0  *  3138.7  *
* Length Wtd. (ft)       *  915.75  * Wetted Per. (ft)       *  119.03  *  156.46  *   31.79  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    0.72  *    1.18  *    0.37  *
* Alpha                  *    1.45  * Stream Power (lb/ft s) *    1.55  *    7.05  *    0.52  *
* Frctn Loss (ft)        *    1.75  * Cum Volume (acre-ft)   * 2009.36  * 8989.88  * 2199.39  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  330.30  *  560.69  *  411.19  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  824.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.100  *   0.051  *   0.100  *
* W.S. Elev (ft)         *  823.65  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  818.65  * Flow Area (sq ft)      *  830.96  * 1682.91  *  129.65  *
* E.G. Slope (ft/ft)     *0.001864  * Area (sq ft)           *  830.96  * 1682.91  *  129.65  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             * 1911.17  *10486.28  *  202.55  *
* Top Width (ft)         *  309.13  * Top Width (ft)         *  121.21  *  154.64  *   33.28  *
* Vel Total (ft/s)       *    4.77  * Avg. Vel. (ft/s)       *    2.30  *    6.23  *    1.56  *
* Max Chl Dpth (ft)      *   14.54  * Hydr. Depth (ft)       *    6.86  *   10.88  *    3.90  *
* Conv. Total (cfs)      *291838.8  * Conv. (cfs)            * 44266.1  *242881.2  *  4691.4  *
* Length Wtd. (ft)       *  916.25  * Wetted Per. (ft)       *  122.41  *  156.46  *   34.11  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    0.79  *    1.25  *    0.44  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *    1.82  *    7.80  *    0.69  *
* Frctn Loss (ft)        *    1.75  * Cum Volume (acre-ft)   * 2869.32  *10680.21  * 3298.51  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  394.41  *  588.82  *  529.51  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  827.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.100  *   0.052  *   0.100  *
* W.S. Elev (ft)         *  826.71  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  820.29  * Flow Area (sq ft)      * 1216.50  * 2155.86  *  241.87  *
* E.G. Slope (ft/ft)     *0.001798  * Area (sq ft)           * 1216.50  * 2155.86  *  241.87  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             * 3360.95  *15246.26  *  492.80  *
* Top Width (ft)         *  325.55  * Top Width (ft)         *  130.80  *  154.64  *   40.11  *
* Vel Total (ft/s)       *    5.28  * Avg. Vel. (ft/s)       *    2.76  *    7.07  *    2.04  *
* Max Chl Dpth (ft)      *   17.60  * Hydr. Depth (ft)       *    9.30  *   13.94  *    6.03  *
* Conv. Total (cfs)      *450445.6  * Conv. (cfs)            * 79263.0  *359560.7  * 11621.9  *
* Length Wtd. (ft)       *  917.80  * Wetted Per. (ft)       *  132.48  *  156.46  *   41.60  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    1.03  *    1.55  *    0.65  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    2.85  *   10.94  *    1.33  *
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* Frctn Loss (ft)        *    1.76  * Cum Volume (acre-ft)   * 4394.86  *12593.75  * 5290.36  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  526.42  *  612.14  *  673.14  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  830.72  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.100  *   0.052  *   0.100  *
* W.S. Elev (ft)         *  829.88  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  821.97  * Flow Area (sq ft)      * 1723.72  * 2645.99  *  380.22  *
* E.G. Slope (ft/ft)     *0.001872  * Area (sq ft)           * 1723.72  * 2645.99  *  380.22  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 4744.98  *21601.43  *  953.59  *
* Top Width (ft)         *  394.55  * Top Width (ft)         *  192.73  *  154.64  *   47.19  *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *    2.75  *    8.16  *    2.51  *
* Max Chl Dpth (ft)      *   20.77  * Hydr. Depth (ft)       *    8.94  *   17.11  *    8.06  *
* Conv. Total (cfs)      *630940.4  * Conv. (cfs)            *109663.0  *499238.7  * 22038.7  *
* Length Wtd. (ft)       *  918.88  * Wetted Per. (ft)       *  194.57  *  156.46  *   49.35  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    1.04  *    1.98  *    0.90  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    2.85  *   16.14  *    2.26  *
* Frctn Loss (ft)        *    1.84  * Cum Volume (acre-ft)   * 7302.09  *15448.20  * 8976.19  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  886.06  *  640.31  * 1126.83  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  832.76  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.93  * Wt. n-Val.             *   0.100  *   0.052  *   0.100  *
* W.S. Elev (ft)         *  831.82  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  822.98  * Flow Area (sq ft)      * 2134.00  * 2946.80  *  476.30  *
* E.G. Slope (ft/ft)     *0.001845  * Area (sq ft)           * 2134.00  * 2946.80  *  476.30  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 6025.75  *25509.93  * 1294.32  *
* Top Width (ft)         *  437.67  * Top Width (ft)         *  231.38  *  154.64  *   51.65  *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *    2.82  *    8.66  *    2.72  *
* Max Chl Dpth (ft)      *   22.71  * Hydr. Depth (ft)       *    9.22  *   19.06  *    9.22  *
* Conv. Total (cfs)      *764289.3  * Conv. (cfs)            *140280.8  *593876.4  * 30132.1  *
* Length Wtd. (ft)       *  919.40  * Wetted Per. (ft)       *  233.67  *  156.46  *   54.22  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    1.05  *    2.17  *    1.01  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    2.97  *   18.78  *    2.75  *
* Frctn Loss (ft)        *    1.90  * Cum Volume (acre-ft)   *10216.35  *17185.56  *12573.58  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         * 1171.03  *  647.45  * 1569.35  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  834.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.100  *   0.053  *   0.100  *
* W.S. Elev (ft)         *  833.54  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  823.99  * Flow Area (sq ft)      * 2582.05  * 3211.36  *  568.07  *
* E.G. Slope (ft/ft)     *0.001894  * Area (sq ft)           * 2586.79  * 3211.36  *  568.07  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 7375.26  *29703.75  * 1670.99  *
* Top Width (ft)         *  505.53  * Top Width (ft)         *  295.25  *  154.64  *   55.64  *
* Vel Total (ft/s)       *    6.09  * Avg. Vel. (ft/s)       *    2.86  *    9.25  *    2.94  *
* Max Chl Dpth (ft)      *   24.43  * Hydr. Depth (ft)       *    9.06  *   20.77  *   10.21  *
* Conv. Total (cfs)      *890333.9  * Conv. (cfs)            *169456.7  *682484.1  * 38393.2  *
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* Length Wtd. (ft)       *  920.16  * Wetted Per. (ft)       *  287.98  *  156.46  *   58.56  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    1.06  *    2.43  *    1.15  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    3.03  *   22.45  *    3.37  *
* Frctn Loss (ft)        *    1.92  * Cum Volume (acre-ft)   *12997.23  *18391.69  *16201.32  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         * 1366.14  *  648.40  * 2001.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  836.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.18  * Wt. n-Val.             *   0.100  *   0.053  *   0.100  *
* W.S. Elev (ft)         *  835.58  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  825.24  * Flow Area (sq ft)      * 3211.84  * 3527.81  *  686.83  *
* E.G. Slope (ft/ft)     *0.001935  * Area (sq ft)           * 3324.88  * 3527.81  *  686.83  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 9544.70  *34965.60  * 2189.70  *
* Top Width (ft)         *  686.29  * Top Width (ft)         *  471.23  *  154.64  *   60.42  *
* Vel Total (ft/s)       *    6.29  * Avg. Vel. (ft/s)       *    2.97  *    9.91  *    3.19  *
* Max Chl Dpth (ft)      *   26.47  * Hydr. Depth (ft)       *    8.89  *   22.81  *   11.37  *
* Conv. Total (cfs)      *1061631.0  * Conv. (cfs)            *216979.7  *794873.0  * 49778.5  *
* Length Wtd. (ft)       *  921.21  * Wetted Per. (ft)       *  365.39  *  156.46  *   63.76  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    1.06  *    2.72  *    1.30  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    3.16  *   27.00  *    4.15  *
* Frctn Loss (ft)        *    1.89  * Cum Volume (acre-ft)   *18290.02  *20189.43  *22525.19  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         * 1665.67  *  650.93  * 2416.86  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  827.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.100  *   0.052  *   0.100  *
* W.S. Elev (ft)         *  827.13  * Reach Len. (ft)        *  938.22  *  913.06  * 1027.93  *
* Crit W.S. (ft)         *  820.51  * Flow Area (sq ft)      * 1271.12  * 2220.12  *  258.73  *
* E.G. Slope (ft/ft)     *0.001796  * Area (sq ft)           * 1271.12  * 2220.12  *  258.73  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 3589.61  *15968.16  *  542.23  *
* Top Width (ft)         *  327.77  * Top Width (ft)         *  132.09  *  154.64  *   41.04  *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)       *    2.82  *    7.19  *    2.10  *
* Max Chl Dpth (ft)      *   18.02  * Hydr. Depth (ft)       *    9.62  *   14.36  *    6.30  *
* Conv. Total (cfs)      *474317.0  * Conv. (cfs)            * 84707.1  *376814.4  * 12795.5  *
* Length Wtd. (ft)       *  918.00  * Wetted Per. (ft)       *  133.84  *  156.46  *   42.61  *
* Min Ch El (ft)         *  809.11  * Shear (lb/sq ft)       *    1.06  *    1.59  *    0.68  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    3.01  *   11.44  *    1.43  *
* Frctn Loss (ft)        *    1.76  * Cum Volume (acre-ft)   * 5198.56  *13529.28  * 6253.12  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  623.46  *  622.46  *  751.53  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 25.804

INPUT
Description:
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Station Elevation Data num= 189

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	871.28	4.84	870.9	7.8	870.66	8.61	870.6	9.14	870.6
32.08	870.79	36.22	870.88	38.81	870.92	42.09	871.01	42.43	871.02
54.21	871.99	63.36	872.65	69.03	872.91	74.4	872.65	89.17	871.62
110.74	870.58	116.39	870.13	127.29	869.02	134.25	868.33	143.32	867.39
156.3	866.9	179.01	865.66	189.15	861.36	191.6	860.34	195.85	861.53
203.51	863.64	205.15	863.82	216.28	864.75	229.66	858.03	231.55	857.14
239.84	853.58	243.58	851.99	244.73	852.26	255.92	854.76	257.02	854.75
261.41	854.75	263.5	853.93	268.59	852	287.1	858.41	287.42	858.52
293.91	859.35	295.14	859.35	296.61	859.42	301.95	860.26	311.26	860.03
327.55	859.92	336.81	859.53	388.15	857.16	422.84	855.28	466.67	853.17
494.55	851.68	517.81	850.89	584.77	848.98	598.11	848.32	630.56	846.83
651.13	846.15	661.73	845.95	675.48	845.32	739.23	842.76	792.73	840.78
823.85	840.05	842.81	839.6	871.34	839.03	892.88	838.52	916.89	838.22
943.27	837.58	969.86	836.87	993.03	836.51	1013.83	836.06	1043.1	835.73
1061.33	835.27	1093.17	834.3	1108.83	834.18	1143.19	834.12	1181.52	833.12
1193.32	832.87	1203.81	832.78	1243.39	832.76	1261.18	832.77	1265.5	832.8
1268.13	832.75	1292.06	832.04	1297.48	831.88	1298.05	831.87	1299.97	832.36
1316.81	836.85	1324.39	836.68	1333.97	836.53	1341.87	833.56	1348.81	830.77
1351.16	829.85	1352.27	829.38	1362.17	828.14	1365.55	827.62	1367.1	827.38
1369.78	828	1375.87	829.41	1382.45	828.98	1402.3	828.15	1451.12	828.02
1457.27	827.97	1459.26	827.92	1462.54	827.81	1504.05	826.58	1516.25	826.58
1518.67	826.52	1525.8	823.49	1538.73	821.7	1540.04	821.54	1545.59	821.09
1574.09	819.34	1604.92	819.62	1632.51	819.62	1641.31	819.5	1655.95	818.6
1692.76	817.38	1700.19	817.51	1703.71	813.76	1710.66	810.96	1711.96	809.45
1720	807	1755	806.42	1790	807	1797.3	809.45	1814.28	818.9
1815.3	819.5	1816.28	820.08	1817.5	820.69	1839.23	831.41	1846.97	836.15
1860.22	843.57	1863.19	845.39	1863.54	845.57	1866.92	845.87	1872.44	846.37
1874.98	846.65	1878.48	846.49	1890.5	846.01	1898.49	845.63	1903.65	850.1
1914.9	860.54	1925.27	863.35	1931.29	864.76	1936.64	865.87	1939.76	865.7
1941.98	865.71	1958.4	868.06	1978.36	870.79	2012.66	874.28	2022.62	875.17
2024.59	875.33	2034.86	876.52	2066.32	879.77	2072.02	880.32	2082.79	881.61
2111.03	884.02	2116.93	884.24	2128.23	884.99	2146.58	886.41	2175.24	888.55
2221.32	893.52	2223.39	893.7	2224.55	893.85	2252.34	898.26	2266.68	901.03
2276.93	903.82	2281.8	905	2297.45	908.29	2320.08	913.21	2327.62	914.61
2330.14	915.39	2343.33	919.12	2349.65	919.99	2378.81	923.87	2392.47	928.14
2400.44	930.52	2406.64	931.61	2420.77	934.27	2438.04	937.25	2444.24	938.43
2462.73	943.46	2475.09	946.76	2484.42	948.66	2505.64	954.73	2509.26	955.65
2511.1	956.14	2513.7	956.68	2519.04	957.98	2520.47	958.31		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.09	1299.97	.1	1700.19	.04	1815.3	.09	2111.03	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1700.19	1815.3	1308.31	1160.94	797.87	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1330	838	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	817.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.		0.040	
W.S. Elev (ft)	816.90	Reach Len. (ft)	1308.31	1160.94	797.87
Crit W.S. (ft)	812.32	Flow Area (sq ft)		941.65	
E.G. Slope (ft/ft)	0.001711	Area (sq ft)		941.65	
Q Total (cfs)	5870.00	Flow (cfs)		5870.00	
Top Width (ft)	109.94	Top Width (ft)		109.94	
Vel Total (ft/s)	6.23	Avg. Vel. (ft/s)		6.23	
Max Chl Dpth (ft)	10.48	Hydr. Depth (ft)		8.57	
Conv. Total (cfs)	141908.2	Conv. (cfs)		141908.2	
Length Wtd. (ft)	1160.61	Wetted Per. (ft)		115.24	
Min Ch El (ft)	806.42	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)		5.44	
Frctn Loss (ft)	1.55	Cum Volume (acre-ft)	852.17	6712.00	823.60
C & E Loss (ft)	0.06	Cum SA (acres)	188.58	516.25	222.47

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	821.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	820.40	Reach Len. (ft)	1308.31	1160.94	797.87
Crit W.S. (ft)	814.91	Flow Area (sq ft)	196.14	1337.32	0.69
E.G. Slope (ft/ft)	0.001907	Area (sq ft)	196.14	1337.32	0.69
Q Total (cfs)	10900.00	Flow (cfs)	156.85	10742.89	0.26
Top Width (ft)	260.00	Top Width (ft)	143.28	115.11	1.61
Vel Total (ft/s)	7.10	Avg. Vel. (ft/s)	0.80	8.03	0.38
Max Chl Dpth (ft)	13.98	Hydr. Depth (ft)	1.37	11.62	0.43
Conv. Total (cfs)	249603.8	Conv. (cfs)	3591.9	246005.9	5.9
Length Wtd. (ft)	1149.09	Wetted Per. (ft)	143.36	121.36	1.84
Min Ch El (ft)	806.42	Shear (lb/sq ft)	0.16	1.31	0.04
Alpha	1.26	Stream Power (lb/ft s)	0.13	10.54	0.02
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)	1999.53	8959.76	2198.22
C & E Loss (ft)	0.14	Cum SA (acres)	327.48	557.86	410.80

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	822.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	821.27	Reach Len. (ft)	1308.31	1160.94	797.87
Crit W.S. (ft)	815.66	Flow Area (sq ft)	327.02	1437.56	2.86
E.G. Slope (ft/ft)	0.001948	Area (sq ft)	327.02	1437.56	2.86
Q Total (cfs)	12600.00	Flow (cfs)	350.00	12248.28	1.72
Top Width (ft)	275.25	Top Width (ft)	156.77	115.11	3.37
Vel Total (ft/s)	7.13	Avg. Vel. (ft/s)	1.07	8.52	0.60
Max Chl Dpth (ft)	14.85	Hydr. Depth (ft)	2.09	12.49	0.85
Conv. Total (cfs)	285467.7	Conv. (cfs)	7929.6	277499.1	39.0
Length Wtd. (ft)	1146.81	Wetted Per. (ft)	156.88	121.36	3.80
Min Ch El (ft)	806.42	Shear (lb/sq ft)	0.25	1.44	0.09
Alpha	1.39	Stream Power (lb/ft s)	0.27	12.28	0.05
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)	2856.85	10647.50	3296.95
C & E Loss (ft)	0.15	Cum SA (acres)	391.41	586.00	529.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	825.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.43	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	824.09	Reach Len. (ft)	1308.31	1160.94	797.87
Crit W.S. (ft)	818.31	Flow Area (sq ft)	801.02	1762.11	20.41
E.G. Slope (ft/ft)	0.002041	Area (sq ft)	801.02	1762.11	20.41
Q Total (cfs)	19100.00	Flow (cfs)	1475.78	17600.01	24.20
Top Width (ft)	299.98	Top Width (ft)	175.79	115.11	9.08
Vel Total (ft/s)	7.39	Avg. Vel. (ft/s)	1.84	9.99	1.19
Max Chl Dpth (ft)	17.67	Hydr. Depth (ft)	4.56	15.31	2.25
Conv. Total (cfs)	422794.6	Conv. (cfs)	32667.7	389591.1	535.8
Length Wtd. (ft)	1142.05	Wetted Per. (ft)	176.17	121.36	10.18
Min Ch El (ft)	806.42	Shear (lb/sq ft)	0.58	1.85	0.26
Alpha	1.69	Stream Power (lb/ft s)	1.07	18.48	0.30
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)	4373.13	12552.69	5287.27
C & E Loss (ft)	0.21	Cum SA (acres)	523.12	609.31	672.56

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	828.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.83	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	826.95	Reach Len. (ft)	1308.31	1160.94	797.87
Crit W.S. (ft)	821.63	Flow Area (sq ft)	1322.25	2092.09	54.77
E.G. Slope (ft/ft)	0.002158	Area (sq ft)	1322.25	2092.09	54.77
Q Total (cfs)	27300.00	Flow (cfs)	3116.20	24090.91	92.89
Top Width (ft)	338.70	Top Width (ft)	208.69	115.11	14.89
Vel Total (ft/s)	7.87	Avg. Vel. (ft/s)	2.36	11.52	1.70
Max Chl Dpth (ft)	20.53	Hydr. Depth (ft)	6.34	18.17	3.68
Conv. Total (cfs)	587710.7	Conv. (cfs)	67085.1	518625.8	1999.7
Length Wtd. (ft)	1138.61	Wetted Per. (ft)	209.57	121.36	16.66
Min Ch El (ft)	806.42	Shear (lb/sq ft)	0.85	2.32	0.44
Alpha	1.90	Stream Power (lb/ft s)	2.00	26.74	0.75
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)	7269.28	15398.54	8971.06
C & E Loss (ft)	0.27	Cum SA (acres)	881.74	637.48	1126.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	830.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.19	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	828.54	Reach Len. (ft)	1308.31	1160.94	797.87
Crit W.S. (ft)	823.10	Flow Area (sq ft)	1725.11	2274.79	80.96
E.G. Slope (ft/ft)	0.002331	Area (sq ft)	1725.11	2274.79	80.96
Q Total (cfs)	32830.00	Flow (cfs)	3878.23	28789.16	162.61
Top Width (ft)	453.54	Top Width (ft)	320.32	115.11	18.11
Vel Total (ft/s)	8.04	Avg. Vel. (ft/s)	2.25	12.66	2.01
Max Chl Dpth (ft)	22.12	Hydr. Depth (ft)	5.39	19.76	4.47
Conv. Total (cfs)	679981.2	Conv. (cfs)	80326.5	596286.6	3368.0
Length Wtd. (ft)	1136.17	Wetted Per. (ft)	321.44	121.36	20.24
Min Ch El (ft)	806.42	Shear (lb/sq ft)	0.78	2.73	0.58
Alpha	2.18	Stream Power (lb/ft s)	1.76	34.52	1.17
Frctn Loss (ft)	1.79	Cum Volume (acre-ft)	10174.79	17130.83	12567.00
C & E Loss (ft)	0.34	Cum SA (acres)	1165.09	644.63	1568.53

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	832.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.34	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	830.20	Reach Len. (ft)	1308.31	1160.94	797.87
Crit W.S. (ft)	824.52	Flow Area (sq ft)	2292.05	2465.77	113.80
E.G. Slope (ft/ft)	0.002310	Area (sq ft)	2292.05	2465.77	113.80
Q Total (cfs)	38750.00	Flow (cfs)	5714.72	32780.36	254.92
Top Width (ft)	486.50	Top Width (ft)	349.92	115.11	21.47
Vel Total (ft/s)	7.95	Avg. Vel. (ft/s)	2.49	13.29	2.24
Max Chl Dpth (ft)	23.78	Hydr. Depth (ft)	6.55	21.42	5.30
Conv. Total (cfs)	806242.0	Conv. (cfs)	118901.8	682036.3	5303.9
Length Wtd. (ft)	1136.13	Wetted Per. (ft)	351.37	121.36	23.99
Min Ch El (ft)	806.42	Shear (lb/sq ft)	0.94	2.93	0.68
Alpha	2.38	Stream Power (lb/ft s)	2.35	38.95	1.53
Frctn Loss (ft)	1.81	Cum Volume (acre-ft)	12944.69	18332.19	16193.28
C & E Loss (ft)	0.35	Cum SA (acres)	1359.19	645.57	2000.77

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

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         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  834.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.39  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  832.35  * Reach Len. (ft)        * 1308.31  * 1160.94  *  797.87  *
* Crit W.S. (ft)         *  826.12  * Flow Area (sq ft)      * 3050.55  * 2713.37  *  164.51  *
* E.G. Slope (ft/ft)     *0.002189  * Area (sq ft)           * 3055.00  * 2713.37  *  164.51  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 8861.72  *37429.66  *  408.62  *
* Top Width (ft)         *  514.17  * Top Width (ft)         *  373.60  *  115.11  *   25.46  *
* Vel Total (ft/s)       *    7.88  * Avg. Vel. (ft/s)       *    2.90  *   13.79  *    2.48  *
* Max Chl Dpth (ft)      *   25.93  * Hydr. Depth (ft)       *    8.59  *   23.57  *    6.46  *
* Conv. Total (cfs)      *998090.0  * Conv. (cfs)            *189396.0  *799960.8  *  8733.2  *
* Length Wtd. (ft)       * 1137.45  * Wetted Per. (ft)       *  357.18  *  121.36  *   28.53  *
* Min Ch El (ft)         *  806.42  * Shear (lb/sq ft)       *    1.17  *    3.06  *    0.79  *
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    3.39  *   42.15  *    1.96  *
* Frctn Loss (ft)        *    1.78  * Cum Volume (acre-ft)   *18221.31  *20124.02  *22515.14  *
* C & E Loss (ft)        *    0.33  * Cum SA (acres)         * 1656.57  *  648.10  * 2415.85  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  825.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.47  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  824.47  * Reach Len. (ft)        * 1308.31  * 1160.94  *  797.87  *
* Crit W.S. (ft)         *  818.75  * Flow Area (sq ft)      *  869.54  * 1806.86  *   24.09  *
* E.G. Slope (ft/ft)     *0.002048  * Area (sq ft)           *  869.54  * 1806.86  *   24.09  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 1688.53  *18381.22  *   30.25  *
* Top Width (ft)         *  301.69  * Top Width (ft)         *  176.71  *  115.11  *    9.87  *
* Vel Total (ft/s)       *    7.44  * Avg. Vel. (ft/s)       *    1.94  *   10.17  *    1.26  *
* Max Chl Dpth (ft)      *   18.05  * Hydr. Depth (ft)       *    4.92  *   15.70  *    2.44  *
* Conv. Total (cfs)      *444203.6  * Conv. (cfs)            * 37315.9  *406219.1  *   668.6  *
* Length Wtd. (ft)       * 1141.59  * Wetted Per. (ft)       *  177.16  *  121.36  *   11.06  *
* Min Ch El (ft)         *  806.42  * Shear (lb/sq ft)       *    0.63  *    1.90  *    0.28  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    1.22  *   19.36  *    0.35  *
* Frctn Loss (ft)        *    1.62  * Cum Volume (acre-ft)   * 5175.50  *13487.07  * 6249.78  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *  620.13  *  619.63  *  750.93  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 25.584

INPUT
Description:
Station Elevation Data    num=     238
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   852.51   14.02   851.59   37.02    849.9   46.13   849.14   53.44    848.4
   67.26   846.99    79.6   845.76   92.17   845.26  106.54   844.25  115.77   843.44
  124.85   842.68  138.38   841.38  145.24   841.61  151.79   841.77  159.82   841.46
  164.15   841.21   165.7   841.19  168.59   841.17  182.27   840.18  191.29   839.91
  203.45   837.83   210.3   836.07   212.8   835.58   223.7   833.99  227.35   834.06
  250.92    834.2  257.82   834.11  266.47   834.96  269.13   835.09  269.23   835.09
```

```
  285.37  835.12  288.71  835.11  289.17  835.12  302.43  835.11   312.3  835.25
  324.27  835.31  330.63  835.31  339.84   835.2  348.56   835.1  357.95  835.25
  376.29  835.35  386.16  835.23     396  835.24  402.07  835.35  441.61  835.64
  448.37  835.66  452.47  836.05  459.47  836.69  465.65  836.64  475.29  836.32
   510.6  836.03  514.64  836.13   520.4  836.33  538.79  836.15  542.98  835.93
  556.68  836.08  564.15  836.02  564.63  836.11  582.41  835.93  585.38  835.86
  586.86   835.9   604.7  835.63  606.33  835.59  606.78  835.61  607.69  835.59
  619.57  835.56  628.13  834.95   632.8  834.99   635.4  834.19  643.42   831.8
  649.22  832.98  650.71  833.28  653.28  833.14  672.59  832.12  677.65   834.2
  694.86  839.35  696.85  839.96  699.03  840.71  701.92  841.89  706.61  843.88
  722.33  850.56  725.11   851.1  730.76  852.18  732.77  852.18  736.27  852.18
  742.06  851.35  747.44  850.56  774.11  836.67  779.95  833.77  791.04  833.23
   822.6  831.72  828.09  831.53  857.06  830.42  873.31  829.91  901.33  829.65
  929.58  829.29  980.91  828.45  981.41  828.44  981.77  828.47  987.51  828.85
   999.5  827.52  999.66   827.5 1001.31  827.46 1020.35  826.92 1023.16  828.31
 1033.85  832.52  1043.8  832.01 1053.29  831.31 1070.15  826.34 1090.83  820.34
 1107.87   818.6 1114.33  817.89 1121.54  816.84 1137.68   814.4 1144.24  811.25
 1151.52  807.56 1154.37  807.56  1170.4  807.56 1171.89  807.56 1173.03  807.77
 1177.81     807    1185     805    1213  804.31    1242     805 1249.38     807
 1258.75  807.56 1260.21  808.36 1265.41  811.22 1269.64  814.14 1282.65  814.58
 1290.22  814.84 1309.79  815.39  1335.4  815.86 1339.24   815.9 1377.65  815.43
 1389.67  815.62 1417.93  815.94 1435.88  815.69 1442.85  816.37 1452.91  817.61
 1476.38  817.93  1490.9  818.45  1509.3  818.91 1541.62  819.74 1553.92   819.9
 1591.95  819.68 1597.93  819.69 1638.27  819.17 1641.93  819.13 1642.52  819.12
  1643.6  819.15  1687.7  820.44 1697.98  822.62 1710.01  823.66 1724.97  824.92
 1726.22   825.5 1730.85  827.27 1738.17  828.48 1744.95  829.54 1749.09     830
 1760.31   831.2 1769.18  831.48 1779.12  832.22 1792.23  833.54 1799.81  834.42
 1811.62  835.39 1838.26   836.5 1846.66  836.62 1858.47  836.55 1889.88  836.54
 1898.59  836.48 1939.95  837.07 1946.34   837.2 1948.41  837.24 1973.19  837.81
  1994.7  838.43 1997.82  838.47 2004.71  838.71 2032.76  839.96 2049.08  840.84
 2076.66  842.58 2078.07  842.64 2082.94  842.99 2104.39  844.48 2123.36  846.75
 2127.15  847.28 2128.98  847.44 2138.65  848.57 2155.93   847.3    2163  846.77
 2171.94  845.47 2177.68  844.56 2181.92  845.95 2199.11   851.9 2202.39  852.26
 2216.16  853.11 2251.99  857.24 2267.04  858.72 2273.02  859.03 2298.86  860.84
 2315.53  862.17 2319.48  862.36  2351.3  865.09 2368.93  866.35 2375.57  866.73
 2377.96  866.86 2394.15  868.88  2419.3  871.41 2419.71  871.45 2437.99   873.6
 2442.41   874.3 2463.91  877.38 2478.49   879.7 2507.12  884.02 2509.49  884.34
 2529.75  887.54 2538.79  889.41 2556.32  892.47 2563.99   893.7 2589.59  896.45
 2589.72  896.46 2589.76  896.47 2590.21  896.56 2612.36  901.03    2615  901.39
 2635.64  905.03 2654.45  908.23 2654.95   908.3  2659.3  908.81 2688.19  912.16
 2715.97  917.93 2721.62  919.12 2727.88  920.63 2753.02  926.43 2774.73  930.52
 2778.87  931.05 2793.36  932.93 2812.58  936.24

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09  619.57      .1 1137.68     .04 1269.64     .09 2442.41      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1137.68 1269.64          1074.92  959.76  603.54             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     735     854       F
 1451.43 2812.58  837.26       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  815.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  815.50  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  810.32  * Flow Area (sq ft)      *    4.03  * 1158.04  *   29.22  *
* E.G. Slope (ft/ft)     *0.001067  * Area (sq ft)           *    4.03  * 1158.04  *   29.22  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    1.30  * 5857.35  *   11.35  *
* Top Width (ft)         *  196.21  * Top Width (ft)         *    7.30  *  131.96  *   56.95  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *    0.32  *    5.06  *    0.39  *
* Max Chl Dpth (ft)      *   11.19  * Hydr. Depth (ft)       *    0.55  *    8.78  *    0.51  *
* Conv. Total (cfs)      *179717.6  * Conv. (cfs)            *    39.9  *179330.2  *   347.5  *
* Length Wtd. (ft)       *  959.43  * Wetted Per. (ft)       *    7.38  *  136.06  *   56.97  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.04  *    0.57  *    0.03  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.01  *    2.87  *    0.01  *
* Frctn Loss (ft)        *    1.43  * Cum Volume (acre-ft)   *  852.11  * 6684.02  *  823.33  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  188.47  *  513.03  *  221.95  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
```

```
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  819.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  819.19  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  812.55  * Flow Area (sq ft)      *   78.59  * 1644.55  *  658.60  *
* E.G. Slope (ft/ft)     *0.000973  * Area (sq ft)           *   78.59  * 1644.55  *  720.12  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *   61.41  *10038.71  *  799.88  *
* Top Width (ft)         *  426.37  * Top Width (ft)         *   35.59  *  131.96  *  258.82  *
* Vel Total (ft/s)       *    4.58  * Avg. Vel. (ft/s)       *    0.78  *    6.10  *    1.21  *
* Max Chl Dpth (ft)      *   14.88  * Hydr. Depth (ft)       *    2.21  *   12.46  *    3.62  *
* Conv. Total (cfs)      *349358.7  * Conv. (cfs)            *  1968.2  *321753.4  * 25637.1  *
* Length Wtd. (ft)       *  947.01  * Wetted Per. (ft)       *   35.92  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.13  *    0.73  *    0.22  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    0.10  *    4.48  *    0.27  *
* Frctn Loss (ft)        *    1.37  * Cum Volume (acre-ft)   * 1995.40  * 8920.03  * 2191.62  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  324.80  *  554.57  *  408.42  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  820.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  820.08  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  813.22  * Flow Area (sq ft)      *  114.21  * 1762.21  *  820.68  *
* E.G. Slope (ft/ft)     *0.000986  * Area (sq ft)           *  114.21  * 1762.21  * 1019.25  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *   99.63  *11338.54  * 1161.83  *
* Top Width (ft)         *  582.09  * Top Width (ft)         *   44.32  *  131.96  *  405.81  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    0.87  *    6.43  *    1.42  *
* Max Chl Dpth (ft)      *   15.77  * Hydr. Depth (ft)       *    2.58  *   13.35  *    4.51  *
* Conv. Total (cfs)      *401192.2  * Conv. (cfs)            *  3172.2  *361026.4  * 36993.6  *
* Length Wtd. (ft)       *  943.79  * Wetted Per. (ft)       *   44.69  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.16  *    0.80  *    0.28  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    0.14  *    5.13  *    0.39  *
* Frctn Loss (ft)        *    1.42  * Cum Volume (acre-ft)   * 2850.23  *10604.86  * 3287.59  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  388.39  *  582.70  *  525.33  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  823.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  822.96  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  815.54  * Flow Area (sq ft)      *  260.40  * 2141.64  * 1343.40  *
* E.G. Slope (ft/ft)     *0.001032  * Area (sq ft)           *  260.40  * 2141.64  * 2234.46  *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *  343.77  *16053.94  * 2702.30  *
* Top Width (ft)         *  620.07  * Top Width (ft)         *   55.87  *  131.96  *  432.24  *
* Vel Total (ft/s)       *    5.10  * Avg. Vel. (ft/s)       *    1.32  *    7.50  *    2.01  *
* Max Chl Dpth (ft)      *   18.65  * Hydr. Depth (ft)       *    4.66  *   16.23  *    7.39  *
* Conv. Total (cfs)      *594484.1  * Conv. (cfs)            * 10699.7  *499675.9  * 84108.5  *
* Length Wtd. (ft)       *  935.60  * Wetted Per. (ft)       *   56.63  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.30  *    1.01  *    0.48  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    0.39  *    7.60  *    0.96  *
* Frctn Loss (ft)        *    1.57  * Cum Volume (acre-ft)   * 4357.19  *12500.67  * 5266.62  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  519.64  *  606.02  *  668.52  *
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*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  826.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.93  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  825.89  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  818.46  * Flow Area (sq ft)      *  438.89  * 2528.27  * 1876.03  *
* E.G. Slope (ft/ft)     *0.001086  * Area (sq ft)           *  438.89  * 2528.27  * 3546.79  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *  751.30  *21712.93  * 4835.77  *
* Top Width (ft)         *  655.52  * Top Width (ft)         *   65.97  *  131.96  *  457.59  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    1.71  *    8.59  *    2.58  *
* Max Chl Dpth (ft)      *   21.58  * Hydr. Depth (ft)       *    6.65  *   19.16  *   10.32  *
* Conv. Total (cfs)      *828442.0  * Conv. (cfs)            * 22799.0  *658897.4  *146745.6  *
* Length Wtd. (ft)       *  928.46  * Wetted Per. (ft)       *   67.14  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.44  *    1.26  *    0.70  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    0.76  *   10.82  *    1.80  *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)   * 7242.84  *15336.97  * 8938.08  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  877.61  *  634.19  * 1121.77  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  828.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.06  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  827.55  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  819.67  * Flow Area (sq ft)      *  560.27  * 2747.12  * 2177.52  *
* E.G. Slope (ft/ft)     *0.001130  * Area (sq ft)           *  560.27  * 2747.12  * 4309.41  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 1066.93  *25438.64  * 6324.43  *
* Top Width (ft)         *  688.80  * Top Width (ft)         *   93.96  *  131.96  *  462.88  *
* Vel Total (ft/s)       *    5.99  * Avg. Vel. (ft/s)       *    1.90  *    9.26  *    2.90  *
* Max Chl Dpth (ft)      *   23.24  * Hydr. Depth (ft)       *    5.96  *   20.82  *   11.98  *
* Conv. Total (cfs)      *976527.9  * Conv. (cfs)            * 31735.8  *756671.9  *188120.2  *
* Length Wtd. (ft)       *  921.93  * Wetted Per. (ft)       *   95.53  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.41  *    1.42  *    0.84  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    0.79  *   13.19  *    2.45  *
* Frctn Loss (ft)        *    1.68  * Cum Volume (acre-ft)   *10140.47  *17063.91  *12526.80  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1158.87  *  641.33  * 1564.13  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  830.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.18  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  829.19  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  820.85  * Flow Area (sq ft)      *  754.99  * 2964.60  * 2477.12  *
* E.G. Slope (ft/ft)     *0.001165  * Area (sq ft)           *  754.99  * 2964.60  * 5080.56  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 1471.39  *29319.76  * 7958.84  *
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* Top Width (ft)         *  772.19  * Top Width (ft)         *  167.14  *  131.96  *  473.09  *
* Vel Total (ft/s)       *    6.25  * Avg. Vel. (ft/s)       *    1.95  *    9.89  *    3.21  *
* Max Chl Dpth (ft)      *   24.88  * Hydr. Depth (ft)       *    4.52  *   22.47  *   13.63  *
* Conv. Total (cfs)      *1135445.0  * Conv. (cfs)           * 43114.4  *859122.3  *233208.6  *
* Length Wtd. (ft)       *  915.21  * Wetted Per. (ft)       *  169.38  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.32  *    1.58  *    0.99  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    0.63  *   15.67  *    3.18  *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)   *12898.93  *18259.82  *16145.71  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1351.42  *  642.28  * 1996.24  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  832.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  831.33  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  822.17  * Flow Area (sq ft)      * 1264.08  * 3246.74  * 2865.80  *
* E.G. Slope (ft/ft)     *0.001171  * Area (sq ft)           * 1264.08  * 3246.74  * 6111.37  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 2320.37  *34205.80  *10173.84  *
* Top Width (ft)         *  909.04  * Top Width (ft)         *  282.24  *  131.96  *  494.84  *
* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *    1.84  *   10.54  *    3.55  *
* Max Chl Dpth (ft)      *   27.02  * Hydr. Depth (ft)       *    4.48  *   24.60  *   15.76  *
* Conv. Total (cfs)      *1364816.0  * Conv. (cfs)           * 67813.2  *999670.9  *297332.3  *
* Length Wtd. (ft)       *  907.77  * Wetted Per. (ft)       *  285.23  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.32  *    1.74  *    1.15  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    0.59  *   18.38  *    4.09  *
* Frctn Loss (ft)        *    1.59  * Cum Volume (acre-ft)   *18156.45  *20044.60  *22457.67  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1646.72  *  644.81  * 2411.09  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  824.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  823.35  * Reach Len. (ft)        * 1074.92  *  959.76  *  603.54  *
* Crit W.S. (ft)         *  816.33  * Flow Area (sq ft)      *  282.83  * 2193.98  * 1415.50  *
* E.G. Slope (ft/ft)     *0.001037  * Area (sq ft)           *  282.83  * 2193.98  * 2406.80  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  389.02  *16755.23  * 2955.74  *
* Top Width (ft)         *  626.02  * Top Width (ft)         *   57.24  *  131.96  *  436.83  *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)       *    1.38  *    7.64  *    2.09  *
* Max Chl Dpth (ft)      *   19.04  * Hydr. Depth (ft)       *    4.94  *   16.63  *    7.79  *
* Conv. Total (cfs)      *624036.2  * Conv. (cfs)           * 12077.8  *520192.7  * 91765.7  *
* Length Wtd. (ft)       *  934.68  * Wetted Per. (ft)       *   58.05  *  136.06  *  181.92  *
* Min Ch El (ft)         *  804.31  * Shear (lb/sq ft)       *    0.32  *    1.04  *    0.50  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.43  *    7.98  *    1.05  *
* Frctn Loss (ft)        *    1.59  * Cum Volume (acre-ft)   * 5158.20  *13433.76  * 6227.52  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  616.62  *  616.34  *  746.84  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 25.402

INPUT
Description:
Station Elevation Data num= 304

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	854.38	.54	854.33	12.79	852.82	44.75	849.42	46.28	849.25
49.01	848.51	76.29	841.07	88.89	837.51	90.34	837.08	91.61	837.02
101.38	836.57	123.91	835.76	125.71	835.75	130.1	835.72	134.65	835.72
162.33	835.71	163.6	835.67	168.33	835.65	171.08	835.56	174.58	835.43
174.64	835.43	174.65	835.43	199.81	835.27	204.14	835.24	209.81	835.04
215.41	834.12	223.84	832.8	235.17	828.95	240.96	827.07	242.5	826.11
248.5	822.42	250.86	820.52	262.12	820.52	265.43	820.52	279.05	820.52
290.54	820.52	309.29	820.52	330.81	820.52	339.25	820.52	356.72	820.52
392.33	820.52	393.32	820.52	396.29	820.52	401.36	823.43	403.06	824.16
408.44	826.7	409.41	826.8	409.93	827.05	413.17	827.99	415.72	828.11
450.07	829.89	451.88	829.9	454.51	829.9	482.37	829.97	511.24	830.05
516.11	830.06	538.58	829.61	544.79	829.23	575.03	829.42	577.19	829.43
579.94	829.4	604.61	829.22	614.03	829.18	664.68	828.97	671.41	828.92
673.51	828.86	677.48	828.78	724.38	828.09	750.88	827.91	753.19	827.91
775.7	827.7	780.26	827.55	785.85	827.46	790.79	827.24	810.45	827.23
814.81	827.26	822.49	827.32	823.71	827.33	825.04	827.34	825.12	827.34
825.39	827.35	825.48	827.35	825.6	827.35	825.82	827.35	826.11	827.35
826.46	827.35	826.63	827.36	834.56	827.42	843.39	827.49	849.94	827.54
850.87	827.57	851.93	827.56	874.8	828.2	885.17	828.39	885.73	828.42
886.83	828.43	912.36	828.3	915.38	828.26	927.83	828.29	942.92	828.27
945.41	828.28	961.25	828.52	962.27	828.55	964.2	828.59	975.57	828.97
978.17	829	983.56	829.06	987.35	828.97	1015.03	829.21	1028.04	828.82
1047.88	827.75	1048.31	827.73	1048.56	827.7	1048.89	827.64	1063.16	825.34
1065.17	824.53	1069.08	823.38	1143.56	823.38	1270.09	823.38	1276.88	824.9
1279.19	825.41	1282.09	826.28	1285.43	827.09	1291.57	826.77	1299.78	826.26
1332.54	826.44	1334.92	826.43	1336.11	827.01	1380.06	847.67	1381.18	847.79
1385.06	848.31	1390.86	849.08	1397.7	849.41	1398.23	849.43	1403.37	848.44
1416.44	845.94	1435.78	835.98	1447.08	830.11	1448.69	829.97	1461.13	828.26
1467.39	827.96	1474.81	827.77	1482.03	827.6	1498.22	831.5	1500.41	831.99
1501.12	832.11	1531.03	831.12	1542.64	830.45	1564.3	830.53	1596.63	830.08
1610.2	830.25	1643.18	830.4	1650.83	830.42	1656.1	830.36	1704.61	829.8
1746.54	828.9	1758.6	828.7	1773.98	828.31	1806.68	827.11	1807.25	827.08
1811.96	826.71	1821.01	823.02	1821.52	822.81	1827.26	820.98	1839.62	819.18
1850.59	817.6	1865.5	815.44	1878.51	814.09	1885.31	813.16	1908.79	811.41
1916.51	810.83	1922.25	810.47	1924.38	809.56	1934.05	805.53	1940	803.5
1965	802.56	1990	803.5	1997.19	805.55	2000.8	806.56	2009.02	810.91
2009.99	811.42	2025.28	821.8	2044	822.03	2049.21	822.08	2051.34	822.1
2071.94	822.22	2085.12	822.29	2138.78	822.46	2144.69	822.49	2155.55	822.56
2204.26	822.94	2230.76	822.98	2250.83	823.03	2263.92	823.12	2287.05	823.24
2322.73	823.39	2323.4	823.39	2324.62	823.38	2382.97	822.71	2414.71	822.77
2442.54	822.7	2493.68	822.52	2502.11	822.45	2506.69	822.5	2540.07	822.98
2561.68	823.2	2598.67	823.32	2621.13	823.32	2643.24	823.9	2660.18	824.1
2662.85	824.23	2664.65	823.59	2670.87	822.27	2673.4	823.05	2679.71	824.66
2683.44	824.56	2688.32	824.38	2703.88	824.7	2719.62	824.88	2725.35	825.35
2732.4	825.79	2744.5	826.2	2747.53	826.29	2753.43	826.67	2786.9	827.98
2797.04	828.17	2803.99	828.52	2814.4	829.37	2824.38	830.14	2833.86	831.72
2840.51	831.74	2865.25	832.7	2867.04	832.76	2868.25	832.96	2886.35	835.51
2900.3	834.66	2910.47	834.08	2919.21	832.53	2919.7	832.44	2920.68	832.74
2925.85	834.34	2927.66	834.8	2939.36	834.91	2968.23	835.52	2977.49	836.06
2994.21	837.54	3012.06	839.11	3017.03	839.98	3036.87	843.45	3051.78	844.65
3065.39	847.08	3077.97	848.67	3095.58	851.47	3099.77	852.15	3107.11	853.24
3114.85	854.89	3119.08	856.21	3122.45	857.2	3126.06	858.85	3133.91	861.86
3138.32	866.31	3138.71	866.76	3139.05	866.79	3146.71	867.52	3153.55	868.7
3156.1	869.54	3161.23	871.32	3161.78	871.51	3161.89	871.56	3176.28	873
3177.96	873.44	3189.39	874.44	3212.91	876.87	3230.83	879.16	3237.73	881.54
3243.72	883.3	3253.72	884.44	3255.7	884.84	3280.55	887.64	3282.93	887.87
3289.92	888.93	3308.22	891.5	3313.58	892.47	3330.09	896.31	3331.67	896.79
3336.58	898.24	3365.51	907.12	3370.02	908.3	3379.51	909.93	3399.22	912.98
3414.61	917.9	3419.31	919.12	3421.47	919.66	3425.41	920.84	3432.55	921.56
3445.67	922.81	3452.44	924.28	3476.85	930.52	3483.41	931.59	3502.86	934.93
3506.98	935.78	3521	938.43	3526.45	939.88	3538.01	942.75		

Manning's n Values num= 5

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09 1270.09      .1 1922.25     .04 2025.28     .06 2939.36      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1827.26 2025.28          1042.01  869.98  679.75             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1400     850       F
    2155 3538.01     830       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0    1395     824

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  814.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.             *          *   0.041  *          *
* W.S. Elev (ft)         *  813.74  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  809.71  * Flow Area (sq ft)      *          *  873.23  *          *
* E.G. Slope (ft/ft)     *0.002216  * Area (sq ft)           *          *  873.23  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)              *          * 5870.00  *          *
* Top Width (ft)         *  132.34  * Top Width (ft)         *          *  132.34  *          *
* Vel Total (ft/s)       *    6.72  * Avg. Vel. (ft/s)       *          *    6.72  *          *
* Max Chl Dpth (ft)      *   11.18  * Hydr. Depth (ft)       *          *    6.60  *          *
* Conv. Total (cfs)      *124687.5  * Conv. (cfs)             *          *124687.5  *          *
* Length Wtd. (ft)       *  869.64  * Wetted Per. (ft)       *          *  136.19  *          *
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *          *    0.89  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.96  *          *
* Frctn Loss (ft)        *    1.94  * Cum Volume (acre-ft)   *  852.06  * 6661.65  *  823.13  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  188.38  *  510.12  *  221.56  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  818.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *          *   0.043  *          *
* W.S. Elev (ft)         *  817.41  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  812.95  * Flow Area (sq ft)      *          * 1426.13  *          *
* E.G. Slope (ft/ft)     *0.002358  * Area (sq ft)           *          * 1426.13  *          *
* Q Total (cfs)          *10900.00  * Flow (cfs)              *          *10900.00  *          *
* Top Width (ft)         *  166.94  * Top Width (ft)         *          *  166.94  *          *
* Vel Total (ft/s)       *    7.64  * Avg. Vel. (ft/s)       *          *    7.64  *          *
* Max Chl Dpth (ft)      *   14.85  * Hydr. Depth (ft)       *          *    8.54  *          *
* Conv. Total (cfs)      *224465.2  * Conv. (cfs)             *          *224465.2  *          *
* Length Wtd. (ft)       *  872.43  * Wetted Per. (ft)       *          *  172.15  *          *
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *          *    1.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    9.32  *          *
* Frctn Loss (ft)        *    1.91  * Cum Volume (acre-ft)   * 1994.43  * 8886.20  * 2186.63  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  324.36  *  551.27  *  406.62  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  819.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *          *   0.043  *          *
* W.S. Elev (ft)         *  818.19  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  813.68  * Flow Area (sq ft)      *          * 1557.88  *          *
* E.G. Slope (ft/ft)     *0.002554  * Area (sq ft)           *          * 1557.88  *          *
* Q Total (cfs)          *12600.00  * Flow (cfs)              *          *12600.00  *          *
* Top Width (ft)         *  173.45  * Top Width (ft)         *          *  173.45  *          *
* Vel Total (ft/s)       *    8.09  * Avg. Vel. (ft/s)       *          *    8.09  *          *
* Max Chl Dpth (ft)      *   15.63  * Hydr. Depth (ft)       *          *    8.98  *          *
* Conv. Total (cfs)      *249334.6  * Conv. (cfs)             *          *249334.6  *          *
* Length Wtd. (ft)       *  871.67  * Wetted Per. (ft)       *          *  178.95  *          *
```

```
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *          *    1.39  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   11.23  *          *
* Frctn Loss (ft)        *    1.96  * Cum Volume (acre-ft)   * 2848.82  *10568.29  * 3280.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  387.85  *  579.34  *  522.52  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  822.07  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  820.67  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  816.05  * Flow Area (sq ft)      *          * 2014.15  *          *
* E.G. Slope (ft/ft)     *0.003190  * Area (sq ft)           *          * 2014.15  *          *
* Q Total (cfs)          *19100.00  * Flow (cfs)             *          *19100.00  *          *
* Top Width (ft)         *  194.22  * Top Width (ft)         *          *  194.22  *          *
* Vel Total (ft/s)       *    9.48  * Avg. Vel. (ft/s)       *          *    9.48  *          *
* Max Chl Dpth (ft)      *   18.11  * Hydr. Depth (ft)       *          *   10.37  *          *
* Conv. Total (cfs)      *338147.3  * Conv. (cfs)            *          *338147.3  *          *
* Length Wtd. (ft)       *  868.18  * Wetted Per. (ft)        *          *  200.67  *          *
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *          *    2.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   18.96  *          *
* Frctn Loss (ft)        *    2.08  * Cum Volume (acre-ft)   * 4353.98  *12454.89  * 5251.14  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  518.95  *  602.43  *  665.53  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  825.07  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.             *   0.100  *   0.046  *   0.060  *
* W.S. Elev (ft)         *  823.31  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  818.40  * Flow Area (sq ft)      *    8.45  * 2536.39  *  136.46  *
* E.G. Slope (ft/ft)     *0.003507  * Area (sq ft)           *    8.45  * 2536.39  *  313.82  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *    8.15  *27084.85  *  207.00  *
* Top Width (ft)         *  758.68  * Top Width (ft)         *    6.97  *  198.02  *  553.70  *
* Vel Total (ft/s)       *   10.18  * Avg. Vel. (ft/s)       *    0.97  *   10.68  *    1.52  *
* Max Chl Dpth (ft)      *   20.75  * Hydr. Depth (ft)       *    1.21  *   12.81  *    1.05  *
* Conv. Total (cfs)      *461015.4  * Conv. (cfs)            *   137.7  *457382.2  *  3495.5  *
* Length Wtd. (ft)       *  864.25  * Wetted Per. (ft)        *    7.35  *  204.84  *  129.72  *
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *    0.25  *    2.71  *    0.23  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    0.24  *   28.95  *    0.35  *
* Frctn Loss (ft)        *    1.99  * Cum Volume (acre-ft)   * 7237.32  *15281.18  * 8911.33  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *  876.71  *  630.56  * 1114.77  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  826.85  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.85  * Wt. n-Val.             *   0.100  *   0.047  *   0.060  *
* W.S. Elev (ft)         *  825.00  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  819.77  * Flow Area (sq ft)      *   23.68  * 2870.25  *  355.17  *
* E.G. Slope (ft/ft)     *0.003402  * Area (sq ft)           *  391.70  * 2870.25  * 1405.23  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             *   32.63  *31793.28  * 1004.09  *
* Top Width (ft)         * 1278.77  * Top Width (ft)         *  384.96  *  198.02  *  695.79  *
* Vel Total (ft/s)       *   10.10  * Avg. Vel. (ft/s)       *    1.38  *   11.08  *    2.83  *
* Max Chl Dpth (ft)      *   22.44  * Hydr. Depth (ft)       *    2.13  *   14.49  *    2.74  *
* Conv. Total (cfs)      *562835.4  * Conv. (cfs)            *   559.4  *545061.9  * 17214.1  *
```

```
* Length Wtd. (ft)       *  860.61  * Wetted Per. (ft)       *   11.82  *  204.84  *  129.72  *
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *    0.43  *    2.98  *    0.58  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.59  *   32.97  *    1.64  *
* Frctn Loss (ft)        *    1.86  * Cum Volume (acre-ft)   *10128.73  *17002.03  *12487.21  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         * 1152.96  *  637.70  * 1556.10  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  828.65  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.88  * Wt. n-Val.             *   0.100  *   0.048  *   0.060  *
* W.S. Elev (ft)         *  826.77  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  821.08  * Flow Area (sq ft)      *   47.15  * 3220.13  *  584.37  *
* E.G. Slope (ft/ft)     *0.003203  * Area (sq ft)           * 1111.89  * 3220.13  * 2662.58  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *   78.06  *36438.01  * 2233.93  *
* Top Width (ft)         * 1386.02  * Top Width (ft)         *  457.40  *  198.02  *  730.60  *
* Vel Total (ft/s)       *   10.06  * Avg. Vel. (ft/s)       *    1.66  *   11.32  *    3.82  *
* Max Chl Dpth (ft)      *   24.21  * Hydr. Depth (ft)       *    2.94  *   16.26  *    4.50  *
* Conv. Total (cfs)      *684721.3  * Conv. (cfs)            *  1379.4  *643867.8  * 39474.0  *
* Length Wtd. (ft)       *  856.83  * Wetted Per. (ft)       *   17.06  *  204.84  *  129.72  *
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *    0.55  *    3.14  *    0.90  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *    0.91  *   35.57  *    3.44  *
* Frctn Loss (ft)        *    1.72  * Cum Volume (acre-ft)   *12875.90  *18191.69  *16092.06  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         * 1343.72  *  638.64  * 1987.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  831.00  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.87  * Wt. n-Val.             *   0.100  *   0.049  *   0.060  *
* W.S. Elev (ft)         *  829.12  * Reach Len. (ft)        * 1042.01  *  869.98  *  679.75  *
* Crit W.S. (ft)         *  823.20  * Flow Area (sq ft)      *  189.04  * 3686.65  *  889.98  *
* E.G. Slope (ft/ft)     *0.002884  * Area (sq ft)           * 2711.68  * 3686.65  * 4456.28  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *  202.55  *42223.51  * 4273.94  *
* Top Width (ft)         * 2008.66  * Top Width (ft)         * 1024.56  *  198.02  *  786.08  *
* Vel Total (ft/s)       *    9.80  * Avg. Vel. (ft/s)       *    1.07  *   11.45  *    4.80  *
* Max Chl Dpth (ft)      *   26.56  * Hydr. Depth (ft)       *    1.52  *   18.62  *    6.86  *
* Conv. Total (cfs)      *869529.9  * Conv. (cfs)            *  3771.4  *786179.9  * 79578.6  *
* Length Wtd. (ft)       *  852.97  * Wetted Per. (ft)       *  125.89  *  204.84  *  129.72  *
* Min Ch El (ft)         *  802.56  * Shear (lb/sq ft)       *    0.27  *    3.24  *    1.24  *
* Alpha                  *    1.26  * Stream Power (lb/ft s) *    0.29  *   37.12  *    5.93  *
* Frctn Loss (ft)        *    1.53  * Cum Volume (acre-ft)   *18107.40  *19968.22  *22384.46  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         * 1630.60  *  641.18  * 2402.21  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
```

E.G. Elev (ft)	822.46	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.45	Wt. n-Val.	0.000	0.045		
W.S. Elev (ft)	821.02	Reach Len. (ft)	1042.01	869.98	679.75	
Crit W.S. (ft)	816.35	Flow Area (sq ft)	0.00	2082.39		
E.G. Slope (ft/ft)	0.003264	Area (sq ft)	0.00	2082.39		
Q Total (cfs)	20100.00	Flow (cfs)	0.00	20100.00		
Top Width (ft)	196.99	Top Width (ft)	0.12	196.87		
Vel Total (ft/s)	9.65	Avg. Vel. (ft/s)	0.06	9.65		
Max Chl Dpth (ft)	18.46	Hydr. Depth (ft)	0.02	10.58		
Conv. Total (cfs)	351806.2	Conv. (cfs)	0.0	351806.2		
Length Wtd. (ft)	867.70	Wetted Per. (ft)	0.13	203.44		
Min Ch El (ft)	802.56	Shear (lb/sq ft)		2.09		
Alpha	1.00	Stream Power (lb/ft s)		20.13		
Frctn Loss (ft)	2.07	Cum Volume (acre-ft)	5154.71	13386.65	6210.84	
C & E Loss (ft)	0.10	Cum SA (acres)	615.91	612.72	743.81	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 25.238

INPUT
Description:
Station Elevation Data num= 287

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	859.73	.46	859.73	7.66	859.7	12.83	859.68	15.72	860.01
21.69	860.3	48.96	861.21	59.89	861.32	60.68	861.33	67.29	860.89
76.82	859.5	91.12	856.69	101.45	855.77	113.26	854.16	114.47	853.92
126.01	851.92	127.26	851.62	134.55	847.97	151.84	843.51	163.07	842.12
167.46	841.49	171.56	839.06	174.53	837.03	177.57	834.77	182.54	833.18
206.71	823.36	208.63	823.09	209.39	823.02	226.11	821.42	231.29	819.98
235.23	818.74	237.35	819.1	248.18	820.31	252.57	820.79	259.87	821.66
269.2	822.32	275.1	823.41	283.21	823.94	290.07	824.25	299.46	823.66
309.57	823.39	321.41	822.68	326.29	822.42	354.57	819.77	354.58	819.77
354.6	819.77	368.84	819.38	406.15	819.31	420.87	819.01	458.62	818.93
507.68	817.77	511.54	816.89	518.87	815.74	524.66	815.5	527.97	815.38
529.68	814.82	534	813.78	537.71	812.01	539.95	814.01	546.42	815.91
570.36	815.9	581.53	815.91	590.52	815.99	596.07	815.99	604.57	815.61
618.83	815.36	641.13	814.97	645.78	814.93	657.22	814.72	660.56	814.6
661.09	814.66	665.3	814.67	672.55	814.66	679.04	814.92	681.87	815.03
684.56	815.14	685.63	815.16	689.93	815.22	703.17	815.41	723.48	815.68
775.12	815.93	788.58	814.83	812.81	813.92	822.68	813.67	827.68	815.98
836.14	820.11	843.32	824.73	858.18	834.89	879.15	835.63	886.61	836.09
894.8	840.47	899.92	843.49	907.34	843.64	908.04	843.65	927.21	843.99
929.88	844.61	934.77	845.76	938.84	846.26	944.15	846.93	948.9	847.04
951.79	847.1	953.09	846.84	969.79	843.7	970.42	843.56	981.91	840.96
989.49	842.96	998.21	845.18	1008.29	845.28	1010.77	845.23	1020.18	845.56
1057.04	846.1	1088.42	845.2	1112.18	844.91	1120.86	844.87	1140.03	844.84
1163.7	844.58	1173.58	843.96	1197.1	842.77	1212.96	842.98	1218.9	841.74
1226.02	839.32	1234.96	836.12	1249.67	831.32	1251.17	830.54	1256.88	829.68
1267.46	827.59	1279.65	823.34	1280.43	822.99	1281.17	822.68	1281.84	823.06
1290.02	827.49	1296.17	827.36	1314.78	827.19	1319.35	825.3	1325.27	823.94
1344.92	817.37	1348.45	816.86	1361.51	811.12	1363.42	810.23	1365.89	810.09
1375.67	809.68	1377.96	805.85	1379.29	804.78	1380.27	803.86	1386.06	803.86
1415.74	804.26	1418.39	806.44	1426.01	811.97	1439.35	812.42	1454.64	812.71
1468.96	813.13	1483.38	813.02	1501.23	812.89	1508.17	813.19	1511.55	808.43
1513.15	806.93	1513.49	806.72	1514.05	806.4	1514.39	806.15	1516.49	804.62
1530	801	1550	800.38	1570	801	1583.98	804.35	1589.99	804.32
1595.11	807.22	1601.88	809.92	1613.38	810.41	1618.5	810.71	1624.57	811.09
1640.78	811.64	1659.49	813.52	1672.04	814.22	1674.78	814.37	1680.67	814.68
1703.21	814.82	1705.64	814.81	1763.16	814.97	1794.21	814.86	1823.73	814.76
1846.02	814.97	1880.61	814.8	1885.71	814.8	1890.56	814.66	1921.52	814.17
1943.24	814	1953.4	814.23	1992.81	814.19	2007.1	814.32	2011.55	814.28
2017.48	814.34	2030.55	815.31	2051.45	815.88	2059.35	816.22	2068.08	816.56
2073.95	816.74	2111.71	816.59	2126.62	816.69	2148.48	816.58	2170.04	816.37
2184.55	816.44	2237.73	816.47	2240.35	816.45	2241.23	816.44	2241.59	816.43
2247.77	816.46	2279.39	816.45	2308.3	816.22	2325.62	816.1	2368.92	815.88

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 2414.18  815.77 2429.45  815.71 2462.64  815.98 2490.07  816.34  2502.1   816.3
 2524.95  816.26 2546.68  816.36 2550.16  816.06 2571.71  815.32 2587.78  814.71
 2600.32  814.04 2610.72  814.02 2623.79  813.81 2659.91  813.36  2672.8  813.29
 2676.21  813.37 2689.07  813.42 2701.17  813.58 2706.76  814.64 2709.63  814.97
 2720.19  816.29 2737.79  818.26 2746.92  818.93 2759.24  817.95 2765.27  817.25
 2768.55   817.4 2772.38  816.41 2774.59  816.41 2779.35  821.83 2780.35  823.08
 2787.96   822.7 2788.46  822.67 2809.03  821.84 2812.12   821.7  2813.8  821.49
 2820.58  820.54  2828.2  822.92 2831.86  824.35 2838.51  825.17 2854.98  828.46
 2858.02  829.19 2865.43  831.36 2873.32  832.67 2885.55  834.53 2908.05  840.65
 2914.66  842.57 2935.91  850.35 2938.77  851.47  2952.4  857.24 2966.21  863.43
 2974.84  867.35 2983.06   871.4 2985.94  871.86 3000.63  873.81 3043.62  879.59
 3048.01   880.2 3057.01  881.74  3070.7  884.04 3075.33  884.56 3098.42  886.82
 3111.36   889.1 3113.39  889.41 3130.49  890.67 3136.26  891.37 3144.72   892.8
 3149.72  893.62 3154.61  894.25 3154.78   894.3 3155.33  894.46 3167.92  898.04
 3175.15  898.31  3180.3  898.52 3189.45  900.61 3191.33  901.03 3212.64   903.7
 3218.12  904.91 3227.46  906.52

Manning's n Values         num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0     .09 1508.17     .04 1601.88      .1 1763.16     .06 2414.18      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1508.17 1601.88            652.3  488.81   499.4              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1317.76  849.41       F
 1842.28 3227.46  841.47       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1350    1430     812

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  812.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *          *   0.040  *   0.100  *
* W.S. Elev (ft)         *  811.69  * Reach Len. (ft)        *  652.30  *  488.81  *  499.40  *
* Crit W.S. (ft)         *  807.63  * Flow Area (sq ft)      *          *  811.26  *   33.33  *
* E.G. Slope (ft/ft)     *0.002244  * Area (sq ft)           *          *  811.26  *   33.33  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *          * 5849.03  *   20.97  *
* Top Width (ft)         *  132.02  * Top Width (ft)         *          *   92.64  *   39.38  *
* Vel Total (ft/s)       *    6.95  * Avg. Vel. (ft/s)       *          *    7.21  *    0.63  *
* Max Chl Dpth (ft)      *   11.31  * Hydr. Depth (ft)        *          *    8.76  *    0.85  *
* Conv. Total (cfs)      *123921.1  * Conv. (cfs)            *          *123478.4  *   442.7  *
* Length Wtd. (ft)       *  488.87  * Wetted Per. (ft)        *          *   97.82  *   39.42  *
* Min Ch El (ft)         *  800.38  * Shear (lb/sq ft)        *          *    1.16  *    0.12  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *          *    8.38  *    0.07  *
* Frctn Loss (ft)        *    1.06  * Cum Volume (acre-ft)    *  852.06  * 6644.82  *  822.87  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  188.38  *  507.87  *  221.25  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  816.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.090  *   0.040  *   0.097  *
* W.S. Elev (ft)         *  815.36  * Reach Len. (ft)        *  652.30  *  488.81  *  499.40  *
* Crit W.S. (ft)         *  810.49  * Flow Area (sq ft)      *  447.59  * 1154.21  *  335.50  *
* E.G. Slope (ft/ft)     *0.002036  * Area (sq ft)           *  543.97  * 1154.21  *  711.73  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *  670.40  * 9904.38  *  325.22  *
* Top Width (ft)         *  963.53  * Top Width (ft)         *  297.38  *   93.71  *  572.44  *
* Vel Total (ft/s)       *    5.63  * Avg. Vel. (ft/s)       *    1.50  *    8.58  *    0.97  *
* Max Chl Dpth (ft)      *   14.98  * Hydr. Depth (ft)        *    2.86  *   12.32  *    1.40  *
* Conv. Total (cfs)      *241542.9  * Conv. (cfs)            * 14856.0  *219480.1  *  7206.8  *
* Length Wtd. (ft)       *  494.56  * Wetted Per. (ft)        *  157.03  *   99.66  *  240.57  *
* Min Ch El (ft)         *  800.38  * Shear (lb/sq ft)        *    0.36  *    1.47  *    0.18  *
* Alpha                  *    2.12  * Stream Power (lb/ft s) *    0.54  *   12.63  *    0.17  *
* Frctn Loss (ft)        *    0.90  * Cum Volume (acre-ft)    * 1987.92  * 8860.43  * 2181.07  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *  320.80  *  548.67  *  402.16  *
*********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	817.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.	0.090	0.040	0.092
W.S. Elev (ft)	816.18	Reach Len. (ft)	652.30	488.81	499.40
Crit W.S. (ft)	811.35	Flow Area (sq ft)	576.86	1231.25	533.15
E.G. Slope (ft/ft)	0.001993	Area (sq ft)	862.20	1231.25	1250.45
Q Total (cfs)	12600.00	Flow (cfs)	1003.58	10912.17	684.25
Top Width (ft)	1354.40	Top Width (ft)	470.18	93.71	790.50
Vel Total (ft/s)	5.38	Avg. Vel. (ft/s)	1.74	8.86	1.28
Max Chl Dpth (ft)	15.80	Hydr. Depth (ft)	3.65	13.14	2.22
Conv. Total (cfs)	282244.5	Conv. (cfs)	22480.6	244436.4	15327.5
Length Wtd. (ft)	496.30	Wetted Per. (ft)	159.07	99.66	240.57
Min Ch El (ft)	800.38	Shear (lb/sq ft)	0.45	1.54	0.28
Alpha	2.36	Stream Power (lb/ft s)	0.78	13.62	0.35
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	2838.50	10540.44	3270.77
C & E Loss (ft)	0.04	Cum SA (acres)	382.22	576.67	516.35

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	819.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.090	0.040	0.087
W.S. Elev (ft)	818.80	Reach Len. (ft)	652.30	488.81	499.40
Crit W.S. (ft)	814.67	Flow Area (sq ft)	1003.54	1476.63	1162.63
E.G. Slope (ft/ft)	0.001860	Area (sq ft)	2151.14	1476.63	4150.59
Q Total (cfs)	19100.00	Flow (cfs)	2345.02	14272.98	2482.00
Top Width (ft)	1802.27	Top Width (ft)	537.24	93.71	1171.32
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)	2.34	9.67	2.13
Max Chl Dpth (ft)	18.42	Hydr. Depth (ft)	5.99	15.76	4.84
Conv. Total (cfs)	442817.7	Conv. (cfs)	54367.4	330907.3	57543.1
Length Wtd. (ft)	500.55	Wetted Per. (ft)	168.83	99.66	240.57
Min Ch El (ft)	800.38	Shear (lb/sq ft)	0.69	1.72	0.56
Alpha	2.59	Stream Power (lb/ft s)	1.61	16.63	1.20
Frctn Loss (ft)	0.96	Cum Volume (acre-ft)	4328.25	12420.03	5218.75
C & E Loss (ft)	0.02	Cum SA (acres)	512.53	599.55	656.39

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	822.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.	0.090	0.040	0.085
W.S. Elev (ft)	821.80	Reach Len. (ft)	652.30	488.81	499.40
Crit W.S. (ft)	817.50	Flow Area (sq ft)	1519.51	1757.74	1883.77
E.G. Slope (ft/ft)	0.001623	Area (sq ft)	4144.80	1757.74	7686.71
Q Total (cfs)	27300.00	Flow (cfs)	4216.91	17823.84	5259.26
Top Width (ft)	2007.71	Top Width (ft)	721.94	93.71	1192.06
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)	2.78	10.14	2.79
Max Chl Dpth (ft)	21.42	Hydr. Depth (ft)	8.61	18.76	7.84
Conv. Total (cfs)	677648.9	Conv. (cfs)	104673.3	442428.7	130546.9
Length Wtd. (ft)	503.75	Wetted Per. (ft)	178.29	99.66	240.57
Min Ch El (ft)	800.38	Shear (lb/sq ft)	0.86	1.79	0.79
Alpha	2.50	Stream Power (lb/ft s)	2.40	18.12	2.22
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	7187.64	15238.30	8848.91
C & E Loss (ft)	0.05	Cum SA (acres)	867.99	627.64	1101.15

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	824.76	Element	Left OB	Channel	Right OB

```
* Vel Head (ft)          *    1.07  * Wt. n-Val.             *   0.090  *   0.040  *   0.084  *
* W.S. Elev (ft)         *  823.68  * Reach Len. (ft)        *  652.30  *  488.81  *  499.40  *
* Crit W.S. (ft)         *  818.50  * Flow Area (sq ft)      * 1857.75  * 1934.51  * 2337.25  *
* E.G. Slope (ft/ft)     *0.001491  * Area (sq ft)           * 5577.30  * 1934.51  * 9979.84  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 5527.74  *20042.11  * 7260.16  *
* Top Width (ft)         * 2124.41  * Top Width (ft)         *  802.42  *   93.71  * 1228.27  *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)       *    2.98  *   10.36  *    3.11  *
* Max Chl Dpth (ft)      *   23.30  * Hydr. Depth (ft)       *   10.20  *   20.64  *    9.72  *
* Conv. Total (cfs)      *850220.4  * Conv. (cfs)            *143155.5  *519043.8  *188021.2  *
* Length Wtd. (ft)       *  505.18  * Wetted Per. (ft)       *  184.24  *   99.66  *  240.57  *
* Min Ch El (ft)         *  800.38  * Shear (lb/sq ft)       *    0.94  *    1.81  *    0.90  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    2.79  *   18.72  *    2.81  *
* Frctn Loss (ft)        *    0.88  * Cum Volume (acre-ft)   *10057.34  *16954.05  *12398.38  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1138.75  *  634.78  * 1541.09  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  826.68  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.07  * Wt. n-Val.             *   0.090  *   0.040  *   0.084  *
* W.S. Elev (ft)         *  825.61  * Reach Len. (ft)        *  652.30  *  488.81  *  499.40  *
* Crit W.S. (ft)         *  819.45  * Flow Area (sq ft)      * 2216.84  * 2115.46  * 2801.47  *
* E.G. Slope (ft/ft)     *0.001376  * Area (sq ft)           * 7182.80  * 2115.46  *12360.57  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 6936.14  *22345.56  * 9468.30  *
* Top Width (ft)         * 2179.02  * Top Width (ft)         *  846.46  *   93.71  * 1238.85  *
* Vel Total (ft/s)       *    5.43  * Avg. Vel. (ft/s)       *    3.13  *   10.56  *    3.38  *
* Max Chl Dpth (ft)      *   25.23  * Hydr. Depth (ft)       *   11.69  *   22.57  *   11.65  *
* Conv. Total (cfs)      *1044744.0  * Conv. (cfs)            *187006.3  *602461.7  *255276.0  *
* Length Wtd. (ft)       *  506.30  * Wetted Per. (ft)       *  191.95  *   99.66  *  240.57  *
* Min Ch El (ft)         *  800.38  * Shear (lb/sq ft)       *    0.99  *    1.82  *    1.00  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    3.10  *   19.26  *    3.38  *
* Frctn Loss (ft)        *    0.83  * Cum Volume (acre-ft)   *12776.69  *18138.41  *15974.85  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1328.12  *  635.73  * 1972.54  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  829.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.090  *   0.040  *   0.084  *
* W.S. Elev (ft)         *  828.17  * Reach Len. (ft)        *  652.30  *  488.81  *  499.40  *
* Crit W.S. (ft)         *  820.58  * Flow Area (sq ft)      * 2704.00  * 2355.29  * 3416.70  *
* E.G. Slope (ft/ft)     *0.001220  * Area (sq ft)           * 9405.37  * 2355.29  *15547.45  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 9068.51  *25171.30  *12460.18  *
* Top Width (ft)         * 2242.53  * Top Width (ft)         *  897.16  *   93.71  * 1251.67  *
* Vel Total (ft/s)       *    5.51  * Avg. Vel. (ft/s)       *    3.35  *   10.69  *    3.65  *
* Max Chl Dpth (ft)      *   27.79  * Hydr. Depth (ft)       *   14.20  *   25.13  *   14.21  *
* Conv. Total (cfs)      *1336814.0  * Conv. (cfs)            *259591.3  *720542.6  *356679.8  *
* Length Wtd. (ft)       *  507.80  * Wetted Per. (ft)       *  192.85  *   99.66  *  240.57  *
* Min Ch El (ft)         *  800.38  * Shear (lb/sq ft)       *    1.07  *    1.80  *    1.08  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    3.58  *   19.24  *    3.95  *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   *17962.47  *19907.88  *22228.38  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1607.61  *  638.26  * 2386.31  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  820.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.10  * Wt. n-Val.             *   0.090  *   0.040  *   0.086  *
```

* W.S. Elev (ft)	* 819.19	* Reach Len. (ft)	* 652.30	* 488.81	* 499.40	*	
* Crit W.S. (ft)	* 814.68	* Flow Area (sq ft)	* 1069.09	* 1513.17	* 1256.37	*	
* E.G. Slope (ft/ft)	*0.001825	* Area (sq ft)	* 2372.50	* 1513.17	* 4608.54	*	
* Q Total (cfs)	*20100.00	* Flow (cfs)	* 2568.76	*14726.09	* 2805.14	*	
* Top Width (ft)	* 1863.92	* Top Width (ft)	* 595.06	* 93.71	* 1175.15	*	
* Vel Total (ft/s)	* 5.24	* Avg. Vel. (ft/s)	* 2.40	* 9.73	* 2.23	*	
* Max Chl Dpth (ft)	* 18.81	* Hydr. Depth (ft)	* 6.34	* 16.15	* 5.23	*	
* Conv. Total (cfs)	*470445.6	* Conv. (cfs)	* 60122.6	*344667.9	* 65655.1	*	
* Length Wtd. (ft)	* 501.05	* Wetted Per. (ft)	* 170.06	* 99.66	* 240.57	*	
* Min Ch El (ft)	* 800.38	* Shear (lb/sq ft)	* 0.72	* 1.73	* 0.60	*	
* Alpha	* 2.58	* Stream Power (lb/ft s)	* 1.72	* 16.84	* 1.33	*	
* Frctn Loss (ft)	* 0.96	* Cum Volume (acre-ft)	* 5126.33	*13350.74	* 6174.89	*	
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 608.79	* 609.81	* 734.64	*	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 25.145

INPUT
Description: XS added for change in XS geometry
Station Elevation Data num= 199

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	857.25	7.75	858.38	30.36	861.75	37.19	862.1	43.39	862.3
48.49	861.96	64.83	862.44	70.94	863.17	81.79	857.16	100.83	847.4
106.96	843.93	110.85	844.49	125.23	846.55	135.63	845.9	149.08	845.03
160.76	850.89	170.35	855.54	195.9	855.6	210.41	855.94	235.93	855.83
244.95	857.03	254.22	857.86	267.08	859.01	267.32	858.28	277.47	858.37
281.92	858.74	294.25	859.99	296.79	860.23	299.12	860.45	303.21	860.84
351.04	865.13	369.27	864.93	399.71	864.59	425.98	864.41	434.23	864.45
443.8	864.3	489.85	863.51	494.89	863.49	499.45	863.4	505.94	863.39
511.8	863.11	526.59	862.75	571.46	861.6	577.12	861.54	594.87	860.45
595.29	860.44	596.36	860.42	612.1	859.13	617.77	858.18	638.52	858.84
646.82	859.39	654.73	859.31	682.32	858.8	689.98	858.49	706.35	857.68
716.98	856.77	726.51	855.81	736.61	854.65	766.27	852.66	780.54	851.72
821.19	849.19	822.27	849.12	822.82	849.07	873.16	844.62	894.5	843.51
906.01	842.35	921.04	841.65	936.34	840.84	940.05	838.74	949.14	833.65
965.9	832.92	975.13	832.49	980.4	832.3	999.06	831.64	1001.66	831.69
1008.54	831.64	1011.93	831.62	1030.52	837.54	1037.86	839.75	1043.68	832.24
1044.92	829.13	1049.49	810.84	1049.59	810.45	1049.71	810.39	1063.9	803.57
1070	800	1095	799.02	1120	800	1129.52	803.57	1133.49	804.94
1133.93	805.09	1134.91	805.15	1142.22	806.22	1143.32	806.37	1143.43	806.38
1143.56	806.42	1150.6	808.24	1158.98	808.85	1165.26	809.21	1173.54	809.71
1187.31	811.11	1199.01	811.45	1219.46	810.74	1245.44	810.3	1263.69	810.21
1279.53	810.41	1285.34	810.44	1288.64	810.46	1305.94	811.08	1318.75	812.3
1329.01	812.49	1352.93	812.59	1361.37	812.62	1363.94	812.63	1380.55	812.62
1425.2	812.74	1448.96	812.36	1470.69	812.21	1485.07	812.13	1540.03	811.26
1544.8	811.16	1575.57	810.77	1599.48	810.53	1605.74	810.52	1608.83	810.94
1621.13	812.05	1639.59	812.21	1664.47	812.34	1722.08	812.63	1723.41	812.64
1724.3	812.67	1728.55	812.66	1784.13	812.77	1813.13	812.35	1831.61	811.95
1843.79	811.95	1867.83	811.59	1903.79	811.12	1904.16	811.12	1963.62	811.01
1995.21	810.98	2012.13	810.86	2023.28	810.7	2048.35	810.5	2083.28	810.5
2086.24	810.5	2142.96	809.97	2177.12	810	2202.8	809.99	2249.03	809.29
2260.68	809.1	2262.56	809.09	2264.37	809.16	2270.76	809.17	2298.58	809.48
2312.87	809.38	2318.37	809.07	2329.97	809.39	2360.52	809.15	2360.88	809.15
2361.03	809.15	2361.24	809.16	2396.94	811.08	2402.52	813.18	2410.2	816.3
2416.34	816.45	2416.88	816.46	2417.89	816.44	2441.04	816.03	2441.99	815.98
2458.7	815.18	2468.37	826.27	2474.49	832.88	2478.91	833.46	2481.49	834.35
2487.8	838.75	2497.64	846.1	2502.74	849.93	2504.46	850.99	2530.3	860.57
2534.78	862.77	2539.79	865.09	2552.79	873.09	2555.25	874.47	2557.26	874.72
2560.31	875.14	2585.94	879.08	2612.25	883.51	2615.65	883.99	2616.62	884.16
2654.45	888.31	2658.16	888.77	2659.17	888.83	2695.6	893.28	2698.2	893.61
2716.36	895.42	2732.82	897.19	2749	899.43	2756.03	900.46		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.09	822.82	.1	1049.59	.04	1150.6	.1

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1049.59  1150.6           733.28 1480.28 1109.17            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1387.54 2756.03  831.22       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  811.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.001  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  810.68  * Reach Len. (ft)        *  733.28  * 1480.28  * 1109.17  *
* Crit W.S. (ft)         *  806.52  * Flow Area (sq ft)      *    0.01  *  849.83  *   64.25  *
* E.G. Slope (ft/ft)     *0.002093  * Area (sq ft)           *    0.01  *  849.83  *  370.49  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *    0.00  * 5828.36  *   41.64  *
* Top Width (ft)         *  592.99  * Top Width (ft)         *    0.06  *  101.01  *  491.92  *
* Vel Total (ft/s)       *    6.42  * Avg. Vel. (ft/s)       *    0.06  *    6.86  *    0.65  *
* Max Chl Dpth (ft)      *   11.66  * Hydr. Depth (ft)       *    0.12  *    8.41  *    0.61  *
* Conv. Total (cfs)      *128321.5  * Conv. (cfs)            *     0.0  *127411.2  *   910.3  *
* Length Wtd. (ft)       * 1433.16  * Wetted Per. (ft)       *    0.24  *  104.81  *  104.80  *
* Min Ch El (ft)         *  799.02  * Shear (lb/sq ft)       *          *    1.06  *    0.08  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *          *    7.26  *    0.05  *
* Frctn Loss (ft)        *    3.26  * Cum Volume (acre-ft)   *  852.06  * 6635.50  *  820.55  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  188.38  *  506.78  *  218.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  815.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  814.58  * Reach Len. (ft)        *  733.28  * 1480.28  * 1109.17  *
* Crit W.S. (ft)         *  809.39  * Flow Area (sq ft)      *    2.14  * 1243.49  *  827.31  *
* E.G. Slope (ft/ft)     *0.001647  * Area (sq ft)           *    2.14  * 1243.49  * 4348.55  *
* Q Total (cfs)          *10900.00  * Flow (cfs)             *    0.82  * 9751.63  * 1147.55  *
* Top Width (ft)         * 1357.42  * Top Width (ft)         *    1.03  *  101.01  * 1255.37  *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *    0.38  *    7.84  *    1.39  *
* Max Chl Dpth (ft)      *   15.56  * Hydr. Depth (ft)       *    2.07  *   12.31  *    3.49  *
* Conv. Total (cfs)      *268581.9  * Conv. (cfs)            *    20.1  *240285.4  * 28276.4  *
* Length Wtd. (ft)       * 1406.33  * Wetted Per. (ft)       *    4.26  *  104.81  *  237.15  *
* Min Ch El (ft)         *  799.02  * Shear (lb/sq ft)       *    0.05  *    1.22  *    0.36  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    0.02  *    9.57  *    0.50  *
* Frctn Loss (ft)        *    2.99  * Cum Volume (acre-ft)   * 1983.84  * 8846.98  * 2152.07  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  318.57  *  547.58  *  391.68  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  816.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  815.35  * Reach Len. (ft)        *  733.28  * 1480.28  * 1109.17  *
* Crit W.S. (ft)         *  810.21  * Flow Area (sq ft)      *    3.02  * 1321.42  * 1010.11  *
* E.G. Slope (ft/ft)     *0.001702  * Area (sq ft)           *    3.02  * 1321.42  * 5318.10  *
* Q Total (cfs)          *12600.00  * Flow (cfs)             *    1.31  *10971.42  * 1627.27  *
* Top Width (ft)         * 1363.28  * Top Width (ft)         *    1.23  *  101.01  * 1261.04  *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *    0.43  *    8.30  *    1.61  *
* Max Chl Dpth (ft)      *   16.33  * Hydr. Depth (ft)       *    2.46  *   13.08  *    4.26  *
* Conv. Total (cfs)      *305373.5  * Conv. (cfs)            *    31.8  *265903.2  * 39438.6  *
* Length Wtd. (ft)       * 1385.36  * Wetted Per. (ft)       *    5.05  *  104.81  *  237.15  *
* Min Ch El (ft)         *  799.02  * Shear (lb/sq ft)       *    0.06  *    1.34  *    0.45  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.03  *   11.13  *    0.73  *
* Frctn Loss (ft)        *    2.95  * Cum Volume (acre-ft)   * 2832.03  *10526.11  * 3233.12  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  378.69  *  575.58  *  504.59  *
**********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	818.92	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.27	Wt. n-Val.	0.100	0.040	0.100	
W.S. Elev (ft)	817.66	Reach Len. (ft)	733.28	1480.28	1109.17	
Crit W.S. (ft)	813.59	Flow Area (sq ft)	6.51	1554.10	1555.90	
E.G. Slope (ft/ft)	0.001977	Area (sq ft)	6.51	1554.10	8299.80	
Q Total (cfs)	19100.00	Flow (cfs)	3.94	15493.29	3602.78	
Top Width (ft)	1413.07	Top Width (ft)	1.80	101.01	1310.26	
Vel Total (ft/s)	6.13	Avg. Vel. (ft/s)	0.60	9.97	2.32	
Max Chl Dpth (ft)	18.64	Hydr. Depth (ft)	3.61	15.39	6.57	
Conv. Total (cfs)	429546.3	Conv. (cfs)	88.5	348433.7	81024.1	
Length Wtd. (ft)	1324.99	Wetted Per. (ft)	7.43	104.81	237.15	
Min Ch El (ft)	799.02	Shear (lb/sq ft)	0.11	1.83	0.81	
Alpha	2.17	Stream Power (lb/ft s)	0.07	18.25	1.88	
Frctn Loss (ft)	2.75	Cum Volume (acre-ft)	4312.10	12403.03	5147.38	
C & E Loss (ft)	0.02	Cum SA (acres)	508.49	598.46	642.16	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	821.91	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.55	Wt. n-Val.	0.100	0.040	0.100	
W.S. Elev (ft)	820.36	Reach Len. (ft)	733.28	1480.28	1109.17	
Crit W.S. (ft)	815.68	Flow Area (sq ft)	12.29	1827.17	2196.45	
E.G. Slope (ft/ft)	0.002067	Area (sq ft)	12.29	1827.17	11845.18	
Q Total (cfs)	27300.00	Flow (cfs)	9.40	20746.65	6543.95	
Top Width (ft)	1416.11	Top Width (ft)	2.48	101.01	1312.62	
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)	0.76	11.35	2.98	
Max Chl Dpth (ft)	21.34	Hydr. Depth (ft)	4.96	18.09	9.27	
Conv. Total (cfs)	600485.9	Conv. (cfs)	206.7	456339.6	143939.6	
Length Wtd. (ft)	1283.86	Wetted Per. (ft)	10.22	104.81	237.15	
Min Ch El (ft)	799.02	Shear (lb/sq ft)	0.16	2.25	1.20	
Alpha	2.19	Stream Power (lb/ft s)	0.12	25.54	3.56	
Frctn Loss (ft)	2.48	Cum Volume (acre-ft)	7156.52	15218.18	8736.95	
C & E Loss (ft)	0.14	Cum SA (acres)	862.57	626.55	1086.79	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	823.82	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.69	Wt. n-Val.	0.100	0.040	0.100	
W.S. Elev (ft)	822.12	Reach Len. (ft)	733.28	1480.28	1109.17	
Crit W.S. (ft)	816.85	Flow Area (sq ft)	17.05	2005.30	2614.28	
E.G. Slope (ft/ft)	0.002047	Area (sq ft)	17.05	2005.30	14161.24	
Q Total (cfs)	32830.00	Flow (cfs)	14.47	24109.82	8705.72	
Top Width (ft)	1418.08	Top Width (ft)	2.92	101.01	1314.16	
Vel Total (ft/s)	7.08	Avg. Vel. (ft/s)	0.85	12.02	3.33	
Max Chl Dpth (ft)	23.10	Hydr. Depth (ft)	5.84	19.85	11.03	
Conv. Total (cfs)	725599.3	Conv. (cfs)	319.7	532868.3	192411.2	
Length Wtd. (ft)	1265.55	Wetted Per. (ft)	12.03	104.81	237.15	
Min Ch El (ft)	799.02	Shear (lb/sq ft)	0.18	2.45	1.41	
Alpha	2.18	Stream Power (lb/ft s)	0.15	29.40	4.69	
Frctn Loss (ft)	2.29	Cum Volume (acre-ft)	10015.45	16931.94	12259.99	
C & E Loss (ft)	0.19	Cum SA (acres)	1132.72	633.69	1526.51	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

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         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  825.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.82  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  823.96  * Reach Len. (ft)        *  733.28  * 1480.28  * 1109.17  *
* Crit W.S. (ft)         *  817.96  * Flow Area (sq ft)      *   22.84  * 2190.82  * 3049.46  *
* E.G. Slope (ft/ft)     *0.001999  * Area (sq ft)           *   22.84  * 2190.82  *16576.38  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *   21.10  *27609.63  *11119.27  *
* Top Width (ft)         * 1420.14  * Top Width (ft)         *    3.38  *  101.01  * 1315.76  *
* Vel Total (ft/s)       *    7.36  * Avg. Vel. (ft/s)       *    0.92  *   12.60  *    3.65  *
* Max Chl Dpth (ft)      *   24.94  * Hydr. Depth (ft)       *    6.76  *   21.69  *   12.87  *
* Conv. Total (cfs)      *866716.9  * Conv. (cfs)            *   471.9  *617541.5  *248703.5  *
* Length Wtd. (ft)       * 1251.04  * Wetted Per. (ft)       *   13.93  *  104.81  *  237.15  *
* Min Ch El (ft)         *  799.02  * Shear (lb/sq ft)       *    0.20  *    2.61  *    1.60  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.19  *   32.87  *    5.85  *
* Frctn Loss (ft)        *    2.12  * Cum Volume (acre-ft)   *12722.74  *18114.25  *15808.97  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         * 1321.76  *  634.64  * 1957.89  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  828.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.93  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  826.43  * Reach Len. (ft)        *  733.28  * 1480.28  * 1109.17  *
* Crit W.S. (ft)         *  819.36  * Flow Area (sq ft)      *   31.95  * 2440.48  * 3635.10  *
* E.G. Slope (ft/ft)     *0.001893  * Area (sq ft)           *   31.95  * 2440.48  *19831.17  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *   32.13  *32165.34  *14502.54  *
* Top Width (ft)         * 1422.93  * Top Width (ft)         *    4.00  *  101.01  * 1317.92  *
* Vel Total (ft/s)       *    7.65  * Avg. Vel. (ft/s)       *    1.01  *   13.18  *    3.99  *
* Max Chl Dpth (ft)      *   27.41  * Hydr. Depth (ft)       *    8.00  *   24.16  *   15.34  *
* Conv. Total (cfs)      *1073274.0  * Conv. (cfs)            *   738.3  *739233.8  *333301.8  *
* Length Wtd. (ft)       * 1236.21  * Wetted Per. (ft)       *   16.47  *  104.81  *  237.15  *
* Min Ch El (ft)         *  799.02  * Shear (lb/sq ft)       *    0.23  *    2.75  *    1.81  *
* Alpha                  *    2.13  * Stream Power (lb/ft s) *    0.23  *   36.27  *    7.23  *
* Frctn Loss (ft)        *    1.91  * Cum Volume (acre-ft)   *17891.81  *19880.98  *22025.58  *
* C & E Loss (ft)        *    0.28  * Cum SA (acres)         * 1600.86  *  637.17  * 2371.58  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  819.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  818.00  * Reach Len. (ft)        *  733.28  * 1480.28  * 1109.17  *
* Crit W.S. (ft)         *  813.89  * Flow Area (sq ft)      *    7.15  * 1589.09  * 1637.97  *
* E.G. Slope (ft/ft)     *0.001995  * Area (sq ft)           *    7.15  * 1589.09  * 8753.69  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *    4.48  *16152.52  * 3943.00  *
* Top Width (ft)         * 1413.46  * Top Width (ft)         *    1.89  *  101.01  * 1310.56  *
* Vel Total (ft/s)       *    6.21  * Avg. Vel. (ft/s)       *    0.63  *   10.16  *    2.41  *
* Max Chl Dpth (ft)      *   18.98  * Hydr. Depth (ft)       *    3.78  *   15.73  *    6.91  *
* Conv. Total (cfs)      *449977.3  * Conv. (cfs)            *   100.3  *361605.3  * 88271.7  *
* Length Wtd. (ft)       * 1318.41  * Wetted Per. (ft)       *    7.79  *  104.81  *  237.15  *
* Min Ch El (ft)         *  799.02  * Shear (lb/sq ft)       *    0.11  *    1.89  *    0.86  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.07  *   19.20  *    2.07  *
* Frctn Loss (ft)        *    2.71  * Cum Volume (acre-ft)   * 5108.51  *13333.34  * 6098.29  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  604.32  *  608.72  *  720.39  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
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        section.  This may indicate the need for additional cross sections.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 24.865

INPUT
Description:
Station Elevation Data    num=     198
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  864.67   14.27  865.86   39.14  867.15   65.36  869.09   73.98  867.99
   83.21  867.03  106.44  868.25  106.94  868.26  107.31  868.01     122  856.74
  127.83   853.6  145.99  844.12  156.01  846.01  163.68  847.45  176.06  846.93
  184.24  846.53  191.05  849.66  221.08  861.97  221.77  861.94  223.25  861.99
  299.83   863.5  301.63  863.62  342.32  866.34  354.93  867.21  385.25  869.03
  399.04  869.98  419.56  871.28  427.68  871.31  431.86  871.29  517.32   871.2
  517.82  871.19  518.66   871.2  523.09  870.93  549.42  869.56  581.24  868.65
  607.39  867.43  610.52  867.28  616.73  866.92  651.27   864.8  664.75  863.89
  689.74  861.96  740.15  858.19  758.02  856.72  773.08  855.65  812.39  853.25
  831.23  854.17  860.18  855.56   865.9  855.84  868.91  855.99  870.25  856.07
  887.88   856.9  927.73  858.61  977.19  859.87  988.55  860.07  995.66  860.28
  997.96  860.31 1055.92  860.64 1062.15  860.68 1068.72  860.71  1074.9   860.8
 1127.93   860.9 1135.34  861.09 1156.93  859.26 1185.14   857.3  1200.5  856.01
 1211.32  855.55 1222.46  855.17 1240.42  854.09 1267.68  852.76 1283.24  851.96
 1320.61  850.83 1341.05  850.25 1369.39  848.34 1387.31  847.12 1402.75  839.54
 1406.07  837.64 1414.15  837.54 1461.77  836.97 1485.85  824.91 1500.37  817.56
  1513.8  813.21 1523.47  810.54 1528.76  810.26 1561.69  809.99  1580.6  809.86
 1591.39  809.72 1596.15   809.7 1627.48   809.6 1659.75  808.78 1666.94  808.84
 1723.11  808.92 1747.69   808.3 1768.26  807.47 1792.34  806.09 1792.35  806.09
 1810.57  806.16 1811.14  806.17 1821.74  806.27  1823.8  806.28 1836.57  806.54
 1846.42  807.05 1851.01  806.84 1857.48  805.56 1861.74  804.68  1865.9  805.57
 1874.34  807.35 1905.81  808.25 1910.54   808.4 1914.29  808.45 1932.08  808.58
 1977.92     809 1990.31  809.02 2019.03  808.89 2041.56   809.1 2071.14  810.01
 2105.19  811.07 2151.98  810.64 2168.82  810.51 2195.07  810.37 2212.73  810.73
 2228.12  810.03 2236.04  809.79 2245.41  809.05 2259.02  808.41 2269.89  807.46
 2275.47  806.38 2281.27  804.53 2297.16  803.59 2298.75  803.44 2299.88  803.37
  2304.8  804.29 2308.71  804.99 2310.62  804.83 2315.29  804.07  2322.1  800.59
 2324.76  799.89 2332.32  799.27 2333.42  799.25 2336.98  799.57 2343.84  800.08
 2344.95  800.15 2349.66  800.46 2356.19  799.85 2360.28  799.41 2368.76  798.52
 2375.82  797.46    2380     796    2393  795.12    2407     796 2412.03  798.56
  2412.8  799.68 2422.05  811.61 2426.23  811.49 2445.53   811.4 2477.46  811.25
 2486.37  811.32 2526.43  811.35 2550.42  811.43 2555.61  811.39  2561.1  811.55
 2581.65  811.74 2586.27  810.64 2597.73  808.04 2608.82  807.28 2614.97  806.74
 2619.36  806.74 2641.64   806.6 2665.56   806.8 2679.62  807.21 2707.67  813.29
 2717.44  815.41 2724.35  816.02 2724.67  816.05 2726.66  816.13 2743.59  816.84
 2749.68   817.1 2763.44   816.2 2765.13  816.04 2771.36  821.91 2781.15  831.27
  2786.8  834.89 2802.64  845.16 2812.74  851.47 2838.38  864.65  2839.3  865.09
 2840.26  866.18 2856.85  885.01 2869.66  887.37 2887.08  890.48 2900.21  893.59
 2910.83  894.86 2942.93  900.45 2945.34  901.03 2952.82  901.85 2975.49  904.01
 2987.94  905.28 3003.06  904.92 3007.07  904.82

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .09  977.19      .1 2349.66     .04 2422.05      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2349.66 2422.05          539.22 1119.54 1118.48             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1981.28     830       F
 2502.78 3007.07     830       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  808.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  807.28  * Reach Len. (ft)        *  539.22  * 1119.54  * 1118.48  *
* Crit W.S. (ft)         *  803.54  * Flow Area (sq ft)       *  358.75  *  653.49  *          *
* E.G. Slope (ft/ft)     *0.002485  * Area (sq ft)           *  455.70  *  653.49  *   35.44  *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *  719.88  * 5150.12  *          *
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* Top Width (ft)          *  321.47  * Top Width (ft)          *  181.30  *   69.03  *   71.14  *
* Vel Total (ft/s)        *    5.80  * Avg. Vel. (ft/s)        *    2.01  *    7.88  *          *
* Max Chl Dpth (ft)       *   12.16  * Hydr. Depth (ft)        *    4.55  *    9.47  *          *
* Conv. Total (cfs)       *117742.9  * Conv. (cfs)             * 14439.6  *103303.3  *          *
* Length Wtd. (ft)        * 1083.94  * Wetted Per. (ft)        *   80.47  *   74.44  *          *
* Min Ch El (ft)          *  795.12  * Shear (lb/sq ft)        *    0.69  *    1.36  *          *
* Alpha                   *    1.64  * Stream Power (lb/ft s)  *    1.39  *   10.73  *          *
* Frctn Loss (ft)         *    1.42  * Cum Volume (acre-ft)    *  848.22  * 6609.96  *  815.38  *
* C & E Loss (ft)         *    0.14  * Cum SA (acres)          *  186.85  *  503.90  *  211.04  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  812.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.37  * Wt. n-Val.              *   0.100  *   0.040  *          *
* W.S. Elev (ft)          *  811.02  * Reach Len. (ft)        *  539.22  * 1119.54  * 1118.48  *
* Crit W.S. (ft)          *  806.61  * Flow Area (sq ft)      *  978.60  *  917.37  *          *
* E.G. Slope (ft/ft)      *0.002849  * Area (sq ft)           * 2186.58  *  917.37  *  390.98  *
* Q Total (cfs)           *10900.00  * Flow (cfs)             * 1587.09  * 9312.91  *          *
* Top Width (ft)          * 1006.05  * Top Width (ft)          *  821.55  *   71.94  *  112.56  *
* Vel Total (ft/s)        *    5.75  * Avg. Vel. (ft/s)        *    1.62  *   10.15  *          *
* Max Chl Dpth (ft)       *   15.90  * Hydr. Depth (ft)        *    2.70  *   12.75  *          *
* Conv. Total (cfs)       *204221.7  * Conv. (cfs)             * 29735.7  *174486.0  *          *
* Length Wtd. (ft)        * 1074.83  * Wetted Per. (ft)        *  363.77  *   79.18  *          *
* Min Ch El (ft)          *  795.12  * Shear (lb/sq ft)        *    0.48  *    2.06  *          *
* Alpha                   *    2.68  * Stream Power (lb/ft s)  *    0.78  *   20.92  *          *
* Frctn Loss (ft)         *    1.74  * Cum Volume (acre-ft)    * 1965.41  * 8810.26  * 2091.72  *
* C & E Loss (ft)         *    0.21  * Cum SA (acres)          *  311.64  *  544.64  *  374.26  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  813.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.36  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  811.94  * Reach Len. (ft)        *  539.22  * 1119.54  * 1118.48  *
* Crit W.S. (ft)          *  807.43  * Flow Area (sq ft)      * 1314.08  *  983.19  *   46.38  *
* E.G. Slope (ft/ft)      *0.002744  * Area (sq ft)           * 2942.25  *  983.19  *  581.91  *
* Q Total (cfs)           *12600.00  * Flow (cfs)             * 2380.11  *10194.94  *   24.95  *
* Top Width (ft)          * 1183.01  * Top Width (ft)          *  831.24  *   72.39  *  279.37  *
* Vel Total (ft/s)        *    5.38  * Avg. Vel. (ft/s)        *    1.81  *   10.37  *    0.54  *
* Max Chl Dpth (ft)       *   16.82  * Hydr. Depth (ft)        *    3.57  *   13.58  *    0.57  *
* Conv. Total (cfs)       *240550.1  * Conv. (cfs)             * 45439.4  *194634.4  *   476.3  *
* Length Wtd. (ft)        * 1061.35  * Wetted Per. (ft)        *  370.17  *   79.92  *   80.73  *
* Min Ch El (ft)          *  795.12  * Shear (lb/sq ft)        *    0.61  *    2.11  *    0.10  *
* Alpha                   *    3.03  * Stream Power (lb/ft s)  *    1.10  *   21.85  *    0.05  *
* Frctn Loss (ft)         *    1.77  * Cum Volume (acre-ft)    * 2807.24  *10486.96  * 3158.00  *
* C & E Loss (ft)         *    0.18  * Cum SA (acres)          *  371.69  *  572.63  *  484.98  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	816.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	814.96	Reach Len. (ft)	539.22	1119.54	1118.48
Crit W.S. (ft)	810.73	Flow Area (sq ft)	2429.94	1202.47	290.93
E.G. Slope (ft/ft)	0.002181	Area (sq ft)	5475.98	1202.47	1449.32
Q Total (cfs)	19100.00	Flow (cfs)	5911.75	12713.72	474.52
Top Width (ft)	1207.01	Top Width (ft)	841.28	72.39	293.34
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	2.43	10.57	1.63
Max Chl Dpth (ft)	19.84	Hydr. Depth (ft)	6.60	16.61	3.60
Conv. Total (cfs)	408984.8	Conv. (cfs)	126587.3	272236.6	10160.9
Length Wtd. (ft)	1023.37	Wetted Per. (ft)	370.17	79.92	80.73
Min Ch El (ft)	795.12	Shear (lb/sq ft)	0.89	2.05	0.49
Alpha	3.22	Stream Power (lb/ft s)	2.17	21.66	0.80
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)	4265.95	12356.19	5023.26
C & E Loss (ft)	0.05	Cum SA (acres)	501.39	595.51	621.75

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	819.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	818.21	Reach Len. (ft)	539.22	1119.54	1118.48
Crit W.S. (ft)	810.67	Flow Area (sq ft)	3623.83	1437.08	552.56
E.G. Slope (ft/ft)	0.001806	Area (sq ft)	8218.46	1437.08	2492.39
Q Total (cfs)	27300.00	Flow (cfs)	10471.76	15570.45	1257.79
Top Width (ft)	1268.33	Top Width (ft)	850.57	72.39	345.38
Vel Total (ft/s)	4.86	Avg. Vel. (ft/s)	2.89	10.83	2.28
Max Chl Dpth (ft)	23.09	Hydr. Depth (ft)	9.84	19.85	6.84
Conv. Total (cfs)	642420.3	Conv. (cfs)	246420.1	366401.9	29598.3
Length Wtd. (ft)	999.20	Wetted Per. (ft)	370.17	79.92	80.73
Min Ch El (ft)	795.12	Shear (lb/sq ft)	1.10	2.03	0.77
Alpha	2.98	Stream Power (lb/ft s)	3.19	21.96	1.76
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)	7087.24	15162.72	8554.41
C & E Loss (ft)	0.01	Cum SA (acres)	855.39	623.60	1065.68

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	821.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	820.28	Reach Len. (ft)	539.22	1119.54	1118.48
Crit W.S. (ft)	814.94	Flow Area (sq ft)	4389.28	1587.50	720.31
E.G. Slope (ft/ft)	0.001612	Area (sq ft)	9990.10	1587.50	3212.34
Q Total (cfs)	32830.00	Flow (cfs)	13616.17	17365.28	1848.56
Top Width (ft)	1274.65	Top Width (ft)	854.67	72.39	347.58
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)	3.10	10.94	2.57
Max Chl Dpth (ft)	25.16	Hydr. Depth (ft)	11.92	21.93	8.92
Conv. Total (cfs)	817713.2	Conv. (cfs)	339144.7	432525.6	46042.9
Length Wtd. (ft)	988.62	Wetted Per. (ft)	370.17	79.92	80.73
Min Ch El (ft)	795.12	Shear (lb/sq ft)	1.19	2.00	0.90
Alpha	2.82	Stream Power (lb/ft s)	3.70	21.86	2.30
Frctn Loss (ft)	1.41	Cum Volume (acre-ft)	9931.22	16870.89	12038.80
C & E Loss (ft)	0.02	Cum SA (acres)	1125.51	630.75	1505.36

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	823.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.	0.100	0.040	0.100

```
* W.S. Elev (ft)         *  822.39  * Reach Len. (ft)        *  539.22  * 1119.54  * 1118.48  *
* Crit W.S. (ft)         *  815.86  * Flow Area (sq ft)      * 5165.25  * 1739.98  *  890.36  *
* E.G. Slope (ft/ft)     *0.001459  * Area (sq ft)           *11794.80  * 1739.98  * 3946.86  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             *16993.89  *19252.00  * 2504.11  *
* Top Width (ft)         * 1281.03  * Top Width (ft)         *  858.83  *   72.39  *  349.81  *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)       *    3.29  *   11.06  *    2.81  *
* Max Chl Dpth (ft)      *   27.27  * Hydr. Depth (ft)       *   14.02  *   24.04  *   11.03  *
* Conv. Total (cfs)      *1014365.0  * Conv. (cfs)           *444852.0  *503963.0  * 65550.4  *
* Length Wtd. (ft)       *  980.31  * Wetted Per. (ft)       *  370.17  *   79.92  *   80.73  *
* Min Ch El (ft)         *  795.12  * Shear (lb/sq ft)       *    1.27  *    1.98  *    1.00  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    4.18  *   21.95  *    2.83  *
* Frctn Loss (ft)        *    1.31  * Cum Volume (acre-ft)   *12623.27  *18047.46  *15547.68  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1314.50  *  631.69  * 1936.69  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  826.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  825.18  * Reach Len. (ft)        *  539.22  * 1119.54  * 1118.48  *
* Crit W.S. (ft)         *  816.97  * Flow Area (sq ft)      * 6191.45  * 1941.64  * 1115.25  *
* E.G. Slope (ft/ft)     *0.001286  * Area (sq ft)           *14194.92  * 1941.64  * 4925.39  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             *21579.64  *21698.63  * 3421.73  *
* Top Width (ft)         * 1289.46  * Top Width (ft)         *  864.34  *   72.39  *  352.73  *
* Vel Total (ft/s)       *    5.05  * Avg. Vel. (ft/s)       *    3.49  *   11.18  *    3.07  *
* Max Chl Dpth (ft)      *   30.06  * Hydr. Depth (ft)       *   16.81  *   26.82  *   13.81  *
* Conv. Total (cfs)      *1302136.0  * Conv. (cfs)           *601705.2  *605022.8  * 95408.2  *
* Length Wtd. (ft)       *  971.89  * Wetted Per. (ft)       *  370.17  *   79.92  *   80.73  *
* Min Ch El (ft)         *  795.12  * Shear (lb/sq ft)       *    1.34  *    1.95  *    1.11  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *    4.68  *   21.80  *    3.40  *
* Frctn Loss (ft)        *    1.18  * Cum Volume (acre-ft)   *17772.06  *19806.52  *21710.39  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1593.56  *  634.22  * 2350.31  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  816.56  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  815.39  * Reach Len. (ft)        *  539.22  * 1119.54  * 1118.48  *
* Crit W.S. (ft)         *  810.67  * Flow Area (sq ft)      * 2587.62  * 1233.45  *  325.48  *
* E.G. Slope (ft/ft)     *0.002117  * Area (sq ft)           * 5836.36  * 1233.45  * 1575.31  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 6467.86  *13068.46  *  563.68  *
* Top Width (ft)         * 1210.30  * Top Width (ft)         *  842.60  *   72.39  *  295.31  *
* Vel Total (ft/s)       *    4.85  * Avg. Vel. (ft/s)       *    2.50  *   10.60  *    1.73  *
* Max Chl Dpth (ft)      *   20.27  * Hydr. Depth (ft)       *    7.02  *   17.04  *    4.03  *
* Conv. Total (cfs)      *436851.7  * Conv. (cfs)           *140572.0  *284028.7  * 12251.0  *
* Length Wtd. (ft)       * 1019.42  * Wetted Per. (ft)       *  370.17  *   79.92  *   80.73  *
* Min Ch El (ft)         *  795.12  * Shear (lb/sq ft)       *    0.92  *    2.04  *    0.53  *
* Alpha                  *    3.20  * Stream Power (lb/ft s) *    2.31  *   21.61  *    0.92  *
* Frctn Loss (ft)        *    1.63  * Cum Volume (acre-ft)   * 5059.33  *13285.38  * 5966.79  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  597.22  *  605.78  *  699.95  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 24.653

INPUT
Description:
```

Station Elevation Data num= 196

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.66	31.87	871.57	57.02	871.82	63	871.91	71.57	872.19
75.95	872.61	96.13	875.23	125.21	861.24	131.22	858.5	137.05	853.35
147.77	843.8	160.89	846.34	163.92	846.95	166.77	846.71	181.19	845.55
188.05	852.35	194.7	859.78	207.54	865.41	215.85	868.26	231.75	874.29
249.04	874.74	309.47	877.48	323.17	877.85	338.89	878.16	363.99	878.95
375.18	879.53	394.51	879.95	395.21	879.97	395.9	879.98	426.53	880.7
463.84	881.4	465.78	881.45	467.13	881.45	467.68	881.42	468.54	881.39
469.82	881.35	504.84	879.85	526.08	879.39	540.32	878.76	559.63	877.09
575.09	876.6	590.06	875.9	600.41	875.35	619.55	874.7	634.46	874.21
647.53	873.47	666.41	873.11	679.99	872.93	685.96	872.66	705.68	872.06
714.73	871.82	723.97	871.57	732.77	871.48	746.11	870.81	757.99	870.74
763.68	870.62	793.59	869.61	799.86	869.49	823.83	868.27	826.34	868.22
830.23	868.47	843.57	869.13	844.55	869.18	855.48	869.42	862.95	869.39
875.99	869.88	886.07	869.87	959.68	871.26	980.64	872.26	985.62	872.45
1012.42	873.29	1035.31	872.66	1144.13	869.19	1151.74	868.92	1159.2	868.27
1169.53	867.74	1183.42	866.48	1244.49	864.79	1255.1	864.21	1262.87	862.84
1282.32	860.99	1296.08	859.93	1316.12	857.84	1322.78	857.2	1352.28	855.38
1379.33	853.27	1388.15	852.77	1404.15	851.68	1407.91	851.54	1414.37	851.29
1425.05	850.7	1439.99	849.92	1446.67	849.46	1455.79	848.91	1490.91	846.49
1500.91	845.95	1518.46	844.78	1528	844.42	1534.56	844.04	1545.09	843.33
1564.04	842.3	1579.11	841.47	1594.52	840.82	1607.96	838.77	1617.55	837.81
1648.09	834.51	1649.27	833.78	1665.13	821.35	1669.69	817.8	1669.97	817.56
1670.4	817.34	1689.11	807.87	1706.04	807.13	1718.36	806.13	1723.74	805.69
1727.49	799.77	1735	792.4	1767.28	791.35	1791	792.4	1799.52	797.88
1800.58	798.66	1809.53	798.6	1820.91	798.7	1822.79	798.71	1831.17	806.29
1832.25	807.18	1854.4	809.31	1858.56	809.58	1865.77	809.95	1874.41	809.57
1894.17	808.57	1908.74	808	1912.38	807.89	1928.41	807.8	1973.46	807.95
2012.07	808.15	2058.52	808.52	2101.94	808.24	2117.39	807.88	2184.21	807.44
2198.23	807.92	2247.21	808.53	2256.98	808.65	2261.5	808.72	2305.1	809.08
2324.82	809.32	2354.18	809.4	2381.97	808.41	2396.02	808.22	2429.19	808.2
2458	808.09	2488.44	807.78	2521.88	807.86	2530.71	808.19	2555.5	809.08
2578.6	809.97	2601.42	811.48	2604.84	811.78	2606.69	812.24	2619.26	814.8
2626.78	814.58	2634.04	814.26	2645.23	818.81	2647.93	819.7	2653.42	820.05
2656.93	820.31	2662.34	820.78	2665.78	821.01	2675.28	820.62	2688.2	820.16
2693.6	819.82	2697.24	819.64	2704.09	823.11	2721.71	831.23	2730.13	836.87
2740.51	842.57	2757.77	851.34	2758.15	851.61	2776.23	865.13	2776.25	865.17
2785.04	879.6	2792.52	880.77	2810.51	883.93	2821.53	884.29	2830.25	884.89
2851.12	885.97	2852.09	885.97	2858.53	886.31	2889.65	888.06	2897.89	887.77
2904.99	887.51	2921.92	886.64	2946.52	885.5	2969.35	884.95	2980.58	883.74
2987.25	883.48								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.09	188.05	.1	1723.74	.04	1831.17	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1723.74	1831.17	565.84	932.26	675.41	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
2062.28	2987.25	827.8	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	806.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.100	0.040	
W.S. Elev (ft)	806.19	Reach Len. (ft)	565.84	932.26	675.41
Crit W.S. (ft)	799.05	Flow Area (sq ft)	1.55	1191.89	
E.G. Slope (ft/ft)	0.000808	Area (sq ft)	1.55	1191.89	
Q Total (cfs)	5870.00	Flow (cfs)	0.26	5869.74	
Top Width (ft)	113.49	Top Width (ft)	6.16	107.32	
Vel Total (ft/s)	4.92	Avg. Vel. (ft/s)	0.17	4.92	
Max Chl Dpth (ft)	14.84	Hydr. Depth (ft)	0.25	11.11	
Conv. Total (cfs)	206453.8	Conv. (cfs)	9.2	206444.6	
Length Wtd. (ft)	930.51	Wetted Per. (ft)	6.18	118.38	
Min Ch El (ft)	791.35	Shear (lb/sq ft)	0.01	0.51	
Alpha	1.00	Stream Power (lb/ft s)	0.00	2.50	
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	845.39	6586.25	814.93
C & E Loss (ft)	0.04	Cum SA (acres)	185.69	501.63	210.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	810.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	809.77	Reach Len. (ft)	565.84	932.26	675.41
Crit W.S. (ft)	801.62	Flow Area (sq ft)	101.50	1576.25	335.65
E.G. Slope (ft/ft)	0.001039	Area (sq ft)	101.50	1576.25	1055.78
Q Total (cfs)	10900.00	Flow (cfs)	92.14	10596.70	211.16
Top Width (ft)	880.54	Top Width (ft)	38.39	107.43	734.73
Vel Total (ft/s)	5.41	Avg. Vel. (ft/s)	0.91	6.72	0.63
Max Chl Dpth (ft)	18.42	Hydr. Depth (ft)	2.64	14.67	1.50
Conv. Total (cfs)	338080.4	Conv. (cfs)	2857.7	328673.1	6549.6
Length Wtd. (ft)	918.75	Wetted Per. (ft)	38.91	118.53	224.04
Min Ch El (ft)	791.35	Shear (lb/sq ft)	0.17	0.86	0.10
Alpha	1.50	Stream Power (lb/ft s)	0.15	5.80	0.06
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	1951.25	8778.22	2073.15
C & E Loss (ft)	0.05	Cum SA (acres)	306.32	542.33	363.39

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	811.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	810.58	Reach Len. (ft)	565.84	932.26	675.41
Crit W.S. (ft)	802.38	Flow Area (sq ft)	133.24	1663.27	522.19
E.G. Slope (ft/ft)	0.001116	Area (sq ft)	133.24	1663.27	1662.88
Q Total (cfs)	12600.00	Flow (cfs)	145.80	12008.49	445.70
Top Width (ft)	904.09	Top Width (ft)	39.99	107.43	756.67
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)	1.09	7.22	0.85
Max Chl Dpth (ft)	19.23	Hydr. Depth (ft)	3.33	15.48	2.26
Conv. Total (cfs)	377176.3	Conv. (cfs)	4364.6	359469.8	13342.0
Length Wtd. (ft)	913.34	Wetted Per. (ft)	40.71	118.53	231.60
Min Ch El (ft)	791.35	Shear (lb/sq ft)	0.23	0.98	0.16
Alpha	1.68	Stream Power (lb/ft s)	0.25	7.06	0.13
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)	2788.20	10452.95	3129.18
C & E Loss (ft)	0.05	Cum SA (acres)	366.29	570.32	471.68

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	814.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	813.43	Reach Len. (ft)	565.84	932.26	675.41
Crit W.S. (ft)	804.97	Flow Area (sq ft)	255.25	1969.49	1180.95
E.G. Slope (ft/ft)	0.001251	Area (sq ft)	255.25	1969.49	3864.58
Q Total (cfs)	19100.00	Flow (cfs)	414.28	16847.33	1838.40
Top Width (ft)	934.42	Top Width (ft)	45.62	107.43	781.37
Vel Total (ft/s)	5.61	Avg. Vel. (ft/s)	1.62	8.55	1.56
Max Chl Dpth (ft)	22.08	Hydr. Depth (ft)	5.60	18.33	5.11
Conv. Total (cfs)	540110.5	Conv. (cfs)	11714.9	476409.3	51986.3
Length Wtd. (ft)	893.14	Wetted Per. (ft)	47.02	118.53	231.60
Min Ch El (ft)	791.35	Shear (lb/sq ft)	0.42	1.30	0.40
Alpha	2.06	Stream Power (lb/ft s)	0.69	11.10	0.62
Frctn Loss (ft)	1.57	Cum Volume (acre-ft)	4230.48	12315.43	4955.04

```
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  495.90  *  593.20  *  607.95  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  817.77  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  816.57  * Reach Len. (ft)        *  565.84  *  932.26  *  675.41  *
* Crit W.S. (ft)         *  808.72  * Flow Area (sq ft)      *  408.25  * 2306.87  * 1906.75  *
* E.G. Slope (ft/ft)     *0.001294  * Area (sq ft)           *  408.25  * 2306.87  * 6371.34  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             *  840.82  *22303.82  * 4155.36  *
* Top Width (ft)         *  967.81  * Top Width (ft)         *   51.82  *  107.43  *  808.56  *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *    2.06  *    9.67  *    2.18  *
* Max Chl Dpth (ft)      *   25.22  * Hydr. Depth (ft)       *    7.88  *   21.47  *    8.25  *
* Conv. Total (cfs)      *758951.4  * Conv. (cfs)            * 23375.1  *620055.4  *115520.8  *
* Length Wtd. (ft)       *  875.28  * Wetted Per. (ft)       *   53.97  *  118.53  *  231.60  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    0.61  *    1.57  *    0.67  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    1.26  *   15.20  *    1.45  *
* Frctn Loss (ft)        *    1.50  * Cum Volume (acre-ft)   * 7033.84  *15114.61  * 8440.61  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  849.80  *  621.29  * 1050.87  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  819.90  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  818.63  * Reach Len. (ft)        *  565.84  *  932.26  *  675.41  *
* Crit W.S. (ft)         *  810.98  * Flow Area (sq ft)      *  518.59  * 2527.82  * 2382.06  *
* E.G. Slope (ft/ft)     *0.001266  * Area (sq ft)           *  518.59  * 2527.82  * 8039.45  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 1182.66  *25691.82  * 5955.52  *
* Top Width (ft)         *  976.16  * Top Width (ft)         *   55.11  *  107.43  *  813.61  *
* Vel Total (ft/s)       *    6.05  * Avg. Vel. (ft/s)       *    2.28  *   10.16  *    2.50  *
* Max Chl Dpth (ft)      *   27.28  * Hydr. Depth (ft)       *    9.41  *   23.53  *   10.31  *
* Conv. Total (cfs)      *922805.3  * Conv. (cfs)            * 33243.0  *722161.1  *167401.2  *
* Length Wtd. (ft)       *  866.00  * Wetted Per. (ft)       *   57.88  *  118.53  *  231.60  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    0.71  *    1.69  *    0.81  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    1.61  *   17.13  *    2.03  *
* Frctn Loss (ft)        *    1.40  * Cum Volume (acre-ft)   * 9866.18  *16818.01  *11894.34  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1119.88  *  628.44  * 1490.45  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  822.08  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.34  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  820.73  * Reach Len. (ft)        *  565.84  *  932.26  *  675.41  *
* Crit W.S. (ft)         *  812.37  * Flow Area (sq ft)      *  637.48  * 2754.02  * 2868.68  *
* E.G. Slope (ft/ft)     *0.001227  * Area (sq ft)           *  637.48  * 2754.02  * 9778.66  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 1580.61  *29176.97  * 7992.43  *
* Top Width (ft)         * 1022.81  * Top Width (ft)         *   57.82  *  107.43  *  857.56  *
* Vel Total (ft/s)       *    6.19  * Avg. Vel. (ft/s)       *    2.48  *   10.59  *    2.79  *
* Max Chl Dpth (ft)      *   29.38  * Hydr. Depth (ft)       *   11.03  *   25.64  *   12.41  *
* Conv. Total (cfs)      *1106373.0  * Conv. (cfs)            * 45128.8  *833048.1  *228196.2  *
* Length Wtd. (ft)       *  858.09  * Wetted Per. (ft)       *   61.30  *  118.53  *  231.60  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    0.80  *    1.78  *    0.95  *
```

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* Alpha                  *    2.25  * Stream Power (lb/ft s) *    1.97  *   18.85  *    2.64  *
* Frctn Loss (ft)        *    1.31  * Cum Volume (acre-ft)   *12546.32  *17989.71  *15371.46  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1308.83  *  629.38  * 1921.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  824.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.39  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  823.56  * Reach Len. (ft)        *  565.84  *  932.26  *  675.41  *
* Crit W.S. (ft)         *  813.93  * Flow Area (sq ft)      *  805.88  * 3057.42  * 3521.37  *
* E.G. Slope (ft/ft)     *0.001151  * Area (sq ft)           *  805.88  * 3057.42  *12237.08  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 2157.07  *33645.93  *10897.00  *
* Top Width (ft)         * 1042.75  * Top Width (ft)         *   61.43  *  107.43  *  873.89  *
* Vel Total (ft/s)       *    6.32  * Avg. Vel. (ft/s)       *    2.68  *   11.00  *    3.09  *
* Max Chl Dpth (ft)      *   32.21  * Hydr. Depth (ft)       *   13.12  *   28.46  *   15.24  *
* Conv. Total (cfs)      *1376261.0  * Conv. (cfs)            * 63569.3  *991554.3  *321137.6  *
* Length Wtd. (ft)       *  849.51  * Wetted Per. (ft)       *   65.89  *  118.53  *  231.60  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    0.88  *    1.85  *    1.09  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    2.35  *   20.41  *    3.38  *
* Frctn Loss (ft)        *    1.18  * Cum Volume (acre-ft)   *17679.22  *19742.28  *21490.05  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1587.83  *  631.91  * 2334.56  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  814.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.03  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  813.85  * Reach Len. (ft)        *  565.84  *  932.26  *  675.41  *
* Crit W.S. (ft)         *  805.35  * Flow Area (sq ft)      *  274.61  * 2014.69  * 1278.18  *
* E.G. Slope (ft/ft)     *0.001256  * Area (sq ft)           *  274.61  * 2014.69  * 4193.75  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             *  462.91  *17534.96  * 2102.13  *
* Top Width (ft)         *  937.32  * Top Width (ft)         *   46.45  *  107.43  *  783.44  *
* Vel Total (ft/s)       *    5.63  * Avg. Vel. (ft/s)       *    1.69  *    8.70  *    1.64  *
* Max Chl Dpth (ft)      *   22.50  * Hydr. Depth (ft)       *    5.91  *   18.75  *    5.53  *
* Conv. Total (cfs)      *567145.7  * Conv. (cfs)            * 13061.6  *494770.1  * 59314.0  *
* Length Wtd. (ft)       *  890.38  * Wetted Per. (ft)       *   47.95  *  118.53  *  231.60  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    0.45  *    1.33  *    0.43  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    0.76  *   11.60  *    0.71  *
* Frctn Loss (ft)        *    1.55  * Cum Volume (acre-ft)   * 5021.51  *13243.64  * 5892.72  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  591.71  *  603.46  *  686.10  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 24.476

INPUT
Description:
Station Elevation Data    num=     192
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  883.02   15.88  882.86   59.35  883.65   86.75  884.49  118.94  885.52
  125.72  886.23  135.27   886.9  145.44  882.23  153.25  878.89   175.7  869.67
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  181.52   864.7   204.6  843.03  205.21  843.13  220.91  845.61  225.11  845.21
  237.79  843.94  239.24  844.57  240.99   845.5  250.32  850.48  261.15  862.59
  265.44  866.37  294.04     880  306.01  885.88  322.18  886.78  356.31  888.59
  383.53  888.27  419.17  887.86  453.16  887.05  466.39  886.77  511.75  885.89
  513.43  885.81   515.8  885.68  556.22  883.97  569.71  883.55   580.9  883.19
  623.75   881.9  633.13  881.75  641.99  881.32  649.48  881.16  658.74  880.84
  707.14  879.48  709.76  879.17  712.03  878.91  720.21  878.15  734.39  876.64
  740.47  877.23  742.64   877.6  749.92  877.35   789.8  875.53  793.88  875.28
  832.14  873.19  868.72  871.89  889.26  870.87  900.62  870.51  928.28  869.09
  928.56  869.08  928.66  869.07  928.82  869.06  969.57  866.95  986.25  866.13
 1002.23  865.75 1024.09  864.99 1032.81  864.68 1039.18  864.49 1064.78  863.92
 1066.64  863.88 1083.46  863.55 1093.82  863.32 1115.89   862.9 1154.25  861.56
 1155.59  861.56 1200.96  859.84 1213.85   859.2 1239.19  858.17 1248.39  857.88
 1266.83  856.76  1288.1  855.56 1322.13  853.54    1376  850.54 1382.11   850.2
 1386.84  849.95 1439.98   847.8 1476.76  846.15 1508.82  844.27 1519.82  843.87
  1527.1   843.7 1538.73  843.55 1549.36  843.61 1575.38  843.74 1588.42  840.23
 1595.13  838.62 1616.12  838.59 1672.98  838.85 1705.46   839.5 1713.53  839.56
 1717.03  839.58 1719.11  839.58 1720.85  839.58 1733.25  839.69 1744.86  839.86
 1772.65  839.95 1812.86  834.11 1830.74  831.46 1854.88  829.89 1873.56  828.72
 1884.89  824.97 1911.95   815.9 1920.86  813.71 1938.53  810.31 1998.38  809.87
 2001.83  809.84 2002.45  809.84 2002.97  809.82 2003.69  809.81 2056.75  808.94
 2077.91  808.46 2108.06  807.33 2113.23   807.2 2123.23  806.88 2204.27  805.87
 2204.31  805.87 2204.35  805.87 2251.55  805.43 2255.27  805.39 2265.45  805.29
  2289.2  804.54 2307.02  804.09 2310.73  804.26  2312.6  804.33 2342.66  805.82
 2355.91  805.66 2366.19  805.39 2378.49   805.5 2399.16  805.24 2400.59  805.04
 2415.11  801.49 2419.48  801.89 2422.44  802.51 2428.61   803.8 2437.57   803.1
 2448.58  802.18 2458.37  801.37 2466.05  799.29 2479.14  795.65    2490     792
    2510  791.35    2523     792 2528.67  795.65 2532.94  800.93  2536.6  806.49
 2549.09  806.45    2558  806.41 2590.92   806.6 2618.33  807.66 2623.39  807.81
 2628.34  807.92 2635.54  809.23 2639.41  810.04 2666.81  816.18 2669.16  816.64
 2672.02   817.5 2687.83  821.76 2693.25  823.73 2709.23   823.7 2709.39  823.69
 2709.52  823.71 2709.66  823.71 2733.72  824.02 2743.53  824.37 2743.81  824.86
 2753.18  840.72 2763.45  844.67 2776.33  849.12 2792.03  853.96 2804.94  859.05
 2820.59  864.08 2828.73  866.31 2835.73  868.21 2843.85  869.29 2858.09  870.33
 2860.06  870.71 2873.24  871.81 2873.62  871.86 2884.82  872.77 2887.09  872.65
 2899.07  873.35 2911.91  874.03 2929.41   876.5 2935.55  876.69 2939.75  876.81
  2959.4  877.03 2965.75  877.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .09 2428.61     .04  2536.6      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2428.61  2536.6           484.63  790.52 1145.77              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2336.73     825       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  805.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.090  *   0.040  *          *
* W.S. Elev (ft)         *  804.46  * Reach Len. (ft)        *  484.63  *  790.52  * 1145.77  *
* Crit W.S. (ft)         *  800.02  * Flow Area (sq ft)      *   44.98  *  807.15  *          *
* E.G. Slope (ft/ft)     *0.002754  * Area (sq ft)           *   49.32  *  807.15  *          *
* Q Total (cfs)          * 5870.00  * Flow (cfs)             *   55.83  * 5814.17  *          *
* Top Width (ft)         *  155.40  * Top Width (ft)         *   48.75  *  106.66  *          *
* Vel Total (ft/s)       *    6.89  * Avg. Vel. (ft/s)       *    1.24  *    7.20  *          *
* Max Chl Dpth (ft)      *   13.11  * Hydr. Depth (ft)       *    1.75  *    7.57  *          *
* Conv. Total (cfs)      *111847.0  * Conv. (cfs)            *  1063.9  *110783.2  *          *
* Length Wtd. (ft)       *  787.97  * Wetted Per. (ft)       *   26.24  *  113.65  *          *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    0.29  *    1.22  *          *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.37  *    8.80  *          *
* Frctn Loss (ft)        *    1.55  * Cum Volume (acre-ft)   *  845.06  * 6564.86  *  814.93  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  185.34  *  499.34  *  210.12  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	808.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.	0.090	0.040	0.100
W.S. Elev (ft)	807.83	Reach Len. (ft)	484.63	790.52	1145.77
Crit W.S. (ft)	803.86	Flow Area (sq ft)	286.77	1169.23	92.69
E.G. Slope (ft/ft)	0.002592	Area (sq ft)	778.13	1169.23	92.69
Q Total (cfs)	10900.00	Flow (cfs)	512.36	10314.86	72.78
Top Width (ft)	529.52	Top Width (ft)	333.87	107.99	87.66
Vel Total (ft/s)	7.04	Avg. Vel. (ft/s)	1.79	8.82	0.79
Max Chl Dpth (ft)	16.48	Hydr. Depth (ft)	3.12	10.83	1.06
Conv. Total (cfs)	214077.2	Conv. (cfs)	10062.8	202585.0	1429.4
Length Wtd. (ft)	775.37	Wetted Per. (ft)	92.55	116.08	87.68
Min Ch El (ft)	791.35	Shear (lb/sq ft)	0.50	1.63	0.17
Alpha	1.49	Stream Power (lb/ft s)	0.90	14.38	0.13
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	1945.54	8748.84	2064.25
C & E Loss (ft)	0.10	Cum SA (acres)	303.90	540.03	357.01

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	809.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.	0.090	0.040	0.100
W.S. Elev (ft)	808.50	Reach Len. (ft)	484.63	790.52	1145.77
Crit W.S. (ft)	804.56	Flow Area (sq ft)	348.00	1241.20	154.55
E.G. Slope (ft/ft)	0.002737	Area (sq ft)	1006.55	1241.20	154.55
Q Total (cfs)	12600.00	Flow (cfs)	726.77	11707.03	166.21
Top Width (ft)	555.17	Top Width (ft)	352.27	107.99	94.90
Vel Total (ft/s)	7.23	Avg. Vel. (ft/s)	2.09	9.43	1.08
Max Chl Dpth (ft)	17.15	Hydr. Depth (ft)	3.79	11.49	1.63
Conv. Total (cfs)	240859.3	Conv. (cfs)	13892.8	223789.4	3177.2
Length Wtd. (ft)	774.31	Wetted Per. (ft)	92.55	116.08	94.98
Min Ch El (ft)	791.35	Shear (lb/sq ft)	0.64	1.83	0.28
Alpha	1.59	Stream Power (lb/ft s)	1.34	17.23	0.30
Frctn Loss (ft)	1.46	Cum Volume (acre-ft)	2780.80	10421.87	3115.09
C & E Loss (ft)	0.13	Cum SA (acres)	363.75	568.02	465.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	812.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.54	Wt. n-Val.	0.090	0.040	0.100
W.S. Elev (ft)	811.27	Reach Len. (ft)	484.63	790.52	1145.77
Crit W.S. (ft)	807.56	Flow Area (sq ft)	603.29	1541.25	437.73
E.G. Slope (ft/ft)	0.002632	Area (sq ft)	2217.09	1541.25	437.73
Q Total (cfs)	19100.00	Flow (cfs)	1783.30	16471.92	844.78
Top Width (ft)	711.40	Top Width (ft)	495.09	107.99	108.32
Vel Total (ft/s)	7.40	Avg. Vel. (ft/s)	2.96	10.69	1.93
Max Chl Dpth (ft)	19.92	Hydr. Depth (ft)	6.57	14.27	4.04
Conv. Total (cfs)	372264.2	Conv. (cfs)	34757.0	321042.1	16465.1
Length Wtd. (ft)	772.86	Wetted Per. (ft)	92.55	116.08	108.68
Min Ch El (ft)	791.35	Shear (lb/sq ft)	1.07	2.18	0.66
Alpha	1.82	Stream Power (lb/ft s)	3.17	23.32	1.28
Frctn Loss (ft)	1.41	Cum Volume (acre-ft)	4214.42	12277.86	4921.68
C & E Loss (ft)	0.17	Cum SA (acres)	492.39	590.90	601.05

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

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         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  816.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.72  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  814.51  * Reach Len. (ft)        *  484.63  *  790.52  * 1145.77  *
* Crit W.S. (ft)         *  809.92  * Flow Area (sq ft)      *  900.33  * 1890.37  *  811.22  *
* E.G. Slope (ft/ft)     *0.002366  * Area (sq ft)           * 3844.45  * 1890.37  *  811.22  *
* Q Total (cfs)          *27300.00  * Flow (cfs)             * 3295.13  *21947.85  * 2057.02  *
* Top Width (ft)         *  741.73  * Top Width (ft)         *  510.99  *  107.99  *  122.74  *
* Vel Total (ft/s)       *    7.58  * Avg. Vel. (ft/s)       *    3.66  *   11.61  *    2.54  *
* Max Chl Dpth (ft)      *   23.16  * Hydr. Depth (ft)       *    9.80  *   17.51  *    6.61  *
* Conv. Total (cfs)      *561203.4  * Conv. (cfs)            * 67737.6  *451179.8  * 42286.0  *
* Length Wtd. (ft)       *  773.45  * Wetted Per. (ft)       *   92.55  *  116.08  *  123.47  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    1.44  *    2.41  *    0.97  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    5.26  *   27.93  *    2.46  *
* Frctn Loss (ft)        *    1.29  * Cum Volume (acre-ft)   * 7006.22  *15069.69  * 8384.93  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *  846.15  *  618.99  * 1043.65  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  818.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  816.70  * Reach Len. (ft)        *  484.63  *  790.52  * 1145.77  *
* Crit W.S. (ft)         *  811.15  * Flow Area (sq ft)      * 1101.50  * 2126.82  * 1090.76  *
* E.G. Slope (ft/ft)     *0.002141  * Area (sq ft)           * 4972.71  * 2126.82  * 1090.76  *
* Q Total (cfs)          *32830.00  * Flow (cfs)             * 4386.03  *25405.15  * 3038.82  *
* Top Width (ft)         *  759.78  * Top Width (ft)         *  519.04  *  107.99  *  132.75  *
* Vel Total (ft/s)       *    7.60  * Avg. Vel. (ft/s)       *    3.98  *   11.95  *    2.79  *
* Max Chl Dpth (ft)      *   25.35  * Hydr. Depth (ft)       *   11.99  *   19.69  *    8.22  *
* Conv. Total (cfs)      *709587.8  * Conv. (cfs)            * 94799.8  *549107.0  * 65681.1  *
* Length Wtd. (ft)       *  774.25  * Wetted Per. (ft)       *   92.55  *  116.08  *  133.71  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    1.59  *    2.45  *    1.09  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    6.33  *   29.25  *    3.04  *
* Frctn Loss (ft)        *    1.19  * Cum Volume (acre-ft)   * 9830.51  *16768.20  *11823.56  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         * 1116.15  *  626.13  * 1483.11  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  820.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.80  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  818.92  * Reach Len. (ft)        *  484.63  *  790.52  * 1145.77  *
* Crit W.S. (ft)         *  812.35  * Flow Area (sq ft)      * 1305.98  * 2367.15  * 1394.81  *
* E.G. Slope (ft/ft)     *0.001951  * Area (sq ft)           * 6135.20  * 2367.15  * 1394.81  *
* Q Total (cfs)          *38750.00  * Flow (cfs)             * 5561.02  *28989.77  * 4199.21  *
* Top Width (ft)         *  774.36  * Top Width (ft)         *  525.68  *  107.99  *  140.70  *
* Vel Total (ft/s)       *    7.65  * Avg. Vel. (ft/s)       *    4.26  *   12.25  *    3.01  *
* Max Chl Dpth (ft)      *   27.57  * Hydr. Depth (ft)       *   14.21  *   21.92  *    9.91  *
* Conv. Total (cfs)      *877354.2  * Conv. (cfs)            *125909.3  *656369.0  * 95075.9  *
* Length Wtd. (ft)       *  775.37  * Wetted Per. (ft)       *   92.55  *  116.08  *  141.96  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    1.72  *    2.48  *    1.20  *
* Alpha                  *    1.98  * Stream Power (lb/ft s) *    7.32  *   30.41  *    3.60  *
* Frctn Loss (ft)        *    1.11  * Cum Volume (acre-ft)   *12502.33  *17934.91  *15284.84  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         * 1305.04  *  627.08  * 1913.45  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
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         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  823.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.82  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  821.91  * Reach Len. (ft)        *  484.63  *  790.52  * 1145.77  *
* Crit W.S. (ft)         *  813.80  * Flow Area (sq ft)      * 1580.48  * 2689.77  * 1831.71  *
* E.G. Slope (ft/ft)     *0.001716  * Area (sq ft)           * 7719.00  * 2689.77  * 1831.71  *
* Q Total (cfs)          *46700.00  * Flow (cfs)             * 7167.57  *33640.33  * 5892.10  *
* Top Width (ft)         *  794.22  * Top Width (ft)         *  534.59  *  107.99  *  151.64  *
* Vel Total (ft/s)       *    7.65  * Avg. Vel. (ft/s)       *    4.54  *   12.51  *    3.22  *
* Max Chl Dpth (ft)      *   30.56  * Hydr. Depth (ft)       *   17.20  *   24.91  *   12.08  *
* Conv. Total (cfs)      *1127427.0  * Conv. (cfs)            *173038.9  *812141.9  *142246.6  *
* Length Wtd. (ft)       *  776.86  * Wetted Per. (ft)       *   92.55  *  116.08  *  153.31  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    1.83  *    2.48  *    1.28  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    8.30  *   31.04  *    4.12  *
* Frctn Loss (ft)        *    1.00  * Cum Volume (acre-ft)   *17623.85  *19680.78  *21380.98  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         * 1583.95  *  629.61  * 2326.61  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  813.28  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.56  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  811.72  * Reach Len. (ft)        *  484.63  *  790.52  * 1145.77  *
* Crit W.S. (ft)         *  807.85  * Flow Area (sq ft)      *  644.46  * 1589.64  *  486.71  *
* E.G. Slope (ft/ft)     *0.002573  * Area (sq ft)           * 2439.44  * 1589.64  *  486.71  *
* Q Total (cfs)          *20100.00  * Flow (cfs)             * 1968.26  *17147.30  *  984.44  *
* Top Width (ft)         *  715.73  * Top Width (ft)         *  497.42  *  107.99  *  110.32  *
* Vel Total (ft/s)       *    7.39  * Avg. Vel. (ft/s)       *    3.05  *   10.79  *    2.02  *
* Max Chl Dpth (ft)      *   20.37  * Hydr. Depth (ft)       *    7.01  *   14.72  *    4.41  *
* Conv. Total (cfs)      *396220.3  * Conv. (cfs)            * 38799.2  *338015.3  * 19405.8  *
* Length Wtd. (ft)       *  772.86  * Wetted Per. (ft)       *   92.55  *  116.08  *  110.73  *
* Min Ch El (ft)         *  791.35  * Shear (lb/sq ft)       *    1.12  *    2.20  *    0.71  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    3.42  *   23.73  *    1.43  *
* Frctn Loss (ft)        *    1.38  * Cum Volume (acre-ft)   * 5003.88  *13205.07  * 5856.43  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  588.18  *  601.16  *  679.17  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 24.326

INPUT
Description:
Station Elevation Data    num=     219
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  891.55   10.54  891.48   17.38  891.44   45.56  891.74   79.59  891.95
   84.87  891.96  110.54  892.28  126.75   892.4  136.53   887.8  159.32  877.31
  169.46   872.6   173.9  870.73  195.72  851.96   204.1  842.63   213.5  843.63
   219.7  844.41  228.41  844.11  236.18  843.78  259.43  867.03  263.55  870.31
  301.08  882.55     309  885.51  314.72  887.73  322.35  887.31  369.35  885.52
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  378.37  885.47  392.47  884.18  409.75   883.1  423.16  882.31   437.2  881.11
  454.35  880.39  480.77  878.61  481.02  878.59  488.09  878.25  500.17  877.78
  514.46  876.76  523.51  876.14  525.33  876.03  603.05  871.95  619.49  870.96
  636.01  870.21  657.05  869.09  671.55  868.43  678.58  868.03  706.51  866.67
  721.58  865.97  743.96  864.46  757.29  863.55  788.76  861.34  837.59  858.05
  848.13  857.13  871.82  855.56  875.29  855.45  876.84  855.33   903.9  854.36
     920  853.68  960.07  851.61  971.79  850.86  990.42  849.95  999.73   849.5
 1001.14  849.38 1015.68  848.21 1042.59  846.39 1068.26  844.29 1070.63  844.11
 1073.93  843.87 1093.93  842.96 1107.49  842.53 1124.54  841.65 1136.42  841.26
  1151.5  840.34 1173.32  839.16 1184.68  838.91 1197.56  838.61 1217.51  837.76
 1241.18  836.82 1253.09  835.49 1258.07  834.99 1263.68  834.43 1270.34  835.17
 1274.09  835.04 1278.77  834.83 1281.98  834.68  1290.2  835.53 1292.66  835.46
 1292.85  835.43 1305.02  833.99 1316.19  833.18 1317.54  833.09 1328.94  832.79
 1329.63  832.77 1343.87   831.8 1344.92  831.74 1346.91  831.62 1353.58  830.85
 1355.09  830.38  1359.6  828.59 1366.81  830.09 1371.94  830.11 1378.29  830.75
 1378.37  830.75 1378.85  830.77 1390.18   830.3 1394.73  829.51 1398.95  828.68
 1404.65  827.52 1406.82  826.62 1415.89  829.65 1416.95  829.89 1424.11  830.89
 1428.67   830.7 1431.34  830.78 1432.84   830.8 1438.89  830.12 1457.91  827.36
 1458.91   827.2 1460.66  827.78 1482.95  835.35 1487.78   835.3 1504.71  835.29
 1514.75  835.08 1522.13  831.73 1538.67  825.51 1546.97  824.38 1557.63  824.03
 1559.01     824 1571.31  823.05 1575.66  822.73  1578.7  822.27 1594.63  821.33
 1603.64  820.82 1609.27  818.35  1617.7  815.06 1630.49  816.02 1643.81  818.49
 1647.91  817.62 1664.37  811.33  1672.8  809.55 1674.88  809.28 1682.63  808.18
 1685.03  808.07 1707.88  807.63 1724.68  806.89 1741.35  806.79 1788.36  806.39
 1798.51  806.29 1825.19  806.36  1843.3  806.45 1877.61  806.88 1906.78  806.97
 1932.51  807.01 1972.78  807.12 1987.34  806.92 1996.78   806.7 2011.78  806.36
 2033.53  805.93 2041.19  805.18 2057.75  802.79 2059.43   802.8 2065.36  802.76
  2090.8  802.53 2107.49  802.51 2133.85   802.7 2167.68  802.54 2168.86   802.5
 2194.19  802.14 2224.52  802.14 2241.54  801.76 2246.96  798.98 2252.44  796.57
  2259.8  793.35 2263.28  793.35 2264.74  793.35    2300     791    2309  790.73
    2320     791 2336.86  793.44 2337.78  793.44 2351.44   801.4 2352.13  801.79
 2352.67  801.89 2352.79  801.91 2377.87  805.23 2404.48  804.31 2406.93  804.29
 2410.08  804.28 2449.89  803.73 2473.39  803.68 2499.69  803.97 2541.29   804.1
 2546.39  804.11 2548.35  804.11 2589.56  803.87 2624.66  802.68 2649.89  801.84
 2650.67  801.81 2651.12  801.73 2663.12  799.85 2665.81  800.63 2678.46  804.21
 2691.25  810.94 2702.09  815.34 2713.04  821.91 2724.12  828.61 2730.35  829.49
 2748.64   832.1 2765.27  832.09 2770.99   832.1 2776.34  831.99 2782.83  831.75
 2794.06  841.14 2795.88  842.77 2798.06   843.3 2841.92  855.17 2849.68  859.15
  2878.5  875.73 2887.73  882.27 2903.79  884.02 2932.49  886.82

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .09 1398.95      .1 2246.96     .04 2352.79      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2246.96 2352.79          696.65  854.03  735.79             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2086.96     825       F
 2453.28 2932.49     825       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  803.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  803.02  * Reach Len. (ft)        *  696.65  *  854.03  *  735.79  *
* Crit W.S. (ft)         *  797.99  * Flow Area (sq ft)      *  111.87  * 1030.25  *    4.64  *
* E.G. Slope (ft/ft)     *0.001531  * Area (sq ft)           *  121.51  * 1030.25  *   71.21  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *   51.09  * 6672.11  *    1.81  *
* Top Width (ft)         *  364.54  * Top Width (ft)         *  190.79  *  105.83  *   67.92  *
* Vel Total (ft/s)       *    5.86  * Avg. Vel. (ft/s)       *    0.46  *    6.48  *    0.39  *
* Max Chl Dpth (ft)      *   12.29  * Hydr. Depth (ft)       *    0.70  *    9.73  *    0.55  *
* Conv. Total (cfs)      *171883.9  * Conv. (cfs)            *  1305.7  *170532.0  *    46.2  *
* Length Wtd. (ft)       *  853.42  * Wetted Per. (ft)       *  160.68  *  109.53  *    8.44  *
* Min Ch El (ft)         *  790.73  * Shear (lb/sq ft)       *    0.07  *    0.90  *    0.05  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.03  *    5.82  *    0.02  *
* Frctn Loss (ft)        *    1.56  * Cum Volume (acre-ft)   *  844.11  * 6548.18  *  813.99  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  184.00  *  497.41  *  209.23  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	807.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	806.62	Reach Len. (ft)	696.65	854.03	735.79
Crit W.S. (ft)	800.64	Flow Area (sq ft)	688.04	1411.35	252.56
E.G. Slope (ft/ft)	0.001423	Area (sq ft)	885.00	1411.35	997.29
Q Total (cfs)	12150.00	Flow (cfs)	1017.12	10871.55	261.32
Top Width (ft)	778.00	Top Width (ft)	341.92	105.83	330.25
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)	1.48	7.70	1.03
Max Chl Dpth (ft)	15.89	Hydr. Depth (ft)	4.30	13.34	2.51
Conv. Total (cfs)	322041.1	Conv. (cfs)	26959.3	288155.3	6926.5
Length Wtd. (ft)	842.09	Wetted Per. (ft)	160.68	109.53	100.73
Min Ch El (ft)	790.73	Shear (lb/sq ft)	0.38	1.15	0.22
Alpha	2.00	Stream Power (lb/ft s)	0.56	8.82	0.23
Frctn Loss (ft)	1.40	Cum Volume (acre-ft)	1936.29	8725.42	2049.91
C & E Loss (ft)	0.05	Cum SA (acres)	300.14	538.09	351.51

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	808.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	807.33	Reach Len. (ft)	696.65	854.03	735.79
Crit W.S. (ft)	801.21	Flow Area (sq ft)	802.31	1486.94	324.33
E.G. Slope (ft/ft)	0.001409	Area (sq ft)	1207.87	1486.94	1233.62
Q Total (cfs)	13500.00	Flow (cfs)	1307.24	11798.33	394.43
Top Width (ft)	969.77	Top Width (ft)	532.34	105.83	331.61
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)	1.63	7.93	1.22
Max Chl Dpth (ft)	16.60	Hydr. Depth (ft)	5.01	14.05	3.23
Conv. Total (cfs)	359666.6	Conv. (cfs)	34827.4	314330.7	10508.5
Length Wtd. (ft)	839.67	Wetted Per. (ft)	160.68	109.53	100.73
Min Ch El (ft)	790.73	Shear (lb/sq ft)	0.44	1.19	0.28
Alpha	2.07	Stream Power (lb/ft s)	0.72	9.47	0.34
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)	2768.48	10397.11	3096.84
C & E Loss (ft)	0.06	Cum SA (acres)	358.82	566.08	459.47

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	811.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	810.26	Reach Len. (ft)	696.65	854.03	735.79
Crit W.S. (ft)	804.45	Flow Area (sq ft)	1270.98	1796.93	618.69
E.G. Slope (ft/ft)	0.001347	Area (sq ft)	2861.03	1796.93	2213.11
Q Total (cfs)	19700.00	Flow (cfs)	2751.59	15816.84	1131.56
Top Width (ft)	1020.54	Top Width (ft)	577.53	105.83	337.17
Vel Total (ft/s)	5.34	Avg. Vel. (ft/s)	2.16	8.80	1.83
Max Chl Dpth (ft)	19.53	Hydr. Depth (ft)	7.94	16.98	6.16
Conv. Total (cfs)	536783.8	Conv. (cfs)	74975.2	430975.9	30832.7
Length Wtd. (ft)	831.54	Wetted Per. (ft)	160.68	109.53	100.73
Min Ch El (ft)	790.73	Shear (lb/sq ft)	0.67	1.38	0.52
Alpha	2.21	Stream Power (lb/ft s)	1.44	12.14	0.94
Frctn Loss (ft)	1.25	Cum Volume (acre-ft)	4186.17	12247.57	4886.82
C & E Loss (ft)	0.07	Cum SA (acres)	486.43	588.96	595.19

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

```
* E.G. Elev (ft)         *  814.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.09  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  813.65  * Reach Len. (ft)        *  696.65  *  854.03  *  735.79  *
* Crit W.S. (ft)         *  806.83  * Flow Area (sq ft)      * 1813.53  * 2155.79  *  959.44  *
* E.G. Slope (ft/ft)     *0.001250  * Area (sq ft)           * 4840.92  * 2155.79  * 3369.44  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 4794.12  *20640.86  * 2265.02  *
* Top Width (ft)         * 1039.64  * Top Width (ft)         *  588.67  *  105.83  *  345.14  *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *    2.64  *    9.57  *    2.36  *
* Max Chl Dpth (ft)      *   22.92  * Hydr. Depth (ft)       *   11.33  *   20.37  *    9.55  *
* Conv. Total (cfs)      *783425.9  * Conv. (cfs)            *135589.9  *583775.5  * 64060.5  *
* Length Wtd. (ft)       *  824.95  * Wetted Per. (ft)       *  160.68  *  109.53  *  100.73  *
* Min Ch El (ft)         *  790.73  * Shear (lb/sq ft)       *    0.88  *    1.54  *    0.74  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    2.33  *   14.71  *    1.75  *
* Frctn Loss (ft)        *    1.13  * Cum Volume (acre-ft)   * 6957.91  *15032.98  * 8329.94  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  840.03  *  617.05  * 1037.49  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  817.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  815.94  * Reach Len. (ft)        *  696.65  *  854.03  *  735.79  *
* Crit W.S. (ft)         *  808.05  * Flow Area (sq ft)      * 2179.29  * 2397.72  * 1189.16  *
* E.G. Slope (ft/ft)     *0.001169  * Area (sq ft)           * 6199.60  * 2397.72  * 4164.74  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 6296.80  *23830.86  * 3132.35  *
* Top Width (ft)         * 1064.75  * Top Width (ft)         *  608.62  *  105.83  *  350.30  *
* Vel Total (ft/s)       *    5.77  * Avg. Vel. (ft/s)       *    2.89  *    9.94  *    2.63  *
* Max Chl Dpth (ft)      *   25.21  * Hydr. Depth (ft)       *   13.62  *   22.66  *   11.83  *
* Conv. Total (cfs)      *972779.8  * Conv. (cfs)            *184167.0  *696998.7  * 91614.0  *
* Length Wtd. (ft)       *  821.65  * Wetted Per. (ft)       *  160.68  *  109.53  *  100.73  *
* Min Ch El (ft)         *  790.73  * Shear (lb/sq ft)       *    0.99  *    1.60  *    0.86  *
* Alpha                  *    2.19  * Stream Power (lb/ft s) *    2.86  *   15.88  *    2.27  *
* Frctn Loss (ft)        *    1.04  * Cum Volume (acre-ft)   * 9768.36  *16727.15  *11754.44  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1109.87  *  624.19  * 1476.76  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  819.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.18  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  818.25  * Reach Len. (ft)        *  696.65  *  854.03  *  735.79  *
* Crit W.S. (ft)         *  809.15  * Flow Area (sq ft)      * 2548.76  * 2642.11  * 1421.21  *
* E.G. Slope (ft/ft)     *0.001095  * Area (sq ft)           * 7635.08  * 2642.11  * 4978.09  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 7910.60  *27109.66  * 4079.74  *
* Top Width (ft)         * 1094.97  * Top Width (ft)         *  634.99  *  105.83  *  354.15  *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *    3.10  *   10.26  *    2.87  *
* Max Chl Dpth (ft)      *   27.52  * Hydr. Depth (ft)       *   15.93  *   24.97  *   14.14  *
* Conv. Total (cfs)      *1181780.0  * Conv. (cfs)            *239094.3  *819377.6  *123308.4  *
* Length Wtd. (ft)       *  818.94  * Wetted Per. (ft)       *  160.68  *  109.53  *  100.73  *
* Min Ch El (ft)         *  790.73  * Shear (lb/sq ft)       *    1.08  *    1.65  *    0.96  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    3.36  *   16.91  *    2.77  *
* Frctn Loss (ft)        *    0.97  * Cum Volume (acre-ft)   *12425.73  *17889.45  *15201.03  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1298.58  *  625.14  * 1906.94  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  822.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
```

```
* W.S. Elev (ft)         *  821.33  * Reach Len. (ft)        *  696.65  *  854.03  *  735.79  *
* Crit W.S. (ft)         *  810.50  * Flow Area (sq ft)      * 3042.00  * 2968.36  * 1731.00  *
* E.G. Slope (ft/ft)     *0.000999  * Area (sq ft)           * 9612.76  * 2968.36  * 6077.77  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *10147.07  *31439.87  * 5413.06  *
* Top Width (ft)         * 1117.47  * Top Width (ft)         *  652.35  *  105.83  *  359.29  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *    3.34  *   10.59  *    3.13  *
* Max Chl Dpth (ft)      *   30.60  * Hydr. Depth (ft)       *   19.01  *   28.05  *   17.23  *
* Conv. Total (cfs)      *1487227.0  * Conv. (cfs)            *321085.0  *994855.6  *171286.1  *
* Length Wtd. (ft)       *  816.05  * Wetted Per. (ft)       *  160.68  *  109.53  *  100.73  *
* Min Ch El (ft)         *  790.73  * Shear (lb/sq ft)       *    1.18  *    1.69  *    1.07  *
* Alpha                  *    2.13  * Stream Power (lb/ft s) *    3.94  *   17.90  *    3.35  *
* Frctn Loss (ft)        *    0.88  * Cum Volume (acre-ft)   *17527.44  *19629.44  *21276.96  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1577.35  *  627.67  * 2319.89  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  811.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  810.74  * Reach Len. (ft)        *  696.65  *  854.03  *  735.79  *
* Crit W.S. (ft)         *  804.84  * Flow Area (sq ft)      * 1347.55  * 1847.58  *  666.78  *
* E.G. Slope (ft/ft)     *0.001324  * Area (sq ft)           * 3137.97  * 1847.58  * 2374.69  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 3006.94  *16422.32  * 1270.75  *
* Top Width (ft)         * 1023.71  * Top Width (ft)         *  579.80  *  105.83  *  338.08  *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)       *    2.23  *    8.89  *    1.91  *
* Max Chl Dpth (ft)      *   20.01  * Hydr. Depth (ft)       *    8.42  *   17.46  *    6.64  *
* Conv. Total (cfs)      *568994.6  * Conv. (cfs)            * 82653.7  *451411.1  * 34929.8  *
* Length Wtd. (ft)       *  830.45  * Wetted Per. (ft)       *  160.68  *  109.53  *  100.73  *
* Min Ch El (ft)         *  790.73  * Shear (lb/sq ft)       *    0.69  *    1.39  *    0.55  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    1.55  *   12.39  *    1.04  *
* Frctn Loss (ft)        *    1.22  * Cum Volume (acre-ft)   * 4972.85  *13173.88  * 5818.80  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  582.19  *  599.22  *  673.27  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 24.165

INPUT
Description:
Station Elevation Data    num=     215
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  892.26   14.54  892.21   42.05  890.53   45.59  890.25   50.71  888.66
   59.02  886.18   81.33  888.56   83.71  888.82  107.44   878.5  115.11  874.94
   126.3  869.09  139.55  865.12  140.45  864.81  146.79  858.98  168.55   838.4
  172.02  838.95  182.57  840.44  188.93  840.36  197.39  840.26  198.65  840.22
  203.55   844.9  224.96  863.56  244.22  871.97  249.82  873.78  261.92  878.72
  290.27  876.57  306.65  875.62  323.16  874.26  340.48  874.04  348.32  873.87
  363.06  873.59  367.28  873.54  369.84  873.45  387.83  873.01  403.06  872.75
  408.59  872.74  417.01  872.61  429.82  872.41   440.2  872.15  455.64  871.67
  469.18  871.28  488.47  870.99  490.73  870.95  501.16  871.17  505.19  871.16
  514.84  870.65  527.79  870.33  545.31  869.99  557.59  869.39  579.81   868.4
  594.06  867.42  603.92  866.92  619.94  865.92  630.44  865.17  650.68  863.55
  697.95  858.76  738.87  855.08  743.28  854.67  784.77  849.83  811.35   846.3
  828.82  839.39   836.5  836.93  840.77  835.45  847.14  832.99  849.61  833.58
  854.95  835.45  856.24  835.53  888.31  839.91  896.81  840.91  907.22  842.22
   935.1  846.83  953.98  849.98  957.94  849.92  996.82  848.33 1000.63  848.15
 1033.84  845.77 1052.74  845.37 1062.06  844.77 1082.46  844.38 1106.54  843.72
 1111.47  843.46 1112.26  843.42 1119.94  843.08 1137.57  841.76 1150.59  838.09
 1162.89  834.67 1169.43  834.21 1171.74  834.13 1176.02   834.1  1219.7  833.89
 1223.55  831.77 1246.61  816.35 1261.24  809.37  1269.6  805.33 1282.14  800.46
  1287.3  797.87 1288.11  797.71  1294.4  796.52 1316.87  792.82 1320.17  789.94
 1320.18  789.93    1340  789.29 1365.27  789.93 1368.27   791.2 1369.72  791.86
 1394.77  794.16 1395.64  794.24  1396.8  794.34  1397.7  794.45 1399.08   795.1
 1411.36  800.38 1418.57  800.99  1425.3   801.8 1426.44  801.84 1434.22  801.83
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 1456.45  801.91 1463.51  802.06  1494.4  801.87 1526.45  801.81  1528.6   801.8
 1539.01  801.77 1567.77  801.76 1590.19  802.24 1630.94   801.9 1652.73  801.65
 1654.01  801.65 1677.11  803.14 1688.73  803.55 1706.57  804.72 1724.36  808.72
 1746.33  812.64 1754.07  813.12 1767.51  814.07 1771.91  814.32 1774.54  814.53
 1790.34  814.46 1806.83  814.14 1817.48  814.47 1835.75  814.64 1855.01  814.74
 1875.88  814.89 1884.96  814.92 1895.11  814.95 1927.01  814.74 1940.53  814.74
 1969.61   814.7 1989.23  813.98 1995.14  813.63 2020.32  812.43 2021.33  812.36
 2022.79  812.38 2044.73  811.77 2047.08  811.91 2067.68   811.7 2070.69  811.74
  2074.4  811.73 2099.51  811.93 2103.86  812.03 2115.84  812.37 2133.94  814.11
 2134.97  814.22 2137.91  814.69 2159.77  815.09 2173.27  815.31 2186.76  815.96
  2198.7  816.31 2211.59  816.22 2224.48  816.42 2237.11  816.78 2246.65  816.85
 2247.11  816.78 2263.91  815.59 2267.06  815.54 2278.71  815.83 2289.95  817.08
 2294.69  816.96 2303.29  817.09 2316.51  819.75 2322.92  820.02 2325.88  820.08
 2344.97  822.19 2347.63  822.48  2353.2  819.77  2362.4  815.54 2372.12  821.68
 2377.21  824.72 2384.23  826.21 2393.08  827.97 2399.51  827.84 2415.62  827.46
 2419.89  827.54    2431  830.02 2445.19  838.94 2455.01  842.23  2463.7  844.92
 2479.19  849.83 2480.66  849.71 2483.12  849.38 2494.47   847.4 2503.61  847.55
 2518.83   848.3 2525.79  848.68 2545.82  848.16 2551.26  848.85 2561.53  851.53
 2567.54  852.73 2571.16  853.98 2584.27  856.76 2588.02   858.3 2596.99  864.83
 2608.01  867.36 2615.29  869.94 2621.08  871.68 2631.25  873.19 2638.17  874.93

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .09  784.77      .1  1269.6     .04 1369.72      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1269.6  1425.3           676.43  559.37  531.83             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1584.78 2638.17     825       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  802.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.046  *          *
* W.S. Elev (ft)         *  801.51  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  796.93  * Flow Area (sq ft)      *          * 1111.85  *          *
* E.G. Slope (ft/ft)     *0.002232  * Area (sq ft)           *          * 1111.85  *          *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *          * 6725.00  *          *
* Top Width (ft)         *  143.44  * Top Width (ft)         *          *  143.44  *          *
* Vel Total (ft/s)       *    6.05  * Avg. Vel. (ft/s)       *          *    6.05  *          *
* Max Chl Dpth (ft)      *   12.22  * Hydr. Depth (ft)       *          *    7.75  *          *
* Conv. Total (cfs)      *142346.2  * Conv. (cfs)            *          *142346.2  *          *
* Length Wtd. (ft)       *  559.31  * Wetted Per. (ft)       *          *  147.59  *          *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *          *    1.05  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.35  *          *
* Frctn Loss (ft)        *    1.30  * Cum Volume (acre-ft)   *  843.14  * 6527.18  *  813.39  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  182.48  *  494.97  *  208.66  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  805.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.048  *   0.100  *
* W.S. Elev (ft)         *  805.34  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  799.38  * Flow Area (sq ft)      *          * 1689.24  *  553.78  *
* E.G. Slope (ft/ft)     *0.001975  * Area (sq ft)           *    0.00  * 1689.24  *  900.10  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *          *11311.39  *  838.61  *
* Top Width (ft)         *  439.75  * Top Width (ft)         *    0.02  *  155.70  *  284.03  *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)       *          *    6.70  *    1.51  *
* Max Chl Dpth (ft)      *   16.05  * Hydr. Depth (ft)       *          *   10.85  *    3.47  *
* Conv. Total (cfs)      *273375.3  * Conv. (cfs)            *          *254506.6  * 18868.7  *
* Length Wtd. (ft)       *  558.00  * Wetted Per. (ft)       *          *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *          *    1.30  *    0.43  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *          *    8.69  *    0.65  *
* Frctn Loss (ft)        *    1.28  * Cum Volume (acre-ft)   * 1929.21  * 8695.03  * 2033.89  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  297.41  *  535.53  *  346.33  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
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         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  806.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.100  *   0.048  *   0.100  *
* W.S. Elev (ft)         *  806.10  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  799.91  * Flow Area (sq ft)      *    0.62  * 1807.74  *  675.16  *
* E.G. Slope (ft/ft)     *0.001899  * Area (sq ft)           *    0.62  * 1807.74  * 1117.57  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *    0.20  *12355.74  * 1144.07  *
* Top Width (ft)         *  444.71  * Top Width (ft)         *    1.60  *  155.70  *  287.41  *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *    0.32  *    6.83  *    1.69  *
* Max Chl Dpth (ft)      *   16.81  * Hydr. Depth (ft)       *    0.39  *   11.61  *    4.23  *
* Conv. Total (cfs)      *309796.2  * Conv. (cfs)            *     4.5  *283537.8  * 26253.9  *
* Length Wtd. (ft)       *  557.68  * Wetted Per. (ft)       *    1.77  *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *    0.04  *    1.33  *    0.50  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *    0.01  *    9.12  *    0.85  *
* Frctn Loss (ft)        *    1.25  * Cum Volume (acre-ft)   * 2758.82  *10364.81  * 3076.98  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  354.56  *  563.51  *  454.24  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  809.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.100  *   0.048  *   0.100  *
* W.S. Elev (ft)         *  809.17  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  802.76  * Flow Area (sq ft)      *   15.24  * 2285.14  * 1164.16  *
* E.G. Slope (ft/ft)     *0.001696  * Area (sq ft)           *   15.24  * 2285.14  * 2019.85  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *   13.42  *17005.73  * 2680.85  *
* Top Width (ft)         *  465.21  * Top Width (ft)         *    7.94  *  155.70  *  301.57  *
* Vel Total (ft/s)       *    5.69  * Avg. Vel. (ft/s)       *    0.88  *    7.44  *    2.30  *
* Max Chl Dpth (ft)      *   19.88  * Hydr. Depth (ft)       *    1.92  *   14.68  *    7.30  *
* Conv. Total (cfs)      *478325.7  * Conv. (cfs)            *   326.0  *412907.5  * 65092.3  *
* Length Wtd. (ft)       *  556.85  * Wetted Per. (ft)       *    8.82  *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *    0.18  *    1.51  *    0.77  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.16  *   11.21  *    1.78  *
* Frctn Loss (ft)        *    1.17  * Cum Volume (acre-ft)   * 4163.17  *12207.55  * 4851.07  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  481.74  *  586.39  *  589.80  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  813.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.100  *   0.049  *   0.100  *
* W.S. Elev (ft)         *  812.69  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  804.89  * Flow Area (sq ft)      *   56.22  * 2833.83  * 1726.16  *
* E.G. Slope (ft/ft)     *0.001513  * Area (sq ft)           *   56.22  * 2833.83  * 3190.27  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             *   72.12  *22746.28  * 4881.60  *
* Top Width (ft)         *  597.23  * Top Width (ft)         *   15.32  *  155.70  *  426.21  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *    1.28  *    8.03  *    2.83  *
* Max Chl Dpth (ft)      *   23.40  * Hydr. Depth (ft)       *    3.67  *   18.20  *   10.82  *
* Conv. Total (cfs)      *712138.1  * Conv. (cfs)            *  1854.2  *584783.1  *125500.9  *
* Length Wtd. (ft)       *  556.39  * Wetted Per. (ft)       *   17.00  *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *    0.31  *    1.67  *    1.02  *
* Alpha                  *    1.51  * Stream Power (lb/ft s) *    0.40  *   13.38  *    2.89  *
* Frctn Loss (ft)        *    1.06  * Cum Volume (acre-ft)   * 6918.75  *14984.07  * 8274.54  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  835.20  *  614.48  * 1030.98  *
*********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  815.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.100  *   0.049  *   0.100  *
* W.S. Elev (ft)         *  815.07  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  805.97  * Flow Area (sq ft)      *   98.55  * 3203.85  * 2105.17  *
* E.G. Slope (ft/ft)     *0.001389  * Area (sq ft)           *   98.55  * 3203.85  * 4410.24  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *  146.00  *26603.17  * 6510.83  *
* Top Width (ft)         *  909.27  * Top Width (ft)         *   20.30  *  155.70  *  733.26  *
* Vel Total (ft/s)       *    6.15  * Avg. Vel. (ft/s)       *    1.48  *    8.30  *    3.09  *
* Max Chl Dpth (ft)      *   25.78  * Hydr. Depth (ft)       *    4.85  *   20.58  *   13.20  *
* Conv. Total (cfs)      *892502.1  * Conv. (cfs)            *  3917.9  *713872.1  *174712.1  *
* Length Wtd. (ft)       *  556.26  * Wetted Per. (ft)       *   22.52  *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *    0.38  *    1.73  *    1.14  *
* Alpha                  *    1.51  * Stream Power (lb/ft s) *    0.56  *   14.36  *    3.54  *
* Frctn Loss (ft)        *    0.97  * Cum Volume (acre-ft)   * 9718.00  *16672.23  *11682.02  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         * 1104.84  *  621.63  * 1467.61  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  818.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.93  * Wt. n-Val.             *   0.100  *   0.049  *   0.100  *
* W.S. Elev (ft)         *  817.46  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  807.00  * Flow Area (sq ft)      *  152.63  * 3575.58  * 2485.92  *
* E.G. Slope (ft/ft)     *0.001284  * Area (sq ft)           *  152.63  * 3575.58  * 6353.85  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *  254.80  *30587.31  * 8257.89  *
* Top Width (ft)         * 1067.35  * Top Width (ft)         *   24.64  *  155.70  *  887.00  *
* Vel Total (ft/s)       *    6.29  * Avg. Vel. (ft/s)       *    1.67  *    8.55  *    3.32  *
* Max Chl Dpth (ft)      *   28.17  * Hydr. Depth (ft)       *    6.19  *   22.96  *   15.59  *
* Conv. Total (cfs)      *1091350.0  * Conv. (cfs)            *  7112.0  *853745.9  *230492.4  *
* Length Wtd. (ft)       *  556.23  * Wetted Per. (ft)       *   27.48  *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *    0.45  *    1.78  *    1.25  *
* Alpha                  *    1.51  * Stream Power (lb/ft s) *    0.74  *   15.26  *    4.15  *
* Frctn Loss (ft)        *    0.90  * Cum Volume (acre-ft)   *12363.46  *17828.50  *15105.32  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         * 1293.31  *  622.57  * 1896.46  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  821.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *   0.100  *   0.050  *   0.100  *
* W.S. Elev (ft)         *  820.63  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  808.25  * Flow Area (sq ft)      *  238.49  * 4070.38  * 2992.73  *
* E.G. Slope (ft/ft)     *0.001156  * Area (sq ft)           *  238.49  * 4070.38  * 9222.68  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *  448.56  *35874.93  *10676.51  *
* Top Width (ft)         * 1109.72  * Top Width (ft)         *   29.40  *  155.70  *  924.62  *
* Vel Total (ft/s)       *    6.44  * Avg. Vel. (ft/s)       *    1.88  *    8.81  *    3.57  *
* Max Chl Dpth (ft)      *   31.34  * Hydr. Depth (ft)       *    8.11  *   26.14  *   18.77  *
* Conv. Total (cfs)      *1382378.0  * Conv. (cfs)            * 13193.2  *1055164.0  *314020.7  *
* Length Wtd. (ft)       *  556.31  * Wetted Per. (ft)       *   33.20  *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *    0.52  *    1.83  *    1.35  *
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* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.98  *   16.12  *    4.83  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *17448.66  *19560.44  *21147.74  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         * 1571.90  *  625.10  * 2309.05  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  810.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.100  *   0.049  *   0.100  *
* W.S. Elev (ft)         *  809.68  * Reach Len. (ft)        *  676.43  *  559.37  *  531.83  *
* Crit W.S. (ft)         *  803.10  * Flow Area (sq ft)      *   19.56  * 2364.54  * 1245.48  *
* E.G. Slope (ft/ft)     *0.001650  * Area (sq ft)           *   19.56  * 2364.54  * 2174.36  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *   18.46  *17722.43  * 2959.11  *
* Top Width (ft)         *  469.13  * Top Width (ft)         *    9.00  *  155.70  *  304.43  *
* Vel Total (ft/s)       *    5.70  * Avg. Vel. (ft/s)       *    0.94  *    7.50  *    2.38  *
* Max Chl Dpth (ft)      *   20.39  * Hydr. Depth (ft)       *    2.17  *   15.19  *    7.81  *
* Conv. Total (cfs)      *509585.3  * Conv. (cfs)            *   454.4  *436284.6  * 72846.2  *
* Length Wtd. (ft)       *  556.76  * Wetted Per. (ft)       *   10.00  *  160.59  *  159.49  *
* Min Ch El (ft)         *  789.29  * Shear (lb/sq ft)       *    0.20  *    1.52  *    0.80  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.19  *   11.37  *    1.91  *
* Frctn Loss (ft)        *    1.13  * Cum Volume (acre-ft)   * 4947.60  *13132.59  * 5780.38  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  577.48  *  596.66  *  667.85  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 24.059

INPUT
Description:
Station Elevation Data    num=     144
      Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
        0    878.5   22.47    879.8   31.67    880.2   37.36   880.62   64.93   882.18
   113.34   882.45  124.42   882.15  148.79   881.82  171.66   881.72  178.12   879.91
    186.1   878.26  202.12   879.82  215.66   881.21  231.27   872.75  241.54   867.33
   257.91   862.49  265.61   860.27  282.81   840.85  287.55   835.64  292.48   836.32
   300.75   837.44  303.86   837.21  315.92   836.49  339.72   858.65   340.4   859.39
    341.3   859.61  361.21    865.5  367.24    865.6  421.87   863.56  422.72   863.55
   423.41    863.5  448.13   862.36   458.3   862.05  466.09   862.24  483.07   862.36
   488.83    862.2  504.55      862  522.52   862.29  545.13   862.47  568.23   862.96
    583.8   862.99  594.14   862.33  639.82    858.3   661.7   856.55  677.35   854.94
   721.95   848.08  735.63   845.84  744.26   842.62  761.98   836.72  764.63    835.9
   765.89   835.41   771.8   833.55  783.25   829.97  785.74   829.58  787.24   829.36
   815.37   826.12  818.69   824.58  821.94   822.92  828.06   819.82  854.29   804.06
   865.98    802.3   869.4    801.7  880.46   799.78  888.13   792.71  892.08   789.93
   895.84   789.93  929.23   787.91   960.2   789.93  967.43    796.1  969.06   797.42
      970   797.48  976.53   797.95 1006.15   799.93 1025.67   801.06 1028.47   801.06
  1045.19    800.6  1093.6   802.08 1105.85    802.1 1112.19   802.09 1112.51   802.07
  1119.89   802.02 1141.55   801.75 1171.44    801.5 1202.68   800.15 1230.34   799.06
  1241.03   799.32 1271.94   800.09 1278.06   800.15 1286.61   800.24 1300.78   800.52
  1308.29    800.6 1324.63   802.33 1333.86   803.31 1355.08   804.83 1360.23   804.89
  1370.32   805.02 1398.17   805.34 1408.02   805.47 1416.81   805.52 1433.05   808.29
  1458.03   812.04 1471.59   809.67 1475.63   808.93 1479.74   809.38 1516.97   814.01
  1517.11   814.01 1568.04    813.3 1609.34   813.66 1636.16   813.76 1683.06   813.62
  1707.63   813.85 1759.58    814.4  1762.9   814.43  1827.7   815.44 1834.53   815.52
  1896.22   815.27 1901.79   815.29 1918.18    815.7 1972.46   817.08 1993.87   817.82
  2018.36   818.07 2045.43   818.49 2074.09   823.56 2074.42   823.62 2074.52   823.62
  2074.69   823.62 2098.33   823.92 2104.49   824.58 2111.09   825.26 2124.54   829.99
  2152.87   843.01 2169.18   850.54 2179.04   855.17 2195.28   863.01 2198.87   864.74
  2210.94   867.01 2243.18   874.29 2270.27   875.84 2285.68   876.54  2292.6   876.77
```

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 2297.31  876.82 2317.07  878.31 2319.39  878.39 2327.59  878.71

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .09  639.82      .1  880.46     .04     970      .1 1398.17     .07
 2018.36      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        880.46     970           863.39  716.03  660.29             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1092.85 2327.59     822       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  800.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *          *   0.040  *   0.100  *
* W.S. Elev (ft)         *  799.79  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)         *  795.53  * Flow Area (sq ft)      *          *  853.05  *   38.73  *
* E.G. Slope (ft/ft)     *0.002426  * Area (sq ft)           *    0.00  *  853.05  *   56.13  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *          * 6694.13  *   30.87  *
* Top Width (ft)         *  171.36  * Top Width (ft)         *    0.03  *   89.54  *   81.79  *
* Vel Total (ft/s)       *    7.54  * Avg. Vel. (ft/s)       *          *    7.85  *    0.80  *
* Max Chl Dpth (ft)      *   11.88  * Hydr. Depth (ft)       *          *    9.53  *    1.14  *
* Conv. Total (cfs)      *136527.3  * Conv. (cfs)            *          *135900.5  *   626.8  *
* Length Wtd. (ft)       *  715.90  * Wetted Per. (ft)       *          *   96.05  *   34.07  *
* Min Ch El (ft)         *  787.91  * Shear (lb/sq ft)       *          *    1.35  *    0.17  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *          *   10.56  *    0.14  *
* Frctn Loss (ft)        *    1.57  * Cum Volume (acre-ft)   *  843.14  * 6514.57  *  813.05  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  182.48  *  493.47  *  208.16  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  804.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  803.13  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)         *  798.57  * Flow Area (sq ft)      *   32.51  * 1152.14  *  340.52  *
* E.G. Slope (ft/ft)     *0.002675  * Area (sq ft)           *   32.51  * 1152.14  *  889.45  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *   34.25  *11599.74  *  516.00  *
* Top Width (ft)         *  471.63  * Top Width (ft)         *   19.97  *   89.54  *  362.13  *
* Vel Total (ft/s)       *    7.97  * Avg. Vel. (ft/s)       *    1.05  *   10.07  *    1.52  *
* Max Chl Dpth (ft)      *   15.22  * Hydr. Depth (ft)       *    1.63  *   12.87  *    2.77  *
* Conv. Total (cfs)      *234908.4  * Conv. (cfs)            *   662.3  *224269.7  *  9976.4  *
* Length Wtd. (ft)       *  713.57  * Wetted Per. (ft)       *   20.25  *   96.05  *  122.99  *
* Min Ch El (ft)         *  787.91  * Shear (lb/sq ft)       *    0.27  *    2.00  *    0.46  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.28  *   20.17  *    0.70  *
* Frctn Loss (ft)        *    1.57  * Cum Volume (acre-ft)   * 1928.96  * 8676.79  * 2022.96  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *  297.26  *  533.95  *  342.38  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  805.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.59  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  803.84  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)         *  799.26  * Flow Area (sq ft)      *   48.38  * 1215.80  *  427.87  *
* E.G. Slope (ft/ft)     *0.002675  * Area (sq ft)           *   48.38  * 1215.80  * 1149.93  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *   57.71  *12687.34  *  754.95  *
* Top Width (ft)         *  485.45  * Top Width (ft)         *   24.69  *   89.54  *  371.22  *
* Vel Total (ft/s)       *    7.98  * Avg. Vel. (ft/s)       *    1.19  *   10.44  *    1.76  *
* Max Chl Dpth (ft)      *   15.93  * Hydr. Depth (ft)       *    1.96  *   13.58  *    3.48  *
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* Conv. Total (cfs)      *261014.0  * Conv. (cfs)            *  1115.7  *245301.6  * 14596.6  *
* Length Wtd. (ft)       *  712.90  * Wetted Per. (ft)       *   25.02  *   96.05  *  122.99  *
* Min Ch El (ft)         *  787.91  * Shear (lb/sq ft)       *    0.32  *    2.11  *    0.58  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.39  *   22.06  *    1.03  *
* Frctn Loss (ft)        *    1.53  * Cum Volume (acre-ft)   * 2758.44  *10345.40  * 3063.14  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *  354.35  *  561.94  *  450.22  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  808.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.92  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  806.71  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)         *  802.62  * Flow Area (sq ft)      *  129.38  * 1473.45  *  781.37  *
* E.G. Slope (ft/ft)     *0.002650  * Area (sq ft)           *  129.38  * 1473.45  * 2348.95  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *  252.91  *17396.82  * 2050.27  *
* Top Width (ft)         *  573.94  * Top Width (ft)         *   30.59  *   89.54  *  453.81  *
* Vel Total (ft/s)       *    8.26  * Avg. Vel. (ft/s)       *    1.95  *   11.81  *    2.62  *
* Max Chl Dpth (ft)      *   18.80  * Hydr. Depth (ft)       *    4.23  *   16.46  *    6.36  *
* Conv. Total (cfs)      *382665.6  * Conv. (cfs)            *  4912.8  *337927.2  * 39825.7  *
* Length Wtd. (ft)       *  711.00  * Wetted Per. (ft)       *   31.67  *   96.05  *  122.99  *
* Min Ch El (ft)         *  787.91  * Shear (lb/sq ft)       *    0.68  *    2.54  *    1.05  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    1.32  *   29.97  *    2.76  *
* Frctn Loss (ft)        *    1.41  * Cum Volume (acre-ft)   * 4162.05  *12183.42  * 4824.40  *
* C & E Loss (ft)        *    0.26  * Cum SA (acres)         *  481.45  *  584.82  *  585.19  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  812.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.18  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  810.17  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)         *  805.22  * Flow Area (sq ft)      *  244.85  * 1782.45  * 1205.31  *
* E.G. Slope (ft/ft)     *0.002459  * Area (sq ft)           *  244.85  * 1782.45  * 3962.17  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             *  620.60  *23012.65  * 4066.75  *
* Top Width (ft)         *  618.71  * Top Width (ft)         *   36.33  *   89.54  *  492.84  *
* Vel Total (ft/s)       *    8.57  * Avg. Vel. (ft/s)       *    2.53  *   12.91  *    3.37  *
* Max Chl Dpth (ft)      *   22.26  * Hydr. Depth (ft)       *    6.74  *   19.91  *    9.81  *
* Conv. Total (cfs)      *558647.1  * Conv. (cfs)            * 12516.2  *464113.8  * 82017.2  *
* Length Wtd. (ft)       *  709.72  * Wetted Per. (ft)       *   38.37  *   96.05  *  122.99  *
* Min Ch El (ft)         *  787.91  * Shear (lb/sq ft)       *    0.98  *    2.85  *    1.50  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    2.48  *   36.77  *    5.08  *
* Frctn Loss (ft)        *    1.25  * Cum Volume (acre-ft)   * 6916.41  *14954.43  * 8230.88  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         *  834.80  *  612.91  * 1025.37  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  814.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.26  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  812.58  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)         *  806.67  * Flow Area (sq ft)      *  337.51  * 1998.83  * 1502.20  *
* E.G. Slope (ft/ft)     *0.002258  * Area (sq ft)           *  337.51  * 1998.83  * 5211.01  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *  940.25  *26694.44  * 5625.31  *
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* Top Width (ft)          *  665.38  * Top Width (ft)          *   40.35  *   89.54  *  535.49  *
* Vel Total (ft/s)        *    8.66  * Avg. Vel. (ft/s)        *    2.79  *   13.36  *    3.74  *
* Max Chl Dpth (ft)       *   24.67  * Hydr. Depth (ft)        *    8.36  *   22.32  *   12.23  *
* Conv. Total (cfs)       *699936.2  * Conv. (cfs)             * 19787.0  *561767.9  *118381.2  *
* Length Wtd. (ft)        *  709.21  * Wetted Per. (ft)        *   43.07  *   96.05  *  122.99  *
* Min Ch El (ft)          *  787.91  * Shear (lb/sq ft)        *    1.10  *    2.93  *    1.72  *
* Alpha                   *    1.94  * Stream Power (lb/ft s) *    3.08  *   39.18  *    6.45  *
* Frctn Loss (ft)         *    1.13  * Cum Volume (acre-ft)   * 9714.61  *16638.83  *11623.29  *
* C & E Loss (ft)         *    0.33  * Cum SA (acres)         * 1104.37  *  620.05  * 1459.86  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  817.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.34  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  815.00  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)          *  808.02  * Flow Area (sq ft)      *  439.81  * 2215.06  * 1798.86  *
* E.G. Slope (ft/ft)      *0.002090  * Area (sq ft)           *  439.81  * 2215.06  * 6839.14  *
* Q Total (cfs)           *39100.00  * Flow (cfs)             * 1312.76  *30478.77  * 7308.48  *
* Top Width (ft)          *  963.18  * Top Width (ft)          *   44.37  *   89.54  *  829.27  *
* Vel Total (ft/s)        *    8.78  * Avg. Vel. (ft/s)        *    2.98  *   13.76  *    4.06  *
* Max Chl Dpth (ft)       *   27.09  * Hydr. Depth (ft)        *    9.91  *   24.74  *   14.64  *
* Conv. Total (cfs)       *855232.8  * Conv. (cfs)             * 28713.9  *666660.9  *159858.0  *
* Length Wtd. (ft)        *  708.91  * Wetted Per. (ft)        *   47.76  *   96.05  *  122.99  *
* Min Ch El (ft)          *  787.91  * Shear (lb/sq ft)        *    1.20  *    3.01  *    1.91  *
* Alpha                   *    1.96  * Stream Power (lb/ft s) *    3.59  *   41.41  *    7.75  *
* Frctn Loss (ft)         *    1.04  * Cum Volume (acre-ft)   *12358.86  *17791.32  *15024.78  *
* C & E Loss (ft)         *    0.33  * Cum SA (acres)         * 1292.77  *  621.00  * 1885.98  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  820.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.42  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  818.23  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)          *  809.73  * Flow Area (sq ft)      *  592.01  * 2504.62  * 2196.14  *
* E.G. Slope (ft/ft)      *0.001878  * Area (sq ft)           *  592.01  * 2504.62  * 9986.01  *
* Q Total (cfs)           *47000.00  * Flow (cfs)             * 1880.65  *35457.70  * 9661.64  *
* Top Width (ft)          * 1198.02  * Top Width (ft)          *   49.76  *   89.54  * 1058.72  *
* Vel Total (ft/s)        *    8.88  * Avg. Vel. (ft/s)        *    3.18  *   14.16  *    4.40  *
* Max Chl Dpth (ft)       *   30.32  * Hydr. Depth (ft)        *   11.90  *   27.97  *   17.88  *
* Conv. Total (cfs)       *1084476.0  * Conv. (cfs)             * 43394.1  *818149.7  *222932.4  *
* Length Wtd. (ft)        *  708.75  * Wetted Per. (ft)        *   54.03  *   96.05  *  122.99  *
* Min Ch El (ft)          *  787.91  * Shear (lb/sq ft)        *    1.28  *    3.06  *    2.09  *
* Alpha                   *    1.97  * Stream Power (lb/ft s) *    4.08  *   43.29  *    9.21  *
* Frctn Loss (ft)         *    0.93  * Cum Volume (acre-ft)   *17442.21  *19518.22  *21030.48  *
* C & E Loss (ft)         *    0.33  * Cum SA (acres)         * 1571.29  *  623.53  * 2296.94  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  809.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.93  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  807.26  * Reach Len. (ft)        *  863.39  *  716.03  *  660.29  *
* Crit W.S. (ft)          *  803.00  * Flow Area (sq ft)      *  146.23  * 1522.06  *  848.06  *
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* E.G. Slope (ft/ft)     *0.002571  * Area (sq ft)           *  146.23  * 1522.06  * 2596.17  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *  298.88  *18086.47  * 2314.65  *
* Top Width (ft)         *  578.03  * Top Width (ft)         *   31.49  *   89.54  *  457.00  *
* Vel Total (ft/s)       *    8.23  * Avg. Vel. (ft/s)       *    2.04  *   11.88  *    2.73  *
* Max Chl Dpth (ft)      *   19.35  * Hydr. Depth (ft)       *    4.64  *   17.00  *    6.90  *
* Conv. Total (cfs)      *408255.2  * Conv. (cfs)            *  5894.7  *356710.0  * 45650.5  *
* Length Wtd. (ft)       *  710.74  * Wetted Per. (ft)       *   32.73  *   96.05  *  122.99  *
* Min Ch El (ft)         *  787.91  * Shear (lb/sq ft)       *    0.72  *    2.54  *    1.11  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    1.47  *   30.22  *    3.02  *
* Frctn Loss (ft)        *    1.35  * Cum Volume (acre-ft)   * 4946.32  *13107.63  * 5751.26  *
* C & E Loss (ft)        *    0.26  * Cum SA (acres)         *  577.16  *  595.08  *  663.20  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 23.923

INPUT
Description:
Station Elevation Data    num=     127
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  857.03    7.41  857.51   26.07  858.75   36.79  858.96   74.69  859.19
  111.48  859.46  137.64  859.08   143.8  855.12  159.58  847.69  167.99  846.75
  173.68  841.97  182.66   829.3  193.95  831.46  196.61  831.95   203.8   831.1
  216.31  829.65  218.89  832.53  230.35   832.2  233.59  832.79  234.63  832.93
  248.36  834.51  268.99  835.87  279.92   835.2  293.66  834.51  296.24  833.97
   297.9  834.38  298.91  834.32  309.82  838.01  321.65  839.45  326.43  839.84
  332.61  836.23   348.4  826.86  351.52  824.94  361.96  822.36  369.28  821.67
  376.05  819.96  383.43  815.56  404.61   805.6  405.54  805.22  408.24  804.28
  418.93  801.01  424.24  799.43  424.54  799.34  426.92   798.5  433.02  796.49
  444.95  792.54     453  789.47  455.13  788.97  457.23  788.46     485  786.15
  518.43  788.46  521.56  788.46  523.66  788.46   525.2  789.06  533.24  792.12
  550.61  798.74  591.33  797.48  592.59  797.44  627.17   796.3  659.47  795.59
  684.92  795.32  741.62  797.24   757.1  797.69  765.26  800.75  797.69  812.71
  816.53  812.62  833.91  812.72  842.37  812.61  883.82  812.36  917.85  812.29
  965.26  811.56  975.57  811.49 1018.76  811.19 1043.38  811.07 1047.67  811.06
 1101.28  810.91 1107.79  810.89 1145.67  811.06 1168.47  811.02 1199.48  811.18
 1251.94  811.47  1254.5  811.49 1256.32   811.5  1313.7  811.59 1320.29  811.55
 1358.77  811.57 1414.84  811.83 1426.64  811.95  1434.8  811.96 1478.59  812.59
  1492.3  812.76 1497.34  812.95 1508.16  813.22 1550.64  814.35 1564.96  818.93
 1579.53   823.6  1599.8  821.47 1602.96  821.11  1604.2  820.76 1608.58  819.71
 1610.96   821.5 1618.64  827.22 1621.64  832.01 1632.86  843.46 1634.89  843.62
 1659.94  847.59 1678.12  850.37 1710.36  855.17 1717.82  856.22 1770.83     868
 1786.27  870.42 1822.69  870.71 1827.51  870.75 1830.09   870.8 1834.86  870.84
 1841.41  870.77 1842.02  870.81 1842.68  870.85 1851.06  870.86 1856.91  871.24
 1872.12  871.44 1879.13   871.9 1882.99  871.83 1888.05  871.89 1889.48     872
 1895.74  871.96 1899.13  871.89

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  418.93     .04  550.61      .1 1199.48     .06 1579.53      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        418.93  550.61           630.01  640.61  648.59             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  549.49     700  798.82        T
     700 1900.98     820        F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  798.40  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  793.85  * Flow Area (sq ft)      *          * 1012.27  *          *
```

```
* E.G. Slope (ft/ft)     *0.001986  * Area (sq ft)           *          * 1012.28  *  358.32  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *          * 6725.00  *          *
* Top Width (ft)         *  320.09  * Top Width (ft)         *          *  122.52  *  197.57  *
* Vel Total (ft/s)       *    6.64  * Avg. Vel. (ft/s)       *          *    6.64  *          *
* Max Chl Dpth (ft)      *   12.25  * Hydr. Depth (ft)       *          *    8.28  *          *
* Conv. Total (cfs)      *150917.5  * Conv. (cfs)            *          *150917.5  *          *
* Length Wtd. (ft)       *  640.25  * Wetted Per. (ft)       *          *  125.90  *          *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *          *    1.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.62  *          *
* Frctn Loss (ft)        *    0.87  * Cum Volume (acre-ft)   *  843.14  * 6499.24  *  809.91  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  182.48  *  491.73  *  206.04  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  801.97  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  796.61  * Flow Area (sq ft)      *    1.52  * 1470.73  *  471.30  *
* E.G. Slope (ft/ft)     *0.001849  * Area (sq ft)           *    1.52  * 1471.06  * 1117.51  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *    0.58  *11501.77  *  647.65  *
* Top Width (ft)         *  352.81  * Top Width (ft)         *    3.15  *  131.68  *  217.97  *
* Vel Total (ft/s)       *    6.25  * Avg. Vel. (ft/s)       *    0.38  *    7.82  *    1.37  *
* Max Chl Dpth (ft)      *   15.82  * Hydr. Depth (ft)       *    0.48  *   11.17  *    3.15  *
* Conv. Total (cfs)      *282536.3  * Conv. (cfs)            *    13.5  *267462.4  * 15060.4  *
* Length Wtd. (ft)       *  640.25  * Wetted Per. (ft)       *    3.30  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.05  *    1.25  *    0.36  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.02  *    9.78  *    0.50  *
* Frctn Loss (ft)        *    0.84  * Cum Volume (acre-ft)   * 1928.62  * 8655.23  * 2007.75  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  297.03  *  532.13  *  337.98  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  803.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  802.78  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  797.20  * Flow Area (sq ft)      *    5.11  * 1576.42  *  591.21  *
* E.G. Slope (ft/ft)     *0.001754  * Area (sq ft)           *    5.11  * 1576.75  * 1293.34  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *    2.84  *12576.75  *  920.41  *
* Top Width (ft)         *  357.61  * Top Width (ft)         *    5.78  *  131.68  *  220.15  *
* Vel Total (ft/s)       *    6.21  * Avg. Vel. (ft/s)       *    0.56  *    7.98  *    1.56  *
* Max Chl Dpth (ft)      *   16.63  * Hydr. Depth (ft)       *    0.88  *   11.97  *    3.96  *
* Conv. Total (cfs)      *322301.7  * Conv. (cfs)            *    67.8  *300259.8  * 21974.1  *
* Length Wtd. (ft)       *  640.29  * Wetted Per. (ft)       *    6.04  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.09  *    1.27  *    0.43  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    0.05  *   10.15  *    0.67  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   * 2757.91  *10322.45  * 3044.62  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  354.05  *  560.12  *  445.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  806.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  805.91  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  800.17  * Flow Area (sq ft)      *   38.61  * 1988.98  * 1059.26  *
* E.G. Slope (ft/ft)     *0.001543  * Area (sq ft)           *   38.61  * 1989.31  * 1996.39  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *   40.94  *17377.49  * 2281.58  *
* Top Width (ft)         *  375.30  * Top Width (ft)         *   14.98  *  131.68  *  228.64  *
* Vel Total (ft/s)       *    6.38  * Avg. Vel. (ft/s)       *    1.06  *    8.74  *    2.15  *
* Max Chl Dpth (ft)      *   19.76  * Hydr. Depth (ft)       *    2.58  *   15.10  *    7.09  *
* Conv. Total (cfs)      *501465.0  * Conv. (cfs)            *  1042.1  *442345.2  * 58077.7  *
* Length Wtd. (ft)       *  640.45  * Wetted Per. (ft)       *   15.77  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.24  *    1.41  *    0.68  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.25  *   12.33  *    1.47  *
```

```
* Frctn Loss (ft)        *    0.74  * Cum Volume (acre-ft)   * 4160.38  *12154.96  * 4791.47  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  480.99  *  583.00  *  580.01  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  810.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  809.62  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  802.33  * Flow Area (sq ft)      *  108.75  * 2477.10  * 1613.03  *
* E.G. Slope (ft/ft)     *0.001331  * Area (sq ft)           *  108.75  * 2477.43  * 2862.56  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             *  159.33  *23269.24  * 4271.43  *
* Top Width (ft)         *  393.24  * Top Width (ft)         *   22.86  *  131.68  *  238.69  *
* Vel Total (ft/s)       *    6.60  * Avg. Vel. (ft/s)       *    1.47  *    9.39  *    2.65  *
* Max Chl Dpth (ft)      *   23.47  * Hydr. Depth (ft)       *    4.76  *   18.81  *   10.80  *
* Conv. Total (cfs)      *759125.0  * Conv. (cfs)            *  4366.6  *637698.9  *117059.6  *
* Length Wtd. (ft)       *  640.60  * Wetted Per. (ft)       *   24.48  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.37  *    1.52  *    0.90  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *    0.54  *   14.25  *    2.38  *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   * 6912.91  *14919.42  * 8179.16  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  834.21  *  611.09  * 1019.82  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  813.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  812.19  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  803.56  * Flow Area (sq ft)      *  174.48  * 2815.28  * 1996.69  *
* E.G. Slope (ft/ft)     *0.001189  * Area (sq ft)           *  174.48  * 2815.61  * 3897.19  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *  285.82  *27214.38  * 5759.80  *
* Top Width (ft)         *  931.51  * Top Width (ft)         *   28.32  *  131.68  *  771.51  *
* Vel Total (ft/s)       *    6.67  * Avg. Vel. (ft/s)       *    1.64  *    9.67  *    2.88  *
* Max Chl Dpth (ft)      *   26.04  * Hydr. Depth (ft)       *    6.16  *   21.38  *   13.37  *
* Conv. Total (cfs)      *964647.9  * Conv. (cfs)            *  8289.6  *789305.4  *167052.9  *
* Length Wtd. (ft)       *  640.68  * Wetted Per. (ft)       *   30.52  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.42  *    1.54  *    0.99  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.70  *   14.88  *    2.86  *
* Frctn Loss (ft)        *    0.60  * Cum Volume (acre-ft)   * 9709.54  *16599.26  *11554.25  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         * 1103.69  *  618.23  * 1449.96  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  815.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  814.72  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  804.73  * Flow Area (sq ft)      *  253.03  * 3148.76  * 2375.02  *
* E.G. Slope (ft/ft)     *0.001083  * Area (sq ft)           *  253.03  * 3149.09  * 6297.19  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *  450.17  *31307.65  * 7342.18  *
* Top Width (ft)         * 1166.57  * Top Width (ft)         *   33.71  *  131.68  * 1001.18  *
* Vel Total (ft/s)       *    6.77  * Avg. Vel. (ft/s)       *    1.78  *    9.94  *    3.09  *
* Max Chl Dpth (ft)      *   28.57  * Hydr. Depth (ft)       *    7.51  *   23.91  *   15.90  *
* Conv. Total (cfs)      *1187961.0  * Conv. (cfs)            * 13677.4  *951208.9  *223074.6  *
* Length Wtd. (ft)       *  640.76  * Wetted Per. (ft)       *   36.47  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.47  *    1.57  *    1.07  *
* Alpha                  *    1.77  * Stream Power (lb/ft s) *    0.83  *   15.59  *    3.32  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   *12351.99  *17747.23  *14925.22  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         * 1292.00  *  619.18  * 1872.11  *
*****************************************************************************************************
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Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  819.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  818.08  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  806.14  * Flow Area (sq ft)      *  376.97  * 3591.52  * 2877.33  *
* E.G. Slope (ft/ft)     *0.000962  * Area (sq ft)           *  376.97  * 3591.85  * 9681.20  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *  734.52  *36738.87  * 9526.62  *
* Top Width (ft)         * 1183.10  * Top Width (ft)         *   39.73  *  131.68  * 1011.69  *
* Vel Total (ft/s)       *    6.87  * Avg. Vel. (ft/s)       *    1.95  *   10.23  *    3.31  *
* Max Chl Dpth (ft)      *   31.93  * Hydr. Depth (ft)       *    9.49  *   27.27  *   19.26  *
* Conv. Total (cfs)      *1515230.0  * Conv. (cfs)           * 23680.1  *1184422.0  *307127.9  *
* Length Wtd. (ft)       *  640.84  * Wetted Per. (ft)       *   43.37  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.52  *    1.59  *    1.16  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    1.02  *   16.25  *    3.83  *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *17432.61  *19468.12  *20881.42  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         * 1570.40  *  621.71  * 2281.25  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  807.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  806.52  * Reach Len. (ft)        *  630.01  *  640.61  *  648.59  *
* Crit W.S. (ft)         *  800.51  * Flow Area (sq ft)      *   48.16  * 2069.44  * 1150.54  *
* E.G. Slope (ft/ft)     *0.001466  * Area (sq ft)           *   48.16  * 2069.77  * 2136.60  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *   54.42  *18093.48  * 2552.11  *
* Top Width (ft)         *  378.26  * Top Width (ft)         *   16.28  *  131.68  *  230.30  *
* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *    1.13  *    8.74  *    2.22  *
* Max Chl Dpth (ft)      *   20.37  * Hydr. Depth (ft)       *    2.96  *   15.72  *    7.70  *
* Conv. Total (cfs)      *540646.5  * Conv. (cfs)           *  1421.2  *472568.9  * 66656.4  *
* Length Wtd. (ft)       *  640.48  * Wetted Per. (ft)       *   17.21  *  135.78  *  149.45  *
* Min Ch El (ft)         *  786.15  * Shear (lb/sq ft)       *    0.26  *    1.39  *    0.70  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    0.29  *   12.20  *    1.56  *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   * 4944.39  *13078.11  * 5715.39  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  576.69  *  593.26  *  657.99  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 23.802

INPUT
Description:
Station Elevation Data    num=     165
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  852.18    6.15  851.79   43.02  849.72    69.5  848.12   70.38  848.06
   71.74  847.97   74.71  847.77   84.54  847.12  125.96  844.12  138.14  843.55
  150.05  842.35  165.48  840.81  175.73  839.63  183.63  838.19  199.97  836.13
  200.01  836.13  200.05  836.12  221.64  828.91  253.37  816.19  255.86   815.2
  257.65  814.44  258.55  814.15  275.82  817.42  297.12  826.34  309.53  829.89
  326.38  836.92  341.29  843.43  375.95  846.03  397.97  847.43  412.31  847.76
  418.34  848.14  421.57  848.41  441.07   849.8  477.09  851.76  484.16  848.76
  489.35  848.19  497.47  848.27  497.83  847.93  505.07  841.03  508.93  834.14
  516.37  829.53  518.28  826.97  520.64  827.33  532.56  829.12  535.11  829.12
  537.74  829.12  542.02  828.46  546.87  827.72  555.44  826.66  567.78  825.03
  573.99  825.58  591.53  827.23  624.33  823.23  648.95  821.03  675.28  819.12
```

```
  693.96  817.78  716.05  804.42  723.52  799.08  740.14  797.44  748.11  796.86
  771.98  795.11  778.44  794.92  793.14  794.67  806.78  794.49  807.68  793.92
  812.92  789.28  814.22  789.69  821.38  792.61  838.52   792.9  857.87  792.58
  861.88  790.77  865.01  789.55  865.42  789.47  878.06  789.41  886.64  789.37
  887.06  789.36  887.49  789.36  889.89  787.42   890.4  787.06  923.97  784.45
  966.02  787.06  966.86  787.06  974.17  790.43  978.06  792.05  992.37  798.01
 1036.47  798.06 1042.58  797.99 1047.03  798.09 1055.37  798.35 1058.42  798.58
 1075.55  799.71 1081.06  800.09 1121.35  803.14 1140.48  808.62 1151.81  811.17
 1161.15  811.63 1209.45  811.57 1228.91   811.6 1283.56  810.91 1286.56  810.88
  1363.6  811.32 1371.55  811.43 1393.35  811.88 1422.65  812.41 1442.27  812.01
 1474.26  811.27 1474.72  811.27 1506.82  811.03 1516.37   811.1 1551.53  810.79
 1552.96  810.77 1555.48   810.8 1556.56  810.78 1558.03  810.75 1586.31  809.53
  1589.1  809.63 1605.54  810.67 1608.97  811.23 1619.54  813.73 1633.75     813
 1646.36  812.41 1655.75   812.3 1666.95  812.15 1680.65  811.99 1683.92  811.97
  1698.7  812.17 1736.42   812.4 1760.94  813.01 1819.91  814.09 1827.27  814.18
 1847.51   814.6 1886.51  815.36 1912.69  816.26  1942.7  817.22 1949.18  818.17
 1966.24  821.13 1986.33  821.07  1989.4  821.07 1995.99  819.99 1999.65  819.41
 2016.68  825.03 2035.13  830.64 2039.74  831.97 2045.85  833.28 2048.94  837.95
 2052.55   837.4 2057.46  840.95 2060.03  842.88 2068.01   843.1 2082.06  844.29
 2104.22  845.37 2113.79  845.64 2115.68  845.71 2119.17  845.99 2130.14  847.08
 2141.62  848.21 2153.65  848.71 2156.78  849.16 2166.32  849.67 2197.19  851.08
 2205.13  851.28 2218.12  852.56 2231.52  853.44 2239.66  853.86  2242.8  853.86

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09  520.64      .1  887.49     .04  992.37    .105 1393.35     .07
 1949.18    .105

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        857.87  992.37            590.4   594.6  531.32              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1150  2242.8     820       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  798.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.100  *   0.044  *          *
* W.S. Elev (ft)         *  797.79  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  791.75  * Flow Area (sq ft)      *  432.32  * 1314.51  *          *
* E.G. Slope (ft/ft)     *0.000980  * Area (sq ft)           *  432.32  * 1314.51  *          *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  462.63  * 6262.37  *          *
* Top Width (ft)         *  255.22  * Top Width (ft)         *  121.26  *  133.97  *          *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    1.07  *    4.76  *          *
* Max Chl Dpth (ft)      *   13.34  * Hydr. Depth (ft)       *    3.57  *    9.81  *          *
* Conv. Total (cfs)      *214792.2  * Conv. (cfs)            * 14776.1  *200016.2  *          *
* Length Wtd. (ft)       *  594.46  * Wetted Per. (ft)       *  123.93  *  137.79  *          *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.21  *    0.58  *          *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.23  *    2.78  *          *
* Frctn Loss (ft)        *    1.05  * Cum Volume (acre-ft)   *  840.01  * 6482.13  *  807.24  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  181.60  *  489.84  *  204.57  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  801.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  801.46  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  794.20  * Flow Area (sq ft)      *  920.51  * 1807.70  *  283.55  *
* E.G. Slope (ft/ft)     *0.000971  * Area (sq ft)           *  920.51  * 1807.70  *  283.55  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 1487.73  *10422.56  *  239.71  *
* Top Width (ft)         *  378.90  * Top Width (ft)         *  137.67  *  134.50  *  106.73  *
* Vel Total (ft/s)       *    4.03  * Avg. Vel. (ft/s)       *    1.62  *    5.77  *    0.85  *
* Max Chl Dpth (ft)      *   17.01  * Hydr. Depth (ft)       *    6.69  *   13.44  *    2.66  *
* Conv. Total (cfs)      *389880.4  * Conv. (cfs)            * 47739.8  *334448.6  *  7692.0  *
* Length Wtd. (ft)       *  592.92  * Wetted Per. (ft)       *  141.17  *  138.36  *  106.84  *
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* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.40  *    0.79  *    0.16  *
* Alpha                  *    1.77  * Stream Power (lb/ft s) *    0.64  *    4.57  *    0.14  *
* Frctn Loss (ft)        *    1.00  * Cum Volume (acre-ft)   * 1921.95  * 8631.12  * 1997.32  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  296.01  *  530.18  *  335.57  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  802.29  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  794.49  * Flow Area (sq ft)      * 1036.22  * 1920.26  *  377.50  *
* E.G. Slope (ft/ft)     *0.000948  * Area (sq ft)           * 1036.22  * 1920.26  *  377.50  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 1778.47  *11364.27  *  357.26  *
* Top Width (ft)         *  391.12  * Top Width (ft)         *  138.84  *  134.50  *  117.78  *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *    1.72  *    5.92  *    0.95  *
* Max Chl Dpth (ft)      *   17.84  * Hydr. Depth (ft)       *    7.46  *   14.28  *    3.21  *
* Conv. Total (cfs)      *438467.1  * Conv. (cfs)            * 57762.9  *369100.7  * 11603.5  *
* Length Wtd. (ft)       *  592.37  * Wetted Per. (ft)       *  142.61  *  138.36  *  117.93  *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.43  *    0.82  *    0.19  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.74  *    4.86  *    0.18  *
* Frctn Loss (ft)        *    0.96  * Cum Volume (acre-ft)   * 2750.37  *10296.73  * 3032.18  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  353.00  *  558.16  *  443.22  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  806.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  805.53  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  796.81  * Flow Area (sq ft)      * 1492.79  * 2355.30  *  799.88  *
* E.G. Slope (ft/ft)     *0.000903  * Area (sq ft)           * 1492.79  * 2355.30  *  799.88  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 3106.45  *15494.87  * 1098.68  *
* Top Width (ft)         *  415.46  * Top Width (ft)         *  143.65  *  134.50  *  137.31  *
* Vel Total (ft/s)       *    4.24  * Avg. Vel. (ft/s)       *    2.08  *    6.58  *    1.37  *
* Max Chl Dpth (ft)      *   21.08  * Hydr. Depth (ft)       *   10.39  *   17.51  *    5.83  *
* Conv. Total (cfs)      *655472.7  * Conv. (cfs)            *103360.0  *515556.6  * 36556.1  *
* Length Wtd. (ft)       *  590.43  * Wetted Per. (ft)       *  148.41  *  138.36  *  137.83  *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.57  *    0.96  *    0.33  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    1.18  *    6.32  *    0.45  *
* Frctn Loss (ft)        *    0.89  * Cum Volume (acre-ft)   * 4149.31  *12123.01  * 4770.65  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  479.85  *  581.04  *  577.29  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  809.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  809.35  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  799.16  * Flow Area (sq ft)      * 2054.36  * 2869.78  * 1350.91  *
* E.G. Slope (ft/ft)     *0.000823  * Area (sq ft)           * 2054.36  * 2869.78  * 1350.91  *
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* Q Total (cfs)          *27700.00  * Flow (cfs)             * 4888.55  *20461.96  * 2349.50  *
* Top Width (ft)         *  435.84  * Top Width (ft)         *  149.97  *  134.50  *  151.36  *
* Vel Total (ft/s)       *    4.41  * Avg. Vel. (ft/s)       *    2.38  *    7.13  *    1.74  *
* Max Chl Dpth (ft)      *   24.90  * Hydr. Depth (ft)       *   13.70  *   21.34  *    8.93  *
* Conv. Total (cfs)      *965412.9  * Conv. (cfs)            *170377.8  *713149.4  * 81885.7  *
* Length Wtd. (ft)       *  588.67  * Wetted Per. (ft)       *  155.80  *  138.36  *  152.39  *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.68  *    1.07  *    0.46  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    1.61  *    7.60  *    0.79  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   * 6897.26  *14880.10  * 8147.79  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  832.96  *  609.13  * 1016.92  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  812.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  812.00  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  800.36  * Flow Area (sq ft)      * 2457.36  * 3226.00  * 1763.96  *
* E.G. Slope (ft/ft)     *0.000751  * Area (sq ft)           * 2457.36  * 3226.00  * 2113.03  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 6159.50  *23694.90  * 3405.60  *
* Top Width (ft)         *  872.42  * Top Width (ft)         *  154.35  *  134.50  *  583.56  *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *    2.51  *    7.34  *    1.93  *
* Max Chl Dpth (ft)      *   27.55  * Hydr. Depth (ft)       *   15.92  *   23.99  *   11.19  *
* Conv. Total (cfs)      *1213626.0  * Conv. (cfs)           *224754.4  *864604.6  *124267.0  *
* Length Wtd. (ft)       *  587.69  * Wetted Per. (ft)       *  160.92  *  138.36  *  158.82  *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.72  *    1.09  *    0.52  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    1.79  *    8.03  *    1.01  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   * 9690.51  *16554.83  *11509.51  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1102.37  *  616.28  * 1439.87  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  815.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  814.60  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  801.45  * Flow Area (sq ft)      * 2865.53  * 3576.05  * 2174.21  *
* E.G. Slope (ft/ft)     *0.000693  * Area (sq ft)           * 2865.53  * 3576.05  * 4103.91  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 7486.29  *26977.55  * 4636.16  *
* Top Width (ft)         * 1152.12  * Top Width (ft)         *  162.33  *  134.50  *  855.29  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    2.61  *    7.54  *    2.13  *
* Max Chl Dpth (ft)      *   30.15  * Hydr. Depth (ft)       *   17.65  *   26.59  *   13.79  *
* Conv. Total (cfs)      *1485007.0  * Conv. (cfs)           *284327.3  *1024600.0  *176079.9  *
* Length Wtd. (ft)       *  586.85  * Wetted Per. (ft)       *  169.74  *  138.36  *  158.82  *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.73  *    1.12  *    0.59  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    1.91  *    8.44  *    1.26  *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   *12329.44  *17697.78  *14847.79  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1290.58  *  617.22  * 1858.29  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  818.70  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  818.04  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  802.82  * Flow Area (sq ft)      * 3479.08  * 4038.51  * 2716.21  *
* E.G. Slope (ft/ft)     *0.000627  * Area (sq ft)           * 3479.08  * 4038.51  * 7263.40  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 9247.77  *31362.18  * 6390.05  *
* Top Width (ft)         * 1286.54  * Top Width (ft)         *  196.10  *  134.50  *  955.93  *
* Vel Total (ft/s)       *    4.59  * Avg. Vel. (ft/s)       *    2.66  *    7.77  *    2.35  *
* Max Chl Dpth (ft)      *   33.59  * Hydr. Depth (ft)       *   17.74  *   30.03  *   17.23  *
* Conv. Total (cfs)      *1876746.0  * Conv. (cfs)            *369270.3  *1252316.0  *255159.7  *
* Length Wtd. (ft)       *  585.96  * Wetted Per. (ft)       *  205.47  *  138.36  *  158.82  *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.66  *    1.14  *    0.67  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    1.76  *    8.87  *    1.58  *
* Frctn Loss (ft)        *    0.59  * Cum Volume (acre-ft)   *17404.72  *19412.01  *20755.27  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1568.69  *  619.75  * 2266.60  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  806.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.100  *   0.045  *   0.105  *
* W.S. Elev (ft)         *  806.17  * Reach Len. (ft)        *  590.40  *  594.60  *  531.32  *
* Crit W.S. (ft)         *  797.08  * Flow Area (sq ft)      * 1585.43  * 2441.73  *  888.84  *
* E.G. Slope (ft/ft)     *0.000865  * Area (sq ft)           * 1585.43  * 2441.73  *  888.84  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 3342.87  *16089.42  * 1267.71  *
* Top Width (ft)         *  418.77  * Top Width (ft)         *  144.71  *  134.50  *  139.55  *
* Vel Total (ft/s)       *    4.21  * Avg. Vel. (ft/s)       *    2.11  *    6.59  *    1.43  *
* Max Chl Dpth (ft)      *   21.72  * Hydr. Depth (ft)       *   10.96  *   18.15  *    6.37  *
* Conv. Total (cfs)      *703679.8  * Conv. (cfs)            *113638.3  *546946.8  * 43094.8  *
* Length Wtd. (ft)       *  590.07  * Wetted Per. (ft)       *  149.65  *  138.36  *  140.16  *
* Min Ch El (ft)         *  784.45  * Shear (lb/sq ft)       *    0.57  *    0.95  *    0.34  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    1.21  *    6.28  *    0.49  *
* Frctn Loss (ft)        *    0.84  * Cum Volume (acre-ft)   * 4932.58  *13044.94  * 5692.87  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  575.53  *  591.31  *  655.23  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 23.689

INPUT
Description:
Station Elevation Data    num=     141
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  855.33   36.78  852.35   46.38  851.79    76.6  849.59    89.3  848.76
  112.71  846.92  136.98  845.74  147.31  845.05  175.73  843.55  181.26  843.19
  187.62  842.94  218.72  841.05  225.91  840.84  240.33  839.74  256.08  838.21
  259.79  837.11  296.61  825.84  297.28  825.54  298.34  825.42  320.59  820.11
   322.3  820.14  331.99  821.08  376.39  824.12  378.57  824.37  387.15  825.51
  390.97   825.5  392.32   825.5  397.13  824.88  415.25  822.01  433.67  807.05
  441.61   800.6  442.81  799.64  443.86  798.97  462.37  787.06  478.52  782.78
  511.33  787.06  520.45  791.29   522.1   792.2  533.96  792.84  551.14  793.78
   581.2  795.32  591.36  796.04  601.08  796.44  606.81  796.59  622.85  796.89
   660.4  797.53  678.36  796.81  704.53  796.71  747.02   796.4  779.52  795.74
  820.38  795.04  833.71   795.8  850.82  796.75  879.09  798.34  884.94  800.36
  892.83  802.95  916.88  812.25  933.74  812.33  946.05  811.72  953.64  811.64
  988.43  811.18 1011.51  812.17 1067.09   812.2 1099.39  812.12 1171.18  812.18
 1185.89  811.74 1200.58   811.6 1238.42  811.55 1240.25  811.66 1243.67   811.8
 1248.61  811.72 1285.07  811.59 1288.02  811.49 1291.88  811.65 1296.03   811.7
```

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 1334.25  812.16  1342.9  811.87 1351.17   810.9    1353  810.49 1354.03  810.29
 1364.59   807.4 1382.35  802.52 1384.13  802.06 1385.62  801.62 1387.58  801.59
 1389.25  801.59 1456.88  800.64  1464.3  800.82 1471.81  800.64 1478.75  800.43
 1493.72  800.33 1498.99  800.33 1510.81  799.37 1518.02   799.1 1528.77  799.32
 1534.84  799.43 1550.41  799.56 1556.03  799.66 1568.43  799.71 1594.59  801.56
 1600.01  801.65 1622.02  805.19 1631.62  806.65 1651.81  808.25  1660.4  809.07
 1682.97  812.38 1685.96  812.37 1713.75   812.2 1748.02  812.38 1775.64  812.47
 1790.85  812.72 1830.37  813.68    1861  814.21 1891.67  814.91 1904.06  817.28
 1914.03  819.56 1915.88  819.97  1917.6  819.93 1938.85  819.51  1964.3  824.15
 1973.89  826.01 1986.17  830.75 1997.63  835.87 2003.82  837.01 2010.14  837.93
 2017.04  840.23 2031.78  842.58 2033.91  842.78 2038.04  843.91 2049.99  846.87
 2062.25  851.61 2063.49  852.23 2065.27  852.49 2099.81  856.63 2125.79  859.77
 2135.01  860.97  2144.9  862.38 2155.34  863.75 2212.16  867.83 2215.27  868.13
 2257.86  870.75

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0      .1  443.86     .04   522.1    .105  933.74      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        443.86  591.36           657.87  787.03  564.45             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  657.44 2257.86     820       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  796.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.             *          *   0.042  *          *
* W.S. Elev (ft)         *  795.86  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  793.47  * Flow Area (sq ft)      *          *  787.99  *          *
* E.G. Slope (ft/ft)     *0.004075  * Area (sq ft)           *          *  787.99  *   25.27  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)              *          * 6725.00  *          *
* Top Width (ft)         *  201.06  * Top Width (ft)          *          *  140.08  *   60.98  *
* Vel Total (ft/s)       *    8.53  * Avg. Vel. (ft/s)        *          *    8.53  *          *
* Max Chl Dpth (ft)      *   13.08  * Hydr. Depth (ft)        *          *    5.63  *          *
* Conv. Total (cfs)      *105348.8  * Conv. (cfs)             *          *105348.8  *          *
* Length Wtd. (ft)       *  786.03  * Wetted Per. (ft)        *          *  144.77  *          *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)        *          *    1.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   11.82  *          *
* Frctn Loss (ft)        *    1.57  * Cum Volume (acre-ft)    *  837.08  * 6467.78  *  807.08  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)          *  180.78  *  487.97  *  204.20  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  800.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.             *   0.100  *   0.046  *   0.105  *
* W.S. Elev (ft)         *  799.64  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  796.44  * Flow Area (sq ft)      *    0.35  * 1338.27  *  182.42  *
* E.G. Slope (ft/ft)     *0.003654  * Area (sq ft)           *    0.35  * 1338.27  *  916.85  *
* Q Total (cfs)          *12150.00  * Flow (cfs)              *    0.14  *11842.85  *  307.01  *
* Top Width (ft)         *  487.49  * Top Width (ft)          *    1.05  *  147.50  *  338.94  *
* Vel Total (ft/s)       *    7.99  * Avg. Vel. (ft/s)        *    0.39  *    8.85  *    1.68  *
* Max Chl Dpth (ft)      *   16.86  * Hydr. Depth (ft)        *    0.34  *    9.07  *    2.76  *
* Conv. Total (cfs)      *201007.2  * Conv. (cfs)             *     2.3  *195925.8  *  5079.1  *
* Length Wtd. (ft)       *  778.22  * Wetted Per. (ft)        *    1.25  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)        *    0.06  *    1.99  *    0.63  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *    0.02  *   17.64  *    1.06  *
* Frctn Loss (ft)        *    1.60  * Cum Volume (acre-ft)    * 1915.71  * 8609.65  * 1990.00  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)          *  295.07  *  528.25  *  332.85  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
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         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  801.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.100  *   0.046  *   0.105  *
* W.S. Elev (ft)         *  800.55  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  796.93  * Flow Area (sq ft)      *    1.83  * 1472.56  *  242.58  *
* E.G. Slope (ft/ft)     *0.003389  * Area (sq ft)           *    1.83  * 1472.56  * 1252.14  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *    1.22  *13023.26  *  475.52  *
* Top Width (ft)         *  549.41  * Top Width (ft)         *    2.19  *  147.50  *  399.72  *
* Vel Total (ft/s)       *    7.86  * Avg. Vel. (ft/s)       *    0.67  *    8.84  *    1.96  *
* Max Chl Dpth (ft)      *   17.77  * Hydr. Depth (ft)       *    0.83  *    9.98  *    3.67  *
* Conv. Total (cfs)      *231885.0  * Conv. (cfs)            *    20.9  *223696.3  *  8167.8  *
* Length Wtd. (ft)       *  776.27  * Wetted Per. (ft)       *    2.70  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)       *    0.14  *    2.04  *    0.78  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.10  *   18.00  *    1.52  *
* Frctn Loss (ft)        *    1.53  * Cum Volume (acre-ft)   * 2743.34  *10273.58  * 3022.24  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *  352.05  *  556.24  *  440.07  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  805.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.             *   0.100  *   0.048  *   0.105  *
* W.S. Elev (ft)         *  803.81  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  798.99  * Flow Area (sq ft)      *   15.50  * 1953.27  *  457.94  *
* E.G. Slope (ft/ft)     *0.003002  * Area (sq ft)           *   15.50  * 1953.27  * 2891.02  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *   19.82  *18389.87  * 1290.31  *
* Top Width (ft)         *  693.18  * Top Width (ft)         *    6.20  *  147.50  *  539.48  *
* Vel Total (ft/s)       *    8.12  * Avg. Vel. (ft/s)       *    1.28  *    9.41  *    2.82  *
* Max Chl Dpth (ft)      *   21.03  * Hydr. Depth (ft)       *    2.50  *   13.24  *    6.93  *
* Conv. Total (cfs)      *359581.0  * Conv. (cfs)            *   361.8  *335667.5  * 23551.8  *
* Length Wtd. (ft)       *  767.50  * Wetted Per. (ft)       *    7.87  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)       *    0.37  *    2.39  *    1.30  *
* Alpha                  *    1.26  * Stream Power (lb/ft s) *    0.47  *   22.51  *    3.66  *
* Frctn Loss (ft)        *    1.41  * Cum Volume (acre-ft)   * 4139.09  *12093.60  * 4748.14  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *  478.83  *  579.12  *  573.16  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  809.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.41  * Wt. n-Val.             *   0.100  *   0.050  *   0.105  *
* W.S. Elev (ft)         *  807.67  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  800.98  * Flow Area (sq ft)      *   48.59  * 2522.35  *  712.89  *
* E.G. Slope (ft/ft)     *0.002605  * Area (sq ft)           *   48.59  * 2522.35  * 5069.28  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             *   84.49  *25102.19  * 2513.32  *
* Top Width (ft)         *  752.98  * Top Width (ft)         *   10.95  *  147.50  *  594.53  *
* Vel Total (ft/s)       *    8.44  * Avg. Vel. (ft/s)       *    1.74  *    9.95  *    3.53  *
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* Max Chl Dpth (ft)      *   24.89  * Hydr. Depth (ft)       *    4.44  *   17.10  *   10.79  *
* Conv. Total (cfs)      *542768.7  * Conv. (cfs)            *  1655.6  *491865.8  * 49247.3  *
* Length Wtd. (ft)       *  757.78  * Wetted Per. (ft)       *   13.99  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)       *    0.56  *    2.68  *    1.75  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    0.98  *   26.66  *    6.18  *
* Frctn Loss (ft)        *    1.21  * Cum Volume (acre-ft)   * 6883.01  *14843.29  * 8108.63  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *  831.87  *  607.21  * 1012.37  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  811.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *   0.100  *   0.051  *   0.105  *
* W.S. Elev (ft)         *  810.37  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  802.21  * Flow Area (sq ft)      *   82.66  * 2920.78  *  891.38  *
* E.G. Slope (ft/ft)     *0.002322  * Area (sq ft)           *   82.66  * 2920.78  * 6736.10  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *  161.86  *29654.37  * 3443.77  *
* Top Width (ft)         *  798.07  * Top Width (ft)         *   14.28  *  147.50  *  636.29  *
* Vel Total (ft/s)       *    8.54  * Avg. Vel. (ft/s)       *    1.96  *   10.15  *    3.86  *
* Max Chl Dpth (ft)      *   27.59  * Hydr. Depth (ft)       *    5.79  *   19.80  *   13.49  *
* Conv. Total (cfs)      *690251.3  * Conv. (cfs)            *  3359.1  *615422.9  * 71469.3  *
* Length Wtd. (ft)       *  752.58  * Wetted Per. (ft)       *   18.28  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)       *    0.66  *    2.77  *    1.95  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    1.28  *   28.07  *    7.55  *
* Frctn Loss (ft)        *    1.07  * Cum Volume (acre-ft)   * 9673.30  *16512.88  *11455.54  *
* C & E Loss (ft)        *    0.26  * Cum SA (acres)         * 1101.23  *  614.35  * 1432.43  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  814.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.51  * Wt. n-Val.             *   0.100  *   0.051  *   0.105  *
* W.S. Elev (ft)         *  812.98  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  803.41  * Flow Area (sq ft)      *  124.21  * 3306.52  * 1064.20  *
* E.G. Slope (ft/ft)     *0.002129  * Area (sq ft)           *  124.21  * 3306.52  * 8979.52  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *  266.59  *34402.73  * 4430.68  *
* Top Width (ft)         * 1375.37  * Top Width (ft)         *   17.50  *  147.50  * 1210.38  *
* Vel Total (ft/s)       *    8.70  * Avg. Vel. (ft/s)       *    2.15  *   10.40  *    4.16  *
* Max Chl Dpth (ft)      *   30.20  * Hydr. Depth (ft)       *    7.10  *   22.42  *   16.10  *
* Conv. Total (cfs)      *847401.7  * Conv. (cfs)            *  5777.7  *745599.3  * 96024.8  *
* Length Wtd. (ft)       *  748.58  * Wetted Per. (ft)       *   22.43  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)       *    0.74  *    2.87  *    2.14  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    1.58  *   29.86  *    8.91  *
* Frctn Loss (ft)        *    0.97  * Cum Volume (acre-ft)   *12309.18  *17650.81  *14768.00  *
* C & E Loss (ft)        *    0.28  * Cum SA (acres)         * 1289.36  *  615.30  * 1845.69  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
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CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  818.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.             *   0.100  *   0.052  *   0.105  *
* W.S. Elev (ft)         *  816.44  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  804.88  * Flow Area (sq ft)      *  192.01  * 3816.14  * 1292.50  *
* E.G. Slope (ft/ft)     *0.001908  * Area (sq ft)           *  192.01  * 3816.14  *13390.53  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *  450.89  *40749.48  * 5799.62  *
* Top Width (ft)         * 1477.56  * Top Width (ft)         *   21.75  *  147.50  * 1308.31  *
* Vel Total (ft/s)       *    8.87  * Avg. Vel. (ft/s)       *    2.35  *   10.68  *    4.49  *
* Max Chl Dpth (ft)      *   33.66  * Hydr. Depth (ft)       *    8.83  *   25.87  *   19.56  *
* Conv. Total (cfs)      *1075882.0  * Conv. (cfs)            * 10321.4  *932800.9  *132759.8  *
* Length Wtd. (ft)       *  743.52  * Wetted Per. (ft)       *   27.91  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)       *    0.82  *    2.97  *    2.33  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    1.93  *   31.71  *   10.45  *
* Frctn Loss (ft)        *    0.86  * Cum Volume (acre-ft)   *17379.85  *19358.40  *20629.31  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         * 1567.22  *  617.83  * 2252.79  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  805.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.100  *   0.049  *   0.105  *
* W.S. Elev (ft)         *  804.53  * Reach Len. (ft)        *  657.87  *  787.03  *  564.45  *
* Crit W.S. (ft)         *  799.28  * Flow Area (sq ft)      *   20.27  * 2059.24  *  505.41  *
* E.G. Slope (ft/ft)     *0.002801  * Area (sq ft)           *   20.27  * 2059.24  * 3281.81  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *   27.37  *19203.54  * 1469.09  *
* Top Width (ft)         *  703.00  * Top Width (ft)         *    7.09  *  147.50  *  548.42  *
* Vel Total (ft/s)       *    8.01  * Avg. Vel. (ft/s)       *    1.35  *    9.33  *    2.91  *
* Max Chl Dpth (ft)      *   21.75  * Hydr. Depth (ft)       *    2.86  *   13.96  *    7.65  *
* Conv. Total (cfs)      *391150.6  * Conv. (cfs)            *   517.1  *362873.3  * 27760.2  *
* Length Wtd. (ft)       *  765.36  * Wetted Per. (ft)       *    9.01  *  153.11  *   66.10  *
* Min Ch El (ft)         *  782.78  * Shear (lb/sq ft)       *    0.39  *    2.35  *    1.34  *
* Alpha                  *    1.27  * Stream Power (lb/ft s) *    0.53  *   21.93  *    3.89  *
* Frctn Loss (ft)        *    1.31  * Cum Volume (acre-ft)   * 4921.69  *13014.22  * 5667.43  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *  574.50  *  589.38  *  651.04  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 23.540

INPUT
Description:
Station Elevation Data    num=     160
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  865.59     9.4  866.05   66.63     862   80.59   861.1  108.97  857.97
   165.1  851.79  203.87  845.09  209.56   844.4  211.12  838.53  213.64  830.98
  231.08  820.72  233.39   819.4  234.12  818.91  236.16  819.21  247.12  820.79
  250.16  820.79  252.29  820.79  261.68   818.9  264.51  818.34  264.91  818.26
  267.12  817.96  317.94  811.15  340.76  801.01   356.4  793.85  364.84  793.58
  374.34  793.32  383.31  794.97   389.8  796.19  399.14  796.12   455.2  796.25
  504.78  796.46  520.81  796.49  542.72   796.3  582.39  795.29  587.12  795.16
  593.68  795.25   603.3  795.25  616.14  795.16  647.83  794.68  671.85  794.07
```

```
  686.69   793.8  688.19  793.78  694.83  790.76  704.95  788.22  706.29  787.81
  745.51  787.31  751.68  787.23  762.72  787.05  763.61  786.62  768.41  785.03
  769.04     782  826.11  780.58  829.63  785.03  833.65   790.7  834.89  792.36
   846.2  792.73  866.47   793.4  871.42  793.52  873.44   793.6   876.7  793.67
  881.68  794.43  912.46  798.89  928.41  798.82   969.2  800.83 1000.01  801.84
 1000.75  801.88 1002.91  802.38 1044.09  811.92 1044.94  811.92 1055.44  811.57
 1091.35  809.86 1098.54  809.25  1110.4  808.16 1135.68  805.62 1161.36  800.75
  1166.2  799.86  1169.5  799.75 1223.78  798.78  1266.8  798.37 1279.58  798.32
 1309.68  798.68 1359.93  798.88 1397.52  799.36    1428  799.75 1430.73  799.65
 1449.89  799.91 1511.21  800.59    1538  802.69 1545.29   802.9 1549.92  803.01
 1559.19  804.28 1560.85  804.59    1573  805.81 1580.43  806.44 1587.53  807.05
 1593.07  807.27 1600.99  806.45 1608.21  806.35 1622.16  802.02  1622.4     802
 1623.17  802.01 1658.47  802.53 1673.89   802.8 1681.61  802.83 1687.53  803.11
 1693.59  803.23 1733.91  803.83 1744.77   804.2 1748.05  804.23 1749.55  804.27
 1752.74   804.4 1806.11  806.01 1811.66   806.4 1822.99  806.75  1865.7  807.75
 1871.65   808.2 1877.44  808.17 1882.09  808.33 1887.22  808.47 1906.71  808.37
  1951.6  809.25    1970   809.8 1974.11  810.88 2002.09   819.1 2005.77  819.11
 2008.65  819.15 2026.95  819.42 2030.78  818.36 2036.48  817.68  2052.5  812.11
 2055.94  812.08 2065.01  811.71 2077.68  813.04 2081.83  813.61  2103.4  815.89
 2113.24  817.09 2119.26  817.85 2121.94  818.17 2161.65  827.47 2175.06  830.21
 2176.88  831.22 2188.58  837.41 2189.13  837.48 2190.49  837.79 2204.26  840.22
 2211.74  841.87  2222.2  843.48 2223.53  843.69 2227.76  844.31  2240.5  844.75
 2245.37  845.01 2259.52  845.91 2273.62   846.6 2290.65  847.28 2293.81  847.29
 2301.53  847.41 2306.21  847.46 2306.77  847.48 2307.59  847.55 2323.19   848.7

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  762.72     .04  834.89      .1 1161.36     .06 1397.52      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        686.69  834.89           353.46  466.07  593.48             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0  614.19     820       F
    1050 2323.19     820       F

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)          *  795.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.             *   0.100  *   0.048  *   0.100  *
* W.S. Elev (ft)          *  794.84  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)          *  788.93  * Flow Area (sq ft)      *   25.39  * 1404.33  *   79.74  *
* E.G. Slope (ft/ft)      *0.001179  * Area (sq ft)           *   55.41  * 1404.33  *   79.74  *
* Q Total (cfs)           * 6725.00  * Flow (cfs)             *    8.32  * 6660.94  *   55.75  *
* Top Width (ft)          *  275.52  * Top Width (ft)         *   77.71  *  148.20  *   49.61  *
* Vel Total (ft/s)        *    4.46  * Avg. Vel. (ft/s)       *    0.33  *    4.74  *    0.70  *
* Max Chl Dpth (ft)       *   14.26  * Hydr. Depth (ft)       *    0.51  *    9.48  *    1.61  *
* Conv. Total (cfs)       *195834.8  * Conv. (cfs)            *   242.2  *193969.2  *  1623.4  *
* Length Wtd. (ft)        *  466.56  * Wetted Per. (ft)       *   49.36  *  157.99  *   49.72  *
* Min Ch El (ft)          *  780.58  * Shear (lb/sq ft)       *    0.04  *    0.65  *    0.12  *
* Alpha                   *    1.12  * Stream Power (lb/ft s) *    0.01  *    3.10  *    0.08  *
* Frctn Loss (ft)         *    0.54  * Cum Volume (acre-ft)   *  836.67  * 6447.97  *  806.40  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  180.19  *  485.37  *  203.48  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)          *  799.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.49  * Wt. n-Val.             *   0.100  *   0.050  *   0.100  *
* W.S. Elev (ft)          *  798.53  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)          *  791.09  * Flow Area (sq ft)      *  288.96  * 1951.38  *  309.89  *
* E.G. Slope (ft/ft)      *0.001313  * Area (sq ft)           * 1015.13  * 1951.38  *  315.45  *
* Q Total (cfs)           *12150.00  * Flow (cfs)             *  391.01  *11331.17  *  427.82  *
* Top Width (ft)          *  610.95  * Top Width (ft)         *  340.51  *  148.20  *  122.24  *
* Vel Total (ft/s)        *    4.76  * Avg. Vel. (ft/s)       *    1.35  *    5.81  *    1.38  *
* Max Chl Dpth (ft)       *   17.95  * Hydr. Depth (ft)       *    3.99  *   13.17  *    4.13  *
* Conv. Total (cfs)       *335353.7  * Conv. (cfs)            * 10792.4  *312752.9  * 11808.3  *
* Length Wtd. (ft)        *  467.21  * Wetted Per. (ft)       *   72.51  *  157.99  *   75.46  *
* Min Ch El (ft)          *  780.58  * Shear (lb/sq ft)       *    0.33  *    1.01  *    0.34  *
* Alpha                   *    1.39  * Stream Power (lb/ft s) *    0.44  *    5.88  *    0.46  *
* Frctn Loss (ft)         *    0.55  * Cum Volume (acre-ft)   * 1908.04  * 8579.93  * 1982.02  *
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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  292.49  *  525.58  *  329.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  800.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.100  *   0.051  *   0.100  *
* W.S. Elev (ft)         *  799.49  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)         *  791.56  * Flow Area (sq ft)      *  358.68  * 2093.88  *  398.76  *
* E.G. Slope (ft/ft)     *0.001281  * Area (sq ft)           * 1343.56  * 2093.88  *  547.29  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  553.79  *12438.22  *  507.99  *
* Top Width (ft)         *  821.82  * Top Width (ft)         *  342.61  *  148.20  *  331.01  *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)       *    1.54  *    5.94  *    1.27  *
* Max Chl Dpth (ft)      *   18.91  * Hydr. Depth (ft)       *    4.95  *   14.13  *    3.72  *
* Conv. Total (cfs)      *377172.6  * Conv. (cfs)            * 15472.2  *347507.8  * 14192.6  *
* Length Wtd. (ft)       *  467.12  * Wetted Per. (ft)       *   72.51  *  157.99  *  107.57  *
* Min Ch El (ft)         *  780.58  * Shear (lb/sq ft)       *    0.40  *    1.06  *    0.30  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *    0.61  *    6.30  *    0.38  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 2733.18  *10241.36  * 3010.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  349.44  *  553.57  *  435.33  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  803.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.100  *   0.052  *   0.100  *
* W.S. Elev (ft)         *  802.90  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)         *  793.60  * Flow Area (sq ft)      *  605.54  * 2598.50  *  889.02  *
* E.G. Slope (ft/ft)     *0.001241  * Area (sq ft)           * 2522.93  * 2598.50  * 2241.80  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 1304.81  *16997.54  * 1397.65  *
* Top Width (ft)         * 1127.44  * Top Width (ft)         *  350.18  *  148.20  *  629.07  *
* Vel Total (ft/s)       *    4.81  * Avg. Vel. (ft/s)       *    2.15  *    6.54  *    1.57  *
* Max Chl Dpth (ft)      *   22.32  * Hydr. Depth (ft)       *    8.35  *   17.53  *    5.22  *
* Conv. Total (cfs)      *559158.2  * Conv. (cfs)            * 37035.2  *482452.6  * 39670.4  *
* Length Wtd. (ft)       *  468.90  * Wetted Per. (ft)       *   72.51  *  157.99  *  170.83  *
* Min Ch El (ft)         *  780.58  * Shear (lb/sq ft)       *    0.65  *    1.27  *    0.40  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    1.39  *    8.34  *    0.63  *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)   * 4119.92  *12052.48  * 4714.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  476.14  *  576.45  *  565.59  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  807.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.100  *   0.053  *   0.100  *
* W.S. Elev (ft)         *  807.03  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)         *  796.19  * Flow Area (sq ft)      *  905.20  * 3211.05  * 1629.59  *
* E.G. Slope (ft/ft)     *0.001077  * Area (sq ft)           * 3989.54  * 3211.05  * 5393.68  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 2375.67  *21984.28  * 3340.06  *
* Top Width (ft)         * 1400.98  * Top Width (ft)         *  359.48  *  148.20  *  893.30  *
* Vel Total (ft/s)       *    4.82  * Avg. Vel. (ft/s)       *    2.62  *    6.85  *    2.05  *
* Max Chl Dpth (ft)      *   26.45  * Hydr. Depth (ft)       *   12.49  *   21.67  *    8.66  *
* Conv. Total (cfs)      *843950.0  * Conv. (cfs)            * 72380.6  *669806.1  *101763.3  *
* Length Wtd. (ft)       *  472.48  * Wetted Per. (ft)       *   72.51  *  157.99  *  189.15  *
* Min Ch El (ft)         *  780.58  * Shear (lb/sq ft)       *    0.84  *    1.37  *    0.58  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *    2.20  *    9.36  *    1.19  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 6852.52  *14791.50  * 8040.84  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  829.08  *  604.54  * 1002.73  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  810.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.100  *   0.054  *   0.100  *
* W.S. Elev (ft)         *  809.91  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)         *  797.46  * Flow Area (sq ft)      * 1113.78  * 3637.43  * 2188.60  *
* E.G. Slope (ft/ft)     *0.000955  * Area (sq ft)           * 5033.07  * 3637.43  * 8246.26  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 3160.58  *25176.32  * 4923.10  *
* Top Width (ft)         * 1594.71  * Top Width (ft)         *  365.95  *  148.20  * 1080.56  *
* Vel Total (ft/s)       *    4.79  * Avg. Vel. (ft/s)       *    2.84  *    6.92  *    2.25  *
* Max Chl Dpth (ft)      *   29.33  * Hydr. Depth (ft)       *   15.36  *   24.54  *   10.92  *
* Conv. Total (cfs)      *1076145.0  * Conv. (cfs)           *102262.4  *814593.5  *159289.4  *
* Length Wtd. (ft)       *  474.49  * Wetted Per. (ft)       *   72.51  *  157.99  *  201.90  *
* Min Ch El (ft)         *  780.58  * Shear (lb/sq ft)       *    0.92  *    1.37  *    0.65  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    2.60  *    9.50  *    1.45  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 9634.66  *16453.64  *11358.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1098.36  *  611.68  * 1421.30  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  813.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.100  *   0.054  *   0.100  *
* W.S. Elev (ft)         *  812.65  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)         *  798.66  * Flow Area (sq ft)      * 1312.91  * 4044.47  * 2759.20  *
* E.G. Slope (ft/ft)     *0.000876  * Area (sq ft)           * 6052.57  * 4044.47  *11333.44  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 3980.35  *28505.04  * 6614.61  *
* Top Width (ft)         * 1696.49  * Top Width (ft)         *  379.97  *  148.20  * 1168.32  *
* Vel Total (ft/s)       *    4.82  * Avg. Vel. (ft/s)       *    3.03  *    7.05  *    2.40  *
* Max Chl Dpth (ft)      *   32.07  * Hydr. Depth (ft)       *   18.11  *   27.29  *   12.83  *
* Conv. Total (cfs)      *1321385.0  * Conv. (cfs)           *134515.8  *963327.9  *223540.8  *
* Length Wtd. (ft)       *  476.77  * Wetted Per. (ft)       *   72.51  *  157.99  *  216.73  *
* Min Ch El (ft)         *  780.58  * Shear (lb/sq ft)       *    0.99  *    1.40  *    0.70  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    3.00  *    9.86  *    1.67  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *12262.54  *17584.40  *14636.39  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1286.36  *  612.63  * 1830.28  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  816.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.100  *   0.055  *   0.100  *
* W.S. Elev (ft)         *  816.28  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
* Crit W.S. (ft)         *  800.23  * Flow Area (sq ft)      * 1575.70  * 4581.64  * 3538.89  *
* E.G. Slope (ft/ft)     *0.000768  * Area (sq ft)           * 7478.85  * 4581.64  *15667.89  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 5053.98  *32564.02  * 9382.01  *
* Top Width (ft)         * 1778.89  * Top Width (ft)         *  407.02  *  148.20  * 1223.67  *
* Vel Total (ft/s)       *    4.85  * Avg. Vel. (ft/s)       *    3.21  *    7.11  *    2.65  *
* Max Chl Dpth (ft)      *   35.70  * Hydr. Depth (ft)       *   21.73  *   30.92  *   16.45  *
* Conv. Total (cfs)      *1695509.0  * Conv. (cfs)           *182320.5  *1174736.0  *338452.6  *
* Length Wtd. (ft)       *  480.75  * Wetted Per. (ft)       *   72.51  *  157.99  *  216.73  *
* Min Ch El (ft)         *  780.58  * Shear (lb/sq ft)       *    1.04  *    1.39  *    0.78  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *    3.34  *    9.89  *    2.08  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *17321.92  *19282.53  *20441.04  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1563.98  *  615.16  * 2236.39  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  804.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.100  *   0.052  *   0.100  *
* W.S. Elev (ft)         *  803.72  * Reach Len. (ft)        *  353.46  *  466.07  *  593.48  *
```

```
* Crit W.S. (ft)         *  793.97  * Flow Area (sq ft)      *  664.93  * 2719.92  * 1029.95  *
* E.G. Slope (ft/ft)     *0.001148  * Area (sq ft)           * 2810.58  * 2719.92  * 2781.38  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 1466.80  *17539.21  * 1693.99  *
* Top Width (ft)         * 1192.91  * Top Width (ft)         *  352.02  *  148.20  *  692.69  *
* Vel Total (ft/s)       *    4.69  * Avg. Vel. (ft/s)       *    2.21  *    6.45  *    1.64  *
* Max Chl Dpth (ft)      *   23.14  * Hydr. Depth (ft)       *    9.17  *   18.35  *    5.93  *
* Conv. Total (cfs)      *610865.3  * Conv. (cfs)            * 43285.7  *517589.1  * 49990.4  *
* Length Wtd. (ft)       *  469.63  * Wetted Per. (ft)       *   72.51  *  157.99  *  174.46  *
* Min Ch El (ft)         *  780.58  * Shear (lb/sq ft)       *    0.66  *    1.23  *    0.42  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    1.45  *    7.96  *    0.70  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   * 4900.32  *12971.04  * 5628.15  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  571.79  *  586.71  *  643.00  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 23.452

INPUT
Description:
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  851.79   23.65  851.79   38.38  850.09  116.59  838.09  131.36  834.41
  160.37  827.17  165.84  825.88  191.09  823.13   207.3  821.36  328.43  802.88
  394.66   793.5  440.14   794.2  458.49  794.48   484.1  794.28     510     788
     520     780     550  779.01     580     780     590     788  615.97  793.88
  683.25  793.81  700.64  793.99  731.84  796.02  772.35  798.25  875.49  803.94
  924.79  806.65  953.78  808.61  996.98  809.65 1045.63  811.71  1063.3  811.16
 1131.11  811.39 1131.36   811.4 1131.51   811.4 1268.31  806.27 1302.92  807.27
    1340  807.97  1495.2  810.76 1501.88  810.79 1570.54  810.54 1667.72  811.82
 1731.97  812.24 1781.91  812.96 1821.73  813.61 1883.86  815.08 1895.28  815.27
 1960.88  816.44 1974.45  816.67 1977.73  816.73 2055.82  817.77 2074.81  818.21
 2121.89  823.33 2286.15  840.96 2370.68  853.64 2394.74  853.24  2398.6  853.32

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1   484.1     .04  615.97     .09    1340      .1 1667.72     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          484.1  615.97           870.79  884.23  621.18             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1045.33  2398.6  817.38       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  794.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  794.19  * Reach Len. (ft)        *  870.79  *  884.23  *  621.18  *
* Crit W.S. (ft)         *  786.54  * Flow Area (sq ft)      *   17.20  * 1248.44  *   28.65  *
* E.G. Slope (ft/ft)     *0.001117  * Area (sq ft)           *   17.20  * 1248.44  *   28.65  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *    4.20  * 6713.30  *    7.50  *
* Top Width (ft)         *  269.03  * Top Width (ft)         *   49.77  *  131.50  *   87.76  *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)       *    0.24  *    5.38  *    0.26  *
* Max Chl Dpth (ft)      *   15.18  * Hydr. Depth (ft)       *    0.35  *    9.49  *    0.33  *
* Conv. Total (cfs)      *201176.8  * Conv. (cfs)            *   125.7  *200826.9  *   224.2  *
* Length Wtd. (ft)       *  875.26  * Wetted Per. (ft)       *   49.83  *  138.55  *   87.77  *
* Min Ch El (ft)         *  779.01  * Shear (lb/sq ft)       *    0.02  *    0.63  *    0.02  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.01  *    3.38  *    0.01  *
* Frctn Loss (ft)        *    1.10  * Cum Volume (acre-ft)   *  836.37  * 6433.78  *  805.66  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  179.68  *  483.87  *  202.55  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	798.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	797.86	Reach Len. (ft)	870.79	884.23	621.18
Crit W.S. (ft)	789.96	Flow Area (sq ft)	403.77	1732.89	459.53
E.G. Slope (ft/ft)	0.001046	Area (sq ft)	403.77	1732.89	459.53
Q Total (cfs)	12150.00	Flow (cfs)	434.29	11197.01	518.70
Top Width (ft)	401.51	Top Width (ft)	120.26	131.87	149.38
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)	1.08	6.46	1.13
Max Chl Dpth (ft)	18.85	Hydr. Depth (ft)	3.36	13.14	3.08
Conv. Total (cfs)	375701.8	Conv. (cfs)	13429.2	346233.3	16039.2
Length Wtd. (ft)	856.87	Wetted Per. (ft)	120.57	138.92	149.50
Min Ch El (ft)	779.01	Shear (lb/sq ft)	0.22	0.81	0.20
Alpha	1.76	Stream Power (lb/ft s)	0.24	5.26	0.23
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)	1902.29	8560.22	1976.74
C & E Loss (ft)	0.05	Cum SA (acres)	290.62	524.08	328.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	799.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	798.89	Reach Len. (ft)	870.79	884.23	621.18
Crit W.S. (ft)	790.70	Flow Area (sq ft)	530.69	1868.00	622.11
E.G. Slope (ft/ft)	0.000953	Area (sq ft)	530.69	1868.00	622.11
Q Total (cfs)	13500.00	Flow (cfs)	628.63	12112.80	758.57
Top Width (ft)	427.33	Top Width (ft)	127.49	131.87	167.97
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)	1.18	6.48	1.22
Max Chl Dpth (ft)	19.88	Hydr. Depth (ft)	4.16	14.17	3.70
Conv. Total (cfs)	437323.4	Conv. (cfs)	20364.1	392386.0	24573.3
Length Wtd. (ft)	852.79	Wetted Per. (ft)	127.88	138.92	168.11
Min Ch El (ft)	779.01	Shear (lb/sq ft)	0.25	0.80	0.22
Alpha	1.90	Stream Power (lb/ft s)	0.29	5.19	0.27
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	2725.58	10220.16	3002.62
C & E Loss (ft)	0.05	Cum SA (acres)	347.54	552.07	431.93

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	803.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	802.38	Reach Len. (ft)	870.79	884.23	621.18
Crit W.S. (ft)	793.44	Flow Area (sq ft)	1019.42	2328.90	1319.90
E.G. Slope (ft/ft)	0.000815	Area (sq ft)	1019.42	2328.90	1319.90
Q Total (cfs)	19700.00	Flow (cfs)	1532.88	16181.54	1985.58
Top Width (ft)	515.36	Top Width (ft)	152.17	131.87	231.32
Vel Total (ft/s)	4.22	Avg. Vel. (ft/s)	1.50	6.95	1.50
Max Chl Dpth (ft)	23.37	Hydr. Depth (ft)	6.70	17.66	5.71
Conv. Total (cfs)	689896.1	Conv. (cfs)	53681.8	566679.1	69535.2
Length Wtd. (ft)	841.81	Wetted Per. (ft)	152.81	138.92	231.57
Min Ch El (ft)	779.01	Shear (lb/sq ft)	0.34	0.85	0.29
Alpha	2.25	Stream Power (lb/ft s)	0.51	5.93	0.44
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	4105.55	12026.12	4690.62
C & E Loss (ft)	0.05	Cum SA (acres)	474.10	574.95	559.73

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	807.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.100	0.040	0.090
W.S. Elev (ft)	806.63	Reach Len. (ft)	870.79	884.23	621.18
Crit W.S. (ft)	796.60	Flow Area (sq ft)	1726.44	2889.41	2467.12
E.G. Slope (ft/ft)	0.000646	Area (sq ft)	1726.44	2889.41	2471.20
Q Total (cfs)	27700.00	Flow (cfs)	2930.10	20633.23	4136.67
Top Width (ft)	643.06	Top Width (ft)	180.28	131.87	330.91

```
* Vel Total (ft/s)       *    3.91  * Avg. Vel. (ft/s)       *    1.70  *    7.14  *    1.68  *
* Max Chl Dpth (ft)      *   27.62  * Hydr. Depth (ft)       *    9.58  *   21.91  *    8.00  *
* Conv. Total (cfs)      *1089802.0  * Conv. (cfs)           *115279.0  *811773.6  *162749.2  *
* Length Wtd. (ft)       *  831.90  * Wetted Per. (ft)       *  181.24  *  138.92  *  308.90  *
* Min Ch El (ft)         *  779.01  * Shear (lb/sq ft)       *    0.38  *    0.84  *    0.32  *
* Alpha                  *    2.53  * Stream Power (lb/ft s) *    0.65  *    5.99  *    0.54  *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   * 6829.33  *14758.86  * 7987.27  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  826.89  *  603.04  *  994.39  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  810.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  809.58  * Reach Len. (ft)        *  870.79  *  884.23  *  621.18  *
* Crit W.S. (ft)         *  797.97  * Flow Area (sq ft)      * 2286.04  * 3277.93  * 3453.12  *
* E.G. Slope (ft/ft)     *0.000547  * Area (sq ft)           * 2286.04  * 3277.93  * 3841.52  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 4019.68  *23421.26  * 5819.06  *
* Top Width (ft)         *  959.23  * Top Width (ft)         *  199.59  *  131.87  *  627.76  *
* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *    1.76  *    7.15  *    1.69  *
* Max Chl Dpth (ft)      *   30.57  * Hydr. Depth (ft)       *   11.45  *   24.86  *    9.13  *
* Conv. Total (cfs)      *1422539.0  * Conv. (cfs)           *171922.8  *1001733.0  *248882.8  *
* Length Wtd. (ft)       *  826.94  * Wetted Per. (ft)       *  200.77  *  138.92  *  378.59  *
* Min Ch El (ft)         *  779.01  * Shear (lb/sq ft)       *    0.39  *    0.81  *    0.31  *
* Alpha                  *    2.71  * Stream Power (lb/ft s) *    0.68  *    5.75  *    0.52  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   * 9604.97  *16416.64  *11276.13  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1096.06  *  610.18  * 1409.67  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  812.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  812.39  * Reach Len. (ft)        *  870.79  *  884.23  *  621.18  *
* Crit W.S. (ft)         *  799.16  * Flow Area (sq ft)      * 2873.30  * 3648.80  * 4607.73  *
* E.G. Slope (ft/ft)     *0.000469  * Area (sq ft)           * 2873.30  * 3648.80  * 6301.20  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 5139.03  *25948.01  * 8012.96  *
* Top Width (ft)         * 1476.55  * Top Width (ft)         *  218.03  *  131.87  * 1126.65  *
* Vel Total (ft/s)       *    3.51  * Avg. Vel. (ft/s)       *    1.79  *    7.11  *    1.74  *
* Max Chl Dpth (ft)      *   33.38  * Hydr. Depth (ft)       *   13.18  *   27.67  *   10.73  *
* Conv. Total (cfs)      *1804714.0  * Conv. (cfs)           *237199.0  *1197666.0  *369849.1  *
* Length Wtd. (ft)       *  821.90  * Wetted Per. (ft)       *  219.42  *  138.92  *  429.84  *
* Min Ch El (ft)         *  779.01  * Shear (lb/sq ft)       *    0.38  *    0.77  *    0.31  *
* Alpha                  *    2.80  * Stream Power (lb/ft s) *    0.69  *    5.47  *    0.55  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *12226.32  *17543.24  *14516.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1283.93  *  611.13  * 1814.64  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  816.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  816.10  * Reach Len. (ft)        *  870.79  *  884.23  *  621.18  *
* Crit W.S. (ft)         *  800.58  * Flow Area (sq ft)      * 3727.41  * 4138.10  * 6200.87  *
* E.G. Slope (ft/ft)     *0.000376  * Area (sq ft)           * 3727.41  * 4138.10  *10867.96  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 6609.12  *28631.38  *11759.50  *
* Top Width (ft)         * 1700.29  * Top Width (ft)         *  242.35  *  131.87  * 1326.07  *
* Vel Total (ft/s)       *    3.34  * Avg. Vel. (ft/s)       *    1.77  *    6.92  *    1.90  *
* Max Chl Dpth (ft)      *   37.09  * Hydr. Depth (ft)       *   15.38  *   31.38  *   14.44  *
* Conv. Total (cfs)      *2424805.0  * Conv. (cfs)           *340974.8  *1477139.0  *606691.6  *
* Length Wtd. (ft)       *  814.65  * Wetted Per. (ft)       *  244.02  *  138.92  *  429.84  *
* Min Ch El (ft)         *  779.01  * Shear (lb/sq ft)       *    0.36  *    0.70  *    0.34  *
* Alpha                  *    2.73  * Stream Power (lb/ft s) *    0.64  *    4.83  *    0.64  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *17276.46  *19235.88  *20260.27  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1561.34  *  613.66  * 2219.02  *
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*****************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

```
*****************************************************************************************
* E.G. Elev (ft)         *  803.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  803.26  * Reach Len. (ft)        *  870.79  *  884.23  *  621.18  *
* Crit W.S. (ft)         *  794.15  * Flow Area (sq ft)      * 1154.62  * 2443.77  * 1528.28  *
* E.G. Slope (ft/ft)     *0.000735  * Area (sq ft)           * 1154.62  * 2443.77  * 1528.28  *
* Q Total (cfs)          *20700.00  * Flow (cfs)              * 1745.88  *16650.45  * 2303.68  *
* Top Width (ft)         *  537.11  * Top Width (ft)          *  158.13  *  131.87  *  247.11  *
* Vel Total (ft/s)       *    4.04  * Avg. Vel. (ft/s)       *    1.51  *    6.81  *    1.51  *
* Max Chl Dpth (ft)      *   24.25  * Hydr. Depth (ft)       *    7.30  *   18.53  *    6.18  *
* Conv. Total (cfs)      *763363.0  * Conv. (cfs)            * 64383.4  *614025.9  * 84953.7  *
* Length Wtd. (ft)       *  839.51  * Wetted Per. (ft)       *  158.83  *  138.92  *  247.38  *
* Min Ch El (ft)         *  779.01  * Shear (lb/sq ft)       *    0.33  *    0.81  *    0.28  *
* Alpha                  *    2.32  * Stream Power (lb/ft s) *    0.50  *    5.50  *    0.43  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   * 4884.23  *12943.42  * 5598.79  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  569.72  *  585.21  *  636.60  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 23.284

INPUT
Description:
Station Elevation Data num= 216

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	852.29	6.59	852.22	24.76	852.36	51.69	851.29	71.55	850.57
86.89	849.49	93.7	848.77	101.31	847.82	121.42	845.9	130.44	845.13
157.47	841.08	162.47	840.93	164.19	840.95	166.94	840.88	191.73	841.27
203.81	841.73	209.1	841.29	222.56	841.43	226.41	841.09	240.61	839.32
251.73	838.18	262.43	837.41	302.27	834.31	311.71	833.61	324.27	831.84
358.36	828.24	385.25	825.78	407.2	823.59	426.66	821.56	450.18	818.96
503.31	816.52	530.59	814.5	541.28	810.68	547.69	808.47	565.66	811.28
569.7	811.79	573.7	811.97	602.2	813.19	605.26	813.19	607.37	813.19
616.87	810.99	619.28	810.44	645.22	802.9	653.54	800.52	662.53	799.19
678.88	796.77	688.69	795.34	691.48	795.05	692.82	794.99	699.34	794.83
739.08	793.76	752.48	791.88	754.55	791.59	759.03	790.74	760.8	790.18
767.04	788.2	767.79	785.72	769.85	782.18	773.47	782.18	796	781.23
817.56	782.18	831.91	783.01	837.81	784.3	839.76	784.76	853.26	785.36
860.46	785.69	863.63	785.75	877.18	788.74	888.26	791.04	892.86	791.85
929.26	791.04	937.02	790.96	964.63	790.64	976.98	790.56	992.16	790.95
993.93	790.94	994.14	790.94	997.35	791.05	1008.61	791.23	1014.41	791.58
1024.1	791.82	1026.36	791.61	1029.79	790.82	1041.08	788.79	1050.99	786.95
1062.34	789.17	1072.06	790.69	1080.56	792.81	1116.89	793.27	1133.11	793.49
1139.75	793.51	1150.77	793.7	1153.59	793.68	1159.25	793.62	1178.24	793.47
1207.03	793.43	1218.53	794.8	1230.72	796.24	1238.24	795.75	1254.52	794.92
1263.62	794.36	1266.91	794.17	1285.95	793.59	1289.92	793.62	1320.38	793.83
1379.34	794.27	1410.54	794.53	1453.97	794.76	1482.61	794.48	1499.89	794.41
1549.36	794.36	1552.13	794.36	1565.88	794.28	1609.38	794.46	1611.03	794.55
1612.56	794.43	1614.84	794.47	1617.31	794.53	1621.1	794.65	1658.12	795.59
1662.76	796.02	1703.12	796.75	1717.93	797.26	1724.18	796.83	1744.95	796.99
1759.3	797.2	1765.35	796.65	1810.47	795.41	1857.5	796.01	1873.47	796.03
1938.7	794.75	1946.01	794.6	1953.83	792.76	1957.51	792.22	1988.54	792.22
2029.25	792.22	2030.17	792.22	2040.92	793.29	2041.38	793.36	2042.61	793.42
2080.52	794.27	2092.12	797.64	2112.51	803.24	2113	803.34	2131.82	798.34
2142.45	796.83	2162.09	803.35	2180.93	808.89	2191.08	808.77	2195.33	808.71
2204.03	808.31	2229.61	807.06	2229.65	807.05	2229.75	807.03	2248.5	803.56
2252.95	802.55	2259.51	800.39	2269.43	801.07	2277.45	801.22	2291.83	802.62
2298.9	803.07	2319.74	805.33	2319.76	805.33	2319.8	805.34	2341.04	809.67
2359.4	810.55	2372.24	811.25	2394.81	813.14	2419.68	812.86	2460.1	812.44
2462.9	812.42	2466.68	812.6	2487.18	804.96	2491.04	802.89	2497.33	801.6
2500.4	800.87	2505.64	798.41	2507.79	797.97	2517.54	798.34	2535.61	807.38
2544.89	812.9	2551.56	813.72	2572.81	815.49	2623.86	820.15	2626.74	820.36
2631.18	820.94	2634.1	820.91	2638.87	820.86	2654.17	820.69	2657.03	820.49

```
 2663.79  820.22 2698.29   831.5 2703.48  833.23 2711.43  834.01 2749.22  837.54
 2774.98  840.37 2792.65  841.79 2803.18  842.44 2820.13  843.42 2840.14  844.73
 2845.29  844.78 2859.75  846.01 2865.82  846.25 2876.32  846.28 2884.46  846.48
 2893.94   846.5 2918.67  847.66 2928.72  847.56 2937.24  847.97 2945.85  847.85
 2957.19  848.54 2976.23  849.96 2981.52  850.25 2988.89  850.44 3011.42  851.26
 3016.67  851.78

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .07  503.31      .1  752.48     .04  892.86      .1 1254.52     .08
 1724.18      .1 2623.86     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        752.48  892.86           425.37  834.04  441.38             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1094 3016.67     820       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  793.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  793.10  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  788.43  * Flow Area (sq ft)      *    5.28  * 1137.70  *  463.26  *
* E.G. Slope (ft/ft)     *0.001421  * Area (sq ft)           *    5.28  * 1137.70  *  533.85  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *    2.11  * 6271.93  *  450.96  *
* Top Width (ft)         *  446.00  * Top Width (ft)         *    8.67  *  140.38  *  296.94  *
* Vel Total (ft/s)       *    4.19  * Avg. Vel. (ft/s)       *    0.40  *    5.51  *    0.97  *
* Max Chl Dpth (ft)      *   11.87  * Hydr. Depth (ft)       *    0.61  *    8.10  *    2.30  *
* Conv. Total (cfs)      *178391.3  * Conv. (cfs)            *    55.9  *166372.9  * 11962.4  *
* Length Wtd. (ft)       *  809.53  * Wetted Per. (ft)       *    8.76  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.05  *    0.69  *    0.20  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *    0.02  *    3.82  *    0.20  *
* Frctn Loss (ft)        *    1.11  * Cum Volume (acre-ft)   *  836.15  * 6409.56  *  801.65  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  179.09  *  481.11  *  199.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  797.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  797.12  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  791.17  * Flow Area (sq ft)      *  203.52  * 1702.78  * 1272.93  *
* E.G. Slope (ft/ft)     *0.000941  * Area (sq ft)           *  203.52  * 1702.78  * 3792.42  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *  178.44  * 9993.65  * 1977.91  *
* Top Width (ft)         * 1404.61  * Top Width (ft)         *   75.98  *  140.38  * 1188.25  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *    0.88  *    5.87  *    1.55  *
* Max Chl Dpth (ft)      *   15.89  * Hydr. Depth (ft)       *    2.68  *   12.13  *    6.33  *
* Conv. Total (cfs)      *396115.5  * Conv. (cfs)            *  5817.6  *325813.8  * 64484.1  *
* Length Wtd. (ft)       *  765.73  * Wetted Per. (ft)       *   76.27  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.16  *    0.69  *    0.37  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    0.14  *    4.03  *    0.57  *
* Frctn Loss (ft)        *    0.83  * Cum Volume (acre-ft)   * 1896.22  * 8525.35  * 1946.42  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  288.66  *  521.32  *  318.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  798.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  798.25  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  792.02  * Flow Area (sq ft)      *  293.77  * 1861.56  * 1500.42  *
* E.G. Slope (ft/ft)     *0.000815  * Area (sq ft)           *  293.77  * 1861.56  * 5159.41  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  287.14  *10791.53  * 2421.34  *
* Top Width (ft)         * 1448.65  * Top Width (ft)         *   83.62  *  140.38  * 1224.65  *
```

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* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *    0.98  *    5.80  *    1.61  *
* Max Chl Dpth (ft)      *   17.02  * Hydr. Depth (ft)       *    3.51  *   13.26  *    7.46  *
* Conv. Total (cfs)      *472878.3  * Conv. (cfs)            * 10057.8  *378005.8  * 84814.7  *
* Length Wtd. (ft)       *  755.51  * Wetted Per. (ft)       *   84.00  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.18  *    0.65  *    0.38  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    0.17  *    3.77  *    0.61  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   * 2717.34  *10182.31  * 2961.39  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  345.43  *  549.31  *  422.00  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  802.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  801.88  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  793.73  * Flow Area (sq ft)      *  638.78  * 2371.10  * 2230.50  *
* E.G. Slope (ft/ft)     *0.000669  * Area (sq ft)           *  638.78  * 2371.10  * 9734.56  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *  821.00  *14631.58  * 4247.41  *
* Top Width (ft)         * 1555.94  * Top Width (ft)         *  103.70  *  140.38  * 1311.85  *
* Vel Total (ft/s)       *    3.76  * Avg. Vel. (ft/s)       *    1.29  *    6.17  *    1.90  *
* Max Chl Dpth (ft)      *   20.65  * Hydr. Depth (ft)       *    6.16  *   16.89  *   11.09  *
* Conv. Total (cfs)      *761717.6  * Conv. (cfs)            * 31744.7  *565742.9  *164230.0  *
* Length Wtd. (ft)       *  731.51  * Wetted Per. (ft)       *  104.44  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.26  *    0.68  *    0.46  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.33  *    4.19  *    0.88  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   * 4088.97  *11978.42  * 4611.80  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  471.54  *  572.19  *  548.73  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  806.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  806.23  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  795.49  * Flow Area (sq ft)      * 1122.45  * 2981.50  * 3105.10  *
* E.G. Slope (ft/ft)     *0.000544  * Area (sq ft)           * 1122.45  * 2981.50  *15697.07  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1726.01  *19326.78  * 6647.21  *
* Top Width (ft)         * 1677.78  * Top Width (ft)         *  118.72  *  140.38  * 1418.68  *
* Vel Total (ft/s)       *    3.84  * Avg. Vel. (ft/s)       *    1.54  *    6.48  *    2.14  *
* Max Chl Dpth (ft)      *   25.00  * Hydr. Depth (ft)       *    9.45  *   21.24  *   15.44  *
* Conv. Total (cfs)      *1187813.0  * Conv. (cfs)            * 74013.8  *828758.4  *285041.2  *
* Length Wtd. (ft)       *  712.32  * Wetted Per. (ft)       *  120.07  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.32  *    0.69  *    0.52  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.49  *    4.50  *    1.12  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 6800.85  *14699.28  * 7857.72  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  823.90  *  600.28  *  981.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  809.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  809.22  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  796.51  * Flow Area (sq ft)      * 1495.87  * 3401.69  * 3707.17  *
* E.G. Slope (ft/ft)     *0.000474  * Area (sq ft)           * 1495.87  * 3401.69  *20064.20  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 2449.26  *22473.90  * 8336.84  *
* Top Width (ft)         * 1785.38  * Top Width (ft)         *  136.03  *  140.38  * 1508.97  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    1.64  *    6.61  *    2.25  *
* Max Chl Dpth (ft)      *   27.99  * Hydr. Depth (ft)       *   11.00  *   24.23  *   18.43  *
* Conv. Total (cfs)      *1527941.0  * Conv. (cfs)            *112517.3  *1032435.0  *382988.4  *
* Length Wtd. (ft)       *  702.20  * Wetted Per. (ft)       *  138.00  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.32  *    0.69  *    0.54  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.53  *    4.56  *    1.22  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 9567.17  *16348.84  *11105.67  *
```

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* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1092.71  *  607.42  * 1394.43  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  812.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  812.05  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  797.46  * Flow Area (sq ft)      * 1933.51  * 3798.66  * 4275.96  *
* E.G. Slope (ft/ft)     *0.000431  * Area (sq ft)           * 1933.51  * 3798.66  *24408.74  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 3245.98  *25766.17  *10087.84  *
* Top Width (ft)         * 1883.04  * Top Width (ft)         *  178.38  *  140.38  * 1564.28  *
* Vel Total (ft/s)       *    3.91  * Avg. Vel. (ft/s)       *    1.68  *    6.78  *    2.36  *
* Max Chl Dpth (ft)      *   30.82  * Hydr. Depth (ft)       *   10.84  *   27.06  *   21.26  *
* Conv. Total (cfs)      *1883138.0  * Conv. (cfs)           *156333.3  *1240953.0  *485851.8  *
* Length Wtd. (ft)       *  695.77  * Wetted Per. (ft)       *  181.38  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.29  *    0.70  *    0.57  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    0.48  *    4.76  *    1.34  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *12178.28  *17467.66  *14297.29  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1279.97  *  608.36  * 1795.46  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  816.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  815.73  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  798.65  * Flow Area (sq ft)      * 2728.05  * 4315.20  * 5016.06  *
* E.G. Slope (ft/ft)     *0.000392  * Area (sq ft)           * 2728.05  * 4315.20  *30469.33  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 4035.82  *30405.04  *12559.14  *
* Top Width (ft)         * 2061.51  * Top Width (ft)         *  238.53  *  140.38  * 1682.60  *
* Vel Total (ft/s)       *    3.90  * Avg. Vel. (ft/s)       *    1.48  *    7.05  *    2.50  *
* Max Chl Dpth (ft)      *   34.50  * Hydr. Depth (ft)       *   11.44  *   30.74  *   24.94  *
* Conv. Total (cfs)      *2372419.0  * Conv. (cfs)           *203715.9  *1534755.0  *633947.9  *
* Length Wtd. (ft)       *  689.87  * Wetted Per. (ft)       *  242.15  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.28  *    0.73  *    0.61  *
* Alpha                  *    2.24  * Stream Power (lb/ft s) *    0.41  *    5.11  *    1.52  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *17211.93  *19150.09  *19965.53  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1556.54  *  610.90  * 2197.57  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  803.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  802.81  * Reach Len. (ft)        *  425.37  *  834.04  *  441.38  *
* Crit W.S. (ft)         *  793.96  * Flow Area (sq ft)      *  736.36  * 2501.15  * 2416.85  *
* E.G. Slope (ft/ft)     *0.000599  * Area (sq ft)           *  736.36  * 2501.15  *10963.21  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *  964.33  *15139.70  * 4595.97  *
* Top Width (ft)         * 1588.91  * Top Width (ft)         *  106.94  *  140.38  * 1341.59  *
* Vel Total (ft/s)       *    3.66  * Avg. Vel. (ft/s)       *    1.31  *    6.05  *    1.90  *
* Max Chl Dpth (ft)      *   21.58  * Hydr. Depth (ft)       *    6.89  *   17.82  *   12.02  *
* Conv. Total (cfs)      *845519.3  * Conv. (cfs)           * 39389.2  *618401.5  *187728.6  *
* Length Wtd. (ft)       *  726.53  * Wetted Per. (ft)       *  107.81  *  145.66  *  202.22  *
* Min Ch El (ft)         *  781.23  * Shear (lb/sq ft)       *    0.26  *    0.64  *    0.45  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.33  *    3.89  *    0.85  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   * 4865.33  *12893.23  * 5509.72  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  567.07  *  582.45  *  625.27  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 23.126

INPUT
Description:
Station Elevation Data num= 187

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	852.36	25.9	849.98	63.56	846.37	129.27	838.64	139.8	837.29
163.86	834.5	177.06	833.17	183.45	832.66	200.39	830.67	220.53	827.8
240.32	825.79	250.88	824.98	261.73	823.75	280.15	821.96	295.46	820.46
303.89	819.59	315.53	818.51	321.24	817.34	324.97	816.96	325.72	817.04
331.18	817.65	345.69	818.01	355	817.5	359.57	816.89	364.47	816.49
373.18	815.6	382.73	814.53	404.85	812.84	409.83	812.48	428.6	811.41
437.02	811.08	453.47	810.54	467.9	810.2	482.59	809.59	501.92	809.31
502.9	809.24	520.98	810.1	539.32	811.07	541.97	811.14	545.67	811.14
547.13	811.13	549.95	810.58	566.5	809.75	569.89	809.5	571.05	809.41
572.4	809.37	586.39	808.79	601.33	807.75	606.75	807.41	612.35	806.93
625.38	804.91	633.73	803.55	644.97	801.78	664.02	798.65	679.71	795.43
683.1	796.29	693.18	795.67	730.2	795.27	752.81	793.9	819.86	793.03
823.16	793.05	843.26	792.99	897.94	792.97	943.57	791.62	953	792.02
965.17	791.39	966.88	791.35	970.06	791.31	972.37	791.32	1024.49	791.58
1062.6	792.04	1072.02	792.29	1099.48	792.49	1111.52	792.39	1143.99	792.25
1161.59	791.72	1179.57	791.59	1212.47	790.77	1232.02	790.23	1236.32	790.17
1250.25	787.51	1254.21	786.88	1263	786.85	1265.13	786.85	1302.04	786.24
1306.58	784.95	1310.66	783.53	1312.8	782.78	1326.3	782.24	1345.48	781.61
1347.28	781.14	1352.55	780.15	1354	779.38	1356	778.57	1357	776.91
1375	776.07	1379	777.37	1389	779.57	1391.47	791.73	1400.52	806.61
1405.38	808.27	1410.78	808.31	1447.75	808.53	1450.66	808.52	1451.55	808.51
1452.02	808.51	1455.63	808.56	1483.45	808.76	1495.08	808.73	1498.44	808.74
1507.24	808.41	1540.21	805.72	1573.77	803.85	1605.92	801.97	1628.64	800.21
1673.25	796.57	1703.41	796.65	1713.63	796.7	1774.29	796.83	1792.33	796.94
1844.91	796.85	1849.09	796.84	1872.68	796.45	1908.92	795.74	1921.02	795.95
1968.17	796.61	2016.53	796.52	2021.55	796.51	2023.46	796.49	2083.24	794.75
2106.72	794.16	2120.4	793.83	2143.67	793.36	2156.77	793.14	2158.51	793.12
2173.83	793.03	2175.1	793.01	2179.9	793.16	2207.87	793.77	2210.16	793.75
2225.64	794.47	2234.79	794.26	2245.76	794.47	2282.82	795.07	2307.95	794.47
2316.56	797.51	2337.23	804.84	2378.22	810.59	2380.99	810.98	2382.24	811.09
2386.39	811.41	2417.08	811.49	2436.68	811.67	2445.37	811.75	2452.93	811.86
2462.56	811.49	2494.82	810.98	2520.17	810.05	2534.81	810.13	2587.2	811.77
2592.4	812.43	2603.77	812.38	2615.2	812.51	2630.83	814.86	2675.27	821.92
2688.2	824.34	2695.63	825.47	2724.98	830.09	2732.19	831.32	2734.09	831.59
2771.3	836.58	2780.4	837.77	2783.95	838.3	2795.49	839.69	2837.81	844.43
2843.17	845.03	2843.8	845.11	2850.95	846.17	2880.64	850.51	2882.58	850.78
2884.92	851.05	2887.69	851.06	2926.27	850.97	2933.32	851.23	2947.38	853.51
2953.91	855.1	2959.59	855.33						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	1302.04	.04	1405.38	.1	1498.44	.07	1713.63	.11
2603.77	.1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1302.04	1405.38	319.31	461.56	557.39	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1114.19	820	F
1448.66	2959.59	820	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	792.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.100	0.040	
W.S. Elev (ft)	791.84	Reach Len. (ft)	319.31	461.56	557.39
Crit W.S. (ft)	786.02	Flow Area (sq ft)	368.10	1014.76	
E.G. Slope (ft/ft)	0.001327	Area (sq ft)	397.92	1014.76	
Q Total (cfs)	6725.00	Flow (cfs)	371.37	6353.63	

```
* Top Width (ft)         *  335.56  * Top Width (ft)         *  246.06  *   89.50  *          *
* Vel Total (ft/s)       *    4.86  * Avg. Vel. (ft/s)       *    1.01  *    6.26  *          *
* Max Chl Dpth (ft)      *   15.77  * Hydr. Depth (ft)       *    2.55  *   11.34  *          *
* Conv. Total (cfs)      *184603.5  * Conv. (cfs)            * 10194.3  *174409.3  *          *
* Length Wtd. (ft)       *  454.66  * Wetted Per. (ft)       *  144.67  *  101.97  *          *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    0.21  *    0.82  *          *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    0.21  *    5.16  *          *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   *  834.18  * 6388.96  *  798.95  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  177.85  *  478.91  *  198.30  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.72  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  796.02  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  789.03  * Flow Area (sq ft)      * 1136.20  * 1394.13  *          *
* E.G. Slope (ft/ft)     *0.001255  * Area (sq ft)           * 2481.08  * 1394.13  *  476.88  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 1983.00  *10167.00  *          *
* Top Width (ft)         * 1015.32  * Top Width (ft)         *  619.67  *   92.04  *  303.61  *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)       *    1.75  *    7.29  *          *
* Max Chl Dpth (ft)      *   19.95  * Hydr. Depth (ft)       *    6.05  *   15.15  *          *
* Conv. Total (cfs)      *342991.8  * Conv. (cfs)            * 55979.6  *287012.2  *          *
* Length Wtd. (ft)       *  442.23  * Wetted Per. (ft)       *  188.18  *  106.86  *          *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    0.47  *    1.02  *          *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    0.83  *    7.45  *          *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 1883.11  * 8495.70  * 1924.79  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  285.26  *  519.09  *  310.92  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  797.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  797.26  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  789.60  * Flow Area (sq ft)      * 1370.47  * 1509.39  *          *
* E.G. Slope (ft/ft)     *0.001132  * Area (sq ft)           * 3263.81  * 1509.39  * 1077.78  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 2574.52  *10925.48  *          *
* Top Width (ft)         * 1375.18  * Top Width (ft)         *  631.27  *   92.80  *  651.12  *
* Vel Total (ft/s)       *    4.69  * Avg. Vel. (ft/s)       *    1.88  *    7.24  *          *
* Max Chl Dpth (ft)      *   21.19  * Hydr. Depth (ft)       *    7.30  *   16.27  *          *
* Conv. Total (cfs)      *401199.8  * Conv. (cfs)            * 76511.0  *324688.9  *          *
* Length Wtd. (ft)       *  442.14  * Wetted Per. (ft)       *  188.18  *  108.32  *          *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    0.51  *    0.99  *          *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    0.97  *    7.13  *          *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 2699.97  *10150.04  * 2929.79  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  341.94  *  547.07  *  412.50  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  801.69  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  800.94  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  792.94  * Flow Area (sq ft)      * 2060.31  * 1854.26  *          *
* E.G. Slope (ft/ft)     *0.001090  * Area (sq ft)           * 5618.03  * 1854.26  * 3570.71  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 4983.06  *14716.94  *          *
* Top Width (ft)         * 1453.92  * Top Width (ft)         *  651.93  *   95.03  *  706.96  *
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* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *    2.42  *    7.94  *          *
* Max Chl Dpth (ft)      *   24.87  * Hydr. Depth (ft)       *   10.97  *   19.51  *          *
* Conv. Total (cfs)      *596760.2  * Conv. (cfs)            *150948.7  *445811.5  *          *
* Length Wtd. (ft)       *  434.71  * Wetted Per. (ft)       *  188.18  *  112.62  *          *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    0.74  *    1.12  *          *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    1.80  *    8.89  *          *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   * 4058.42  *11937.97  * 4544.39  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  467.85  *  569.93  *  538.50  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  806.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  805.34  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  795.14  * Flow Area (sq ft)      * 2887.65  * 2278.69  *          *
* E.G. Slope (ft/ft)     *0.001002  * Area (sq ft)           * 8549.70  * 2278.69  * 6862.16  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 8387.55  *19312.45  *          *
* Top Width (ft)         * 1570.92  * Top Width (ft)         *  679.44  *   97.71  *  793.78  *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)       *    2.90  *    8.48  *          *
* Max Chl Dpth (ft)      *   29.27  * Hydr. Depth (ft)       *   15.37  *   23.32  *          *
* Conv. Total (cfs)      *875036.1  * Conv. (cfs)            *264960.7  *610075.4  *          *
* Length Wtd. (ft)       *  429.17  * Wetted Per. (ft)       *  188.18  *  117.77  *          *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    0.96  *    1.21  *          *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *    2.79  *   10.26  *          *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 6753.63  *14648.92  * 7743.43  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  820.00  *  598.00  *  970.71  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  809.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  808.39  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  796.40  * Flow Area (sq ft)      * 3460.85  * 2583.33  *    1.11  *
* E.G. Slope (ft/ft)     *0.000943  * Area (sq ft)           *10660.27  * 2583.33  * 9381.82  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *11000.12  *22259.80  *    0.08  *
* Top Width (ft)         * 1687.51  * Top Width (ft)         *  709.93  *  103.34  *  874.24  *
* Vel Total (ft/s)       *    5.50  * Avg. Vel. (ft/s)       *    3.18  *    8.62  *    0.07  *
* Max Chl Dpth (ft)      *   32.32  * Hydr. Depth (ft)       *   18.42  *   25.00  *    0.06  *
* Conv. Total (cfs)      *1083355.0  * Conv. (cfs)            *358299.4  *725053.3  *     2.5  *
* Length Wtd. (ft)       *  427.56  * Wetted Per. (ft)       *  188.18  *  124.39  *   19.15  *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    1.08  *    1.22  *    0.00  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    3.44  *   10.53  *    0.00  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 9507.81  *16291.55  *10956.49  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         * 1088.58  *  605.09  * 1382.36  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  812.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  811.24  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  797.63  * Flow Area (sq ft)      * 3995.32  * 2877.35  *  122.52  *
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* E.G. Slope (ft/ft)     *0.000869  * Area (sq ft)           *12871.46  * 2877.35  *12173.87  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *13416.44  *25576.18  *  107.38  *
* Top Width (ft)         * 2042.74  * Top Width (ft)         *  869.03  *  103.34  * 1070.38  *
* Vel Total (ft/s)       *    5.59  * Avg. Vel. (ft/s)       *    3.36  *    8.89  *    0.88  *
* Max Chl Dpth (ft)      *   35.17  * Hydr. Depth (ft)       *   21.27  *   27.84  *    2.83  *
* Conv. Total (cfs)      *1326576.0  * Conv. (cfs)            *455189.9  *867742.5  *  3643.3  *
* Length Wtd. (ft)       *  427.14  * Wetted Per. (ft)       *  188.18  *  124.39  *   43.28  *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    1.15  *    1.25  *    0.15  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    3.87  *   11.15  *    0.13  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *12105.99  *17403.74  *14111.95  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         * 1274.86  *  606.03  * 1782.11  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  815.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  814.95  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  799.11  * Flow Area (sq ft)      * 4692.44  * 3260.85  *  283.14  *
* E.G. Slope (ft/ft)     *0.000784  * Area (sq ft)           *16208.95  * 3260.85  *16619.14  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *16661.31  *29926.69  *  412.00  *
* Top Width (ft)         * 2252.39  * Top Width (ft)         *  923.04  *  103.34  * 1226.01  *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)       *    3.55  *    9.18  *    1.46  *
* Max Chl Dpth (ft)      *   38.88  * Hydr. Depth (ft)       *   24.98  *   31.55  *    6.54  *
* Conv. Total (cfs)      *1678780.0  * Conv. (cfs)            *595120.8  *1068943.0  * 14716.1  *
* Length Wtd. (ft)       *  426.01  * Wetted Per. (ft)       *  188.18  *  124.39  *   43.28  *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    1.22  *    1.28  *    0.32  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    4.33  *   11.77  *    0.47  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *17119.47  *19077.56  *19726.96  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         * 1550.87  *  608.56  * 2182.83  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  802.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.100  *   0.040  *          *
* W.S. Elev (ft)         *  801.94  * Reach Len. (ft)        *  319.31  *  461.56  *  557.39  *
* Crit W.S. (ft)         *  793.26  * Flow Area (sq ft)      * 2249.37  * 1950.21  *          *
* E.G. Slope (ft/ft)     *0.000995  * Area (sq ft)           * 6277.23  * 1950.21  * 4290.17  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 5511.17  *15188.83  *          *
* Top Width (ft)         * 1476.53  * Top Width (ft)         *  658.10  *   95.64  *  722.79  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *    2.45  *    7.79  *          *
* Max Chl Dpth (ft)      *   25.87  * Hydr. Depth (ft)       *   11.97  *   20.39  *          *
* Conv. Total (cfs)      *656298.4  * Conv. (cfs)            *174732.9  *481565.5  *          *
* Length Wtd. (ft)       *  433.10  * Wetted Per. (ft)       *  188.18  *  113.79  *          *
* Min Ch El (ft)         *  776.07  * Shear (lb/sq ft)       *    0.74  *    1.06  *          *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    1.82  *    8.29  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 4831.09  *12850.62  * 5432.44  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  563.33  *  580.19  *  614.81  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION

RIVER: Blue River
```

REACH: Main RS: 23.039

INPUT
Description: Upstream side of Red Bridge
Station Elevation Data num= 362

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850.51	17.68	850.12	25.68	849.55	63.87	847.84	77.28	846.97
79.85	846.81	93.66	846.08	120.82	844.49	137.69	843.7	150.34	842.03
158.67	840.2	163.64	839.11	173.75	840.33	175.49	840.52	193.1	840.24
194.71	840.21	196.4	840.17	209.43	839.42	217.1	839.12	221.11	838.7
225.31	838.27	231.12	837.6	250.85	834.16	265.77	831.64	276.84	829.37
286.37	827.53	308.8	822.73	310.57	822.13	311.27	821.97	311.78	821.89
358.14	812.09	374.68	810.77	389.76	808.74	401.91	806.22	422	804.67
432.81	803.14	466.04	800.44	468.03	800.36	468.5	800.37	484.59	800.56
500.3	800.7	504.3	800.77	510.13	800.28	537.04	799.91	544.61	800.2
559.71	800	574.91	798.25	576.98	797.79	580.7	797.2	584.6	796.7
591.55	795.75	600.15	794.75	611.17	795.61	624.5	796.61	630.72	797.08
635.5	800.22	640.69	801.69	645.64	803.92	656.24	808.29	665.03	809.34
668.03	809.69	673.95	809.4	675.98	809.31	680.18	808.99	690.52	808.26
708.82	801.39	712.52	800	714.93	799.14	721.85	796.7	739.26	795.95
753.29	795.87	761.99	795.88	767.54	795.88	780.76	795.86	783.47	795.86
809.27	795.74	823.97	795.76	836.71	795.33	842.9	795.18	851.51	794.92
857.67	794.73	861.79	794.16	864.4	793.72	864.77	792.98	870.76	785.73
874.39	785.97	890.4	786.97	894.57	786.84	901.82	786.63	913.09	786.38
926.24	786.05	931.72	787.56	946.59	790.77	957.47	793.92	963.61	795.58
972.66	797.89	979.6	797.94	990.76	797.96	990.82	797.96	990.86	797.96
1007.88	797.4	1016.42	797.17	1026.81	796.64	1033.03	795.86	1045.92	795.35
1054.75	795	1076.39	793.15	1086.27	792.79	1100.55	792	1103.13	792.12
1112.58	790.02	1113.7	790.08	1114.64	789.28	1115.35	789.29	1132.15	789.6
1161.66	789.22	1164.57	788.96	1195.65	788.67	1206.03	788.7	1219.59	788.91
1232.43	788.69	1244.3	788.94	1259	789.05	1260.77	789.06	1263.57	789.09
1271.49	787.21	1278.65	785.51	1282.09	784.18	1293.06	778.74	1293.14	778.7
1293.22	778.65	1297	779.52	1300	778.19	1324	778.85	1338	777.57
1347	778.86	1363	780.19	1368	778.15	1373	778.5	1384.58	778.65
1385.78	780.22	1386.9	780.65	1397.87	787.71	1404.31	792.65	1405.37	793.46
1410.98	793.67	1415.13	793.88	1426.54	793.81	1428.3	793.83	1430.98	793.82
1449.03	793.56	1451.23	793.53	1466.65	793.27	1494.99	793.16	1498.62	793.11
1531.13	793.05	1533.3	793.04	1536.52	793.01	1557.12	793.06	1572.59	793.44
1576.21	793.44	1611.89	793.39	1616.22	793.39	1662.73	793.05	1663.54	793.04
1663.66	793.04	1677.5	793.82	1683.66	794.01	1693.09	794.83	1699.11	794.91
1699.4	794.92	1708.38	795	1724.33	794.72	1735.17	794.53	1737.9	794.48
1740.2	794.16	1749.32	793.12	1759.99	790.98	1764.66	790.27	1767.11	790.28
1773.95	790.28	1786.97	790.28	1797.95	790.32	1820.29	790.42	1835.79	790.45
1853.64	790.44	1855.43	790.34	1857.65	790.51	1876.44	790.8	1922.21	791.01
1925.22	791.04	1965.93	791.86	1978.94	792.17	2012.24	792.66	2024.84	792.79
2032.36	792.68	2058.44	792.92	2069.56	792.98	2073.68	792.97	2078.22	793.01
2092.39	792.96	2102.39	792.95	2106.76	792.98	2137.86	792.57	2141.13	792.51
2141.57	792.51	2141.97	792.51	2162.8	792.4	2165.05	792.38	2174.13	792.14
2205.99	791.74	2215.63	791.65	2221.51	791.59	2239.38	791.46	2240.92	791.43
2243.28	791.39	2257.18	791.41	2274.47	791.47	2293.88	791.79	2316.5	792.23
2331.51	792.91	2345.11	793.23	2362.87	793.55	2367.2	793.59	2370.27	795.17
2377.1	799.35	2385.97	803.5	2387.6	804.41	2390.07	805.23	2395.76	804.45
2401.54	803.83	2408.82	802.31	2413.62	801.79	2425.27	800.25	2427.7	799.83
2436.16	798.81	2444.47	799.34	2445.47	799.61	2458.92	801.39	2473.97	802.81
2481.94	803.38	2484.97	803.75	2494.7	804.33	2512.86	807.32	2527.09	808.39
2553.02	810.01	2564.63	811.46	2583.22	812.58	2592.78	813.86	2594.68	814.53
2600.05	815.23	2607.35	815.77	2613.39	816.65	2619.39	817.08	2623.66	817.84
2628.36	818.39	2637.62	819.09	2645.41	819.93	2652.62	820.48	2664.58	821.32
2671.35	821.84	2676.22	822.22	2689.73	822.93	2695.68	823.13	2700.05	823.32
2709.45	823.61	2712.49	823.81	2716.27	824.16	2739.69	824.72	2744.46	824.98
2746.66	825	2768.97	824.6	2772.11	824.58	2803.26	823.75	2804.54	823.72
2804.6	823.71	2804.73	823.7	2814.35	822.99	2822.19	822.93	2833.34	822.86
2834.02	822.91	2843.19	823.47	2845.9	823.64	2858.69	824.24	2863.08	824.3
2865.59	824.53	2879.1	825.15	2892.43	825.68	2900.29	825.94	2914.08	826.49
2918.32	826.83	2929.16	827.6	2934.03	827.98	2944.75	828.74	2947.77	829.26
2967.45	830.72	2973.65	831.1	2977.05	831.21	2992.19	831.96	2997.88	832.38
3003.24	832.51	3016.8	833.18	3023.45	832.91	3037.62	833.64	3042.78	833.36
3049.06	832.64	3056.44	831.9	3067.81	832.29	3073.96	831.52	3079.27	831.61
3085.2	831.53	3090.02	831.6	3098.9	831.55	3105.81	831.71	3118.4	831.9
3131.22	831.72	3136.22	831.61	3138.95	831.62	3149.61	831.41	3151.31	831.32
3159.11	831.23	3161.68	831.18	3162.57	831.13	3175.8	830.42	3183.94	830.04
3191.08	829.96	3205.16	829.32	3213.9	829.26	3216.79	829.24	3223.2	829.17
3230.98	829.08	3231.96	829.06	3238.9	829.43	3244.6	829.53	3270.89	830.1
3274.36	830.16	3276.51	830.21	3301.87	830.38	3303.25	830.46	3316.55	831.32
3317.37	831.4	3319.9	831.96	3322.77	833.03	3323.99	833.13	3329.19	833.74

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 3333.47  834.67 3334.88   835.1 3342.68   837.7 3351.36  838.48 3356.53  839.01
 3361.62  841.06 3362.75  841.35 3364.93   841.5  3379.5  843.05 3389.86  845.01
 3395.12  846.78 3396.54  847.14 3406.28   849.2 3413.36  852.33 3423.21  856.85
  3425.1  857.45 3437.39  859.51

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .105  656.24      .1 1016.42    .095 1260.77     .04 1404.31      .1
 1494.99     .07 1797.95    .105 2445.47      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1260.77 1404.31             45      45      45              .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
    1770    3000     820       F
    1600    1770   795.5       T
     850    1115     797       T
    1405    1600     802       T
     675     850     820       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     350     670   809.5    2390    2515     805

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  791.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.095  *   0.040  *         *
* W.S. Elev (ft)         *  791.66  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  784.02  * Flow Area (sq ft)      *  384.63  * 1515.69  *         *
* E.G. Slope (ft/ft)     *0.000597  * Area (sq ft)           *  764.48  * 1515.69  *  203.98  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  280.65  * 6444.35  *         *
* Top Width (ft)         *  653.12  * Top Width (ft)         *  239.40  *  142.25  *  271.47  *
* Vel Total (ft/s)       *    3.54  * Avg. Vel. (ft/s)       *    0.73  *    4.25  *         *
* Max Chl Dpth (ft)      *   14.09  * Hydr. Depth (ft)       *    2.64  *   10.65  *         *
* Conv. Total (cfs)      *275236.0  * Conv. (cfs)            * 11486.4  *263749.7  *         *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  145.79  *  149.50  *         *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.10  *    0.38  *         *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.07  *    1.61  *         *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  829.92  * 6375.55  *  797.64  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  176.07  *  477.68  *  196.56  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  796.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.095  *   0.040  *   0.072  *
* W.S. Elev (ft)         *  795.90  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  786.53  * Flow Area (sq ft)      * 1002.40  * 2123.38  *   70.20  *
* E.G. Slope (ft/ft)     *0.000553  * Area (sq ft)           * 2001.67  * 2123.38  * 3330.94  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 1315.17  *10655.26  *   19.48  *
* Top Width (ft)         * 1555.74  * Top Width (ft)         *  445.05  *  143.54  *  967.15  *
* Vel Total (ft/s)       *    3.75  * Avg. Vel. (ft/s)       *    1.31  *    5.02  *    0.28  *
* Max Chl Dpth (ft)      *   18.33  * Hydr. Depth (ft)       *    6.88  *   14.79  *    0.41  *
* Conv. Total (cfs)      *516827.9  * Conv. (cfs)            * 56690.7  *459297.8  *   839.5  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  145.79  *  151.12  *  171.28  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.24  *    0.48  *    0.01  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *    0.31  *    2.43  *    0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1866.68  * 8477.06  * 1900.43  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  281.36  *  517.84  *  302.79  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  797.52  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.095  *   0.040  *   0.070  *
```

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* W.S. Elev (ft)         *  797.13  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  787.08  * Flow Area (sq ft)      * 1209.99  * 2300.28  *  280.56  *
* E.G. Slope (ft/ft)     *0.000529  * Area (sq ft)           * 2585.36  * 2300.28  * 4524.13  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 1141.22  *11119.17  *  174.95  *
* Top Width (ft)         * 1605.41  * Top Width (ft)         *  492.70  *  143.54  *  969.17  *
* Vel Total (ft/s)       *    3.28  * Avg. Vel. (ft/s)       *    0.94  *    4.83  *    0.62  *
* Max Chl Dpth (ft)      *   19.56  * Hydr. Depth (ft)       *    3.33  *   16.03  *    1.64  *
* Conv. Total (cfs)      *586951.1  * Conv. (cfs)            * 53866.0  *524827.6  *  8257.5  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  369.48  *  151.12  *  171.28  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.11  *    0.50  *    0.05  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    0.10  *    2.43  *    0.03  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2678.53  *10129.86  * 2893.95  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  337.82  *  545.82  *  402.13  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  801.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.              *   0.096  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  800.95  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  789.81  * Flow Area (sq ft)      * 2748.43  * 2847.87  *  931.72  *
* E.G. Slope (ft/ft)     *0.000410  * Area (sq ft)           * 4640.12  * 2847.87  * 8233.92  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 3286.20  *15176.88  * 1236.91  *
* Top Width (ft)         * 1670.52  * Top Width (ft)         *  550.77  *  143.54  *  976.21  *
* Vel Total (ft/s)       *    3.02  * Avg. Vel. (ft/s)       *    1.20  *    5.33  *    1.33  *
* Max Chl Dpth (ft)      *   23.38  * Hydr. Depth (ft)       *    6.69  *   19.84  *    5.46  *
* Conv. Total (cfs)      *972446.8  * Conv. (cfs)            *162216.2  *749173.2  * 61057.5  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  417.03  *  151.12  *  171.28  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.17  *    0.48  *    0.14  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    0.20  *    2.57  *    0.19  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 4020.83  *11913.06  * 4468.87  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  463.45  *  568.67  *  527.73  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  805.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.              *   0.096  *   0.040  *   0.072  *
* W.S. Elev (ft)         *  805.50  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  792.05  * Flow Area (sq ft)      * 4616.28  * 3500.57  * 2389.47  *
* E.G. Slope (ft/ft)     *0.000299  * Area (sq ft)           * 7172.12  * 3500.57  *12749.31  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 6315.96  *18282.43  * 3101.61  *
* Top Width (ft)         * 1803.89  * Top Width (ft)         *  562.89  *  143.54  * 1097.47  *
* Vel Total (ft/s)       *    2.64  * Avg. Vel. (ft/s)       *    1.37  *    5.22  *    1.30  *
* Max Chl Dpth (ft)      *   27.93  * Hydr. Depth (ft)       *   11.24  *   24.39  *    6.53  *
* Conv. Total (cfs)      *1601006.0  * Conv. (cfs)           *365050.3  *1056689.0  *179266.8  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  417.03  *  151.12  *  366.40  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.21  *    0.43  *    0.12  *
* Alpha                  *    2.68  * Stream Power (lb/ft s) *    0.28  *    2.26  *    0.16  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 6696.01  *14618.30  * 7617.96  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  815.45  *  596.72  *  958.61  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  808.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.              *   0.096  *   0.040  *   0.073  *
* W.S. Elev (ft)         *  808.62  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  793.22  * Flow Area (sq ft)      * 5898.43  * 3948.60  * 3530.91  *
* E.G. Slope (ft/ft)     *0.000236  * Area (sq ft)           * 8942.79  * 3948.60  *16210.61  *
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* Q Total (cfs)          *33260.00  * Flow (cfs)             * 8329.96  *19834.31  * 5095.73  *
* Top Width (ft)         * 1845.25  * Top Width (ft)         *  575.30  *  143.54  * 1126.41  *
* Vel Total (ft/s)       *    2.49  * Avg. Vel. (ft/s)       *    1.41  *    5.02  *    1.44  *
* Max Chl Dpth (ft)      *   31.05  * Hydr. Depth (ft)       *   14.36  *   27.51  *    9.66  *
* Conv. Total (cfs)      *2165847.0  * Conv. (cfs)           *542436.0  *1291584.0  *331827.2  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  417.03  *  151.12  *  366.40  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.21  *    0.38  *    0.14  *
* Alpha                  *    2.57  * Stream Power (lb/ft s) *    0.29  *    1.93  *    0.20  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 9435.97  *16256.94  *10792.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1083.87  *  603.78  * 1369.56  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  811.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.096  *   0.040  *   0.073  *
* W.S. Elev (ft)         *  811.53  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  794.35  * Flow Area (sq ft)      * 7701.72  * 4366.71  * 4596.08  *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)           *11251.88  * 4366.71  *19550.28  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *10398.99  *21545.65  * 7155.36  *
* Top Width (ft)         * 2200.62  * Top Width (ft)         *  895.61  *  143.54  * 1161.47  *
* Vel Total (ft/s)       *    2.35  * Avg. Vel. (ft/s)       *    1.35  *    4.93  *    1.56  *
* Max Chl Dpth (ft)      *   33.96  * Hydr. Depth (ft)       *   10.69  *   30.42  *   12.57  *
* Conv. Total (cfs)      *2771981.0  * Conv. (cfs)           *737232.6  *1527471.0  *507276.8  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  727.00  *  151.12  *  366.40  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.13  *    0.36  *    0.16  *
* Alpha                  *    2.61  * Stream Power (lb/ft s) *    0.18  *    1.77  *    0.24  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *12017.57  *17365.37  *13908.98  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1268.39  *  604.72  * 1767.83  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  815.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.097  *   0.040  *   0.074  *
* W.S. Elev (ft)         *  815.32  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  796.23  * Flow Area (sq ft)      *10479.30  * 4910.18  * 5980.66  *
* E.G. Slope (ft/ft)     *0.000159  * Area (sq ft)           *14692.06  * 4910.18  *24029.25  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *13730.87  *23442.79  * 9826.34  *
* Top Width (ft)         * 2258.33  * Top Width (ft)         *  917.89  *  143.54  * 1196.90  *
* Vel Total (ft/s)       *    2.20  * Avg. Vel. (ft/s)       *    1.31  *    4.77  *    1.64  *
* Max Chl Dpth (ft)      *   37.75  * Hydr. Depth (ft)       *   14.11  *   34.21  *   16.35  *
* Conv. Total (cfs)      *3723633.0  * Conv. (cfs)           *1087845.0  *1857284.0  *778503.7  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  749.64  *  151.12  *  366.40  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.14  *    0.32  *    0.16  *
* Alpha                  *    2.57  * Stream Power (lb/ft s) *    0.18  *    1.54  *    0.27  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *17006.21  *19034.27  *19466.89  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1544.12  *  607.26  * 2167.33  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  802.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.096  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  801.99  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  790.19  * Flow Area (sq ft)      * 3175.12  * 2996.97  * 1109.03  *
* E.G. Slope (ft/ft)     *0.000354  * Area (sq ft)           * 5213.68  * 2996.97  * 9249.11  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 3807.46  *15355.69  * 1536.86  *
* Top Width (ft)         * 1675.51  * Top Width (ft)         *  553.54  *  143.54  *  978.43  *
* Vel Total (ft/s)       *    2.84  * Avg. Vel. (ft/s)       *    1.20  *    5.12  *    1.39  *
* Max Chl Dpth (ft)      *   24.42  * Hydr. Depth (ft)       *    7.73  *   20.88  *    6.50  *
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* Conv. Total (cfs)      *1099565.0  * Conv. (cfs)            *202248.5  *815680.4  * 81636.4  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  417.03  *  151.12  *  171.28  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.17  *    0.44  *    0.14  *
* Alpha                  *    2.46  * Stream Power (lb/ft s) *    0.20  *    2.25  *    0.20  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 4788.97  *12824.41  * 5345.82  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  558.89  *  578.92  *  603.92  *
*****************************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 23.035

INPUT
Description: Red Bridge Road
Distance from Upstream XS = 8
Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 25

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
670	809.5	775	855	798	775	925	796.65	775
975	798	775	1115	801	775	1115	802.84	797.85
1250	802.84	797.85	1250.1	807	797.85	1290	810	797.85
1310	810	797.85	1350	807	797.85	1350.1	802.84	797.85
1405	802.84	797.85	1405	800	775	1500	798	775
1600	796	775	1685	795.4	775	1770	796	775
1840	798	775	1875	800	775	1915	802	775
2000	804	775	2100	805	775	2320	806	775
2580	806	775						

Upstream Bridge Cross Section Data
Station Elevation Data num= 362

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850.51	17.68	850.12	25.68	849.55	63.87	847.84	77.28	846.97
79.85	846.81	93.66	846.08	120.82	844.49	137.69	843.7	150.34	842.03
158.67	840.2	163.64	839.11	173.75	840.33	175.49	840.52	193.1	840.24
194.71	840.21	196.4	840.17	209.43	839.42	217.1	839.12	221.11	838.7
225.31	838.27	231.12	837.6	250.85	834.16	265.77	831.64	276.84	829.37
286.37	827.53	308.8	822.73	310.57	822.13	311.27	821.97	311.78	821.89
358.14	812.09	374.68	810.77	389.76	808.74	401.91	806.22	422	804.67
432.81	803.14	466.04	800.44	468.03	800.36	468.5	800.37	484.59	800.56
500.3	800.7	504.3	800.77	510.13	800.28	537.04	799.91	544.61	800.2
559.71	800	574.91	798.25	576.98	797.79	580.7	797.2	584.6	796.7
591.55	795.75	600.15	794.75	611.17	795.61	624.5	796.61	630.72	797.08
635.5	800.22	640.69	801.69	645.64	803.92	656.24	808.29	665.03	809.34
668.03	809.69	673.95	809.4	675.98	809.31	680.18	808.99	690.52	808.26
708.82	801.39	712.52	800	714.93	799.14	721.85	796.7	739.26	795.95
753.29	795.87	761.99	795.88	767.54	795.88	780.76	795.86	783.47	795.86
809.27	795.74	823.97	795.76	836.71	795.33	842.9	795.18	851.51	794.92
857.67	794.73	861.79	794.16	864.4	793.72	864.77	792.98	870.76	785.73
874.39	785.97	890.4	786.97	894.57	786.84	901.82	786.63	913.09	786.38
926.24	786.05	931.72	787.56	946.59	790.77	957.47	793.92	963.61	795.58
972.66	797.89	979.6	797.94	990.76	797.96	990.82	797.96	990.86	797.96
1007.88	797.4	1016.42	797.17	1026.81	796.64	1033.03	795.86	1045.92	795.35
1054.75	795	1076.39	793.15	1086.27	792.79	1100.55	792	1103.13	792.12
1112.58	790.02	1113.7	790.08	1114.64	789.28	1115.35	789.29	1132.15	789.6
1161.66	789.22	1164.57	788.96	1195.65	788.67	1206.03	788.7	1219.59	788.91
1232.43	788.69	1244.3	788.94	1259	789.05	1260.77	789.06	1263.57	789.09
1271.49	787.21	1278.65	785.51	1282.09	784.18	1293.06	778.74	1293.14	778.7
1293.22	778.65	1297	779.52	1300	778.19	1324	778.85	1338	777.57
1347	778.86	1363	780.19	1368	778.15	1373	778.5	1384.58	778.65
1385.78	780.22	1386.9	780.65	1397.87	787.71	1404.31	792.65	1405.37	793.46
1410.98	793.67	1415.13	793.88	1426.54	793.81	1428.3	793.83	1430.98	793.82
1449.03	793.56	1451.23	793.53	1466.65	793.27	1494.99	793.16	1498.62	793.11
1531.13	793.05	1533.3	793.04	1536.52	793.01	1557.12	793.06	1572.59	793.44
1576.21	793.44	1611.89	793.39	1616.22	793.39	1662.73	793.05	1663.54	793.04
1663.66	793.04	1677.5	793.82	1683.66	794.01	1693.09	794.83	1699.11	794.91
1699.4	794.92	1708.38	795	1724.33	794.72	1735.17	794.53	1737.9	794.48
1740.2	794.16	1749.32	793.12	1759.99	790.98	1764.66	790.27	1767.11	790.28

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 1773.95  790.28 1786.97  790.28 1797.95  790.32 1820.29  790.42 1835.79  790.45
 1853.64  790.44 1855.43  790.34 1857.65  790.51 1876.44   790.8 1922.21  791.01
 1925.22  791.04 1965.93  791.86 1978.94  792.17 2012.24  792.66 2024.84  792.79
 2032.36  792.68 2058.44  792.92 2069.56  792.98 2073.68  792.97 2078.22  793.01
 2092.39  792.96 2102.39  792.95 2106.76  792.98 2137.86  792.57 2141.13  792.51
 2141.57  792.51 2141.97  792.51  2162.8   792.4 2165.05  792.38 2174.13  792.14
 2205.99  791.74 2215.63  791.65 2221.51  791.59 2239.38  791.46 2240.92  791.43
 2243.28  791.39 2257.18  791.41 2274.47  791.47 2293.88  791.79  2316.5  792.23
 2331.51  792.91 2345.11  793.23 2362.87  793.55  2367.2  793.59 2370.27  795.17
  2377.1  799.35 2385.97   803.5  2387.6  804.41 2390.07  805.23 2395.76  804.45
 2401.54  803.83 2408.82  802.31 2413.62  801.79 2425.27  800.25  2427.7  799.83
 2436.16  798.81 2444.47  799.34 2445.47  799.61 2458.92  801.39 2473.97  802.81
 2481.94  803.38 2484.97  803.75  2494.7  804.33 2512.86  807.32 2527.09  808.39
 2553.02  810.01 2564.63  811.46 2583.22  812.58 2592.78  813.86 2594.68  814.53
 2600.05  815.23 2607.35  815.77 2613.39  816.65 2619.39  817.08 2623.66  817.84
 2628.36  818.39 2637.62  819.09 2645.41  819.93 2652.62  820.48 2664.58  821.32
 2671.35  821.84 2676.22  822.22 2689.73  822.93 2695.68  823.13 2700.05  823.32
 2709.45  823.61 2712.49  823.81 2716.27  824.16 2739.69  824.72 2744.46  824.98
 2746.66      825 2768.97   824.6 2772.11  824.58 2803.26  823.75 2804.54  823.72
  2804.6  823.71 2804.73   823.7 2814.35  822.99 2822.19  822.93 2833.34  822.86
 2834.02  822.91 2843.19  823.47  2845.9  823.64 2858.69  824.24 2863.08   824.3
 2865.59  824.53  2879.1  825.15 2892.43  825.68 2900.29  825.94 2914.08  826.49
 2918.32  826.83 2929.16   827.6 2934.03  827.98 2944.75  828.74 2947.77  829.26
 2967.45  830.72 2973.65   831.1 2977.05  831.21 2992.19  831.96 2997.88  832.38
 3003.24  832.51  3016.8  833.18 3023.45  832.91 3037.62  833.64 3042.78  833.36
 3049.06  832.64 3056.44   831.9 3067.81  832.29 3073.96  831.52 3079.27  831.61
  3085.2  831.53 3090.02   831.6  3098.9  831.55 3105.81  831.71  3118.4   831.9
 3131.22  831.72 3136.22  831.61 3138.95  831.62 3149.61  831.41 3151.31  831.32
 3159.11  831.23 3161.68  831.18 3162.57  831.13  3175.8  830.42 3183.94  830.04
 3191.08  829.96 3205.16  829.32  3213.9  829.26 3216.79  829.24  3223.2  829.17
 3230.98  829.08 3231.96  829.06  3238.9  829.43  3244.6  829.53 3270.89   830.1
 3274.36  830.16 3276.51  830.21 3301.87  830.38 3303.25  830.46 3316.55  831.32
 3317.37   831.4  3319.9  831.96 3322.77  833.03 3323.99  833.13 3329.19  833.74
 3333.47  834.67 3334.88   835.1 3342.68   837.7 3351.36  838.48 3356.53  839.01
 3361.62  841.06 3362.75  841.35 3364.93   841.5  3379.5  843.05 3389.86  845.01
 3395.12  846.78 3396.54  847.14 3406.28   849.2 3413.36  852.33 3423.21  856.85
  3425.1  857.45 3437.39  859.51

Manning's n Values        num=       8
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0    .105  656.24      .1 1016.42    .095 1260.77     .04 1404.31      .1
 1494.99     .07 1797.95    .105 2445.47      .1

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1260.77 1404.31              .1       .3
Ineffective Flow     num=        5
   Sta L   Sta R    Elev  Permanent
    1770    3000     820       F
    1600    1770   795.5       T
     850    1115     797       T
    1405    1600     802       T
     675     850     820       F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
     350     670   809.5    2390    2515     805

Downstream  Deck/Roadway Coordinates
    num=      25
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
     670   809.5     775     855     798     775     925  796.65     775
     975     798     775    1115     801     775    1115  802.84  797.85
    1250  802.84  797.85  1250.1     807  797.85    1290     810  797.85
    1310     810  797.85    1350     807  797.85  1350.1  802.84  797.85
    1405  802.84  797.85    1405     800     775    1500     798     775
    1600     796     775    1685   795.4     775    1770     796     775
    1840     798     775    1875     800     775    1915     802     775
    2000     804     775    2100     805     775    2320     806     775
    2580     806     775

Downstream Bridge Cross Section Data
Station Elevation Data    num=     362
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

0	850.51	17.68	850.12	25.68	849.55	63.87	847.84	77.28	846.97
79.85	846.81	93.66	846.08	120.82	844.49	137.69	843.7	150.34	842.03
158.67	840.2	163.64	839.11	173.75	840.33	175.49	840.52	193.1	840.24
194.71	840.21	196.4	840.17	209.43	839.42	217.1	839.12	221.11	838.7
225.31	838.27	231.12	837.6	250.85	834.16	265.77	831.64	276.84	829.37
286.37	827.53	308.8	822.73	310.57	822.13	311.27	821.97	311.78	821.89
358.14	812.09	374.68	810.77	389.76	808.74	401.91	806.22	422	804.67
432.81	803.14	466.04	800.44	468.03	800.36	468.5	800.37	484.59	800.56
500.3	800.7	504.3	800.77	510.13	800.28	537.04	799.91	544.61	800.2
559.71	800	574.91	798.25	576.98	797.79	580.7	797.2	584.6	796.7
591.55	795.75	600.15	794.75	611.17	795.61	624.5	796.61	630.72	797.08
635.5	800.22	640.69	801.69	645.64	803.92	656.24	808.29	665.03	809.34
668.03	809.69	673.95	809.4	675.98	809.31	680.18	808.99	690.52	808.26
708.82	801.39	712.52	800	714.93	799.14	721.85	796.7	739.26	795.95
753.29	795.87	761.99	795.88	767.54	795.88	780.76	795.86	783.47	795.86
809.27	795.74	823.97	795.76	836.71	795.33	842.9	795.18	851.51	794.92
857.67	794.73	861.79	794.16	864.4	793.72	864.77	792.98	870.76	785.73
874.39	785.97	890.4	786.97	894.57	786.84	901.82	786.63	913.09	786.38
926.24	786.05	931.72	787.56	946.59	790.77	957.47	793.92	963.61	795.58
972.66	797.89	979.6	797.94	990.76	797.96	990.82	797.96	990.86	797.96
1007.88	797.4	1016.42	797.17	1026.81	796.64	1033.03	795.86	1045.92	795.35
1054.75	795	1076.39	793.15	1086.27	792.79	1100.55	792	1103.13	792.12
1112.58	790.02	1113.7	790.08	1114.64	789.28	1115.35	789.29	1132.15	789.6
1161.66	789.22	1164.57	788.96	1195.65	788.67	1206.03	788.7	1219.59	788.91
1232.43	788.69	1244.3	788.94	1259	789.05	1260.77	789.06	1263.57	789.09
1271.49	787.21	1278.65	785.51	1282.09	784.18	1293.06	778.74	1293.14	778.7
1293.22	778.65	1297	779.52	1300	778.19	1324	778.85	1338	777.57
1347	778.86	1363	780.19	1368	778.15	1373	778.5	1384.58	778.65
1385.78	780.22	1386.9	780.65	1397.87	787.71	1404.31	792.65	1405.37	793.46
1410.98	793.67	1415.13	793.88	1426.54	793.81	1428.3	793.83	1430.98	793.82
1449.03	793.56	1451.23	793.53	1466.65	793.27	1494.99	793.16	1498.62	793.11
1531.13	793.05	1533.3	793.04	1536.52	793.01	1557.12	793.06	1572.59	793.44
1576.21	793.44	1611.89	793.39	1616.22	793.39	1662.73	793.05	1663.54	793.04
1663.66	793.04	1677.5	793.82	1683.66	794.01	1693.09	794.83	1699.11	794.91
1699.4	794.92	1708.38	795	1724.33	794.72	1735.17	794.53	1737.9	794.48
1740.2	794.16	1749.32	793.12	1759.99	790.98	1764.66	790.27	1767.11	790.28
1773.95	790.28	1786.97	790.28	1797.95	790.32	1820.29	790.42	1835.79	790.45
1853.64	790.44	1855.43	790.34	1857.65	790.51	1876.44	790.8	1922.21	791.01
1925.22	791.04	1965.93	791.86	1978.94	792.17	2012.24	792.66	2024.84	792.79
2032.36	792.68	2058.44	792.92	2069.56	792.98	2073.68	792.97	2078.22	793.01
2092.39	792.96	2102.39	792.95	2106.76	792.98	2137.86	792.57	2141.13	792.51
2141.57	792.51	2141.97	792.51	2162.8	792.4	2165.05	792.38	2174.13	792.14
2205.99	791.74	2215.63	791.65	2221.51	791.59	2239.38	791.46	2240.92	791.43
2243.28	791.39	2257.18	791.41	2274.47	791.47	2293.88	791.79	2316.5	792.23
2331.51	792.91	2345.11	793.23	2362.87	793.55	2367.2	793.59	2370.27	795.17
2377.1	799.35	2385.97	803.5	2387.6	804.41	2390.07	805.23	2395.76	804.45
2401.54	803.83	2408.82	802.31	2413.62	801.79	2425.27	800.25	2427.7	799.83
2436.16	798.81	2444.47	799.34	2445.47	799.61	2458.92	801.39	2473.97	802.81
2481.94	803.38	2484.97	803.75	2494.7	804.33	2512.86	807.32	2527.09	808.39
2553.02	810.01	2564.63	811.46	2583.22	812.58	2592.78	813.86	2594.68	814.53
2600.05	815.23	2607.35	815.77	2613.39	816.65	2619.39	817.08	2623.66	817.84
2628.36	818.39	2637.62	819.09	2645.41	819.93	2652.62	820.48	2664.58	821.32
2671.35	821.84	2676.22	822.22	2689.73	822.93	2695.68	823.13	2700.05	823.32
2709.45	823.61	2712.49	823.81	2716.27	824.16	2739.69	824.72	2744.46	824.98
2746.66	825	2768.97	824.6	2772.11	824.58	2803.26	823.75	2804.54	823.72
2804.6	823.71	2804.73	823.7	2814.35	822.99	2822.19	822.93	2833.34	822.86
2834.02	822.91	2843.19	823.47	2845.9	823.64	2858.69	824.24	2863.08	824.3
2865.59	824.53	2879.1	825.15	2892.43	825.68	2900.29	825.94	2914.08	826.49
2918.32	826.83	2929.16	827.6	2934.03	827.98	2944.75	828.74	2947.77	829.26
2967.45	830.72	2973.65	831.1	2977.05	831.21	2992.19	831.96	2997.88	832.38
3003.24	832.51	3016.8	833.18	3023.45	832.91	3037.62	833.64	3042.78	833.36
3049.06	832.64	3056.44	831.9	3067.81	832.29	3073.96	831.52	3079.27	831.61
3085.2	831.53	3090.02	831.6	3098.9	831.55	3105.81	831.71	3118.4	831.9
3131.22	831.72	3136.22	831.61	3138.95	831.62	3149.61	831.41	3151.31	831.32
3159.11	831.23	3161.68	831.18	3162.57	831.13	3175.8	830.42	3183.94	830.04
3191.08	829.96	3205.16	829.32	3213.9	829.26	3216.79	829.24	3223.2	829.17
3230.98	829.08	3231.96	829.06	3238.9	829.43	3244.6	829.53	3270.89	830.1
3274.36	830.16	3276.51	830.21	3301.87	830.38	3303.25	830.46	3316.55	831.32
3317.37	831.4	3319.9	831.96	3322.77	833.03	3323.99	833.13	3329.19	833.74
3333.47	834.67	3334.88	835.1	3342.68	837.7	3351.36	838.48	3356.53	839.01
3361.62	841.06	3362.75	841.35	3364.93	841.5	3379.5	843.05	3389.86	845.01
3395.12	846.78	3396.54	847.14	3406.28	849.2	3413.36	852.33	3423.21	856.85
3425.1	857.45	3437.39	859.51						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
*******************************************************************************
       0    .105  656.24      .1 1016.42    .095 1260.77     .04 1404.31    .099
 1494.99     .07 1797.95    .105 2445.47      .1

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1260.77 1404.31            .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
    1770    3000     810       F
    1600    1770   795.5       T
     850    1115     797       T
    1405    1600     802       T
     675     850     810       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     350     670   809.5    2390    2515     805

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream=    1147    Downstream=    1147
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     775       6     799
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     775       6     799

Pier Data
Pier Station     Upstream=    1181    Downstream=    1181
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     775       6     799
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     775       6     799

Pier Data
Pier Station     Upstream=    1215    Downstream=    1215
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       8     775       8     799
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       8     775       8     799

Pier Data
Pier Station     Upstream=    1250    Downstream=    1250
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       9     775       9     799
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       9     775       9     799

Pier Data
Pier Station     Upstream=    1319    Downstream=    1319
Upstream     num=       2
    Width   Elev    Width   Elev
```

```
********************************
       9     775       9     799
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       9     775       9     799

Pier Data
Pier Station     Upstream=    1353    Downstream=    1353
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       8     775       8     799
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       8     775       8     799

Pier Data
Pier Station     Upstream=    1387    Downstream=    1387
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     775       6     799
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       6     775       6     799

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     791.93  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     791.66  * E.G. Elev (ft)         *     791.89  *     791.83  *
* Q Total (cfs)          *    6725.00  * W.S. Elev (ft)         *     791.47  *     791.41  *
* Q Bridge (cfs)         *    6725.00  * Crit W.S. (ft)         *     784.83  *     784.83  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      13.90  *      13.84  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.49  *       4.54  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1496.73  *    1482.42  *
* Weir Submerg           *             * Froude # Chl           *       0.29  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    8507.90  *    8426.40  *
* Min El Weir Flow (ft)  *     795.51  * Hydr Depth (ft)        *       6.35  *       6.29  *
* Min El Prs (ft)        *     797.85  * W.P. Total (ft)        *     332.59  *     331.64  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *   158922.8  *   157374.7  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *     235.77  *     235.69  *
* BR Open Area (sq ft)   *    3013.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.54  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.50  *       0.51  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.26  *       2.31  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	796.26	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	795.90	E.G. Elev (ft)	796.24	796.18
Q Total (cfs)	12150.00	W.S. Elev (ft)	795.72	795.66
Q Bridge (cfs)	11989.91	Crit W.S. (ft)	787.73	787.73
Q Weir (cfs)	160.09	Max Chl Dpth (ft)	18.15	18.09
Weir Sta Lft (ft)	1600.00	Vel Total (ft/s)	4.78	4.81
Weir Sta Rgt (ft)	1770.00	Flow Area (sq ft)	2505.75	2491.41
Weir Submerg	0.02	Froude # Chl	0.26	0.26
Weir Max Depth (ft)	0.76	Specif Force (cu ft)	18030.23	17891.43
Min El Weir Flow (ft)	795.51	Hydr Depth (ft)	10.53	10.47
Min El Prs (ft)	797.85	W.P. Total (ft)	394.86	394.02
Delta EG (ft)	0.13	Conv. Total (cfs)	283686.1	281753.7
Delta WS (ft)	0.14	Top Width (ft)	238.00	238.00
BR Open Area (sq ft)	3013.16	Frctn Loss (ft)	0.05	0.01
BR Open Vel (ft/s)	4.81	C & E Loss (ft)	0.00	0.05
Coef of Q		Shear Total (lb/sq ft)	0.73	0.73
Br Sel Method	Energy/Weir	Power Total (lb/ft s)	3.48	3.53

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	797.52	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	797.13	E.G. Elev (ft)	797.51	797.46
Q Total (cfs)	13500.00	W.S. Elev (ft)	797.06	797.01
Q Bridge (cfs)	12435.34	Crit W.S. (ft)	788.37	788.37
Q Weir (cfs)	1064.66	Max Chl Dpth (ft)	19.49	19.44
Weir Sta Lft (ft)	880.03	Vel Total (ft/s)	4.40	4.42
Weir Sta Rgt (ft)	1770.00	Flow Area (sq ft)	2825.47	2814.39
Weir Submerg	0.74	Froude # Chl	0.23	0.23
Weir Max Depth (ft)	2.02	Specif Force (cu ft)	21519.75	21396.16
Min El Weir Flow (ft)	795.51	Hydr Depth (ft)	11.87	11.83
Min El Prs (ft)	797.85	W.P. Total (ft)	413.67	413.01
Delta EG (ft)	0.08	Conv. Total (cfs)	327637.3	326088.9
Delta WS (ft)	0.09	Top Width (ft)	238.00	238.00
BR Open Area (sq ft)	3013.16	Frctn Loss (ft)	0.04	0.01
BR Open Vel (ft/s)	4.42	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.72	0.73
Br Sel Method	Energy/Weir	Power Total (lb/ft s)	3.19	3.22

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Notes(60): This is an inside cross section of a perched bridge that has energy, low flow inside of the bridge and weir flow over the embankment. The reported hydraulics are based on the flow and area inside of the bridge.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	801.30	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	800.95	E.G. Elev (ft)	801.29	801.20	
Q Total (cfs)	19700.00	W.S. Elev (ft)	800.95	800.85	
Q Bridge (cfs)	13005.43	Crit W.S. (ft)	791.29	791.29	
Q Weir (cfs)	6694.57	Max Chl Dpth (ft)	23.38	23.28	
Weir Sta Lft (ft)	850.00	Vel Total (ft/s)	4.35	4.39	
Weir Sta Rgt (ft)	1770.00	Flow Area (sq ft)	4527.37	4485.25	
Weir Submerg	0.94	Froude # Chl	0.19	0.20	
Weir Max Depth (ft)	5.79	Specif Force (cu ft)	37726.24	37319.95	
Min El Weir Flow (ft)	795.51	Hydr Depth (ft)	10.47	10.48	
Min El Prs (ft)	797.85	W.P. Total (ft)	1108.60	1104.03	
Delta EG (ft)	0.10	Conv. Total (cfs)			
Delta WS (ft)	0.10	Top Width (ft)	793.97	785.87	
BR Open Area (sq ft)	3013.16	Frctn Loss (ft)			
BR Open Vel (ft/s)	4.32	C & E Loss (ft)			
Coef of Q		Shear Total (lb/sq ft)			
Br Sel Method	Press/Weir	Power Total (lb/ft s)			

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.
Note: For the cross section inside the bridge at the upstream end, the water surface and energy have been projected from the upstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: For the cross section inside the bridge at the downstream end, the water surface and energy have been projected from the downstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	805.78	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	805.50	E.G. Elev (ft)	805.78	805.70	
Q Total (cfs)	27700.00	W.S. Elev (ft)	805.49	805.41	
Q Bridge (cfs)	13208.17	Crit W.S. (ft)	793.34	793.35	
Q Weir (cfs)		Max Chl Dpth (ft)	27.92	27.84	
Weir Sta Lft (ft)		Vel Total (ft/s)	3.60	3.64	
Weir Sta Rgt (ft)		Flow Area (sq ft)	7688.07	7620.15	
Weir Submerg		Froude # Chl	0.14	0.14	
Weir Max Depth (ft)		Specif Force (cu ft)	64823.70	64227.74	
Min El Weir Flow (ft)	795.51	Hydr Depth (ft)	9.38	9.29	
Min El Prs (ft)	797.85	W.P. Total (ft)	1505.95	1505.78	
Delta EG (ft)	0.09	Conv. Total (cfs)	555152.1	548417.4	
Delta WS (ft)	0.09	Top Width (ft)	1373.64	1354.08	
BR Open Area (sq ft)	3013.16	Frctn Loss (ft)	0.08	0.00	
BR Open Vel (ft/s)	4.38	C & E Loss (ft)	0.00	0.00	
Coef of Q		Shear Total (lb/sq ft)	0.79	0.81	
Br Sel Method	Energy only	Power Total (lb/ft s)	2.86	2.93	

Note: The weir over a bridge is submerged, the energy answer was used.
Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

```
*********************************************************************************************
* E.G. US. (ft)          *     808.86  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     808.62  * E.G. Elev (ft)         *     808.84  *     808.80  *
* Q Total (cfs)          *   33260.00  * W.S. Elev (ft)         *     808.65  *     808.60  *
* Q Bridge (cfs)         *   10477.86  * Crit W.S. (ft)         *     794.54  *     794.52  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *      31.08  *      31.03  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)        *       3.23  *       3.24  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)       *   10312.66  *   10270.24  *
* Weir Submerg           *             * Froude # Chl            *       0.12  *       0.12  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)    *   93250.23  *   92761.84  *
* Min El Weir Flow (ft)  *     795.51  * Hydr Depth (ft)         *      11.94  *      11.91  *
* Min El Prs (ft)        *     797.85  * W.P. Total (ft)         *    1552.97  *    1551.66  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)       *   843557.5  *   838913.8  *
* Delta WS (ft)          *       0.08  * Top Width (ft)          *    1790.17  *    1787.38  *
* BR Open Area (sq ft)   *    3013.16  * Frctn Loss (ft)         *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       3.48  * C & E Loss (ft)         *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       0.64  *       0.65  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)   *       2.08  *       2.10  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     811.75  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     811.53  * E.G. Elev (ft)         *     811.73  *     811.68  *
* Q Total (cfs)          *   39100.00  * W.S. Elev (ft)         *     811.57  *     811.62  *
* Q Bridge (cfs)         *    8617.32  * Crit W.S. (ft)         *     796.61  *     796.60  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *      34.00  *      34.05  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)        *       2.88  *       1.87  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)       *   13571.77  *   20883.21  *
* Weir Submerg           *             * Froude # Chl            *       0.10  *       0.06  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)    *  128044.80  *  159093.70  *
* Min El Weir Flow (ft)  *     795.51  * Hydr Depth (ft)         *      11.03  *       9.48  *
* Min El Prs (ft)        *     797.85  * W.P. Total (ft)         *    1919.60  *    2893.17  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)       *  1199738.0  *  1626165.0  *
* Delta WS (ft)          *      -0.08  * Top Width (ft)          *    2201.86  *    2203.13  *
* BR Open Area (sq ft)   *    3013.16  * Frctn Loss (ft)         *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       2.86  * C & E Loss (ft)         *       0.03  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       0.47  *       0.26  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)   *       1.35  *       0.49  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     815.51  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     815.32  * E.G. Elev (ft)         *     815.49  *     815.45  *
* Q Total (cfs)          *   47000.00  * W.S. Elev (ft)         *     815.36  *     815.40  *
* Q Bridge (cfs)         *    6640.59  * Crit W.S. (ft)         *     797.85  *     797.85  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *      37.79  *      37.83  *
```

* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	*	2.57	* 1.60 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	*	18280.72	* 29356.97 *
* Weir Submerg	*	* Froude # Chl	*	0.08	* 0.05 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	*	188632.10	* 254255.40 *
* Min El Weir Flow (ft)	* 795.51	* Hydr Depth (ft)	*	14.60	* 12.99 *
* Min El Prs (ft)	* 797.85	* W.P. Total (ft)	*	1941.92	* 2950.64 *
* Delta EG (ft)	* 0.06	* Conv. Total (cfs)	*	1847157.0	* 2671668.0 *
* Delta WS (ft)	* -0.08	* Top Width (ft)	*	2259.14	* 2259.95 *
* BR Open Area (sq ft)	* 3013.16	* Frctn Loss (ft)	*	0.01	* 0.00 *
* BR Open Vel (ft/s)	* 2.20	* C & E Loss (ft)	*	0.02	* 0.00 *
* Coef of Q	*	* Shear Total (lb/sq ft)	*	0.38	* 0.19 *
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	*	0.98	* 0.31 *

Note: The weir over a bridge is submerged, the energy answer was used.
Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

* E.G. US. (ft)	* 802.30	* Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (ft)	* 801.99	* E.G. Elev (ft)	* 802.30	* 802.20	*
* Q Total (cfs)	* 20700.00	* W.S. Elev (ft)	* 801.99	* 801.89	*
* Q Bridge (cfs)	* 12357.20	* Crit W.S. (ft)	* 791.60	* 791.60	*
* Q Weir (cfs)	* 8342.80	* Max Chl Dpth (ft)	* 24.42	* 24.32	*
* Weir Sta Lft (ft)	* 850.00	* Vel Total (ft/s)	* 4.16	* 4.19	*
* Weir Sta Rgt (ft)	* 1770.00	* Flow Area (sq ft)	* 4979.17	* 4935.49	*
* Weir Submerg	* 0.95	* Froude # Chl	* 0.18	* 0.18	*
* Weir Max Depth (ft)	* 6.80	* Specif Force (cu ft)	* 42616.91	* 42155.13	*
* Min El Weir Flow (ft)	* 795.51	* Hydr Depth (ft)	* 11.45	* 11.35	*
* Min El Prs (ft)	* 797.85	* W.P. Total (ft)	* 1112.01	* 1111.91	*
* Delta EG (ft)	* 0.10	* Conv. Total (cfs)	*	*	*
* Delta WS (ft)	* 0.10	* Top Width (ft)	* 833.87	* 830.25	*
* BR Open Area (sq ft)	* 3013.16	* Frctn Loss (ft)	*	*	*
* BR Open Vel (ft/s)	* 4.10	* C & E Loss (ft)	*	*	*
* Coef of Q	*	* Shear Total (lb/sq ft)	*	*	*
* Br Sel Method	* Press/Weir	* Power Total (lb/ft s)	*	*	*

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.
Note: For the cross section inside the bridge at the upstream end, the water surface and energy have been projected from the upstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: For the cross section inside the bridge at the downstream end, the water surface and energy have been projected from the downstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 23.030

INPUT
Description: Downstream side of Red Bridge, copied from upstream side

Station Elevation Data num= 362

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850.51	17.68	850.12	25.68	849.55	63.87	847.84	77.28	846.97
79.85	846.81	93.66	846.08	120.82	844.49	137.69	843.7	150.34	842.03
158.67	840.2	163.64	839.11	173.75	840.33	175.49	840.52	193.1	840.24
194.71	840.21	196.4	840.17	209.43	839.42	217.1	839.12	221.11	838.7
225.31	838.27	231.12	837.6	250.85	834.16	265.77	831.64	276.84	829.37
286.37	827.53	308.8	822.73	310.57	822.13	311.27	821.97	311.78	821.89
358.14	812.09	374.68	810.77	389.76	808.74	401.91	806.22	422	804.67
432.81	803.14	466.04	800.44	468.03	800.36	468.5	800.37	484.59	800.56
500.3	800.7	504.3	800.77	510.13	800.28	537.04	799.91	544.61	800.2
559.71	800	574.91	798.25	576.98	797.79	580.7	797.2	584.6	796.7
591.55	795.75	600.15	794.75	611.17	795.61	624.5	796.61	630.72	797.08
635.5	800.22	640.69	801.69	645.64	803.92	656.24	808.29	665.03	809.34
668.03	809.69	673.95	809.4	675.98	809.31	680.18	808.99	690.52	808.26
708.82	801.39	712.52	800	714.93	799.14	721.85	796.7	739.26	795.95
753.29	795.87	761.99	795.88	767.54	795.88	780.76	795.86	783.47	795.86
809.27	795.74	823.97	795.76	836.71	795.33	842.9	795.18	851.51	794.92
857.67	794.73	861.79	794.16	864.4	793.72	864.77	792.98	870.76	785.73
874.39	785.97	890.4	786.97	894.57	786.84	901.82	786.63	913.09	786.38
926.24	786.05	931.72	787.56	946.59	790.77	957.47	793.92	963.61	795.58
972.66	797.89	979.6	797.94	990.76	797.96	990.82	797.96	990.86	797.96
1007.88	797.4	1016.42	797.17	1026.81	796.64	1033.03	795.86	1045.92	795.35
1054.75	795	1076.39	793.15	1086.27	792.79	1100.55	792	1103.13	792.12
1112.58	790.02	1113.7	790.08	1114.64	789.28	1115.35	789.29	1132.15	789.6
1161.66	789.22	1164.57	788.96	1195.65	788.67	1206.03	788.7	1219.59	788.91
1232.43	788.69	1244.3	788.94	1259	789.05	1260.77	789.06	1263.57	789.09
1271.49	787.21	1278.65	785.51	1282.09	784.18	1293.06	778.74	1293.14	778.7
1293.22	778.65	1297	779.52	1300	778.19	1324	778.85	1338	777.57
1347	778.86	1363	780.19	1368	778.15	1373	778.5	1384.58	778.65
1385.78	780.22	1386.9	780.65	1397.87	787.71	1404.31	792.65	1405.37	793.46
1410.98	793.67	1415.13	793.88	1426.54	793.81	1428.3	793.83	1430.98	793.82
1449.03	793.56	1451.23	793.53	1466.65	793.27	1494.99	793.16	1498.62	793.11
1531.13	793.05	1533.3	793.04	1536.52	793.01	1557.12	793.06	1572.59	793.44
1576.21	793.44	1611.89	793.39	1616.22	793.39	1662.73	793.05	1663.54	793.04
1663.66	793.04	1677.5	793.82	1683.66	794.01	1693.09	794.83	1699.11	794.91
1699.4	794.92	1708.38	795	1724.33	794.72	1735.17	794.53	1737.9	794.48
1740.2	794.16	1749.32	793.12	1759.99	790.98	1764.66	790.27	1767.11	790.28
1773.95	790.28	1786.97	790.28	1797.95	790.32	1820.29	790.42	1835.79	790.45
1853.64	790.44	1855.43	790.34	1857.65	790.51	1876.44	790.8	1922.21	791.01
1925.22	791.04	1965.93	791.86	1978.94	792.17	2012.24	792.66	2024.84	792.79
2032.36	792.68	2058.44	792.92	2069.56	792.98	2073.68	792.97	2078.22	793.01
2092.39	792.96	2102.39	792.95	2106.76	792.98	2137.86	792.57	2141.13	792.51
2141.57	792.51	2141.97	792.51	2162.8	792.4	2165.05	792.38	2174.13	792.14
2205.99	791.74	2215.63	791.65	2221.51	791.59	2239.38	791.46	2240.92	791.43
2243.28	791.39	2257.18	791.41	2274.47	791.47	2293.88	791.79	2316.5	792.23
2331.51	792.91	2345.11	793.23	2362.87	793.55	2367.2	793.59	2370.27	795.17
2377.1	799.35	2385.97	803.5	2387.6	804.41	2390.07	805.23	2395.76	804.45
2401.54	803.83	2408.82	802.31	2413.62	801.79	2425.27	800.25	2427.7	799.83
2436.16	798.81	2444.47	799.34	2445.47	799.61	2458.92	801.39	2473.97	802.81
2481.94	803.38	2484.97	803.75	2494.7	804.33	2512.86	807.32	2527.09	808.39
2553.02	810.01	2564.63	811.46	2583.22	812.58	2592.78	813.86	2594.68	814.53
2600.05	815.23	2607.35	815.77	2613.39	816.65	2619.39	817.08	2623.66	817.84
2628.36	818.39	2637.62	819.09	2645.41	819.93	2652.62	820.48	2664.58	821.32
2671.35	821.84	2676.22	822.22	2689.73	822.93	2695.68	823.13	2700.05	823.32
2709.45	823.61	2712.49	823.81	2716.27	824.16	2739.69	824.72	2744.46	824.98
2746.66	825	2768.97	824.6	2772.11	824.58	2803.26	823.75	2804.54	823.72
2804.6	823.71	2804.73	823.7	2814.35	822.99	2822.19	822.93	2833.34	822.86
2834.02	822.91	2843.19	823.47	2845.9	823.64	2858.69	824.24	2863.08	824.3
2865.59	824.53	2879.1	825.15	2892.43	825.68	2900.29	825.94	2914.08	826.49
2918.32	826.83	2929.16	827.6	2934.03	827.98	2944.75	828.74	2947.77	829.26
2967.45	830.72	2973.65	831.1	2977.05	831.21	2992.19	831.96	2997.88	832.38
3003.24	832.51	3016.8	833.18	3023.45	832.91	3037.62	833.64	3042.78	833.36
3049.06	832.64	3056.44	831.9	3067.81	832.29	3073.96	831.52	3079.27	831.61
3085.2	831.53	3090.02	831.6	3098.9	831.55	3105.81	831.71	3118.4	831.9
3131.22	831.72	3136.22	831.61	3138.95	831.62	3149.61	831.41	3151.31	831.32
3159.11	831.23	3161.68	831.18	3162.57	831.13	3175.8	830.42	3183.94	830.04
3191.08	829.96	3205.16	829.32	3213.9	829.26	3216.79	829.24	3223.2	829.17
3230.98	829.08	3231.96	829.06	3238.9	829.43	3244.6	829.53	3270.89	830.1
3274.36	830.16	3276.51	830.21	3301.87	830.38	3303.25	830.46	3316.55	831.32
3317.37	831.4	3319.9	831.96	3322.77	833.03	3323.99	833.13	3329.19	833.74
3333.47	834.67	3334.88	835.1	3342.68	837.7	3351.36	838.48	3356.53	839.01
3361.62	841.06	3362.75	841.35	3364.93	841.5	3379.5	843.05	3389.86	845.01
3395.12	846.78	3396.54	847.14	3406.28	849.2	3413.36	852.33	3423.21	856.85
3425.1	857.45	3437.39	859.51						

```
Manning's n Values         num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .105  656.24      .1 1016.42    .095 1260.77     .04 1404.31    .099
 1494.99     .07 1797.95    .105 2445.47      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1260.77 1404.31            640.2     640   786.5             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
    1770    3000     810       F
    1600    1770   795.5       T
     850    1115     797       T
    1405    1600     802       T
     675     850     810       F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     350     670   809.5    2390    2515     805

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  791.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.             *   0.095  *   0.040  *          *
* W.S. Elev (ft)          *  791.51  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)          *  784.02  * Flow Area (sq ft)      *  362.60  * 1494.21  *          *
* E.G. Slope (ft/ft)      *0.000629  * Area (sq ft)           *  728.41  * 1494.21  *  165.53  *
* Q Total (cfs)           * 6725.00  * Flow (cfs)             *  261.01  * 6463.99  *          *
* Top Width (ft)          *  616.16  * Top Width (ft)         *  238.07  *  142.06  *  236.03  *
* Vel Total (ft/s)        *    3.62  * Avg. Vel. (ft/s)       *    0.72  *    4.33  *          *
* Max Chl Dpth (ft)       *   13.94  * Hydr. Depth (ft)       *    2.49  *   10.52  *          *
* Conv. Total (cfs)       *268245.3  * Conv. (cfs)            * 10411.0  *257834.3  *          *
* Length Wtd. (ft)        *  640.96  * Wetted Per. (ft)       *  145.79  *  149.25  *          *
* Min Ch El (ft)          *  777.57  * Shear (lb/sq ft)       *    0.10  *    0.39  *          *
* Alpha                   *    1.37  * Stream Power (lb/ft s) *    0.07  *    1.70  *          *
* Frctn Loss (ft)         *    0.49  * Cum Volume (acre-ft)   *  829.55  * 6374.25  *  797.61  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  175.93  *  477.56  *  196.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  796.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.37  * Wt. n-Val.             *   0.095  *   0.040  *   0.073  *
* W.S. Elev (ft)          *  795.76  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)          *  786.53  * Flow Area (sq ft)      *  981.87  * 2103.16  *   46.16  *
* E.G. Slope (ft/ft)      *0.000574  * Area (sq ft)           * 1944.33  * 2103.16  * 3194.72  *
* Q Total (cfs)           *12150.00  * Flow (cfs)             * 1311.90  *10827.75  *   10.35  *
* Top Width (ft)          * 1494.97  * Top Width (ft)         *  384.50  *  143.54  *  966.92  *
* Vel Total (ft/s)        *    3.88  * Avg. Vel. (ft/s)       *    1.34  *    5.15  *    0.22  *
* Max Chl Dpth (ft)       *   18.19  * Hydr. Depth (ft)       *    6.74  *   14.65  *    0.27  *
* Conv. Total (cfs)       *507232.0  * Conv. (cfs)            * 54768.4  *452031.3  *   432.2  *
* Length Wtd. (ft)        *  646.41  * Wetted Per. (ft)       *  145.79  *  151.12  *  171.28  *
* Min Ch El (ft)          *  777.57  * Shear (lb/sq ft)       *    0.24  *    0.50  *    0.01  *
* Alpha                   *    1.58  * Stream Power (lb/ft s) *    0.32  *    2.57  *    0.00  *
* Frctn Loss (ft)         *    0.46  * Cum Volume (acre-ft)   * 1865.67  * 8475.22  * 1899.86  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  281.19  *  517.72  *  302.62  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  797.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.39  * Wt. n-Val.             *   0.095  *   0.040  *   0.070  *
* W.S. Elev (ft)          *  797.05  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)          *  787.08  * Flow Area (sq ft)      * 1179.70  * 2288.06  *  266.04  *
* E.G. Slope (ft/ft)      *0.000541  * Area (sq ft)           * 2543.53  * 2288.06  * 4441.67  *
* Q Total (cfs)           *13500.00  * Flow (cfs)             * 1222.28  *12101.87  *  175.86  *
* Top Width (ft)          * 1603.03  * Top Width (ft)         *  490.46  *  143.54  *  969.03  *
```

```
* Vel Total (ft/s)       *    3.62  * Avg. Vel. (ft/s)       *    1.04  *    5.29  *    0.66  *
* Max Chl Dpth (ft)      *   19.48  * Hydr. Depth (ft)       *    3.26  *   15.94  *    1.56  *
* Conv. Total (cfs)      *580289.7  * Conv. (cfs)            * 52538.8  *520191.8  *  7559.1  *
* Length Wtd. (ft)       *  648.97  * Wetted Per. (ft)       *  367.46  *  151.12  *  171.28  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.11  *    0.51  *    0.05  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.11  *    2.71  *    0.03  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   * 2677.28  *10127.84  * 2893.18  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  337.63  *  545.69  *  401.97  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  801.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.096  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  800.85  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)         *  789.81  * Flow Area (sq ft)      * 2708.22  * 2833.81  *  915.01  *
* E.G. Slope (ft/ft)     *0.000420  * Area (sq ft)           * 4586.21  * 2833.81  * 8138.36  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 3252.53  *15232.87  * 1214.60  *
* Top Width (ft)         * 1670.05  * Top Width (ft)         *  550.51  *  143.54  *  976.00  *
* Vel Total (ft/s)       *    3.05  * Avg. Vel. (ft/s)       *    1.20  *    5.38  *    1.33  *
* Max Chl Dpth (ft)      *   23.28  * Hydr. Depth (ft)       *    6.59  *   19.74  *    5.36  *
* Conv. Total (cfs)      *960917.9  * Conv. (cfs)            *158650.4  *743022.1  * 59245.4  *
* Length Wtd. (ft)       *  655.97  * Wetted Per. (ft)       *  417.03  *  151.12  *  171.28  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.17  *    0.49  *    0.14  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    0.20  *    2.64  *    0.19  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 4018.55  *11910.86  * 4465.90  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  463.09  *  568.64  *  527.14  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  805.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.096  *   0.040  *   0.072  *
* W.S. Elev (ft)         *  805.40  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)         *  792.05  * Flow Area (sq ft)      * 4578.57  * 3487.39  * 2355.90  *
* E.G. Slope (ft/ft)     *0.000305  * Area (sq ft)           * 7120.46  * 3487.39  *12648.60  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 6293.05  *18341.65  * 3065.31  *
* Top Width (ft)         * 1803.09  * Top Width (ft)         *  562.64  *  143.54  * 1096.91  *
* Vel Total (ft/s)       *    2.66  * Avg. Vel. (ft/s)       *    1.37  *    5.26  *    1.30  *
* Max Chl Dpth (ft)      *   27.83  * Hydr. Depth (ft)       *   11.15  *   24.30  *    6.44  *
* Conv. Total (cfs)      *1585839.0  * Conv. (cfs)            *360280.3  *1050069.0  *175490.3  *
* Length Wtd. (ft)       *  662.30  * Wetted Per. (ft)       *  417.03  *  151.12  *  366.40  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.21  *    0.44  *    0.12  *
* Alpha                  *    2.68  * Stream Power (lb/ft s) *    0.29  *    2.31  *    0.16  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   * 6691.64  *14615.87  * 7611.95  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  814.91  *  596.65  *  957.73  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  808.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.096  *   0.040  *   0.073  *
* W.S. Elev (ft)         *  808.54  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)         *  793.22  * Flow Area (sq ft)      * 5866.66  * 3937.50  * 3502.63  *
* E.G. Slope (ft/ft)     *0.000239  * Area (sq ft)           * 8898.34  * 3937.50  *16123.55  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 8313.62  *19876.46  * 5069.93  *
* Top Width (ft)         * 1842.92  * Top Width (ft)         *  574.21  *  143.54  * 1125.17  *
* Vel Total (ft/s)       *    2.50  * Avg. Vel. (ft/s)       *    1.42  *    5.05  *    1.45  *
* Max Chl Dpth (ft)      *   30.97  * Hydr. Depth (ft)       *   14.28  *   27.43  *    9.58  *
* Conv. Total (cfs)      *2151137.0  * Conv. (cfs)            *537694.8  *1285538.0  *327904.5  *
* Length Wtd. (ft)       *  666.71  * Wetted Per. (ft)       *  417.03  *  151.12  *  366.40  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.21  *    0.39  *    0.14  *
* Alpha                  *    2.57  * Stream Power (lb/ft s) *    0.30  *    1.96  *    0.21  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 9429.81  *16254.27  *10783.23  *
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* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1083.27  *  603.68  * 1368.39  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  811.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.097  *   0.040  *   0.094  *
* W.S. Elev (ft)         *  811.61  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)         *  794.35  * Flow Area (sq ft)      *10117.68  * 4378.34  *17625.29  *
* E.G. Slope (ft/ft)     *0.000084  * Area (sq ft)           *11324.52  * 4378.34  *19644.47  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 8628.74  *14076.79  *16394.47  *
* Top Width (ft)         * 2202.98  * Top Width (ft)         *  896.62  *  143.54  * 1162.82  *
* Vel Total (ft/s)       *    1.22  * Avg. Vel. (ft/s)       *    0.85  *    3.22  *    0.93  *
* Max Chl Dpth (ft)      *   34.04  * Hydr. Depth (ft)       *   11.28  *   30.50  *   15.16  *
* Conv. Total (cfs)      *4261594.0  * Conv. (cfs)            *940465.6  *1534260.0  *1786869.0  *
* Length Wtd. (ft)       *  687.26  * Wetted Per. (ft)       *  905.15  *  151.12  * 1166.84  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.06  *    0.15  *    0.08  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    0.05  *    0.49  *    0.07  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *12008.98  *17362.30  *13895.94  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1267.46  *  604.58  * 1766.63  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  815.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *   0.098  *   0.040  *   0.094  *
* W.S. Elev (ft)         *  815.39  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)         *  796.18  * Flow Area (sq ft)      *13554.87  * 4921.07  *22100.92  *
* E.G. Slope (ft/ft)     *0.000065  * Area (sq ft)           *14761.71  * 4921.07  *24120.09  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *11266.09  *15079.65  *20654.26  *
* Top Width (ft)         * 2259.71  * Top Width (ft)         *  918.25  *  143.54  * 1197.92  *
* Vel Total (ft/s)       *    1.16  * Avg. Vel. (ft/s)       *    0.83  *    3.06  *    0.93  *
* Max Chl Dpth (ft)      *   37.82  * Hydr. Depth (ft)       *   14.76  *   34.28  *   18.45  *
* Conv. Total (cfs)      *5810161.0  * Conv. (cfs)            *1392719.0  *1864154.0  *2553289.0  *
* Length Wtd. (ft)       *  689.75  * Wetted Per. (ft)       *  927.14  *  151.12  * 1202.23  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.06  *    0.13  *    0.08  *
* Alpha                  *    2.66  * Stream Power (lb/ft s) *    0.05  *    0.41  *    0.07  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *16994.06  *19030.64  *19449.22  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1543.17  *  607.11  * 2166.09  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  802.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.096  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  801.89  * Reach Len. (ft)        *  640.20  *  640.00  *  786.50  *
* Crit W.S. (ft)         *  790.19  * Flow Area (sq ft)      * 3133.88  * 2982.56  * 1091.89  *
* E.G. Slope (ft/ft)     *0.000363  * Area (sq ft)           * 5158.11  * 2982.56  * 9150.89  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 3774.82  *15410.21  * 1514.97  *
* Top Width (ft)         * 1675.02  * Top Width (ft)         *  553.27  *  143.54  *  978.21  *
* Vel Total (ft/s)       *    2.87  * Avg. Vel. (ft/s)       *    1.20  *    5.17  *    1.39  *
* Max Chl Dpth (ft)      *   24.32  * Hydr. Depth (ft)       *    7.63  *   20.78  *    6.40  *
* Conv. Total (cfs)      *1086908.0  * Conv. (cfs)            *198207.0  *809153.6  * 79547.3  *
* Length Wtd. (ft)       *  657.58  * Wetted Per. (ft)       *  417.03  *  151.12  *  171.28  *
* Min Ch El (ft)         *  777.57  * Shear (lb/sq ft)       *    0.17  *    0.45  *    0.14  *
* Alpha                  *    2.46  * Stream Power (lb/ft s) *    0.20  *    2.31  *    0.20  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 4786.31  *12822.19  * 5342.24  *
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* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  558.52  *  578.90  *  603.32  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 22.909

INPUT
Description:
Station Elevation Data    num=     195
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  863.67    4.67  863.83   14.24  864.02   22.63  863.84   32.33  863.36
    41.8  863.17   60.68  862.67    68.1  863.19   97.73  861.39  105.08  860.61
  109.75  860.26  152.53  849.95   153.4  849.75  153.61  849.71  154.28  849.23
  220.05  803.17  225.56  804.38  233.07  806.12  243.29  806.63  243.69  806.65
  244.01   806.6   250.2  805.74  255.95  805.07  266.61  803.65  278.48  799.05
  284.56  797.09   294.5  795.39  320.25  791.12  332.42  791.43  365.45  791.38
   412.6  791.79  413.12  791.79  413.91  791.79  458.14  791.72  471.54   791.8
  482.22  791.84   506.9  791.67  514.84  787.39   531.4  778.45  537.29  776.39
  594.71  776.39  596.66  777.97  603.71  782.68  613.32  788.53  618.72  788.48
  630.63  788.36  630.89  788.36   631.3  788.37   653.9  789.34  662.74  789.72
  662.96  789.73  663.44  789.73  701.89  789.89  716.12   789.9  728.99  789.87
  761.87  791.15  768.65  791.42  770.86  792.03  781.49  794.53  793.78  794.68
  803.93  794.79   832.3  793.66  840.81  793.36   846.5  793.39  883.79  793.59
  918.26   793.9  942.56  794.41  948.74  794.57  976.76  794.92  996.15  795.51
 1014.89  796.19 1040.69  797.34 1058.91  798.48 1073.08   799.4 1100.97  801.03
 1111.19  802.62 1120.67  804.29 1155.78  807.75 1156.27   807.8  1156.4   807.8
 1194.67  808.81 1215.15  808.67  1263.7  808.85 1281.66  808.93 1288.95  808.86
 1320.44  808.64 1336.95  808.83 1376.82  808.92 1387.39  808.91 1437.25   808.4
 1465.19  808.42 1469.01  808.39 1472.17  808.36 1502.43  808.36 1515.44  808.41
 1527.89   808.4 1560.19  808.56  1571.3  808.55 1585.87  809.27 1602.39  809.97
 1616.43  810.21 1651.55  811.46 1652.82  811.55 1654.25  811.66 1675.61   812.6
 1705.26  815.03 1709.18  815.34 1712.55  815.72  1751.4  818.88  1770.9  821.11
 1785.32  822.84 1789.24   823.3 1803.63  825.16 1804.49  825.21 1812.12  826.22
 1816.67  826.75 1816.97  826.77 1828.62  827.53 1830.59  827.59 1847.07  828.24
  1852.1  828.36 1862.44  828.77 1867.87  829.04 1889.74   829.3  1893.2  829.38
 1896.85   829.3  1901.7  829.32 1924.56  828.98  1928.3  828.71    1931  828.33
  1941.9  827.21 1966.08  825.66 1975.16  825.02 2001.19  823.45 2015.72  822.59
 2020.33  822.35 2041.43  822.34  2049.6  822.03 2064.92  821.24 2088.76  819.87
 2089.35  819.84 2090.28   819.8 2109.52  819.22 2145.01  818.18 2146.69  818.18
 2150.76  818.22 2199.83  818.86  2217.7  819.55 2239.92  820.11 2242.94  820.27
 2245.06   820.4 2272.62   821.3 2281.39  821.66  2314.7  823.89 2341.44   825.3
 2365.07  826.76 2402.03  828.73 2422.12  829.79  2446.8  830.84  2491.3   833.1
 2530.47   835.3 2542.83  835.58 2579.15  836.55 2594.83  836.96 2607.92  837.37
 2652.13  838.44 2693.92  839.58 2708.35   839.8 2720.76  839.13 2723.54  838.92
 2726.32  838.92 2738.02  838.91 2748.31  839.06 2749.83  839.08 2750.28  839.09
 2761.01  839.51 2795.65  842.59 2803.67  843.27 2806.07   843.4 2832.42  844.51
 2846.25   845.5 2850.97  845.72 2860.25  845.79 2890.35   845.6 2927.37  846.93
 2927.49  846.93 2927.62  846.94 2943.87  848.84  2946.6  849.13 2958.56   849.7
 2971.97  850.88 2981.33  851.07 2989.56  851.02 3004.15  850.98 3005.81  850.93

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .105   506.9     .04  613.32    .105  976.76     .06 2750.28      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         506.9  613.32           836.84  759.76  692.74             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     440     815       F
     785 3005.81     815       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  791.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.              *          *   0.040  *   0.105  *
* W.S. Elev (ft)         *  790.82  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  783.32  * Flow Area (sq ft)      *          * 1199.46  *  174.29  *
* E.G. Slope (ft/ft)     *0.000939  * Area (sq ft)           *          * 1199.46  *  174.29  *
```

```
* Q Total (cfs)          * 6725.00  * Flow (cfs)              *          * 6637.52  *   87.48  *
* Top Width (ft)         *  244.79  * Top Width (ft)          *          *  104.83  *  139.96  *
* Vel Total (ft/s)       *    4.90  * Avg. Vel. (ft/s)        *          *    5.53  *    0.50  *
* Max Chl Dpth (ft)      *   14.43  * Hydr. Depth (ft)        *          *   11.44  *    1.25  *
* Conv. Total (cfs)      *219422.1  * Conv. (cfs)             *          *216567.8  *  2854.3  *
* Length Wtd. (ft)       *  759.47  * Wetted Per. (ft)        *          *  111.94  *  140.00  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)        *          *    0.63  *    0.07  *
* Alpha                  *    1.26  * Stream Power (lb/ft s)  *          *    3.48  *    0.04  *
* Frctn Loss (ft)        *    0.60  * Cum Volume (acre-ft)    *  824.19  * 6354.46  *  794.54  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *  174.18  *  475.74  *  193.12  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  795.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.              *   0.105  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  795.04  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  786.34  * Flow Area (sq ft)      *  219.19  * 1648.05  *  853.12  *
* E.G. Slope (ft/ft)     *0.000896  * Area (sq ft)           *  683.48  * 1648.05  * 1040.75  *
* Q Total (cfs)          *12150.00  * Flow (cfs)              *  204.86  *10894.31  * 1050.83  *
* Top Width (ft)         *  683.98  * Top Width (ft)          *  210.27  *  106.42  *  367.29  *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)        *    0.93  *    6.61  *    1.23  *
* Max Chl Dpth (ft)      *   18.65  * Hydr. Depth (ft)        *    3.28  *   15.49  *    4.97  *
* Conv. Total (cfs)      *405813.0  * Conv. (cfs)             *  6842.4  *363872.6  * 35098.0  *
* Length Wtd. (ft)       *  756.42  * Wetted Per. (ft)        *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)        *    0.18  *    0.81  *    0.28  *
* Alpha                  *    1.97  * Stream Power (lb/ft s)  *    0.17  *    5.36  *    0.34  *
* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)    * 1846.36  * 8447.66  * 1861.63  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *  276.82  *  515.88  *  290.57  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  797.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *   0.105  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  796.43  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  787.00  * Flow Area (sq ft)      *  312.57  * 1796.60  * 1092.77  *
* E.G. Slope (ft/ft)     *0.000773  * Area (sq ft)           *  982.77  * 1796.60  * 1583.04  *
* Q Total (cfs)          *13500.00  * Flow (cfs)              *  343.72  *11682.02  * 1474.27  *
* Top Width (ft)         *  731.94  * Top Width (ft)          *  218.50  *  106.42  *  407.02  *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)        *    1.10  *    6.50  *    1.35  *
* Max Chl Dpth (ft)      *   20.04  * Hydr. Depth (ft)        *    4.67  *   16.88  *    6.37  *
* Conv. Total (cfs)      *485549.1  * Conv. (cfs)             * 12362.3  *420162.4  * 53024.3  *
* Length Wtd. (ft)       *  755.55  * Wetted Per. (ft)        *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)        *    0.23  *    0.76  *    0.31  *
* Alpha                  *    2.07  * Stream Power (lb/ft s)  *    0.25  *    4.96  *    0.41  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)    * 2651.37  *10097.83  * 2838.79  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *  332.42  *  543.86  *  389.54  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  800.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.              *   0.105  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  800.17  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  790.13  * Flow Area (sq ft)      *  562.61  * 2194.35  * 1734.43  *
* E.G. Slope (ft/ft)     *0.000721  * Area (sq ft)           * 1826.91  * 2194.35  * 3234.83  *
* Q Total (cfs)          *19700.00  * Flow (cfs)              *  883.92  *15741.84  * 3074.24  *
* Top Width (ft)         *  810.68  * Top Width (ft)          *  231.31  *  106.42  *  472.94  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)        *    1.57  *    7.17  *    1.77  *
* Max Chl Dpth (ft)      *   23.78  * Hydr. Depth (ft)        *    8.41  *   20.62  *   10.10  *
* Conv. Total (cfs)      *733813.1  * Conv. (cfs)             * 32925.6  *586373.9  *114513.5  *
* Length Wtd. (ft)       *  753.85  * Wetted Per. (ft)        *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)        *    0.38  *    0.87  *    0.45  *
* Alpha                  *    2.17  * Stream Power (lb/ft s)  *    0.59  *    6.23  *    0.80  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)    * 3971.42  *11873.93  * 4363.23  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *  457.35  *  566.81  *  514.06  *
```

```
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  805.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.105  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  804.67  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  793.36  * Flow Area (sq ft)      *  863.34  * 2672.72  * 2506.15  *
* E.G. Slope (ft/ft)     *0.000642  * Area (sq ft)           * 2901.97  * 2672.72  * 5461.78  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1703.11  *20638.53  * 5358.37  *
* Top Width (ft)         *  874.38  * Top Width (ft)         *  256.79  *  106.42  *  511.16  *
* Vel Total (ft/s)       *    4.58  * Avg. Vel. (ft/s)       *    1.97  *    7.72  *    2.14  *
* Max Chl Dpth (ft)      *   28.28  * Hydr. Depth (ft)       *   12.90  *   25.11  *   14.60  *
* Conv. Total (cfs)      *1093256.0  * Conv. (cfs)           * 67217.9  *814555.6  *211482.5  *
* Length Wtd. (ft)       *  752.54  * Wetted Per. (ft)       *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)       *    0.52  *    0.94  *    0.58  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    1.02  *    7.27  *    1.25  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   * 6617.99  *14570.62  * 7448.45  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  808.89  *  594.81  *  943.22  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  808.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.105  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  807.78  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  794.84  * Flow Area (sq ft)      * 1071.38  * 3003.66  * 3040.03  *
* E.G. Slope (ft/ft)     *0.000583  * Area (sq ft)           * 3769.92  * 3003.66  * 7100.43  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 2325.69  *23889.74  * 7044.57  *
* Top Width (ft)         *  942.56  * Top Width (ft)         *  293.43  *  106.42  *  542.71  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    2.17  *    7.95  *    2.32  *
* Max Chl Dpth (ft)      *   31.39  * Hydr. Depth (ft)       *   16.01  *   28.22  *   17.71  *
* Conv. Total (cfs)      *1377612.0  * Conv. (cfs)           * 96328.7  *989500.5  *291782.4  *
* Length Wtd. (ft)       *  752.03  * Wetted Per. (ft)       *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)       *    0.58  *    0.96  *    0.64  *
* Alpha                  *    2.15  * Stream Power (lb/ft s) *    1.27  *    7.64  *    1.49  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 9336.72  *16203.28  *10573.57  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1076.90  *  601.84  * 1353.34  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  811.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.105  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  810.73  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  796.07  * Flow Area (sq ft)      * 1268.72  * 3317.58  * 3546.46  *
* E.G. Slope (ft/ft)     *0.000546  * Area (sq ft)           * 4641.69  * 3317.58  * 9634.46  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 2984.62  *27297.83  * 8817.55  *
* Top Width (ft)         * 1421.64  * Top Width (ft)         *  297.64  *  106.42  * 1017.59  *
* Vel Total (ft/s)       *    4.81  * Avg. Vel. (ft/s)       *    2.35  *    8.23  *    2.49  *
* Max Chl Dpth (ft)      *   34.34  * Hydr. Depth (ft)       *   18.96  *   31.17  *   20.66  *
* Conv. Total (cfs)      *1672692.0  * Conv. (cfs)           *127681.6  *1167797.0  *377213.3  *
* Length Wtd. (ft)       *  751.79  * Wetted Per. (ft)       *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)       *    0.65  *    1.00  *    0.70  *
* Alpha                  *    2.12  * Stream Power (lb/ft s) *    1.52  *    8.19  *    1.75  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *11891.65  *17305.76  *13631.61  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1258.69  *  602.74  * 1746.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  815.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *   0.105  *   0.040  *   0.105  *
```

```
* W.S. Elev (ft)         *  814.46  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  797.55  * Flow Area (sq ft)      * 1518.85  * 3715.47  * 4188.35  *
* E.G. Slope (ft/ft)     *0.000510  * Area (sq ft)           * 5764.51  * 3715.47  *13587.60  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 3893.18  *31862.65  *11244.17  *
* Top Width (ft)         * 1494.43  * Top Width (ft)         *  302.98  *  106.42  * 1085.04  *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)       *    2.56  *    8.58  *    2.68  *
* Max Chl Dpth (ft)      *   38.07  * Hydr. Depth (ft)       *   22.70  *   34.91  *   24.40  *
* Conv. Total (cfs)      *2080516.0  * Conv. (cfs)           *172336.7  *1410442.0  *497737.8  *
* Length Wtd. (ft)       *  751.56  * Wetted Per. (ft)       *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)       *    0.72  *    1.04  *    0.78  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    1.85  *    8.93  *    2.08  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *16843.22  *18967.19  *19108.80  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1534.20  *  605.27  * 2145.48  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  801.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.105  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  801.25  * Reach Len. (ft)        *  836.84  *  759.76  *  692.74  *
* Crit W.S. (ft)         *  790.65  * Flow Area (sq ft)      *  634.70  * 2309.02  * 1919.42  *
* E.G. Slope (ft/ft)     *0.000646  * Area (sq ft)           * 2077.65  * 2309.02  * 3754.11  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 1023.42  *16229.36  * 3447.22  *
* Top Width (ft)         *  829.56  * Top Width (ft)         *  234.09  *  106.42  *  489.05  *
* Vel Total (ft/s)       *    4.26  * Avg. Vel. (ft/s)       *    1.61  *    7.03  *    1.80  *
* Max Chl Dpth (ft)      *   24.86  * Hydr. Depth (ft)       *    9.49  *   21.70  *   11.18  *
* Conv. Total (cfs)      *814166.0  * Conv. (cfs)            * 40252.9  *638328.3  *135584.9  *
* Length Wtd. (ft)       *  753.48  * Wetted Per. (ft)       *   66.90  *  113.74  *  172.11  *
* Min Ch El (ft)         *  776.39  * Shear (lb/sq ft)       *    0.38  *    0.82  *    0.45  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    0.62  *    5.76  *    0.81  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   * 4733.14  *12783.32  * 5225.73  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  552.73  *  577.06  *  590.07  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 22.765

INPUT
Description:
Station Elevation Data    num=     237
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0   859.3    3.19   858.8    6.39  858.26    8.25  857.68   36.62  848.91
   47.84  847.59   54.21  846.43   64.22  839.59    71.9  834.48  113.85  807.38
   133.8  796.58  136.12  795.41  145.01  796.29  147.49  796.54  148.27  796.49
  169.13  795.31  181.21  802.11  185.04  804.51  190.63  804.87  195.41  805.15
  201.41  805.06  204.59  805.02  211.69  803.19  211.93  803.13  212.51  802.91
  236.96  793.62  246.91  789.81  253.79  789.57  283.45  788.32  294.18  787.89
  296.97  787.78  299.94  787.65  314.26  781.54  326.74  776.19     360  775.34
  394.36  776.41  396.82  776.43  412.54  788.29  413.27  788.83   414.5  788.87
  439.25  789.41  445.33  789.31  464.28  788.96  467.94  788.84  470.61   788.8
  477.21  787.66   488.4  786.17  491.83  786.03   505.3  784.03  508.65  783.78
  519.97  783.56  524.84  783.55  537.76  783.51  537.79  783.51  537.86   783.5
  538.25  783.51  570.16  783.92  575.26  785.18  591.19  788.54  599.32  788.61
   609.6  788.64  615.27  788.68  620.79  788.75  636.49  788.66  654.14  788.71
  657.78  788.71   673.2  788.69  679.85  788.69  691.41  789.02  706.09  789.97
  714.28  790.36  728.35  790.93  734.15   791.2  748.86  794.14  758.18  795.24
  769.74  796.88   784.8  798.44  786.31  798.59  787.85  798.71  797.78  799.85
  799.12  799.82  807.39  800.25  811.01  800.34  819.67  800.55  823.31  801.83
  832.22  804.98  834.17  805.32  836.13  805.47  848.51  806.27  865.59  806.53
  885.62  806.65  890.01  806.71  935.13  807.18  949.97  807.23  993.98  807.43
 1030.87   807.5 1052.63  807.57 1103.36  807.62 1124.13  807.64 1210.37  808.21
 1213.26  808.23 1216.02  808.28 1236.16  808.57 1278.72  809.16 1288.82   809.4
 1348.41  812.32 1361.35  812.95 1362.34  813.03 1364.75  813.25  1431.2   819.2
 1466.66  822.46  1476.7  823.71 1488.31  824.65 1508.37  825.99 1535.19  827.83
  1542.7  828.37 1546.35   829.2 1561.41  832.21 1562.79  832.48 1563.23  832.54
 1577.35   833.3 1586.86  833.85 1595.89  834.28 1606.91  834.52 1618.62  835.06
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 1633.59  835.52 1644.99  836.31 1659.31  837.34 1676.95  838.15 1692.22  838.88
 1716.69  839.16 1733.57  839.51 1756.48  839.65 1776.86  839.55 1798.54  839.25
 1821.73  838.74  1839.2  838.34 1855.88   837.8  1879.8  837.23 1899.35  836.24
 1900.42  836.21 1912.61  835.73 1942.88  834.56 1944.17  834.47 1946.05  834.43
 1984.51  832.82 1990.62  832.42 2020.47  830.67 2027.74  830.28 2038.15  829.85
 2052.18  829.24 2073.29  828.23  2089.3  827.44 2112.54  826.22 2113.12   826.2
 2113.81  826.18 2135.08  825.48 2149.97  824.95 2155.49   824.8  2160.8  824.66
 2184.96  824.06 2220.58  823.69 2233.08  823.55 2236.68  823.52    2239  823.49
  2268.9  822.98 2288.34  822.66 2300.54  822.81  2322.4  823.88 2325.19  824.02
 2332.87  824.36 2361.29  824.95 2376.13  825.33  2380.3  825.35 2397.25  825.82
 2427.09  826.55 2436.11  826.96 2466.45  827.91 2477.03  828.24 2519.82  830.46
 2526.56  830.92  2542.7   831.6  2561.8  832.53 2573.77  833.21 2574.07  833.22
 2574.44  833.24 2575.51  833.29 2585.45  833.76 2595.84  833.23 2597.24  833.16
 2597.58  833.09  2606.7  831.67 2608.18  831.89 2613.01  832.63 2638.69  834.78
 2638.94   834.8 2638.98   834.8 2639.01   834.8 2639.23  834.81 2676.38  836.45
 2686.05   836.6 2689.99  836.39 2693.08  836.39 2729.01  836.63  2730.7   836.6
 2736.22  836.59 2748.44  836.28 2753.66  836.78 2770.58  838.46 2780.17   839.2
 2786.91  839.58 2803.89  840.39 2804.06   840.4 2814.85  842.09  2819.8   842.6
 2822.67   843.2 2833.21   845.5 2835.54  845.85 2839.97   846.9 2854.01  847.42
 2856.42   847.5 2857.18  847.52 2857.69  847.53 2860.23  847.81 2879.61  849.33
  2882.8  849.52 2887.71  849.61 2892.61  849.31 2898.03  849.24 2907.43  848.82
 2921.39  849.58 2937.77  850.93 2942.78  850.97 2949.54  851.03 2968.42  850.84
 2973.53  851.45 2973.62  851.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  299.94     .04  412.54    .105  848.51     .06 2573.77      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        299.94  412.54           1143.3  936.15  918.48             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     200     820       F
     450     585     790       T
     585    2800     820       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  790.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.37  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)          *  790.29  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)          *  782.14  * Flow Area (sq ft)      *   81.99  * 1360.75  *   80.21  *
* E.G. Slope (ft/ft)      *0.000675  * Area (sq ft)           *   81.99  * 1360.75  *  889.09  *
* Q Total (cfs)           * 6725.00  * Flow (cfs)             *   41.60  * 6665.77  *   17.64  *
* Top Width (ft)          *  467.04  * Top Width (ft)         *   54.27  *  112.60  *  300.16  *
* Vel Total (ft/s)        *    4.42  * Avg. Vel. (ft/s)       *    0.51  *    4.90  *    0.22  *
* Max Chl Dpth (ft)       *   14.94  * Hydr. Depth (ft)       *    1.51  *   12.08  *    0.47  *
* Conv. Total (cfs)       *258924.0  * Conv. (cfs)            *  1601.5  *256643.5  *   679.0  *
* Length Wtd. (ft)        *  936.75  * Wetted Per. (ft)       *   54.40  *  118.95  *  173.38  *
* Min Ch El (ft)          *  775.34  * Shear (lb/sq ft)       *    0.06  *    0.48  *    0.02  *
* Alpha                   *    1.22  * Stream Power (lb/ft s) *    0.03  *    2.36  *    0.00  *
* Frctn Loss (ft)         *    0.79  * Cum Volume (acre-ft)   *  823.41  * 6332.14  *  786.09  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  173.66  *  473.85  *  189.62  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  795.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.50  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)          *  794.54  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)          *  784.96  * Flow Area (sq ft)      *  336.35  * 1839.49  *  813.46  *
* E.G. Slope (ft/ft)      *0.000665  * Area (sq ft)           *  336.35  * 1839.49  * 2274.96  *
* Q Total (cfs)           *12150.00  * Flow (cfs)             *  380.46  *10937.59  *  831.94  *
* Top Width (ft)          *  517.67  * Top Width (ft)         *   65.39  *  112.60  *  339.68  *
* Vel Total (ft/s)        *    4.06  * Avg. Vel. (ft/s)       *    1.13  *    5.95  *    1.02  *
* Max Chl Dpth (ft)       *   19.20  * Hydr. Depth (ft)       *    5.14  *   16.34  *    4.72  *
* Conv. Total (cfs)       *471177.1  * Conv. (cfs)            * 14754.4  *424160.0  * 32262.7  *
* Length Wtd. (ft)        *  938.78  * Wetted Per. (ft)       *   66.31  *  118.95  *  173.38  *
* Min Ch El (ft)          *  775.34  * Shear (lb/sq ft)       *    0.21  *    0.64  *    0.19  *
* Alpha                   *    1.93  * Stream Power (lb/ft s) *    0.24  *    3.82  *    0.20  *
* Frctn Loss (ft)         *    0.75  * Cum Volume (acre-ft)   * 1836.56  * 8417.25  * 1835.26  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  274.17  *  513.97  *  284.95  *
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*****************************************************************************************
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  796.00  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)         *  785.56  * Flow Area (sq ft)      *  435.09  * 2004.65  * 1066.42  *
* E.G. Slope (ft/ft)     *0.000577  * Area (sq ft)           *  441.90  * 2004.65  * 2781.88  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  522.87  *11760.02  * 1217.11  *
* Top Width (ft)         *  553.54  * Top Width (ft)         *   89.91  *  112.60  *  351.02  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    1.20  *    5.87  *    1.14  *
* Max Chl Dpth (ft)      *   20.66  * Hydr. Depth (ft)       *    6.28  *   17.80  *    6.18  *
* Conv. Total (cfs)      *561938.1  * Conv. (cfs)            * 21764.7  *489511.4  * 50662.1  *
* Length Wtd. (ft)       *  939.66  * Wetted Per. (ft)       *   70.44  *  118.95  *  173.38  *
* Min Ch El (ft)         *  775.34  * Shear (lb/sq ft)       *    0.22  *    0.61  *    0.22  *
* Alpha                  *    2.03  * Stream Power (lb/ft s) *    0.27  *    3.56  *    0.25  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   * 2637.68  *10064.68  * 2804.08  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  329.46  *  541.95  *  383.51  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  800.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  799.76  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)         *  788.05  * Flow Area (sq ft)      *  713.75  * 2427.54  * 1714.13  *
* E.G. Slope (ft/ft)     *0.000563  * Area (sq ft)           *  875.48  * 2427.54  * 4160.72  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 1073.22  *15976.02  * 2650.75  *
* Top Width (ft)         *  625.29  * Top Width (ft)         *  128.24  *  112.60  *  384.45  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    1.50  *    6.58  *    1.55  *
* Max Chl Dpth (ft)      *   24.42  * Hydr. Depth (ft)       *    9.02  *   21.56  *    9.94  *
* Conv. Total (cfs)      *830440.8  * Conv. (cfs)            * 45241.1  *673458.9  *111740.8  *
* Length Wtd. (ft)       *  941.59  * Wetted Per. (ft)       *   81.01  *  118.95  *  173.38  *
* Min Ch El (ft)         *  775.34  * Shear (lb/sq ft)       *    0.31  *    0.72  *    0.35  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.47  *    4.72  *    0.54  *
* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)   * 3945.46  *11833.62  * 4304.42  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  453.89  *  564.90  *  507.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  804.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  804.30  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)         *  791.71  * Flow Area (sq ft)      * 1100.72  * 2938.39  * 2496.55  *
* E.G. Slope (ft/ft)     *0.000517  * Area (sq ft)           * 1522.10  * 2938.39  * 6017.40  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1901.22  *21045.59  * 4753.19  *
* Top Width (ft)         *  688.04  * Top Width (ft)         *  157.69  *  112.60  *  417.75  *
* Vel Total (ft/s)       *    4.24  * Avg. Vel. (ft/s)       *    1.73  *    7.16  *    1.90  *
* Max Chl Dpth (ft)      *   28.96  * Hydr. Depth (ft)       *   11.89  *   26.10  *   14.48  *
* Conv. Total (cfs)      *1218615.0  * Conv. (cfs)            * 83640.9  *925865.3  *209108.6  *
* Length Wtd. (ft)       *  943.46  * Wetted Per. (ft)       *   95.18  *  118.95  *  173.38  *
* Min Ch El (ft)         *  775.34  * Shear (lb/sq ft)       *    0.37  *    0.80  *    0.46  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.64  *    5.71  *    0.88  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 6575.50  *14521.69  * 7357.17  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  804.90  *  592.90  *  935.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
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* E.G. Elev (ft)         *  808.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  807.45  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)         *  793.19  * Flow Area (sq ft)      * 1411.01  * 3293.03  * 3039.72  *
* E.G. Slope (ft/ft)     *0.000473  * Area (sq ft)           * 2085.52  * 3293.03  * 7436.18  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 2614.81  *24334.71  * 6310.48  *
* Top Width (ft)         *  888.40  * Top Width (ft)         *  186.19  *  112.60  *  589.61  *
* Vel Total (ft/s)       *    4.30  * Avg. Vel. (ft/s)       *    1.85  *    7.39  *    2.08  *
* Max Chl Dpth (ft)      *   32.11  * Hydr. Depth (ft)       *   14.12  *   29.25  *   17.63  *
* Conv. Total (cfs)      *1530103.0  * Conv. (cfs)           *120292.4  *1119501.0  *290309.1  *
* Length Wtd. (ft)       *  944.24  * Wetted Per. (ft)       *  102.67  *  118.95  *  173.38  *
* Min Ch El (ft)         *  775.34  * Shear (lb/sq ft)       *    0.41  *    0.82  *    0.52  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.75  *    6.03  *    1.07  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 9280.47  *16148.37  *10457.98  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1072.29  *  599.93  * 1344.33  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  811.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  810.43  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)         *  794.47  * Flow Area (sq ft)      * 1708.96  * 3628.72  * 3553.87  *
* E.G. Slope (ft/ft)     *0.000443  * Area (sq ft)           * 2647.49  * 3628.72  * 9900.72  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 3483.08  *27691.35  * 7925.57  *
* Top Width (ft)         * 1200.64  * Top Width (ft)         *  190.81  *  112.60  *  897.23  *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)       *    2.04  *    7.63  *    2.23  *
* Max Chl Dpth (ft)      *   35.09  * Hydr. Depth (ft)       *   17.10  *   32.23  *   20.61  *
* Conv. Total (cfs)      *1858319.0  * Conv. (cfs)           *165541.4  *1316096.0  *376681.1  *
* Length Wtd. (ft)       *  946.36  * Wetted Per. (ft)       *  102.67  *  118.95  *  173.38  *
* Min Ch El (ft)         *  775.34  * Shear (lb/sq ft)       *    0.46  *    0.84  *    0.57  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.94  *    6.43  *    1.26  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *11821.63  *17245.18  *13476.28  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1254.00  *  600.83  * 1731.72  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  814.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  814.20  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)         *  795.97  * Flow Area (sq ft)      * 2085.91  * 4053.42  * 4204.35  *
* E.G. Slope (ft/ft)     *0.000413  * Area (sq ft)           * 3378.18  * 4053.42  *13423.05  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 4691.37  *32175.21  *10133.42  *
* Top Width (ft)         * 1272.05  * Top Width (ft)         *  196.64  *  112.60  *  962.80  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    2.25  *    7.94  *    2.41  *
* Max Chl Dpth (ft)      *   38.86  * Hydr. Depth (ft)       *   20.87  *   36.00  *   24.38  *
* Conv. Total (cfs)      *2311950.0  * Conv. (cfs)           *230770.6  *1582712.0  *498467.2  *
* Length Wtd. (ft)       *  948.76  * Wetted Per. (ft)       *  102.67  *  118.95  *  173.38  *
* Min Ch El (ft)         *  775.34  * Shear (lb/sq ft)       *    0.52  *    0.88  *    0.63  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    1.18  *    6.98  *    1.51  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   *16755.40  *18899.44  *18894.03  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1529.40  *  603.36  * 2129.20  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  801.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  800.88  * Reach Len. (ft)        * 1143.30  *  936.15  *  918.48  *
* Crit W.S. (ft)         *  788.43  * Flow Area (sq ft)      *  804.17  * 2553.85  * 1907.58  *
* E.G. Slope (ft/ft)     *0.000506  * Area (sq ft)           * 1023.26  * 2553.85  * 4607.26  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 1210.28  *16485.76  * 3003.96  *
* Top Width (ft)         *  655.93  * Top Width (ft)         *  135.26  *  112.60  *  408.07  *
* Vel Total (ft/s)       *    3.93  * Avg. Vel. (ft/s)       *    1.51  *    6.46  *    1.57  *
* Max Chl Dpth (ft)      *   25.54  * Hydr. Depth (ft)       *    9.80  *   22.68  *   11.06  *
* Conv. Total (cfs)      *920207.4  * Conv. (cfs)           * 53802.4  *732865.6  *133539.5  *
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* Length Wtd. (ft)       *  942.10  * Wetted Per. (ft)       *   84.17  *  118.95  *  173.38  *
* Min Ch El (ft)         *  775.34  * Shear (lb/sq ft)       *    0.30  *    0.68  *    0.35  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.45  *    4.38  *    0.55  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 4703.35  *12740.91  * 5159.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  549.18  *  575.15  *  582.94  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 22.588

INPUT
Description:
Station Elevation Data    num=     192
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  854.82    4.06  854.73   46.41  853.51   49.93  853.35   62.79  851.84
   74.98  850.88   90.18  849.45    99.2  846.25  129.89  840.38  140.95  837.89
  152.72  832.31  175.41  821.48  185.47  816.56   187.4  815.78  187.94  815.62
  189.11  815.31  193.86  813.99  205.82  810.43  211.35   809.2  231.89  804.09
  241.15  801.79  243.21  802.18  256.29  804.78  256.46   804.8  260.66  805.32
  263.97  805.73  265.26  805.68   273.3  805.43  275.23   805.2  281.75   804.4
  296.27  796.69  306.49  790.36  319.69   791.1  322.86  791.32  326.64  791.18
  346.77  790.65   350.6  790.55  365.24  780.75  374.74  775.38  376.04  775.38
  377.26  775.38     400  773.84  428.99  775.38  442.73  783.72  446.03  785.77
  447.13   786.4   448.1  786.47  459.32   787.3  465.38  787.69  480.94  788.62
  517.13  788.93  530.79  789.02  536.55  789.03   576.4  789.57  597.28  789.35
  601.05  789.29  639.93  790.36  645.57  790.49  646.54  790.53  647.67  790.52
  693.92  790.37  708.38  791.67  721.92  792.95  733.06  793.51  757.46  794.86
  763.12   795.1  776.37  795.54  824.37  797.32  848.37  797.84  870.83  798.42
  873.08  798.45  873.76   798.4  880.95  797.38  889.48     798  894.39  798.28
  902.69  798.76  941.39  801.44  949.11  801.88  988.22  804.56  989.06  804.62
  989.74  804.69 1014.68  805.94 1022.55  806.63 1071.75  808.95 1075.07  809.12
 1075.75  809.13  1076.4  809.14 1083.86  809.09 1129.01  808.78 1139.68  808.77
 1161.31  808.83 1187.22  808.86 1199.53   808.9 1200.87  808.91 1257.78   808.8
 1288.96  809.21  1360.2  809.95 1396.64  810.47 1436.32   810.7 1508.85  811.15
  1510.1  811.16 1512.57  811.17 1576.84  811.79 1642.67  812.76 1648.67  812.86
 1653.49  812.86  1729.7  813.07 1743.84   813.2 1780.04  813.76 1803.63  813.79
 1832.08  813.63 1891.81   813.5 1897.69  813.45 1915.27  813.56 1915.96  813.56
 1918.49  813.48 1933.78  812.99 1939.51   812.8 1950.53  812.55 1960.72  812.11
  1966.5  811.79 1976.58  811.25 1979.62  811.04 1990.87   810.6 1994.83  810.49
 2002.49  810.08 2023.42   806.2 2025.88  805.77 2027.98  805.27 2037.42  803.15
 2039.08  802.79 2048.65  802.79 2050.24   802.8 2060.58  802.58 2061.25  802.61
 2061.86  802.64 2076.46  803.29 2084.39  804.36 2089.13  804.98 2097.94  806.25
 2101.78  806.59 2110.98  807.42 2117.54  807.81  2131.3  808.93 2146.29  810.12
 2154.69  810.68 2161.19  811.27 2174.55  811.27 2193.38  810.48 2197.85  809.31
 2211.42  805.16 2216.18  803.64 2223.94  807.58  2230.5  810.96 2231.85  811.04
 2279.68  813.77 2301.93  814.33 2322.74  814.82  2343.6  816.14 2359.47  817.23
 2392.56  818.84 2406.97  819.54 2443.07  820.61 2448.05  820.72 2450.46  820.74
    2493  820.85 2503.31  820.83 2509.65   821.2    2516  821.78  2525.3   821.2
 2531.03  820.79 2535.01  820.48 2544.78  819.66 2552.53  817.97 2566.08  815.26
 2568.01  816.22 2580.68   822.9 2586.15  823.82 2626.61   828.2 2648.76  829.77
 2679.42  832.05 2713.57   834.4 2735.15  836.51  2756.7   837.8 2788.53  840.73
 2801.12  841.91 2805.86  842.36 2818.51  843.68 2854.67  847.03 2875.37  850.46
 2910.26  856.67 2934.71  861.13

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************************
       0    .105   350.6     .04  447.13    .099  757.46     .06 1918.49      .1
 2552.53    .105

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         346.77  465.38           524.92  983.65  938.71            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     700 2934.71  820.49       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
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```
* E.G. Elev (ft)         *  789.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.040  *   0.099  *
* W.S. Elev (ft)         *  789.32  * Reach Len. (ft)        *  524.92  *  983.65  *  938.71  *
* Crit W.S. (ft)         *  782.03  * Flow Area (sq ft)      *          * 1152.44  *   47.84  *
* E.G. Slope (ft/ft)     *0.001081  * Area (sq ft)           *          * 1152.44  *   47.84  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *          * 6709.86  *   15.14  *
* Top Width (ft)         *  209.28  * Top Width (ft)         *          *  112.95  *   96.33  *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)       *          *    5.82  *    0.32  *
* Max Chl Dpth (ft)      *   15.48  * Hydr. Depth (ft)       *          *   10.20  *    0.50  *
* Conv. Total (cfs)      *204515.0  * Conv. (cfs)            *          *204054.6  *   460.4  *
* Length Wtd. (ft)       *  983.58  * Wetted Per. (ft)       *          *  120.19  *   96.36  *
* Min Ch El (ft)         *  773.84  * Shear (lb/sq ft)       *          *    0.65  *    0.03  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *          *    3.77  *    0.01  *
* Frctn Loss (ft)        *    0.90  * Cum Volume (acre-ft)   *  822.33  * 6305.13  *  776.21  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  172.94  *  471.42  *  185.44  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  794.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.105  *   0.041  *   0.099  *
* W.S. Elev (ft)         *  793.68  * Reach Len. (ft)        *  524.92  *  983.65  *  938.71  *
* Crit W.S. (ft)         *  785.21  * Flow Area (sq ft)      *  120.43  * 1662.82  *  976.17  *
* E.G. Slope (ft/ft)     *0.000976  * Area (sq ft)           *  120.43  * 1662.82  * 1019.93  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *  100.22  *10866.13  * 1183.65  *
* Top Width (ft)         *  434.97  * Top Width (ft)         *   45.64  *  118.61  *  270.72  *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)       *    0.83  *    6.53  *    1.21  *
* Max Chl Dpth (ft)      *   19.84  * Hydr. Depth (ft)       *    2.64  *   14.02  *    4.16  *
* Conv. Total (cfs)      *388973.3  * Conv. (cfs)            *  3208.5  *347871.0  * 37893.8  *
* Length Wtd. (ft)       *  976.34  * Wetted Per. (ft)       *   46.62  *  126.23  *  234.70  *
* Min Ch El (ft)         *  773.84  * Shear (lb/sq ft)       *    0.16  *    0.80  *    0.25  *
* Alpha                  *    1.98  * Stream Power (lb/ft s) *    0.13  *    5.24  *    0.31  *
* Frctn Loss (ft)        *    0.95  * Cum Volume (acre-ft)   * 1830.57  * 8379.61  * 1800.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  272.71  *  511.49  *  278.52  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  795.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.105  *   0.041  *   0.099  *
* W.S. Elev (ft)         *  795.34  * Reach Len. (ft)        *  524.92  *  983.65  *  938.71  *
* Crit W.S. (ft)         *  785.89  * Flow Area (sq ft)      *  198.48  * 1859.89  * 1366.00  *
* E.G. Slope (ft/ft)     *0.000771  * Area (sq ft)           *  198.48  * 1859.89  * 1495.50  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  196.13  *11461.79  * 1842.08  *
* Top Width (ft)         *  471.89  * Top Width (ft)         *   48.32  *  118.61  *  304.96  *
* Vel Total (ft/s)       *    3.94  * Avg. Vel. (ft/s)       *    0.99  *    6.16  *    1.35  *
* Max Chl Dpth (ft)      *   21.50  * Hydr. Depth (ft)       *    4.11  *   15.68  *    5.82  *
* Conv. Total (cfs)      *486179.0  * Conv. (cfs)            *  7063.1  *412776.6  * 66339.3  *
* Length Wtd. (ft)       *  970.73  * Wetted Per. (ft)       *   49.77  *  126.23  *  234.70  *
* Min Ch El (ft)         *  773.84  * Shear (lb/sq ft)       *    0.19  *    0.71  *    0.28  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    0.19  *    4.37  *    0.38  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   * 2629.28  *10023.16  * 2758.99  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  327.65  *  539.46  *  376.60  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  799.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.105  *   0.042  *   0.099  *
* W.S. Elev (ft)         *  799.20  * Reach Len. (ft)        *  524.92  *  983.65  *  938.71  *
* Crit W.S. (ft)         *  789.13  * Flow Area (sq ft)      *  397.99  * 2317.98  * 2272.14  *
* E.G. Slope (ft/ft)     *0.000679  * Area (sq ft)           *  397.99  * 2317.98  * 2928.90  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *  531.65  *15133.08  * 4035.27  *
* Top Width (ft)         *  617.53  * Top Width (ft)         *   55.23  *  118.61  *  443.69  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *    1.34  *    6.53  *    1.78  *
* Max Chl Dpth (ft)      *   25.36  * Hydr. Depth (ft)       *    7.21  *   19.54  *    9.68  *
```

```
* Conv. Total (cfs)      *756266.1  * Conv. (cfs)            * 20409.5  *580946.1  *154910.5  *
* Length Wtd. (ft)       *  950.27  * Wetted Per. (ft)        *   57.70  *  126.23  *  234.70  *
* Min Ch El (ft)         *  773.84  * Shear (lb/sq ft)        *    0.29  *    0.78  *    0.41  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    0.39  *    5.08  *    0.73  *
* Frctn Loss (ft)        *    0.70  * Cum Volume (acre-ft)   * 3928.75  *11782.63  * 4229.68  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  451.48  *  562.41  *  498.51  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  804.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.105  *   0.043  *   0.099  *
* W.S. Elev (ft)         *  803.85  * Reach Len. (ft)        *  524.92  *  983.65  *  938.71  *
* Crit W.S. (ft)         *  792.67  * Flow Area (sq ft)      *  694.29  * 2869.06  * 3362.23  *
* E.G. Slope (ft/ft)     *0.000575  * Area (sq ft)           *  694.29  * 2869.06  * 5191.56  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1068.15  *19496.54  * 7135.31  *
* Top Width (ft)         *  761.12  * Top Width (ft)         *   82.72  *  118.61  *  559.79  *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *    1.54  *    6.80  *    2.12  *
* Max Chl Dpth (ft)      *   30.01  * Hydr. Depth (ft)       *    8.39  *   24.19  *   14.33  *
* Conv. Total (cfs)      *1155583.0  * Conv. (cfs)            * 44560.9  *813352.6  *297669.3  *
* Length Wtd. (ft)       *  930.04  * Wetted Per. (ft)        *   86.79  *  126.23  *  234.70  *
* Min Ch El (ft)         *  773.84  * Shear (lb/sq ft)        *    0.29  *    0.82  *    0.51  *
* Alpha                  *    2.11  * Stream Power (lb/ft s) *    0.44  *    5.54  *    1.09  *
* Frctn Loss (ft)        *    0.59  * Cum Volume (acre-ft)   * 6546.41  *14459.28  * 7239.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  801.75  *  590.42  *  925.52  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  807.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.105  *   0.043  *   0.099  *
* W.S. Elev (ft)         *  807.06  * Reach Len. (ft)        *  524.92  *  983.65  *  938.71  *
* Crit W.S. (ft)         *  793.86  * Flow Area (sq ft)      * 1042.20  * 3249.80  * 4115.35  *
* E.G. Slope (ft/ft)     *0.000514  * Area (sq ft)           * 1042.20  * 3249.80  * 7162.44  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 1327.90  *22483.18  * 9448.92  *
* Top Width (ft)         *  917.54  * Top Width (ft)         *  126.81  *  118.61  *  672.12  *
* Vel Total (ft/s)       *    3.96  * Avg. Vel. (ft/s)       *    1.27  *    6.92  *    2.30  *
* Max Chl Dpth (ft)      *   33.22  * Hydr. Depth (ft)       *    8.22  *   27.40  *   17.54  *
* Conv. Total (cfs)      *1467484.0  * Conv. (cfs)            * 58589.0  *991993.8  *416901.3  *
* Length Wtd. (ft)       *  921.13  * Wetted Per. (ft)        *  131.63  *  126.23  *  234.70  *
* Min Ch El (ft)         *  773.84  * Shear (lb/sq ft)        *    0.25  *    0.83  *    0.56  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    0.32  *    5.71  *    1.29  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 9239.43  *16078.06  *10304.07  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1068.18  *  597.45  * 1331.03  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  810.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.105  *   0.043  *   0.099  *
* W.S. Elev (ft)         *  810.09  * Reach Len. (ft)        *  524.92  *  983.65  *  938.71  *
* Crit W.S. (ft)         *  795.01  * Flow Area (sq ft)      * 1445.92  * 3609.90  * 4827.67  *
* E.G. Slope (ft/ft)     *0.000465  * Area (sq ft)           * 1445.92  * 3609.90  * 9693.16  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 2048.17  *25319.18  *11732.65  *
* Top Width (ft)         * 1340.66  * Top Width (ft)         *  139.44  *  118.61  * 1082.61  *
* Vel Total (ft/s)       *    3.96  * Avg. Vel. (ft/s)       *    1.42  *    7.01  *    2.43  *
* Max Chl Dpth (ft)      *   36.25  * Hydr. Depth (ft)       *   10.37  *   30.44  *   20.58  *
* Conv. Total (cfs)      *1812866.0  * Conv. (cfs)            * 94963.1  *1173921.0  *543982.6  *
* Length Wtd. (ft)       *  912.54  * Wetted Per. (ft)        *  144.62  *  126.23  *  234.70  *
* Min Ch El (ft)         *  773.84  * Shear (lb/sq ft)        *    0.29  *    0.83  *    0.60  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.41  *    5.83  *    1.45  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *11767.92  *17167.40  *13269.71  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1249.66  *  598.34  * 1710.85  *
**********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	814.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.105	0.043	0.099
W.S. Elev (ft)	813.92	Reach Len. (ft)	524.92	983.65	938.71
Crit W.S. (ft)	796.33	Flow Area (sq ft)	2005.99	4064.16	5726.23
E.G. Slope (ft/ft)	0.000418	Area (sq ft)	2005.99	4064.16	15112.32
Q Total (cfs)	47000.00	Flow (cfs)	3154.36	29058.08	14787.56
Top Width (ft)	2091.71	Top Width (ft)	152.69	118.61	1820.41
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)	1.57	7.15	2.58
Max Chl Dpth (ft)	40.08	Hydr. Depth (ft)	13.14	34.26	24.41
Conv. Total (cfs)	2297936.0	Conv. (cfs)	154223.6	1420715.0	722997.1
Length Wtd. (ft)	903.64	Wetted Per. (ft)	158.42	126.23	234.70
Min Ch El (ft)	773.84	Shear (lb/sq ft)	0.33	0.84	0.64
Alpha	2.13	Stream Power (lb/ft s)	0.52	6.01	1.65
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	16684.75	18812.21	18593.19
C & E Loss (ft)	0.02	Cum SA (acres)	1524.81	600.88	2099.86

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	800.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.105	0.042	0.099
W.S. Elev (ft)	800.40	Reach Len. (ft)	524.92	983.65	938.71
Crit W.S. (ft)	789.89	Flow Area (sq ft)	465.59	2460.25	2553.57
E.G. Slope (ft/ft)	0.000591	Area (sq ft)	465.59	2460.25	3471.50
Q Total (cfs)	20700.00	Flow (cfs)	625.82	15501.00	4573.18
Top Width (ft)	637.11	Top Width (ft)	57.49	118.61	461.01
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)	1.34	6.30	1.79
Max Chl Dpth (ft)	26.56	Hydr. Depth (ft)	8.10	20.74	10.88
Conv. Total (cfs)	851833.9	Conv. (cfs)	25753.3	637888.0	188192.6
Length Wtd. (ft)	944.08	Wetted Per. (ft)	60.25	126.23	234.70
Min Ch El (ft)	773.84	Shear (lb/sq ft)	0.28	0.72	0.40
Alpha	2.14	Stream Power (lb/ft s)	0.38	4.53	0.72
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	4683.82	12687.03	5074.07
C & E Loss (ft)	0.02	Cum SA (acres)	546.65	572.67	573.78

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 22.402

INPUT
Description:
Station Elevation Data num= 191

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	861.59	13.62	861.07	36.7	859.99	46.39	858.95	71.62	854.15
93.8	853.66	126.9	849.08	159.14	843.53	170.31	841.96	190.49	840.03
202.86	838.72	233.99	809.6	238.47	805.28	240.83	805.31	246.42	805.36
248.16	805.71	251.7	806.39	255.36	806.32	260.33	806.17	264.28	805.77
271.42	805.11	289.72	802.97	296.66	801.73	300.69	800.38	307.51	797.71
314.05	797.61	327.99	797.73	349.84	797.28	361.18	797.01	376.52	795.47
415.14	790.59	422.72	790.59	452.22	790.65	482.55	790.15	493.41	789.91
544.67	790.07	554.4	790.11	594.63	790.38	628.22	790.52	648.59	790.83
677.22	791.13	701.32	791.32	746.37	791.82	764.17	792.14	825.91	793.51
833.12	793.6	872.47	793.89	886.14	793.99	888.8	794	932.38	793.9
970.67	793.95	990.35	793.63	1027.48	792.49	1052.47	792.15	1061.24	791.8
1063.9	791.76	1089.18	789.34	1092.52	789.15	1099.04	788.98	1124.59	788.06
1138.74	782.22	1140.36	781.55	1157.17	774.52	1190	772.26	1221.27	774.55
1239.58	791.14	1241.96	793.62	1244.5	796.26	1253.84	801.78	1258.59	804.58
1263.34	804.92	1285.2	806.31	1285.37	806.28	1305.47	803.34	1319.97	801.01
1321	800.84	1327.8	800.16	1336.87	798.67	1339.34	798.61	1344.11	798.44
1353.79	799.23	1354.32	799.27	1355.51	799.22	1374.96	798.64	1377.92	798.9

```
 1384.21  799.99 1391.03  801.01 1395.89  801.47 1405.15  801.09 1416.19  801.72
 1419.66  802.39 1420.91  802.54 1433.45   804.7 1443.22  805.48 1463.42   806.1
 1464.58  806.12 1489.25  807.25 1497.48  807.35 1530.34  807.56 1588.24  807.44
  1591.4  807.43 1593.11  807.42  1615.9  807.53 1690.76  807.83 1698.85  807.77
  1744.4  806.72 1758.53  806.28 1762.95  806.17 1783.31  806.38 1797.45  806.41
 1808.27  805.65 1809.07  805.61 1810.67  805.58  1831.6  804.69 1834.78  802.14
  1843.9  795.79 1850.49  795.79 1861.73  795.79 1864.94  795.79 1867.98  795.79
 1900.23  795.79 2115.58  795.79 2190.89  795.79  2200.1  795.79 2202.56  795.79
 2241.02  795.79 2263.76  795.79 2269.78  795.79 2278.41  795.79 2283.23  795.79
 2292.86  795.79 2386.67  795.79 2389.68  795.79 2391.62  795.94 2396.79  796.35
 2421.27  796.76 2432.83  796.95 2436.74  797.01 2442.81  797.15 2452.25  797.18
 2457.61  797.16 2485.42  797.29 2510.56  797.59 2546.33  798.08 2566.27  798.39
 2590.17  798.66  2598.3  799.03  2615.1  799.76 2626.38  801.55 2631.44  802.38
 2634.31  802.57 2640.58  802.93 2644.38  803.09 2659.77  803.36  2663.9  803.43
  2665.8  803.45 2687.85  799.42  2690.6  798.84 2701.04     800 2701.12  800.01
  2715.4  800.28 2731.72   800.9 2743.37  800.69  2750.5  800.65 2758.44  800.27
 2764.17  798.91 2771.76  797.15 2779.98  798.01 2787.41  798.52 2791.29  798.25
 2795.63  797.95 2804.83  799.11 2817.83  800.77 2822.73  803.39 2839.13  810.47
 2839.38  810.57 2840.21  810.97 2857.29     819  2862.5  820.73 2875.38     824
 2886.68  827.78 2901.41  831.54 2907.24  833.01 2916.81  836.97 2929.73   839.1
 2950.63  841.97  2964.4  844.12 2973.46   845.2 2990.23  847.58 3004.28  850.83
  3014.6  852.26

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .105  452.22     .09 1124.59     .04 1258.59     .07 1850.49     .06
 2396.79     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1124.59 1258.59           807.91  736.38 1064.64              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  924.45     820       F
 1285.38  3014.6     820       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1285    1490     806

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  788.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.090  *   0.040  *          *
* W.S. Elev (ft)         *  788.50  * Reach Len. (ft)        *  807.91  *  736.38  * 1064.64  *
* Crit W.S. (ft)         *  780.18  * Flow Area (sq ft)      *    2.70  * 1309.77  *          *
* E.G. Slope (ft/ft)     *0.000792  * Area (sq ft)           *    2.70  * 1309.77  *          *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *    0.46  * 6724.54  *          *
* Top Width (ft)         *  124.33  * Top Width (ft)         *   12.25  *  112.08  *          *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *    0.17  *    5.13  *          *
* Max Chl Dpth (ft)      *   16.24  * Hydr. Depth (ft)       *    0.22  *   11.69  *          *
* Conv. Total (cfs)      *238999.2  * Conv. (cfs)            *    16.3  *238982.9  *          *
* Length Wtd. (ft)       *  736.70  * Wetted Per. (ft)       *   12.26  *  120.32  *          *
* Min Ch El (ft)         *  772.26  * Shear (lb/sq ft)       *    0.01  *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    2.76  *          *
* Frctn Loss (ft)        *    0.57  * Cum Volume (acre-ft)   *  822.31  * 6277.33  *  775.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  172.87  *  468.88  *  184.40  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  793.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.090  *   0.040  *          *
* W.S. Elev (ft)         *  792.63  * Reach Len. (ft)        *  807.91  *  736.38  * 1064.64  *
* Crit W.S. (ft)         *  783.16  * Flow Area (sq ft)      *  207.74  * 1781.24  *          *
* E.G. Slope (ft/ft)     *0.000962  * Area (sq ft)           *  907.91  * 1781.24  *          *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *  171.29  *11978.71  *          *
* Top Width (ft)         *  604.95  * Top Width (ft)         *  488.53  *  116.42  *          *
* Vel Total (ft/s)       *    6.11  * Avg. Vel. (ft/s)       *    0.82  *    6.72  *          *
* Max Chl Dpth (ft)      *   20.37  * Hydr. Depth (ft)       *    2.05  *   15.30  *          *
* Conv. Total (cfs)      *391753.4  * Conv. (cfs)            *  5522.9  *386230.5  *          *
* Length Wtd. (ft)       *  750.90  * Wetted Per. (ft)       *  101.67  *  126.31  *          *
* Min Ch El (ft)         *  772.26  * Shear (lb/sq ft)       *    0.12  *    0.85  *          *
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* Alpha                  *    1.20  * Stream Power (lb/ft s) *    0.10  *    5.70  *          *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   * 1824.37  * 8340.73  * 1789.53  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  269.49  *  508.83  *  275.60  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  795.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.090  *   0.040  *          *
* W.S. Elev (ft)         *  794.40  * Reach Len. (ft)        *  807.91  *  736.38  * 1064.64  *
* Crit W.S. (ft)         *  783.82  * Flow Area (sq ft)      *  464.09  * 1989.62  *          *
* E.G. Slope (ft/ft)     *0.000818  * Area (sq ft)           * 1972.85  * 1989.62  *          *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  383.79  *13116.21  *          *
* Top Width (ft)         *  857.74  * Top Width (ft)          *  739.62  *  118.12  *          *
* Vel Total (ft/s)       *    5.50  * Avg. Vel. (ft/s)       *    0.83  *    6.59  *          *
* Max Chl Dpth (ft)      *   22.14  * Hydr. Depth (ft)       *    2.32  *   16.84  *          *
* Conv. Total (cfs)      *471909.6  * Conv. (cfs)            * 13415.8  *458493.8  *          *
* Length Wtd. (ft)       *  757.81  * Wetted Per. (ft)       *  200.31  *  128.77  *          *
* Min Ch El (ft)         *  772.26  * Shear (lb/sq ft)       *    0.12  *    0.79  *          *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.10  *    5.20  *          *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   * 2616.20  * 9979.69  * 2742.87  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  322.90  *  536.79  *  373.31  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.090  *   0.040  *          *
* W.S. Elev (ft)         *  798.27  * Reach Len. (ft)        *  807.91  *  736.38  * 1064.64  *
* Crit W.S. (ft)         *  786.46  * Flow Area (sq ft)      * 1237.23  * 2454.58  *          *
* E.G. Slope (ft/ft)     *0.000796  * Area (sq ft)           * 4931.21  * 2454.58  * 1533.79  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 1939.87  *17760.13  *          *
* Top Width (ft)         * 1683.52  * Top Width (ft)          *  818.50  *  123.30  *  741.72  *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)       *    1.57  *    7.24  *          *
* Max Chl Dpth (ft)      *   26.01  * Hydr. Depth (ft)       *    6.18  *   19.91  *          *
* Conv. Total (cfs)      *698338.8  * Conv. (cfs)            * 68765.7  *629573.1  *          *
* Length Wtd. (ft)       *  769.81  * Wetted Per. (ft)       *  200.31  *  135.29  *          *
* Min Ch El (ft)         *  772.26  * Shear (lb/sq ft)       *    0.31  *    0.90  *          *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.48  *    6.52  *          *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 3896.64  *11728.74  * 4181.59  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  446.22  *  559.68  *  485.74  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  803.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.090  *   0.040  *          *
* W.S. Elev (ft)         *  803.02  * Reach Len. (ft)        *  807.91  *  736.38  * 1064.64  *
* Crit W.S. (ft)         *  789.41  * Flow Area (sq ft)      * 2189.37  * 3060.32  *          *
* E.G. Slope (ft/ft)     *0.000699  * Area (sq ft)           * 8857.67  * 3060.32  * 5721.97  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 4706.96  *22993.04  *          *
* Top Width (ft)         * 1929.69  * Top Width (ft)          *  835.32  *  131.36  *  963.01  *
* Vel Total (ft/s)       *    5.28  * Avg. Vel. (ft/s)       *    2.15  *    7.51  *          *
* Max Chl Dpth (ft)      *   30.76  * Hydr. Depth (ft)       *   10.94  *   23.30  *          *
* Conv. Total (cfs)      *1047663.0  * Conv. (cfs)            *178025.4  *869637.6  *          *
* Length Wtd. (ft)       *  779.69  * Wetted Per. (ft)       *  200.31  *  144.65  *          *
* Min Ch El (ft)         *  772.26  * Shear (lb/sq ft)       *    0.48  *    0.92  *          *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    1.03  *    6.94  *          *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 6488.86  *14392.33  * 7121.41  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  796.22  *  587.59  *  909.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	807.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.	0.090	0.040	0.070
W.S. Elev (ft)	806.33	Reach Len. (ft)	807.91	736.38	1064.64
Crit W.S. (ft)	791.26	Flow Area (sq ft)	2851.24	3501.41	23.14
E.G. Slope (ft/ft)	0.000607	Area (sq ft)	11679.68	3501.41	9115.79
Q Total (cfs)	33260.00	Flow (cfs)	6810.62	26438.43	10.95
Top Width (ft)	2280.77	Top Width (ft)	883.75	134.00	1263.03
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)	2.39	7.55	0.47
Max Chl Dpth (ft)	34.07	Hydr. Depth (ft)	14.25	26.13	0.86
Conv. Total (cfs)	1350240.0	Conv. (cfs)	276487.2	1073308.0	444.7
Length Wtd. (ft)	784.46	Wetted Per. (ft)	200.31	147.71	26.85
Min Ch El (ft)	772.26	Shear (lb/sq ft)	0.54	0.90	0.03
Alpha	1.71	Stream Power (lb/ft s)	1.29	6.78	0.02
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	9162.77	16001.83	10128.67
C & E Loss (ft)	0.11	Cum SA (acres)	1062.09	594.59	1310.18

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	810.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.090	0.040	0.070
W.S. Elev (ft)	809.41	Reach Len. (ft)	807.91	736.38	1064.64
Crit W.S. (ft)	793.21	Flow Area (sq ft)	3468.36	3914.59	105.74
E.G. Slope (ft/ft)	0.000541	Area (sq ft)	14420.16	3914.59	13659.10
Q Total (cfs)	39100.00	Flow (cfs)	8912.18	30057.65	130.17
Top Width (ft)	2602.50	Top Width (ft)	890.41	134.00	1578.09
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)	2.57	7.68	1.23
Max Chl Dpth (ft)	37.15	Hydr. Depth (ft)	17.33	29.21	3.95
Conv. Total (cfs)	1681454.0	Conv. (cfs)	383258.7	1292597.0	5597.8
Length Wtd. (ft)	788.26	Wetted Per. (ft)	200.31	147.71	26.85
Min Ch El (ft)	772.26	Shear (lb/sq ft)	0.58	0.89	0.13
Alpha	1.72	Stream Power (lb/ft s)	1.50	6.87	0.16
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	11672.32	17082.44	13018.09
C & E Loss (ft)	0.11	Cum SA (acres)	1243.46	595.49	1682.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	814.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.090	0.040	0.070
W.S. Elev (ft)	813.28	Reach Len. (ft)	807.91	736.38	1064.64
Crit W.S. (ft)	796.08	Flow Area (sq ft)	4242.41	4432.85	209.35
E.G. Slope (ft/ft)	0.000481	Area (sq ft)	17871.82	4432.85	19779.08
Q Total (cfs)	47000.00	Flow (cfs)	11754.56	34862.34	383.10
Top Width (ft)	2615.07	Top Width (ft)	894.53	134.00	1586.54
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)	2.77	7.86	1.83
Max Chl Dpth (ft)	41.02	Hydr. Depth (ft)	21.20	33.08	7.81
Conv. Total (cfs)	2143867.0	Conv. (cfs)	536174.9	1590217.0	17474.7
Length Wtd. (ft)	792.26	Wetted Per. (ft)	200.31	147.71	26.85
Min Ch El (ft)	772.26	Shear (lb/sq ft)	0.64	0.90	0.23
Alpha	1.71	Stream Power (lb/ft s)	1.76	7.08	0.43
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	16564.98	18716.28	18217.24
C & E Loss (ft)	0.11	Cum SA (acres)	1518.50	598.02	2063.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	800.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.090	0.040	
W.S. Elev (ft)	799.59	Reach Len. (ft)	807.91	736.38	1064.64
Crit W.S. (ft)	786.83	Flow Area (sq ft)	1502.14	2619.27	
E.G. Slope (ft/ft)	0.000691	Area (sq ft)	6016.81	2619.27	2585.35
Q Total (cfs)	20700.00	Flow (cfs)	2496.96	18203.04	

```
* Top Width (ft)          * 1777.83  * Top Width (ft)          *  821.88  *  125.54  *  830.41  *
* Vel Total (ft/s)        *    5.02  * Avg. Vel. (ft/s)        *    1.66  *    6.95  *          *
* Max Chl Dpth (ft)       *   27.33  * Hydr. Depth (ft)        *    7.51  *   20.86  *          *
* Conv. Total (cfs)       *787702.8  * Conv. (cfs)             * 95017.4  *692685.4  *          *
* Length Wtd. (ft)        *  773.05  * Wetted Per. (ft)        *  200.31  *  137.89  *          *
* Min Ch El (ft)          *  772.26  * Shear (lb/sq ft)        *    0.32  *    0.82  *          *
* Alpha                   *    1.70  * Stream Power (lb/ft s) *    0.54  *    5.69  *          *
* Frctn Loss (ft)         *    0.39  * Cum Volume (acre-ft)    * 4644.76  *12629.68  * 5008.81  *
* C & E Loss (ft)         *    0.10  * Cum SA (acres)          *  541.36  *  569.91  *  559.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 22.262

INPUT
Description:
Station Elevation Data    num=     205
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  842.32    7.42  842.34   15.92  842.22      24  842.17    44.4  841.96
   58.87  841.88   94.44  841.98  113.76  840.76  120.93  840.52  133.71  839.71
  143.06  838.86  150.19  838.21  156.46   837.8  167.44  837.24   175.5   836.5
  176.99  836.36  185.53  833.76  197.01  829.67  208.93  825.75  233.22  822.04
  233.67  821.93  235.31  821.54  242.48  819.56  264.83  813.36   265.6  813.98
  271.27  818.37  273.65  818.08  290.25  817.49  291.76  816.79  318.41  803.34
  320.03  803.62  327.92  804.99  336.96  806.22  337.97  806.35  338.49  806.35
  342.69  806.35  350.55  805.34  353.28  804.99  355.72  804.76  363.91   803.7
  378.39  803.86  392.97  803.96  405.84  803.88  411.58  803.53  434.29  802.21
  435.88  802.25  438.71  801.69     444  800.81  453.42  799.23  456.35  799.85
  456.89  799.97  467.48  799.51  472.45   799.3   472.7   799.3  477.34     799
  487.17  796.24  496.93  793.51  499.39  792.84  503.75  792.81  546.81  792.52
  567.98  792.41  571.13  792.39  614.31   791.6  656.23  791.08  657.89  791.05
  658.27  791.05  659.59  790.99  681.22  790.04  690.95   789.5   714.3   788.2
   719.2  788.46  724.87   788.8  738.26  789.57  751.03  790.39  769.03  790.32
  794.79  790.86  801.19  791.15  831.63  790.99  842.87  790.88  851.02   790.9
  886.79  790.45  894.08   790.4  919.23  789.07  938.18  788.04  965.38  787.29
  985.08  788.13  985.77  788.13  991.47  788.16  992.31  788.18 1011.95  788.49
 1013.28  788.48 1034.09  788.12 1046.78  789.15 1060.72  789.23 1068.84  789.23
 1076.43  789.23 1087.18  780.83 1102.29  773.22    1130  771.07 1159.97  773.23
 1168.42   779.2 1174.93  782.91 1177.73  784.51  1196.1  786.65 1196.86  786.73
 1203.49  786.85 1226.47  787.25 1232.26  787.42 1246.69  787.55 1262.45  787.69
 1272.39  787.72 1306.66  788.25 1320.75  788.37 1337.42  788.27 1349.62  788.23
 1369.95  788.31 1397.42  788.34 1409.28  788.44 1458.66  788.21 1467.71  788.19
 1471.59  788.17 1496.48  788.03 1516.85  787.91  1523.4  787.89 1558.33  787.34
 1570.98  787.05 1603.03  786.26 1616.16  786.35 1654.53  783.77 1665.69  783.65
 1671.03  783.81 1677.67  784.61 1700.01  784.53 1700.76  784.53 1712.42  782.81
 1715.53  782.53 1718.84  782.97 1729.37  784.32 1735.57  784.99 1754.15  786.26
 1754.78  786.27 1755.07  786.28 1767.31  786.36  1769.4  786.49 1778.74  786.63
 1783.59  786.66 1791.82  787.31 1798.84  787.95  1805.9  787.62 1811.31  790.24
 1815.38  794.09 1819.02  797.66 1822.89  797.87  1830.1  798.25 1833.42  798.51
 1845.33  799.21 1853.61  799.91 1865.56  800.29 1900.19  801.38 1905.97  801.52
  1916.9  801.66 1965.09  802.22 1970.23  802.69 1980.34  802.74 2010.14  802.75
 2014.35  802.74 2017.24  802.68 2044.04   802.4 2072.19  802.58 2088.35  802.59
 2118.83  803.03  2145.8  803.05 2158.94  802.99 2191.09  802.75  2234.5   802.6
 2244.29  802.55 2258.13  802.45 2273.11  802.35 2280.97  802.33  2304.2  802.18
 2316.03  802.11 2350.53  802.22 2361.97  802.38  2387.9  804.53 2410.29  805.58
 2424.29  806.09 2434.12  807.61 2453.65  810.64 2465.05  811.28 2467.95  811.45
 2471.43  811.14  2478.7  810.51 2482.32  810.46 2487.03  810.41 2499.57  818.19
 2506.29  822.09 2529.48  832.39 2537.46  835.94 2539.71  836.97 2548.59  838.64
 2572.47  843.13 2579.34  846.49 2593.59   852.6  2626.3     867 2635.79  868.51

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  233.22      .1 1076.43     .04 1177.73   .1013 1853.61      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1076.43  1196.1            742.07 1257.36  711.61              .1       .3
Ineffective Flow     num=       2
```

Sta L	Sta R	Elev	Permanent
0	907	822	F
1400	2635.79	822	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	788.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.040	0.101
W.S. Elev (ft)	787.93	Reach Len. (ft)	742.07	1257.36	711.61
Crit W.S. (ft)	779.36	Flow Area (sq ft)	12.27	1306.20	47.22
E.G. Slope (ft/ft)	0.000757	Area (sq ft)	12.27	1306.20	658.02
Q Total (cfs)	6725.00	Flow (cfs)	2.35	6710.25	12.41
Top Width (ft)	538.84	Top Width (ft)	38.28	118.01	382.55
Vel Total (ft/s)	4.92	Avg. Vel. (ft/s)	0.19	5.14	0.26
Max Chl Dpth (ft)	16.86	Hydr. Depth (ft)	0.32	11.07	0.53
Conv. Total (cfs)	244348.4	Conv. (cfs)	85.3	243812.3	450.8
Length Wtd. (ft)	1238.16	Wetted Per. (ft)	38.30	125.85	89.94
Min Ch El (ft)	771.07	Shear (lb/sq ft)	0.02	0.49	0.02
Alpha	1.09	Stream Power (lb/ft s)	0.00	2.52	0.01
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	822.18	6255.22	767.65
C & E Loss (ft)	0.06	Cum SA (acres)	172.40	466.94	179.73

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	792.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.100	0.041	0.101
W.S. Elev (ft)	792.16	Reach Len. (ft)	742.07	1257.36	711.61
Crit W.S. (ft)	782.47	Flow Area (sq ft)	633.14	1810.89	871.16
E.G. Slope (ft/ft)	0.000723	Area (sq ft)	1152.08	1810.89	3184.49
Q Total (cfs)	12150.00	Flow (cfs)	609.02	10636.11	904.87
Top Width (ft)	1229.49	Top Width (ft)	492.58	119.67	617.24
Vel Total (ft/s)	3.66	Avg. Vel. (ft/s)	0.96	5.87	1.04
Max Chl Dpth (ft)	21.09	Hydr. Depth (ft)	3.74	15.13	4.27
Conv. Total (cfs)	451757.2	Conv. (cfs)	22644.5	395468.2	33644.6
Length Wtd. (ft)	1171.86	Wetted Per. (ft)	169.55	127.96	203.92
Min Ch El (ft)	771.07	Shear (lb/sq ft)	0.17	0.64	0.19
Alpha	2.26	Stream Power (lb/ft s)	0.16	3.75	0.20
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	1805.27	8310.37	1750.62
C & E Loss (ft)	0.08	Cum SA (acres)	260.39	506.84	268.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	794.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.100	0.041	0.101
W.S. Elev (ft)	794.11	Reach Len. (ft)	742.07	1257.36	711.61
Crit W.S. (ft)	783.15	Flow Area (sq ft)	963.86	2044.48	1269.17
E.G. Slope (ft/ft)	0.000530	Area (sq ft)	2247.85	2044.48	4391.33
Q Total (cfs)	13500.00	Flow (cfs)	1050.49	10999.00	1450.51
Top Width (ft)	1320.61	Top Width (ft)	581.64	119.67	619.30
Vel Total (ft/s)	3.16	Avg. Vel. (ft/s)	1.09	5.38	1.14
Max Chl Dpth (ft)	23.04	Hydr. Depth (ft)	5.69	17.08	6.22
Conv. Total (cfs)	586267.2	Conv. (cfs)	45619.8	477656.0	62991.5
Length Wtd. (ft)	1145.21	Wetted Per. (ft)	169.55	127.96	203.92
Min Ch El (ft)	771.07	Shear (lb/sq ft)	0.19	0.53	0.21
Alpha	2.39	Stream Power (lb/ft s)	0.21	2.85	0.24
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	2577.06	9945.59	2689.21
C & E Loss (ft)	0.06	Cum SA (acres)	310.64	534.78	365.75

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	798.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.100	0.042	0.101
W.S. Elev (ft)	798.06	Reach Len. (ft)	742.07	1257.36	711.61

```
* Crit W.S. (ft)         *  786.19  * Flow Area (sq ft)      * 1633.83  * 2517.68  * 2075.44  *
* E.G. Slope (ft/ft)     *0.000463  * Area (sq ft)           * 4575.72  * 2517.68  * 6849.57  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 2364.26  *14260.91  * 3074.83  *
* Top Width (ft)         * 1345.89  * Top Width (ft)         *  595.75  *  119.67  *  630.46  *
* Vel Total (ft/s)       *    3.16  * Avg. Vel. (ft/s)       *    1.45  *    5.66  *    1.48  *
* Max Chl Dpth (ft)      *   26.99  * Hydr. Depth (ft)       *    9.64  *   21.04  *   10.18  *
* Conv. Total (cfs)      *916028.6  * Conv. (cfs)            *109935.5  *663116.6  *142976.4  *
* Length Wtd. (ft)       * 1106.77  * Wetted Per. (ft)       *  169.55  *  127.96  *  203.92  *
* Min Ch El (ft)         *  771.07  * Shear (lb/sq ft)       *    0.28  *    0.57  *    0.29  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *    0.40  *    3.22  *    0.44  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 3808.48  *11686.71  * 4079.15  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  433.11  *  557.63  *  468.97  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  803.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.100  *   0.042  *   0.101  *
* W.S. Elev (ft)         *  802.89  * Reach Len. (ft)        *  742.07  * 1257.36  *  711.61  *
* Crit W.S. (ft)         *  790.43  * Flow Area (sq ft)      * 2451.67  * 3095.33  * 3059.67  *
* E.G. Slope (ft/ft)     *0.000385  * Area (sq ft)           * 7589.70  * 3095.33  *10299.01  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 4244.26  *18096.42  * 5359.32  *
* Top Width (ft)         * 1882.44  * Top Width (ft)         *  653.85  *  119.67  * 1108.92  *
* Vel Total (ft/s)       *    3.22  * Avg. Vel. (ft/s)       *    1.73  *    5.85  *    1.75  *
* Max Chl Dpth (ft)      *   31.82  * Hydr. Depth (ft)       *   14.47  *   25.87  *   15.01  *
* Conv. Total (cfs)      *1411158.0  * Conv. (cfs)           *216221.0  *921910.3  *273027.1  *
* Length Wtd. (ft)       * 1076.68  * Wetted Per. (ft)       *  169.55  *  127.96  *  203.92  *
* Min Ch El (ft)         *  771.07  * Shear (lb/sq ft)       *    0.35  *    0.58  *    0.36  *
* Alpha                  *    2.26  * Stream Power (lb/ft s) *    0.60  *    3.40  *    0.63  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 6336.33  *14340.30  * 6925.62  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  782.41  *  585.47  *  883.80  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  806.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.100  *   0.042  *   0.101  *
* W.S. Elev (ft)         *  806.24  * Reach Len. (ft)        *  742.07  * 1257.36  *  711.61  *
* Crit W.S. (ft)         *  791.69  * Flow Area (sq ft)      * 3018.94  * 3496.00  * 3742.34  *
* E.G. Slope (ft/ft)     *0.000338  * Area (sq ft)           * 9985.72  * 3496.00  *14298.19  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 5623.96  *20613.74  * 7022.30  *
* Top Width (ft)         * 2106.13  * Top Width (ft)         *  757.31  *  119.67  * 1229.15  *
* Vel Total (ft/s)       *    3.24  * Avg. Vel. (ft/s)       *    1.86  *    5.90  *    1.88  *
* Max Chl Dpth (ft)      *   35.17  * Hydr. Depth (ft)       *   17.82  *   29.21  *   18.35  *
* Conv. Total (cfs)      *1808968.0  * Conv. (cfs)           *305880.0  *1121154.0  *381933.7  *
* Length Wtd. (ft)       * 1062.52  * Wetted Per. (ft)       *  169.55  *  127.96  *  203.92  *
* Min Ch El (ft)         *  771.07  * Shear (lb/sq ft)       *    0.38  *    0.58  *    0.39  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.70  *    3.40  *    0.73  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   * 8961.86  *15942.69  * 9842.55  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1046.88  *  592.45  * 1279.72  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  809.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.100  *   0.042  *   0.101  *
* W.S. Elev (ft)         *  809.35  * Reach Len. (ft)        *  742.07  * 1257.36  *  711.61  *
* Crit W.S. (ft)         *  792.76  * Flow Area (sq ft)      * 3546.56  * 3868.67  * 4377.31  *
* E.G. Slope (ft/ft)     *0.000311  * Area (sq ft)           *12373.17  * 3868.67  *18157.26  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 7057.96  *23292.88  * 8749.16  *
* Top Width (ft)         * 2138.86  * Top Width (ft)         *  769.93  *  119.67  * 1249.25  *
* Vel Total (ft/s)       *    3.32  * Avg. Vel. (ft/s)       *    1.99  *    6.02  *    2.00  *
* Max Chl Dpth (ft)      *   38.28  * Hydr. Depth (ft)       *   20.93  *   32.33  *   21.47  *
* Conv. Total (cfs)      *2216352.0  * Conv. (cfs)           *400074.5  *1320338.0  *495939.1  *
* Length Wtd. (ft)       * 1050.92  * Wetted Per. (ft)       *  169.55  *  127.96  *  203.92  *
```

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* Min Ch El (ft)          *  771.07  * Shear (lb/sq ft)       *    0.41  *    0.59  *    0.42  *
* Alpha                   *    2.11  * Stream Power (lb/ft s) *    0.81  *    3.54  *    0.83  *
* Frctn Loss (ft)         *    0.25  * Cum Volume (acre-ft)   *11423.85  *17016.66  *12629.28  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         * 1228.06  *  593.35  * 1647.63  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  813.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.37  * Wt. n-Val.             *   0.100  *   0.043  *   0.101  *
* W.S. Elev (ft)          *  813.25  * Reach Len. (ft)        *  742.07  * 1257.36  *  711.61  *
* Crit W.S. (ft)          *  794.03  * Flow Area (sq ft)      * 4206.94  * 4335.10  * 5172.04  *
* E.G. Slope (ft/ft)      *0.000287  * Area (sq ft)           *15389.15  * 4335.10  *23139.19  *
* Q Total (cfs)           *47000.00  * Flow (cfs)             * 9008.54  *26897.13  *11094.34  *
* Top Width (ft)          * 2192.84  * Top Width (ft)         *  777.66  *  119.67  * 1295.51  *
* Vel Total (ft/s)        *    3.43  * Avg. Vel. (ft/s)       *    2.14  *    6.20  *    2.15  *
* Max Chl Dpth (ft)       *   42.18  * Hydr. Depth (ft)       *   24.83  *   36.23  *   25.37  *
* Conv. Total (cfs)       *2774485.0  * Conv. (cfs)            *531788.3  *1587780.0  *654916.4  *
* Length Wtd. (ft)        * 1038.86  * Wetted Per. (ft)       *  169.55  *  127.96  *  203.92  *
* Min Ch El (ft)          *  771.07  * Shear (lb/sq ft)       *    0.44  *    0.61  *    0.45  *
* Alpha                   *    2.04  * Stream Power (lb/ft s) *    0.95  *    3.77  *    0.97  *
* Frctn Loss (ft)         *    0.23  * Cum Volume (acre-ft)   *16256.53  *18642.16  *17692.76  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         * 1503.00  *  595.88  * 2027.93  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  799.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.33  * Wt. n-Val.             *   0.100  *   0.042  *   0.101  *
* W.S. Elev (ft)          *  799.43  * Reach Len. (ft)        *  742.07  * 1257.36  *  711.61  *
* Crit W.S. (ft)          *  786.67  * Flow Area (sq ft)      * 1865.48  * 2681.30  * 2354.22  *
* E.G. Slope (ft/ft)      *0.000391  * Area (sq ft)           * 5395.01  * 2681.30  * 7726.65  *
* Q Total (cfs)           *20700.00  * Flow (cfs)             * 2712.53  *14498.03  * 3489.44  *
* Top Width (ft)          * 1380.73  * Top Width (ft)         *  609.22  *  119.67  *  651.84  *
* Vel Total (ft/s)        *    3.00  * Avg. Vel. (ft/s)       *    1.45  *    5.41  *    1.48  *
* Max Chl Dpth (ft)       *   28.36  * Hydr. Depth (ft)       *   11.01  *   22.41  *   11.55  *
* Conv. Total (cfs)       *1046424.0  * Conv. (cfs)            *137123.6  *732902.5  *176397.9  *
* Length Wtd. (ft)        * 1096.75  * Wetted Per. (ft)       *  169.55  *  127.96  *  203.92  *
* Min Ch El (ft)          *  771.07  * Shear (lb/sq ft)       *    0.27  *    0.51  *    0.28  *
* Alpha                   *    2.35  * Stream Power (lb/ft s) *    0.39  *    2.77  *    0.42  *
* Frctn Loss (ft)         *    0.32  * Cum Volume (acre-ft)   * 4538.93  *12584.87  * 4882.80  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *  528.08  *  567.84  *  541.75  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 22.024

INPUT
Description:
Station Elevation Data    num=     185
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  852.35    8.48  851.51   19.72  850.42   36.35  849.46   45.45  849.08
   51.68  848.64   64.29  847.99   75.82  847.71   81.22   846.9  103.17  845.58
  116.41  844.84  136.62  843.45  154.18  841.98  170.26  840.38  184.19  839.52
  214.93  836.65  215.71  836.59  216.17  836.55  224.26  835.78  238.71  834.42
  242.55  834.09  257.91  832.74  261.94   832.5  280.16  831.22  282.59  830.75
  313.51  827.05  319.03  826.51  342.21   824.6  342.36  824.59  343.89  824.46
  355.87  823.54  386.63  820.74  386.92  820.71  387.23  820.69  421.64   818.4
  441.72  817.11  445.17  816.94  460.46  816.06  464.67  815.81  484.84  813.03
  485.39  812.97  487.23  812.99   508.1  813.45  514.95  810.14  528.72  803.56
  536.61  805.26  538.82  805.73  541.16   805.9  550.93  806.61  554.02  806.61
  555.54  806.61  563.45  805.75  563.69  805.73   564.2  805.64  579.03  803.09
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  585.76  802.94  594.05  802.74  602.62  802.19  608.95  801.83  610.28  801.82
  611.64  801.89  638.71  803.23  643.89  801.48  664.55  794.98  679.12  790.12
  682.25  789.07  686.43  787.84  702.19   784.6  702.25   784.6  703.61  784.38
  705.64  784.05  710.55  783.31  712.07  783.31  713.31  783.31  730.18  783.49
  755.25   783.1  762.24  783.35  789.43  784.33  789.47  784.33  815.93  784.51
  847.69  785.93  850.08  785.95  851.36  786.01  858.25  786.34  878.84  787.41
  899.02  787.09  930.07  786.87  944.56  786.72  976.04  786.68  988.09  786.58
   994.6  786.61 1079.22  787.17    1095  787.24 1150.16  787.25 1198.92   787.4
 1217.52  787.39 1242.61  787.69 1262.21  787.82 1290.01  787.99 1308.68  788.16
 1338.08  788.46 1358.25  788.54 1373.05  788.63 1445.84  788.51 1454.23  788.47
 1505.77  788.49 1530.52  788.53 1543.47  788.33  1576.2  787.91 1603.62  788.05
 1642.02   788.1 1673.12  787.85 1697.08  787.65 1711.73  787.44 1782.79  787.32
 1819.61  787.06 1876.25  786.22 1915.87  785.41 1963.24  784.91 1988.74   784.5
 2001.27  784.35  2034.5  784.47 2036.76  784.46 2070.69   784.2 2076.06  784.18
  2100.8  784.52 2130.35  785.12 2134.64  785.19 2134.65  785.19 2135.12   785.2
 2143.71  784.95 2153.58  784.68  2161.8  783.62 2178.38  782.18  2182.4  781.83
 2182.75   781.8 2187.25  781.07 2192.13  780.42 2196.74  780.25 2205.89  778.39
 2215.81   776.2 2230.13  773.05    2235     771    2255  769.98    2278     771
 2283.85  773.18  2293.7  778.24 2302.99   782.2 2315.68  786.62 2318.33  787.91
 2319.78  788.76 2330.83  795.22 2332.36  795.83 2338.06  798.42    2340  799.26
 2344.88  799.49 2350.41  804.23 2364.19  804.44 2380.56   804.6 2411.12  805.04
 2414.77  805.25 2431.48  805.52 2454.26  806.37 2464.85   807.8 2479.98  810.26
 2501.72  809.91 2503.01  809.88 2503.44  809.81  2512.4  808.38  2518.5  809.46
 2533.99   812.3 2545.44  815.16 2549.79  816.12 2561.68  817.93 2579.69  822.91
 2585.97  825.22 2588.28  826.03 2615.69  837.11 2618.15  838.14 2618.42  838.25
 2619.11  838.37 2637.49  842.13 2646.68  844.13 2662.07  849.75 2663.17  850.23

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .07  460.46   .1013  944.56     .06 1988.74      .1 2196.74     .04
 2319.78      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2143.71 2319.78          808.15  700.24  514.11             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 1873.35     822        F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  787.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.19  * Wt. n-Val.             *   0.083  *   0.042  *          *
* W.S. Elev (ft)          *  787.36  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)          *  778.40  * Flow Area (sq ft)      *  677.27  * 1704.57  *          *
* E.G. Slope (ft/ft)      *0.000462  * Area (sq ft)           * 1349.81  * 1704.57  *          *
* Q Total (cfs)           * 6725.00  * Flow (cfs)             *  485.68  * 6239.32  *          *
* Top Width (ft)          * 1051.36  * Top Width (ft)         *  877.87  *  173.49  *          *
* Vel Total (ft/s)        *    2.82  * Avg. Vel. (ft/s)       *    0.72  *    3.66  *          *
* Max Chl Dpth (ft)       *   17.38  * Hydr. Depth (ft)       *    2.51  *    9.83  *          *
* Conv. Total (cfs)       *312860.3  * Conv. (cfs)            * 22594.7  *290265.6  *          *
* Length Wtd. (ft)        *  704.54  * Wetted Per. (ft)       *  270.39  *  178.32  *          *
* Min Ch El (ft)          *  769.98  * Shear (lb/sq ft)       *    0.07  *    0.28  *          *
* Alpha                   *    1.56  * Stream Power (lb/ft s) *    0.05  *    1.01  *          *
* Frctn Loss (ft)         *    0.38  * Cum Volume (acre-ft)   *  810.57  * 6211.77  *  762.28  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  164.60  *  462.73  *  176.61  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  791.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.19  * Wt. n-Val.             *   0.080  *   0.044  *   0.100  *
* W.S. Elev (ft)          *  791.75  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)          *  781.49  * Flow Area (sq ft)      * 1864.09  * 2475.75  *    7.65  *
* E.G. Slope (ft/ft)      *0.000382  * Area (sq ft)           * 7360.18  * 2475.75  *    7.65  *
* Q Total (cfs)           *12150.00  * Flow (cfs)             * 2462.06  * 9685.31  *    2.63  *
* Top Width (ft)          * 1650.66  * Top Width (ft)         * 1469.48  *  176.07  *    5.11  *
* Vel Total (ft/s)        *    2.79  * Avg. Vel. (ft/s)       *    1.32  *    3.91  *    0.34  *
* Max Chl Dpth (ft)       *   21.77  * Hydr. Depth (ft)       *    6.89  *   14.06  *    1.49  *
* Conv. Total (cfs)       *621718.7  * Conv. (cfs)            *125984.4  *495599.6  *   134.7  *
* Length Wtd. (ft)        *  716.01  * Wetted Per. (ft)       *  270.39  *  181.26  *    5.92  *
* Min Ch El (ft)          *  769.98  * Shear (lb/sq ft)       *    0.16  *    0.33  *    0.03  *
```

```
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.22  *    1.27  *    0.01  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   * 1732.76  * 8248.50  * 1724.55  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  243.68  *  502.57  *  262.97  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  793.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.079  *   0.044  *   0.100  *
* W.S. Elev (ft)         *  793.83  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)         *  782.13  * Flow Area (sq ft)      * 2425.86  * 2841.60  *   21.97  *
* E.G. Slope (ft/ft)     *0.000279  * Area (sq ft)           *10420.05  * 2841.60  *   21.97  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 3280.08  *10210.74  *    9.19  *
* Top Width (ft)         * 1660.45  * Top Width (ft)         * 1475.71  *  176.07  *    8.67  *
* Vel Total (ft/s)       *    2.55  * Avg. Vel. (ft/s)       *    1.35  *    3.59  *    0.42  *
* Max Chl Dpth (ft)      *   23.85  * Hydr. Depth (ft)       *    8.97  *   16.14  *    2.53  *
* Conv. Total (cfs)      *808324.3  * Conv. (cfs)            *196397.4  *611376.9  *   550.0  *
* Length Wtd. (ft)       *  719.44  * Wetted Per. (ft)       *  270.39  *  181.26  *   10.04  *
* Min Ch El (ft)         *  769.98  * Shear (lb/sq ft)       *    0.16  *    0.27  *    0.04  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    0.21  *    0.98  *    0.02  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 2469.15  * 9875.08  * 2653.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  293.12  *  530.51  *  360.62  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  798.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.079  *   0.045  *   0.100  *
* W.S. Elev (ft)         *  797.82  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)         *  785.11  * Flow Area (sq ft)      * 3506.33  * 3545.25  *   72.36  *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *16342.23  * 3545.25  *   72.36  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 5849.18  *13809.16  *   41.66  *
* Top Width (ft)         * 1681.24  * Top Width (ft)         * 1488.20  *  176.07  *   16.97  *
* Vel Total (ft/s)       *    2.77  * Avg. Vel. (ft/s)       *    1.67  *    3.90  *    0.58  *
* Max Chl Dpth (ft)      *   27.84  * Hydr. Depth (ft)       *   12.97  *   20.14  *    4.26  *
* Conv. Total (cfs)      *1228673.0  * Conv. (cfs)            *364808.8  *861266.1  *  2598.0  *
* Length Wtd. (ft)       *  723.10  * Wetted Per. (ft)       *  270.39  *  181.26  *   19.27  *
* Min Ch El (ft)         *  769.98  * Shear (lb/sq ft)       *    0.21  *    0.31  *    0.06  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.35  *    1.22  *    0.03  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 3630.30  *11599.21  * 4022.61  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  415.35  *  553.36  *  463.68  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.079  *   0.046  *   0.100  *
* W.S. Elev (ft)         *  802.70  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)         *  787.50  * Flow Area (sq ft)      * 4823.66  * 4403.15  *  190.73  *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           *23646.28  * 4403.15  *  190.73  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 9359.06  *18202.76  *  138.18  *
* Top Width (ft)         * 1741.55  * Top Width (ft)         * 1536.64  *  176.07  *   28.84  *
* Vel Total (ft/s)       *    2.94  * Avg. Vel. (ft/s)       *    1.94  *    4.13  *    0.72  *
* Max Chl Dpth (ft)      *   32.72  * Hydr. Depth (ft)       *   17.84  *   25.01  *    6.61  *
* Conv. Total (cfs)      *1843439.0  * Conv. (cfs)            *622847.1  *1211396.0  *  9195.7  *
* Length Wtd. (ft)       *  725.40  * Wetted Per. (ft)       *  270.39  *  181.26  *   32.63  *
* Min Ch El (ft)         *  769.98  * Shear (lb/sq ft)       *    0.25  *    0.34  *    0.08  *
* Alpha                  *    1.45  * Stream Power (lb/ft s) *    0.49  *    1.42  *    0.06  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 6070.27  *14232.08  * 6839.94  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  763.75  *  581.20  *  874.50  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  806.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.20  * Wt. n-Val.              *   0.078  *   0.046  *   0.100  *
* W.S. Elev (ft)          *  806.07  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)          *  788.46  * Flow Area (sq ft)      * 5735.97  * 4997.29  *  399.20  *
* E.G. Slope (ft/ft)      *0.000204  * Area (sq ft)           *28967.41  * 4997.29  *  399.20  *
* Q Total (cfs)           *33260.00  * Flow (cfs)             *11901.94  *21179.69  *  178.38  *
* Top Width (ft)          * 1905.81  * Top Width (ft)         * 1603.27  *  176.07  *  126.47  *
* Vel Total (ft/s)        *    2.99  * Avg. Vel. (ft/s)       *    2.07  *    4.24  *    0.45  *
* Max Chl Dpth (ft)       *   36.09  * Hydr. Depth (ft)       *   21.22  *   28.38  *    3.16  *
* Conv. Total (cfs)       *2326436.0  * Conv. (cfs)           *832504.1  *1481455.0  * 12477.0  *
* Length Wtd. (ft)        *  726.54  * Wetted Per. (ft)       *  270.39  *  181.26  *  130.86  *
* Min Ch El (ft)          *  769.98  * Shear (lb/sq ft)       *    0.27  *    0.35  *    0.04  *
* Alpha                   *    1.45  * Stream Power (lb/ft s) *    0.56  *    1.49  *    0.02  *
* Frctn Loss (ft)         *    0.12  * Cum Volume (acre-ft)   * 8630.06  *15820.11  * 9722.50  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         * 1026.77  *  588.18  * 1268.65  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  809.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.21  * Wt. n-Val.              *   0.078  *   0.046  *   0.100  *
* W.S. Elev (ft)          *  809.21  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)          *  789.31  * Flow Area (sq ft)      * 6583.85  * 5549.47  *  852.39  *
* E.G. Slope (ft/ft)      *0.000190  * Area (sq ft)           *34053.15  * 5549.47  *  852.39  *
* Q Total (cfs)           *39100.00  * Flow (cfs)             *14441.78  *24126.18  *  532.05  *
* Top Width (ft)          * 1966.46  * Top Width (ft)         * 1626.81  *  176.07  *  163.58  *
* Vel Total (ft/s)        *    3.01  * Avg. Vel. (ft/s)       *    2.19  *    4.35  *    0.62  *
* Max Chl Dpth (ft)       *   39.23  * Hydr. Depth (ft)       *   24.35  *   31.52  *    5.21  *
* Conv. Total (cfs)       *2838941.0  * Conv. (cfs)           *1048577.0  *1751734.0  * 38630.3  *
* Length Wtd. (ft)        *  727.69  * Wetted Per. (ft)       *  270.39  *  181.26  *  168.32  *
* Min Ch El (ft)          *  769.98  * Shear (lb/sq ft)       *    0.29  *    0.36  *    0.06  *
* Alpha                   *    1.48  * Stream Power (lb/ft s) *    0.63  *    1.58  *    0.04  *
* Frctn Loss (ft)         *    0.11  * Cum Volume (acre-ft)   *11028.40  *16880.73  *12474.01  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         * 1207.65  *  589.08  * 1636.09  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  813.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.22  * Wt. n-Val.              *   0.078  *   0.047  *   0.100  *
* W.S. Elev (ft)          *  813.13  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)          *  790.37  * Flow Area (sq ft)      * 7644.24  * 6240.03  * 1643.05  *
* E.G. Slope (ft/ft)      *0.000175  * Area (sq ft)           *40450.50  * 6240.03  * 1643.05  *
* Q Total (cfs)           *47000.00  * Flow (cfs)             *17804.18  *27972.40  * 1223.41  *
* Top Width (ft)          * 2037.99  * Top Width (ft)         * 1644.39  *  176.07  *  217.53  *
* Vel Total (ft/s)        *    3.03  * Avg. Vel. (ft/s)       *    2.33  *    4.48  *    0.74  *
* Max Chl Dpth (ft)       *   43.15  * Hydr. Depth (ft)       *   28.27  *   35.44  *    7.55  *
* Conv. Total (cfs)       *3553595.0  * Conv. (cfs)           *1346146.0  *2114949.0  * 92500.4  *
* Length Wtd. (ft)        *  726.36  * Wetted Per. (ft)       *  270.39  *  181.26  *  222.79  *
* Min Ch El (ft)          *  769.98  * Shear (lb/sq ft)       *    0.31  *    0.38  *    0.08  *
* Alpha                   *    1.53  * Stream Power (lb/ft s) *    0.72  *    1.69  *    0.06  *
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)   *15780.90  *18489.54  *17490.33  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         * 1482.37  *  591.61  * 2015.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  799.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.16  * Wt. n-Val.              *   0.079  *   0.045  *   0.100  *
* W.S. Elev (ft)          *  799.23  * Reach Len. (ft)        *  808.15  *  700.24  *  514.11  *
* Crit W.S. (ft)          *  785.66  * Flow Area (sq ft)      * 3886.64  * 3792.92  *   98.45  *
* E.G. Slope (ft/ft)      *0.000220  * Area (sq ft)           *18438.79  * 3792.92  *   98.45  *
* Q Total (cfs)           *20700.00  * Flow (cfs)             * 6435.02  *14207.33  *   57.65  *
```

* Top Width (ft)	* 1688.89	* Top Width (ft)	* 1492.67	* 176.07	* 20.15	*
* Vel Total (ft/s)	* 2.66	* Avg. Vel. (ft/s)	* 1.66	* 3.75	* 0.59	*
* Max Chl Dpth (ft)	* 29.25	* Hydr. Depth (ft)	* 14.38	* 21.54	* 4.88	*
* Conv. Total (cfs)	*1394874.0	* Conv. (cfs)	*433625.3	*957364.4	* 3884.7	*
* Length Wtd. (ft)	* 723.93	* Wetted Per. (ft)	* 270.39	* 181.26	* 22.75	*
* Min Ch El (ft)	* 769.98	* Shear (lb/sq ft)	* 0.20	* 0.29	* 0.06	*
* Alpha	* 1.48	* Stream Power (lb/ft s)	* 0.33	* 1.08	* 0.03	*
* Frctn Loss (ft)	* 0.13	* Cum Volume (acre-ft)	* 4335.92	*12491.43	* 4818.88	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 510.18	* 563.57	* 536.26	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 21.891

INPUT
Description:
Station Elevation Data num= 265

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	851.35	3.26	851.2	16.95	850.99	30.45	850.09	42.84	849.41
59.01	849.04	70.47	848.84	86.97	847.83	92.06	847.45	94.67	847.2
112.99	845.48	120.28	844.98	148.21	843.56	155.96	843.14	169.01	842.26
191.9	841.33	217.68	841.51	225.14	841.44	233.78	841.18	258.54	840.45
264.72	840.54	275.11	840.97	282.95	841.4	286.02	841.46	289.79	841.2
296.46	840.76	306.65	840.54	344.01	839.62	347.25	839.46	376.7	837.71
386.93	837.11	388.02	837.04	397.24	836.47	398.81	836.46	416.21	838.52
428.63	838.59	447.06	839.67	451.92	839.54	460.8	839.28	482.01	838.43
498.98	838.35	513.43	837.83	524.95	835.4	529.81	834.89	544.14	829.64
554.29	823.07	554.36	823.03	554.44	822.98	554.6	822.94	554.73	822.91
574.08	817.28	587.57	813.28	588.45	813.02	589.7	812.96	608.08	811.6
612.44	811.25	624.18	810.83	629.9	810.5	631.32	810.59	633.39	810.49
647.9	810.1	659.43	810.01	671.78	809.75	678.9	809.71	692.43	809.46
712.13	809.37	724.5	809.24	729.31	809.6	739.55	809.74	759.51	810.45
760.84	810.48	761.23	810.49	763.15	810.58	777.89	812.38	787.94	813.43
799.06	814.71	808.1	815.77	814.13	816.78	836.83	819.54	847.63	820.47
858.97	821.34	867.82	821.36	873.23	821.39	892.67	818.34	896.35	817.48
898.91	816.85	899.04	816.82	899.18	816.79	899.46	816.72	917.37	810.68
923.99	807.29	925.56	806.61	926.02	806.41	927.6	806.09	933.86	804.44
943.47	805.44	947.02	805.82	954.03	806.58	958.16	807.03	958.96	807.03
962.75	807.03	966.19	806.56	971.75	805.82	977.4	806.17	989.46	806.84
997.89	809.96	1006.14	813	1018.77	818.97	1025.03	822.01	1026.17	830.62
1027.41	836.53	1029.94	836.51	1034.25	836.8	1050.68	833.24	1060.2	830.96
1077.05	827.64	1096.83	821.73	1110.23	817.69	1123.77	814.08	1137.49	810.47
1165.52	802.25	1165.9	802.21	1178.23	801.25	1179.4	801.35	1198.03	803.97
1206.42	804.03	1236.31	804.2	1245.99	803.85	1260.84	803.78	1269.43	803.56
1292.21	803.05	1294.87	802.72	1296.69	801.86	1309.11	795.92	1321.59	788.2
1327.52	786.98	1341.25	783.51	1359.07	783.68	1389.22	783.75	1423.88	784.95
1459.35	785.5	1472.31	785.55	1493.07	785.49	1494.98	785.48	1496.76	785.52
1523.36	785.46	1530.27	785.47	1530.71	785.47	1576.84	787.39	1609.2	788.18
1616.33	788.36	1646.71	787.96	1649.37	787.94	1654.17	787.76	1673.66	787.72
1676.79	787.72	1694.66	787.83	1697.97	787.84	1729.75	787.91	1740.29	787.93
1782.17	787.77	1788.28	787.82	1811.3	788.15	1826.03	788.25	1848.59	788.21
1857.17	788.17	1873.26	787.93	1903.96	787.39	1918.07	787.34	1962.25	787.21
2001.76	787.24	2033.08	787.23	2093.57	785.48	2100.29	785.26	2104.86	785.2
2122.51	785.17	2130.83	785.14	2137.03	785.14	2183.06	784.8	2202.88	784.23
2246.98	784.45	2247.84	784.45	2248.68	784.45	2284.78	783.7	2290.66	783.41
2309.6	783.48	2336.6	783.45	2350.95	784.07	2356.33	784.47	2385.26	784.8
2385.79	784.78	2386.96	784.8	2389.11	784.82	2432.82	784.86	2461.43	784.96
2487.66	785.13	2519.58	785.2	2538.73	785.37	2578	784.97	2579.41	784.95
2584.25	785.12	2611.08	786.01	2618.99	786.01	2632.62	785.96	2643.23	786.05
2650.18	786.08	2660.61	786.28	2674.3	786.27	2685.62	786.19	2697.92	786.11
2698.41	785.83	2711.12	773.05	2740	769.65	2770.72	773.18	2783.95	777.97
2786.02	778.62	2789.4	779.69	2797.26	780.87	2822.2	784.27	2825.92	784.51
2851.8	784.21	2885.31	784.01	2891.11	783.92	2892.67	783.91	2910.53	784.37
2921.52	784.7	2948.15	786.09	2948.99	786.12	2978.87	786.93	2985.05	787.27
2990.24	787.81	3006.35	791.34	3018.64	792.81	3029.23	794.22	3034.96	795.56
3057.2	805.5	3061.26	807.35	3061.81	807.5	3062.47	807.5	3064.15	807.49
3085.65	807.33	3094.93	806.04	3100.57	805.24	3117.33	810.89	3119.44	811.76
3131.87	816.79	3132.68	817.12	3132.95	817.26	3146.92	825.17	3158.54	832
3178.04	840.01	3179.11	840.48	3179.76	840.61	3217.32	847.21	3222.96	849.35

```
 3258.86  863.45 3262.52  865.09 3264.77  865.86 3273.94  867.41 3282.05  868.65
 3285.77  869.22 3314.28  872.39 3330.79  874.22 3361.76  877.51 3366.83  877.93

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0      .1  1165.9      .1 1496.76    .065 2697.92     .04 2825.92      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2697.92 2825.92           451.59  629.89  710.19             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  2378.3     822       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  786.87  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  778.54  * Flow Area (sq ft)      *  479.87  * 1379.93  *  304.26  *
* E.G. Slope (ft/ft)     *0.000655  * Area (sq ft)           * 1666.21  * 1379.93  *  304.26  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  368.09  * 6172.29  *  184.62  *
* Top Width (ft)         * 1167.94  * Top Width (ft)         *  889.05  *  128.00  *  150.89  *
* Vel Total (ft/s)       *    3.11  * Avg. Vel. (ft/s)       *    0.77  *    4.47  *    0.61  *
* Max Chl Dpth (ft)      *   17.22  * Hydr. Depth (ft)       *    1.50  *   10.78  *    2.02  *
* Conv. Total (cfs)      *262772.4  * Conv. (cfs)            * 14382.9  *241175.8  *  7213.8  *
* Length Wtd. (ft)       *  625.76  * Wetted Per. (ft)       *  319.65  *  135.22  *  150.95  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.06  *    0.42  *    0.08  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.05  *    1.87  *    0.05  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   *  782.60  * 6186.97  *  760.48  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  148.21  *  460.31  *  175.71  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  791.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  791.48  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  781.84  * Flow Area (sq ft)      * 1952.40  * 1969.64  * 1087.18  *
* E.G. Slope (ft/ft)     *0.000362  * Area (sq ft)           * 7612.21  * 1969.64  * 1087.18  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 2837.03  * 8301.62  * 1011.36  *
* Top Width (ft)         * 1691.25  * Top Width (ft)         * 1381.64  *  128.00  *  181.61  *
* Vel Total (ft/s)       *    2.43  * Avg. Vel. (ft/s)       *    1.45  *    4.21  *    0.93  *
* Max Chl Dpth (ft)      *   21.83  * Hydr. Depth (ft)       *    6.11  *   15.39  *    5.99  *
* Conv. Total (cfs)      *638699.6  * Conv. (cfs)            *149136.3  *436398.5  * 53164.8  *
* Length Wtd. (ft)       *  600.07  * Wetted Per. (ft)       *  319.65  *  135.22  *  182.10  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.14  *    0.33  *    0.13  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.20  *    1.39  *    0.13  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 1593.88  * 8212.77  * 1718.08  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  217.23  *  500.12  *  261.87  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  793.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  793.65  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  782.51  * Flow Area (sq ft)      * 2646.69  * 2247.69  * 1501.11  *
* E.G. Slope (ft/ft)     *0.000237  * Area (sq ft)           *10617.27  * 2247.69  * 1501.11  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 3811.64  * 8370.83  * 1317.54  *
* Top Width (ft)         * 1712.20  * Top Width (ft)         * 1385.15  *  128.00  *  199.06  *
* Vel Total (ft/s)       *    2.11  * Avg. Vel. (ft/s)       *    1.44  *    3.72  *    0.88  *
* Max Chl Dpth (ft)      *   24.00  * Hydr. Depth (ft)       *    8.28  *   17.56  *    7.54  *
* Conv. Total (cfs)      *877061.5  * Conv. (cfs)            *247632.6  *543831.9  * 85597.0  *
* Length Wtd. (ft)       *  591.20  * Wetted Per. (ft)       *  319.65  *  135.22  *  199.68  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.12  *    0.25  *    0.11  *
* Alpha                  *    2.08  * Stream Power (lb/ft s) *    0.18  *    0.92  *    0.10  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 2274.00  * 9834.17  * 2644.17  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  266.58  *  528.07  *  359.39  *
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*****************************************************************************************
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  797.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  797.69  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  786.67  * Flow Area (sq ft)      * 3936.58  * 2764.26  * 2341.52  *
* E.G. Slope (ft/ft)     *0.000193  * Area (sq ft)           *16221.21  * 2764.26  * 2341.52  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 6664.86  *10661.66  * 2373.48  *
* Top Width (ft)         * 1734.31  * Top Width (ft)         * 1392.51  *  128.00  *  213.80  *
* Vel Total (ft/s)       *    2.18  * Avg. Vel. (ft/s)       *    1.69  *    3.86  *    1.01  *
* Max Chl Dpth (ft)      *   28.04  * Hydr. Depth (ft)       *   12.32  *   21.60  *   10.95  *
* Conv. Total (cfs)      *1418546.0  * Conv. (cfs)           *479919.3  *767718.5  *170908.4  *
* Length Wtd. (ft)       *  580.92  * Wetted Per. (ft)       *  319.65  *  135.22  *  215.08  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.15  *    0.25  *    0.13  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.25  *    0.95  *    0.13  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 3328.24  *11548.50  * 4008.36  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  388.63  *  550.92  *  462.32  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  802.60  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  788.38  * Flow Area (sq ft)      * 5505.99  * 3392.77  * 3418.31  *
* E.G. Slope (ft/ft)     *0.000154  * Area (sq ft)           *23102.09  * 3392.77  * 3418.31  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             *10431.18  *13421.45  * 3847.37  *
* Top Width (ft)         * 1779.54  * Top Width (ft)         * 1426.75  *  128.00  *  224.79  *
* Vel Total (ft/s)       *    2.25  * Avg. Vel. (ft/s)       *    1.89  *    3.96  *    1.13  *
* Max Chl Dpth (ft)      *   32.95  * Hydr. Depth (ft)       *   17.23  *   26.51  *   15.21  *
* Conv. Total (cfs)      *2229330.0  * Conv. (cfs)           *839513.9  *1080175.0  *309641.4  *
* Length Wtd. (ft)       *  573.58  * Wetted Per. (ft)       *  319.65  *  135.22  *  227.11  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.17  *    0.24  *    0.15  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.31  *    0.96  *    0.16  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 5636.62  *14169.42  * 6818.64  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  736.26  *  578.76  *  873.01  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  806.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  806.00  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  789.20  * Flow Area (sq ft)      * 6591.37  * 3827.44  * 4197.43  *
* E.G. Slope (ft/ft)     *0.000133  * Area (sq ft)           *28224.55  * 3827.44  * 4197.43  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *13090.83  *15256.53  * 4912.64  *
* Top Width (ft)         * 1937.93  * Top Width (ft)         * 1570.00  *  128.00  *  239.93  *
* Vel Total (ft/s)       *    2.28  * Avg. Vel. (ft/s)       *    1.99  *    3.99  *    1.17  *
* Max Chl Dpth (ft)      *   36.35  * Hydr. Depth (ft)       *   20.62  *   29.90  *   17.49  *
* Conv. Total (cfs)      *2878841.0  * Conv. (cfs)           *1133086.0  *1320539.0  *425217.1  *
* Length Wtd. (ft)       *  570.79  * Wetted Per. (ft)       *  319.65  *  135.22  *  243.16  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.17  *    0.24  *    0.14  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.34  *    0.94  *    0.17  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 8099.54  *15749.18  * 9695.37  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  997.33  *  585.74  * 1266.49  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  809.29  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  809.14  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  789.97  * Flow Area (sq ft)      * 7595.94  * 4229.75  * 5039.21  *
* E.G. Slope (ft/ft)     *0.000125  * Area (sq ft)           *33291.96  * 4229.75  * 5039.21  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *16047.47  *17440.62  * 5611.91  *
* Top Width (ft)         * 2045.39  * Top Width (ft)         * 1631.18  *  128.00  *  286.21  *
* Vel Total (ft/s)       *    2.32  * Avg. Vel. (ft/s)       *    2.11  *    4.12  *    1.11  *
* Max Chl Dpth (ft)      *   39.49  * Hydr. Depth (ft)       *   23.77  *   33.04  *   17.61  *
* Conv. Total (cfs)      *3497108.0  * Conv. (cfs)           *1435287.0  *1559890.0  *501930.1  *
* Length Wtd. (ft)       *  567.79  * Wetted Per. (ft)       *  319.65  *  135.22  *  290.36  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.19  *    0.24  *    0.14  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.39  *    1.01  *    0.15  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *10403.69  *16802.13  *12439.24  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1177.42  *  586.64  * 1633.43  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  813.23  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  813.07  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  790.88  * Flow Area (sq ft)      * 8853.76  * 4733.47  * 6187.29  *
* E.G. Slope (ft/ft)     *0.000113  * Area (sq ft)           *40297.65  * 4733.47  * 6187.29  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *19687.20  *19992.70  * 7320.11  *
* Top Width (ft)         * 2287.38  * Top Width (ft)         * 1862.61  *  128.00  *  296.77  *
* Vel Total (ft/s)       *    2.38  * Avg. Vel. (ft/s)       *    2.22  *    4.22  *    1.18  *
* Max Chl Dpth (ft)      *   43.42  * Hydr. Depth (ft)       *   27.70  *   36.98  *   20.85  *
* Conv. Total (cfs)      *4423471.0  * Conv. (cfs)           *1852888.0  *1881641.0  *688942.1  *
* Length Wtd. (ft)       *  566.31  * Wetted Per. (ft)       *  319.65  *  135.22  *  301.63  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.20  *    0.25  *    0.14  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.43  *    1.04  *    0.17  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *15031.86  *18401.34  *17444.12  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1449.83  *  589.17  * 2012.53  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  799.25  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.             *   0.065  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  799.12  * Reach Len. (ft)        *  451.59  *  629.89  *  710.19  *
* Crit W.S. (ft)         *  787.00  * Flow Area (sq ft)      * 4394.59  * 2947.68  * 2650.19  *
* E.G. Slope (ft/ft)     *0.000160  * Area (sq ft)           *18218.81  * 2947.68  * 2650.19  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 7282.19  *10792.77  * 2625.04  *
* Top Width (ft)         * 1740.52  * Top Width (ft)         * 1395.51  *  128.00  *  217.01  *
* Vel Total (ft/s)       *    2.07  * Avg. Vel. (ft/s)       *    1.66  *    3.66  *    0.99  *
* Max Chl Dpth (ft)      *   29.47  * Hydr. Depth (ft)       *   13.75  *   23.03  *   12.21  *
* Conv. Total (cfs)      *1638861.0  * Conv. (cfs)           *576545.6  *854485.9  *207829.7  *
* Length Wtd. (ft)       *  578.41  * Wetted Per. (ft)       *  319.65  *  135.22  *  218.59  *
* Min Ch El (ft)         *  769.65  * Shear (lb/sq ft)       *    0.14  *    0.22  *    0.12  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.23  *    0.79  *    0.12  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 3995.87  *12437.26  * 4802.66  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  483.39  *  561.12  *  534.86  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 21.772

INPUT
Description: Ineffective area due to I-435 embankment.
Station Elevation Data    num=     246
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
**********************************************************************************
```

```
       0  850.13   24.31  849.75   51.46  849.35   57.68  849.22   75.55  849.48
   97.38  849.89   98.99   849.9  119.31  849.79  133.01  849.95  150.25  849.93
  159.98   849.9  180.49  849.87  209.21  849.49  221.08  849.31  223.02  849.28
  225.94  849.24   230.7  849.17  248.88  848.96  256.66  844.47  259.87  842.53
   263.9  840.62  274.72  835.62  290.75  831.04  296.08  829.66  297.46  828.82
  310.02  822.44  325.93  811.87  325.96  811.85  326.01  811.83  338.06  808.11
  353.33   807.8  359.85  807.48  372.39  805.97  377.87  805.78  399.17  805.75
  408.83  805.41  422.51  804.07  424.76  803.76   425.5  803.71  428.75   803.4
  447.86  801.52  457.15  803.99  464.58  806.07  469.72  806.43  475.48  806.86
  477.57  806.86  480.06  806.86  486.55  806.29  489.33  806.06   496.3  805.35
  499.17  805.05  500.55  805.16  510.15  805.79  519.78   806.3  525.69  806.57
  538.38  804.01  541.88  803.13  545.48  802.33  553.57  800.84  558.59  801.46
  569.76   803.5  574.58  804.31  589.29  808.27  590.77  808.71  609.13  813.02
  616.03  814.65  616.52  814.62     630  813.75  650.78  814.55  654.39  814.67
  660.06  814.87  677.79  815.49  687.91  816.24  693.94  816.71  705.65  813.38
  707.52  812.85  709.14  812.32   748.2  799.93  762.83  795.59  775.98  791.88
  791.39  791.78  797.94   791.6  807.53  791.81  821.48  793.79  836.01  795.15
  851.31  796.59  867.96  800.27  884.84  800.93  893.28  802.03  901.96  802.74
  922.63  801.79  961.43  800.75   970.3   800.1  995.79  799.44 1001.68  799.13
 1031.46  798.42 1032.31  798.38 1033.45  798.44 1042.44   798.4 1054.25  798.05
 1056.07  797.99 1076.84  797.37 1082.41   797.2 1115.63  796.21 1126.54  795.87
 1149.81  795.09 1164.47  794.66    1184  793.87 1196.11  793.45 1218.52  792.51
 1239.33  791.64 1246.32  791.26 1247.21  791.23 1248.24  791.19 1272.63  789.99
  1275.9   789.9  1277.4  789.84 1281.92  789.74 1281.96  789.74  1299.9  788.99
 1305.43  788.75 1308.82  788.77 1311.87  788.63 1334.36  787.63 1334.39  787.63
 1335.87  787.56 1337.41  787.49 1338.39  787.54 1339.99  787.53 1349.62  787.21
 1375.34  786.82 1379.53   786.7 1385.92  786.69  1407.4  786.65 1426.87   786.6
 1432.43  786.59  1441.6  786.57 1455.62  786.26 1458.68  786.21 1479.12  785.77
 1508.31  785.48 1511.41  785.44 1531.99  785.42 1547.24  785.53 1560.63  785.74
 1597.28  786.16 1616.46  786.45 1640.29  786.72 1680.41   787.1 1728.12   787.7
 1746.58   787.9 1762.89  788.12 1783.78  788.47 1816.65  788.83 1862.09     788
  1930.9  788.03 1937.09     788 2015.92   787.1  2048.7  786.94 2095.65  786.57
  2124.8   786.4 2171.37  785.65 2189.93  785.38 2198.23  785.34 2204.77  785.24
 2249.04  784.74 2261.29  785.15 2272.96  786.55 2295.16  786.51 2297.09  786.59
 2298.57  785.77 2306.13  781.72 2315.13  778.09 2317.85  777.04    2318  776.98
 2319.28  776.47 2332.25  771.39    2333   771.2    2358   771.3    2364   770.4
    2377   769.4    2393  769.35 2400.91  777.72 2403.53   779.8 2409.19  783.96
 2417.42  784.65 2418.41  784.66 2436.95  784.95 2436.97  784.95 2437.01  784.94
 2449.42  782.55 2450.68  782.57 2451.67  782.59 2455.67  782.62 2457.67  782.55
 2468.85  784.67 2471.05  785.09 2471.51  785.17  2480.7  789.64 2496.17  799.14
 2496.77   799.5 2496.88  799.46 2516.03  795.77 2528.84  794.16 2532.75  794.15
 2544.76  797.07 2550.31  798.33 2572.58  807.03 2574.77  807.89 2576.44  808.34
 2579.99  808.51 2597.92  809.39 2606.93  808.56  2615.6  807.73 2623.96  809.71
 2636.16  812.39 2636.59  812.65 2637.24  812.86 2652.17  816.12 2655.88  816.17
 2660.96  817.06 2666.43  818.03 2675.55  819.09 2685.88  818.78 2687.75  818.72
 2695.07   823.4  2696.8  824.32 2706.26   828.2  2723.6  843.88 2725.88  842.68
 2727.21  845.66 2735.58  845.64 2744.19  846.65 2747.18  847.01 2755.24  848.42
 2770.84   851.6 2783.19  853.45 2797.01  855.59 2800.82  856.92 2820.98  863.21
 2821.69  863.38 2838.14   866.8 2838.58  866.91 2840.68  867.26 2862.93  870.51
 2868.85  871.44

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  248.88      .1  447.86     .07 2297.09     .04 2409.19      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2297.09 2409.19            802.9   922.5 1066.14             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2012.03     820        F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  786.76  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.            *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  786.43  * Reach Len. (ft)       *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  777.26  * Flow Area (sq ft)     *  140.71  * 1399.21  *  151.49  *
* E.G. Slope (ft/ft)     *0.000607  * Area (sq ft)          *  242.90  * 1399.21  *  151.49  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)            *   69.91  * 6558.26  *   96.83  *
* Top Width (ft)         *  495.61  * Top Width (ft)        *  318.90  *  111.81  *   64.91  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)      *    0.50  *    4.69  *    0.64  *
* Max Chl Dpth (ft)      *   17.08  * Hydr. Depth (ft)      *    0.93  *   12.51  *    2.33  *
* Conv. Total (cfs)      *272871.7  * Conv. (cfs)           *  2836.8  *266106.1  *  3928.8  *
* Length Wtd. (ft)       *  923.09  * Wetted Per. (ft)      *  152.02  *  120.79  *   65.70  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)      *    0.04  *    0.44  *    0.09  *
```

```
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.02  *    2.06  *    0.06  *
* Frctn Loss (ft)        *    0.73  * Cum Volume (acre-ft)   *  772.70  * 6166.88  *  756.77  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  141.95  *  458.57  *  173.96  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  791.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  791.10  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  780.29  * Flow Area (sq ft)      * 1430.50  * 1922.82  *  476.65  *
* E.G. Slope (ft/ft)     *0.000464  * Area (sq ft)           * 4274.63  * 1922.82  *  476.65  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 1915.98  * 9714.63  *  519.39  *
* Top Width (ft)         * 1232.99  * Top Width (ft)         * 1047.00  *  112.10  *   73.89  *
* Vel Total (ft/s)       *    3.17  * Avg. Vel. (ft/s)       *    1.34  *    5.05  *    1.09  *
* Max Chl Dpth (ft)      *   21.75  * Hydr. Depth (ft)       *    5.02  *   17.15  *    6.45  *
* Conv. Total (cfs)      *564284.6  * Conv. (cfs)            * 88984.1  *451178.1  * 24122.3  *
* Length Wtd. (ft)       *  918.33  * Wetted Per. (ft)       *  285.17  *  121.12  *   75.84  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.15  *    0.46  *    0.18  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.19  *    2.32  *    0.20  *
* Frctn Loss (ft)        *    0.57  * Cum Volume (acre-ft)   * 1532.26  * 8184.63  * 1705.34  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  204.64  *  498.39  *  259.79  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  793.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  793.39  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  780.94  * Flow Area (sq ft)      * 2082.85  * 2179.35  *  650.00  *
* E.G. Slope (ft/ft)     *0.000314  * Area (sq ft)           * 6793.02  * 2179.35  *  650.00  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 2951.44  * 9857.56  *  691.00  *
* Top Width (ft)         * 1337.21  * Top Width (ft)         * 1147.50  *  112.10  *   77.61  *
* Vel Total (ft/s)       *    2.75  * Avg. Vel. (ft/s)       *    1.42  *    4.52  *    1.06  *
* Max Chl Dpth (ft)      *   24.04  * Hydr. Depth (ft)       *    7.31  *   19.44  *    8.37  *
* Conv. Total (cfs)      *761309.9  * Conv. (cfs)            *166441.3  *555900.8  * 38967.8  *
* Length Wtd. (ft)       *  916.39  * Wetted Per. (ft)       *  285.17  *  121.12  *   80.21  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.14  *    0.35  *    0.16  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.20  *    1.60  *    0.17  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   * 2183.76  * 9802.16  * 2626.64  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  253.45  *  526.33  *  357.13  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  797.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  797.44  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  783.65  * Flow Area (sq ft)      * 3237.91  * 2633.58  * 1051.90  *
* E.G. Slope (ft/ft)     *0.000277  * Area (sq ft)           *11788.76  * 2633.58  * 1051.90  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 5780.18  *12687.14  * 1232.68  *
* Top Width (ft)         * 1556.47  * Top Width (ft)         * 1321.14  *  112.10  *  123.23  *
* Vel Total (ft/s)       *    2.85  * Avg. Vel. (ft/s)       *    1.79  *    4.82  *    1.17  *
* Max Chl Dpth (ft)      *   28.09  * Hydr. Depth (ft)       *   11.36  *   23.49  *    8.54  *
* Conv. Total (cfs)      *1183401.0  * Conv. (cfs)            *347221.5  *762130.5  * 74048.7  *
* Length Wtd. (ft)       *  914.00  * Wetted Per. (ft)       *  285.17  *  121.12  *  127.63  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.20  *    0.38  *    0.14  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    0.35  *    1.81  *    0.17  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 3183.04  *11509.47  * 3980.70  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  374.57  *  549.18  *  459.57  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  802.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  802.37  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  788.19  * Flow Area (sq ft)      * 4643.33  * 3186.26  * 1752.50  *
* E.G. Slope (ft/ft)     *0.000234  * Area (sq ft)           *18886.64  * 3186.26  * 1752.50  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 9690.88  *16022.73  * 1986.39  *
* Top Width (ft)         * 1837.66  * Top Width (ft)         * 1574.10  *  112.10  *  151.46  *
* Vel Total (ft/s)       *    2.89  * Avg. Vel. (ft/s)       *    2.09  *    5.03  *    1.13  *
* Max Chl Dpth (ft)      *   33.02  * Hydr. Depth (ft)       *   16.29  *   28.42  *   11.57  *
* Conv. Total (cfs)      *1809936.0  * Conv. (cfs)            *633208.4  *1046936.0  *129792.0  *
* Length Wtd. (ft)       *  912.23  * Wetted Per. (ft)       *  285.17  *  121.12  *  157.49  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.24  *    0.38  *    0.16  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    0.50  *    1.93  *    0.18  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   * 5418.97  *14121.85  * 6776.49  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  720.71  *  577.02  *  869.94  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  806.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  805.79  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  789.37  * Flow Area (sq ft)      * 5617.10  * 3569.19  * 2284.83  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           *24467.82  * 3569.19  * 2284.83  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *12420.02  *18065.07  * 2774.91  *
* Top Width (ft)         * 1994.06  * Top Width (ft)         * 1721.76  *  112.10  *  160.21  *
* Vel Total (ft/s)       *    2.90  * Avg. Vel. (ft/s)       *    2.21  *    5.06  *    1.21  *
* Max Chl Dpth (ft)      *   36.44  * Hydr. Depth (ft)       *   19.70  *   31.84  *   14.26  *
* Conv. Total (cfs)      *2328901.0  * Conv. (cfs)            *869663.3  *1264936.0  *194302.0  *
* Length Wtd. (ft)       *  912.01  * Wetted Per. (ft)       *  285.17  *  121.12  *  166.88  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.25  *    0.38  *    0.17  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    0.55  *    1.90  *    0.21  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 7826.40  *15695.70  * 9642.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  980.27  *  584.00  * 1263.23  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  809.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  808.94  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  790.36  * Flow Area (sq ft)      * 6515.84  * 3922.63  * 2817.04  *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           *30123.28  * 3922.63  * 2817.04  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *15288.50  *20323.37  * 3488.13  *
* Top Width (ft)         * 2143.17  * Top Width (ft)         * 1833.66  *  112.10  *  197.42  *
* Vel Total (ft/s)       *    2.95  * Avg. Vel. (ft/s)       *    2.35  *    5.18  *    1.24  *
* Max Chl Dpth (ft)      *   39.59  * Hydr. Depth (ft)       *   22.86  *   34.99  *   14.27  *
* Conv. Total (cfs)      *2848356.0  * Conv. (cfs)            *1113736.0  *1480516.0  *254103.3  *
* Length Wtd. (ft)       *  911.58  * Wetted Per. (ft)       *  285.17  *  121.12  *  204.76  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.27  *    0.38  *    0.16  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.63  *    1.97  *    0.20  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *10074.97  *16743.18  *12375.20  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1159.46  *  584.90  * 1629.49  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  813.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  812.88  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  791.58  * Flow Area (sq ft)      * 7637.99  * 4363.91  * 3680.54  *
```

```
* E.G. Slope (ft/ft)     *0.000174  * Area (sq ft)           *37423.11  * 4363.91  * 3680.54  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *19155.61  *23338.75  * 4505.65  *
* Top Width (ft)         * 2213.97  * Top Width (ft)         * 1873.76  *  112.10  *  228.12  *
* Vel Total (ft/s)       *    3.00  * Avg. Vel. (ft/s)       *    2.51  *    5.35  *    1.22  *
* Max Chl Dpth (ft)      *   43.53  * Hydr. Depth (ft)       *   26.79  *   38.93  *   16.13  *
* Conv. Total (cfs)      *3561216.0  * Conv. (cfs)            *1451431.0  *1768390.0  *341395.3  *
* Length Wtd. (ft)       *  911.41  * Wetted Per. (ft)       *  285.17  *  121.12  *  235.99  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.29  *    0.39  *    0.17  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.73  *    2.10  *    0.21  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *14628.99  *18335.56  *17363.68  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1430.47  *  587.43  * 2008.26  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  799.13  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.070  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  798.91  * Reach Len. (ft)        *  802.90  *  922.50  * 1066.14  *
* Crit W.S. (ft)         *  784.06  * Flow Area (sq ft)      * 3656.70  * 2798.27  * 1244.75  *
* E.G. Slope (ft/ft)     *0.000232  * Area (sq ft)           *13780.29  * 2798.27  * 1244.75  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 6476.51  *12841.87  * 1381.62  *
* Top Width (ft)         * 1647.04  * Top Width (ft)         * 1396.28  *  112.10  *  138.65  *
* Vel Total (ft/s)       *    2.69  * Avg. Vel. (ft/s)       *    1.77  *    4.59  *    1.11  *
* Max Chl Dpth (ft)      *   29.56  * Hydr. Depth (ft)       *   12.83  *   24.96  *    8.98  *
* Conv. Total (cfs)      *1359177.0  * Conv. (cfs)            *425252.4  *843206.3  * 90718.2  *
* Length Wtd. (ft)       *  913.50  * Wetted Per. (ft)       *  285.17  *  121.12  *  143.81  *
* Min Ch El (ft)         *  769.35  * Shear (lb/sq ft)       *    0.19  *    0.33  *    0.13  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    0.33  *    1.54  *    0.14  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   * 3830.00  *12395.71  * 4770.91  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  468.92  *  559.39  *  531.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 21.597

INPUT
Description: Upstream side of I-435
Station Elevation Data    num=     215
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  835.12     4.9  835.65    9.29  835.96   12.92  836.34    19.8  837.45
   32.41  839.22   37.91  840.09   42.79  840.77   54.13  841.38    71.4  841.82
    77.5  841.75   90.35  842.08   91.44  842.09    95.9  842.04  113.66   841.6
  125.22  841.01  137.89  840.23   139.9  839.22  148.52  834.88   154.6   832.5
  179.26  822.57  181.58  821.59  184.61   821.1  195.79  819.87  203.93  818.88
  207.44  817.84  227.65  812.29   228.4     812  231.92  810.95  246.58   806.8
  249.65  806.79  253.63  806.81  264.59  806.69  265.62  806.67   266.2  806.66
  270.23  806.66  276.91  806.37  281.43  806.16  287.57   804.7   297.9  803.12
  309.18  802.78  316.76  802.48  322.77  802.75  335.38  803.33  343.18  803.72
   369.9  807.31  370.77  807.43  370.93  807.45   371.2  807.46  392.42  807.98
  400.09  807.76   416.7  807.43  420.48  807.34  437.12  806.87  452.71  806.36
  462.57  806.27  478.94   808.6  478.99  808.61  479.49  808.68  481.01  808.83
  496.57  811.05  500.11  811.36   507.4  811.39  523.63  812.35   536.3  812.28
  566.32  812.06  569.44  812.04  571.69  811.98  587.86  811.78  606.61  811.24
  614.91  810.81  631.97  810.43  643.13  810.18  650.05  810.52  660.86  811.06
  677.46  812.06  680.16  812.21  681.43  812.28  684.57  812.49   706.7  813.39
  712.96  813.56  735.98  814.42  752.06  814.81  768.74  815.38  779.71  815.56
  805.88  816.14  810.74  816.22  832.86  816.74  844.52  815.83  846.28  815.66
  852.51  815.12  913.62  810.11  931.58  808.61  949.24  807.16  976.19  804.89
  986.05  804.08 1018.69  801.37 1022.98  801.46 1023.98   801.6 1025.09  801.69
 1026.37  801.79 1069.38  804.46 1075.88  805.08 1096.89  805.34  1109.1  804.84
 1122.04  805.13 1153.97  805.87  1157.9  805.84 1161.71   805.8 1197.19  804.58
 1209.55  804.24 1216.17   804.1 1240.61  803.91 1267.82  803.28  1283.2  803.16
 1338.53  801.33 1348.63   801.1 1353.22  800.98 1366.04  800.32    1385  799.68
 1417.23  798.59 1417.36  798.58 1417.44  798.58 1417.76  798.57 1442.96  798.53
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 1457.18  798.52 1472.39  798.49 1510.11  799.36 1517.83  799.36 1525.06  799.36
  1550.9  799.94 1571.19  799.43 1578.61   799.6 1587.74  799.97  1599.5  800.45
 1609.42  800.85 1622.06  801.17 1643.18  801.97 1656.29  802.31  1664.8  802.88
 1683.87  803.87 1718.13  806.09 1741.11   807.3 1779.67  809.39 1818.19  811.71
 1847.95  813.41  1867.5  813.65 1868.96  813.69 1899.51  814.05 1914.39  811.49
  1920.7  809.22 1930.04  805.21 1939.25  801.35 1956.67  794.89 1968.94  789.98
 1977.15  786.71 1996.07  786.23  2010.1  785.54 2022.34  785.56 2037.05  785.67
 2038.22  785.68 2045.78  785.84  2076.2  772.33 2080.31   770.3 2088.92   770.3
    2100  768.89 2121.82   770.3 2132.79  775.17 2133.99  775.65 2135.23  776.24
 2139.81  778.37 2152.38   784.2 2163.88  784.53 2174.92  784.85 2200.44  785.29
 2220.15  785.95 2225.99  786.17 2243.96  787.29 2258.93  788.71 2265.35  790.74
 2275.97  795.63 2280.42  797.96 2291.93  803.83 2312.66   812.9 2317.78  813.94
 2337.85  814.87 2338.57  814.91    2339   814.9 2345.21  814.91 2356.63  824.48
 2356.98   824.8 2357.36  825.16 2365.78  834.33 2377.03   853.8 2377.64  855.06
 2378.29  855.32 2380.78  856.25 2393.02  860.97 2395.81  861.15 2409.62   862.1
 2422.05   862.5 2430.09  862.75  2445.1  862.94 2458.07  862.98 2471.91  863.27
  2480.7  863.71 2484.83  863.91 2495.65  864.45 2516.75  865.47 2521.34  867.26
 2523.31  867.88 2533.84  871.77 2537.51  872.55 2544.66  874.99 2551.16  876.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .07 2045.78     .04 2152.38     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     2045.78 2152.38             215     215     215              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0 1896.36     821       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  786.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.52  * Wt. n-Val.             *          *   0.040  *   0.070  *
* W.S. Elev (ft)          *  785.50  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)          *  778.00  * Flow Area (sq ft)      *          * 1161.83  *   33.43  *
* E.G. Slope (ft/ft)      *0.001071  * Area (sq ft)           *          * 1161.83  *   33.43  *
* Q Total (cfs)           * 6725.00  * Flow (cfs)              *          * 6708.19  *   16.81  *
* Top Width (ft)          *  160.05  * Top Width (ft)          *          *  105.83  *   54.22  *
* Vel Total (ft/s)        *    5.63  * Avg. Vel. (ft/s)        *          *    5.77  *    0.50  *
* Max Chl Dpth (ft)       *   16.61  * Hydr. Depth (ft)        *          *   10.98  *    0.62  *
* Conv. Total (cfs)       *205505.3  * Conv. (cfs)             *          *204991.5  *   513.8  *
* Length Wtd. (ft)        *   55.00  * Wetted Per. (ft)        *          *  112.24  *   54.24  *
* Min Ch El (ft)          *  768.89  * Shear (lb/sq ft)        *          *    0.69  *    0.04  *
* Alpha                   *    1.05  * Stream Power (lb/ft s) *          *    4.00  *    0.02  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)    *  770.46  * 6139.76  *  754.51  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  139.01  *  456.27  *  172.50  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  790.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.60  * Wt. n-Val.             *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)          *  790.23  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)          *  781.28  * Flow Area (sq ft)      *  311.97  * 1666.34  *  475.47  *
* E.G. Slope (ft/ft)      *0.000856  * Area (sq ft)           *  311.97  * 1666.34  *  475.47  *
* Q Total (cfs)           *12150.00  * Flow (cfs)              *  487.58  *10886.80  *  775.62  *
* Top Width (ft)          *  295.42  * Top Width (ft)          *   77.47  *  106.60  *  111.36  *
* Vel Total (ft/s)        *    4.95  * Avg. Vel. (ft/s)        *    1.56  *    6.53  *    1.63  *
* Max Chl Dpth (ft)       *   21.34  * Hydr. Depth (ft)        *    4.03  *   15.63  *    4.27  *
* Conv. Total (cfs)       *415213.0  * Conv. (cfs)             * 16662.4  *372044.7  * 26506.0  *
* Length Wtd. (ft)        *   55.00  * Wetted Per. (ft)        *   78.17  *  113.09  *  111.72  *
* Min Ch El (ft)          *  768.89  * Shear (lb/sq ft)        *    0.21  *    0.79  *    0.23  *
* Alpha                   *    1.57  * Stream Power (lb/ft s) *    0.33  *    5.15  *    0.37  *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)    * 1489.99  * 8146.62  * 1693.68  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  194.28  *  496.07  *  257.52  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  793.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  792.78  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         *  781.98  * Flow Area (sq ft)      *  517.75  * 1938.32  *  767.82  *
* E.G. Slope (ft/ft)     *0.000557  * Area (sq ft)           *  517.75  * 1938.32  *  767.82  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  864.87  *11296.67  * 1338.46  *
* Top Width (ft)         *  307.85  * Top Width (ft)         *   83.84  *  106.60  *  117.40  *
* Vel Total (ft/s)       *    4.19  * Avg. Vel. (ft/s)       *    1.67  *    5.83  *    1.74  *
* Max Chl Dpth (ft)      *   23.89  * Hydr. Depth (ft)       *    6.18  *   18.18  *    6.54  *
* Conv. Total (cfs)      *572023.4  * Conv. (cfs)            * 36646.6  *478663.8  * 56713.1  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)       *   85.03  *  113.09  *  118.30  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.21  *    0.60  *    0.23  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *    0.35  *    3.47  *    0.39  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 2116.38  * 9758.56  * 2609.28  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  242.11  *  524.02  *  354.75  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  797.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  796.83  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         *  784.79  * Flow Area (sq ft)      *  877.80  * 2369.63  * 1260.44  *
* E.G. Slope (ft/ft)     *0.000509  * Area (sq ft)           *  877.80  * 2369.63  * 1260.44  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 1834.03  *15089.19  * 2776.78  *
* Top Width (ft)         *  326.81  * Top Width (ft)         *   94.34  *  106.60  *  125.88  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    2.09  *    6.37  *    2.20  *
* Max Chl Dpth (ft)      *   27.94  * Hydr. Depth (ft)       *    9.31  *   22.23  *   10.01  *
* Conv. Total (cfs)      *873486.9  * Conv. (cfs)            * 81319.9  *669046.1  *123120.9  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)       *   96.28  *  113.09  *  127.69  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.29  *    0.67  *    0.31  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    0.60  *    4.24  *    0.69  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 3066.31  *11456.49  * 3952.40  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  361.52  *  546.86  *  456.52  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  802.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  801.78  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         *  788.54  * Flow Area (sq ft)      * 1378.32  * 2897.85  * 1908.00  *
* E.G. Slope (ft/ft)     *0.000437  * Area (sq ft)           * 2027.89  * 2897.85  * 1908.00  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 3289.64  *19548.50  * 4861.85  *
* Top Width (ft)         *  675.67  * Top Width (ft)         *  433.53  *  106.60  *  135.54  *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)       *    2.39  *    6.75  *    2.55  *
* Max Chl Dpth (ft)      *   32.89  * Hydr. Depth (ft)       *   12.81  *   27.18  *   14.08  *
* Conv. Total (cfs)      *1325808.0  * Conv. (cfs)           *157452.5  *935651.9  *232703.3  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)       *  110.41  *  113.09  *  138.54  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.34  *    0.70  *    0.38  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.81  *    4.71  *    0.96  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 5226.22  *14057.43  * 6731.70  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  702.20  *  574.71  *  866.43  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  805.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  805.23  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         *  790.01  * Flow Area (sq ft)      * 1762.72  * 3264.79  * 2386.48  *
* E.G. Slope (ft/ft)     *0.000386  * Area (sq ft)           * 4201.38  * 3264.79  * 2386.48  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 4428.29  *22433.88  * 6397.84  *
* Top Width (ft)         * 1102.34  * Top Width (ft)         *  853.00  *  106.60  *  142.74  *
* Vel Total (ft/s)       *    4.49  * Avg. Vel. (ft/s)       *    2.51  *    6.87  *    2.68  *
* Max Chl Dpth (ft)      *   36.34  * Hydr. Depth (ft)       *   15.23  *   30.63  *   16.72  *
```

```
* Conv. Total (cfs)      *1692124.0  * Conv. (cfs)            *225292.0  *1141338.0  *325494.0  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)        *  119.31  *  113.09  *  146.53  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)        *    0.36  *    0.70  *    0.39  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.90  *    4.78  *    1.05  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    * 7562.19  *15623.34  * 9585.36  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  956.54  *  581.69  * 1259.52  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  808.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.              *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  808.38  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         *  791.25  * Flow Area (sq ft)      * 2140.15  * 3601.61  * 2848.89  *
* E.G. Slope (ft/ft)     *0.000359  * Area (sq ft)           * 7467.89  * 3601.61  * 2848.89  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 5645.59  *25457.79  * 7996.63  *
* Top Width (ft)         * 1442.94  * Top Width (ft)         * 1186.38  *  106.60  *  149.96  *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *    2.64  *    7.07  *    2.81  *
* Max Chl Dpth (ft)      *   39.49  * Hydr. Depth (ft)       *   17.38  *   33.79  *   19.00  *
* Conv. Total (cfs)      *2064610.0  * Conv. (cfs)            *298105.8  *1344256.0  *422248.6  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)        *  127.32  *  113.09  *  154.41  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)        *    0.38  *    0.71  *    0.41  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *    0.99  *    5.04  *    1.16  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    * 9728.53  *16663.51  *12305.86  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          * 1131.63  *  582.58  * 1625.24  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  812.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  812.32  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         *  792.71  * Flow Area (sq ft)      * 2645.81  * 4020.99  * 3456.54  *
* E.G. Slope (ft/ft)     *0.000334  * Area (sq ft)           *12614.37  * 4020.99  * 3456.54  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 7248.97  *29525.98  *10225.05  *
* Top Width (ft)         * 1792.25  * Top Width (ft)         * 1526.70  *  106.60  *  158.95  *
* Vel Total (ft/s)       *    4.64  * Avg. Vel. (ft/s)       *    2.74  *    7.34  *    2.96  *
* Max Chl Dpth (ft)      *   43.43  * Hydr. Depth (ft)       *   19.42  *   37.72  *   21.75  *
* Conv. Total (cfs)      *2571003.0  * Conv. (cfs)            *396534.4  *1615136.0  *559332.7  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)        *  141.03  *  113.09  *  164.23  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)        *    0.39  *    0.74  *    0.44  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    1.07  *    5.45  *    1.30  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    *14167.84  *18246.78  *17276.34  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          * 1399.13  *  585.12  * 2003.52  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  798.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.              *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  798.38  * Reach Len. (ft)        *   55.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         *  785.36  * Flow Area (sq ft)      * 1027.50  * 2535.12  * 1458.15  *
* E.G. Slope (ft/ft)     *0.000424  * Area (sq ft)           * 1027.50  * 2535.12  * 1458.15  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 2111.58  *15412.77  * 3175.65  *
* Top Width (ft)         *  333.99  * Top Width (ft)         *   98.52  *  106.60  *  128.86  *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *    2.06  *    6.08  *    2.18  *
* Max Chl Dpth (ft)      *   29.49  * Hydr. Depth (ft)       *   10.43  *   23.78  *   11.32  *
* Conv. Total (cfs)      *1005557.0  * Conv. (cfs)            *102575.6  *748716.2  *154265.4  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)        *  100.75  *  113.09  *  131.05  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)        *    0.27  *    0.59  *    0.29  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.55  *    3.61  *    0.64  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    * 3693.53  *12339.24  * 4737.83  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  455.14  *  557.07  *  528.69  *
**********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 21.573

INPUT
Description: I-435
Distance from Upstream XS = 55
Deck/Roadway Width = 150
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 15

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
90	841	766	187	837.25	766	187.1	837.25	832.25
500	830	825	500.1	830	766	900	822	766
1100	821	766	1300	822	766	1425	824	766
1830	838	766	1880	839	766	1880.1	839	834
2375	860	855	2400	861.3	856.3	2410	862	850

Upstream Bridge Cross Section Data
Station Elevation Data num= 215

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	835.12	4.9	835.65	9.29	835.96	12.92	836.34	19.8	837.45
32.41	839.22	37.91	840.09	42.79	840.77	54.13	841.38	71.4	841.82
77.5	841.75	90.35	842.08	91.44	842.09	95.9	842.04	113.66	841.6
125.22	841.01	137.89	840.23	139.9	839.22	148.52	834.88	154.6	832.5
179.26	822.57	181.58	821.59	184.61	821.1	195.79	819.87	203.93	818.88
207.44	817.84	227.65	812.29	228.4	812	231.92	810.95	246.58	806.8
249.65	806.79	253.63	806.81	264.59	806.69	265.62	806.67	266.2	806.66
270.23	806.66	276.91	806.37	281.43	806.16	287.57	804.7	297.9	803.12
309.18	802.78	316.76	802.48	322.77	802.75	335.38	803.33	343.18	803.72
369.9	807.31	370.77	807.43	370.93	807.45	371.2	807.46	392.42	807.98
400.09	807.76	416.7	807.43	420.48	807.34	437.12	806.87	452.71	806.36
462.57	806.27	478.94	808.6	478.99	808.61	479.49	808.68	481.01	808.83
496.57	811.05	500.11	811.36	507.4	811.39	523.63	812.35	536.3	812.28
566.32	812.06	569.44	812.04	571.69	811.98	587.86	811.78	606.61	811.24
614.91	810.81	631.97	810.43	643.13	810.18	650.05	810.52	660.86	811.06
677.46	812.06	680.16	812.21	681.43	812.28	684.57	812.49	706.7	813.39
712.96	813.56	735.98	814.42	752.06	814.81	768.74	815.38	779.71	815.56
805.88	816.14	810.74	816.22	832.86	816.74	844.52	815.83	846.28	815.66
852.51	815.12	913.62	810.11	931.58	808.61	949.24	807.16	976.19	804.89
986.05	804.08	1018.69	801.37	1022.98	801.46	1023.98	801.6	1025.09	801.69
1026.37	801.79	1069.38	804.46	1075.88	805.08	1096.89	805.34	1109.1	804.84
1122.04	805.13	1153.97	805.87	1157.9	805.84	1161.71	805.8	1197.19	804.58
1209.55	804.24	1216.17	804.1	1240.61	803.91	1267.82	803.28	1283.2	803.16
1338.53	801.33	1348.63	801.1	1353.22	800.98	1366.04	800.32	1385	799.68
1417.23	798.59	1417.36	798.58	1417.44	798.58	1417.76	798.57	1442.96	798.53
1457.18	798.52	1472.39	798.49	1510.11	799.36	1517.83	799.36	1525.06	799.36
1550.9	799.94	1571.19	799.43	1578.61	799.6	1587.74	799.97	1599.5	800.45
1609.42	800.85	1622.06	801.17	1643.18	801.97	1656.29	802.31	1664.8	802.88
1683.87	803.87	1718.13	806.09	1741.11	807.3	1779.67	809.39	1818.19	811.71
1847.95	813.41	1867.5	813.65	1868.96	813.69	1899.51	814.05	1914.39	811.49
1920.7	809.22	1930.04	805.21	1939.25	801.35	1956.67	794.89	1968.94	789.98
1977.15	786.71	1996.07	786.23	2010.1	785.54	2022.34	785.56	2037.05	785.67
2038.22	785.68	2045.78	785.84	2076.2	772.33	2080.31	770.3	2088.92	770.3
2100	768.89	2121.82	770.3	2132.79	775.17	2133.99	775.65	2135.23	776.24
2139.81	778.37	2152.38	784.2	2163.88	784.53	2174.92	784.85	2200.44	785.29
2220.15	785.95	2225.99	786.17	2243.96	787.29	2258.93	788.71	2265.35	790.74
2275.97	795.63	2280.42	797.96	2291.93	803.83	2312.66	812.9	2317.78	813.94
2337.85	814.87	2338.57	814.91	2339	814.9	2345.21	814.91	2356.63	824.48
2356.98	824.8	2357.36	825.16	2365.78	834.33	2377.03	853.8	2377.64	855.06
2378.29	855.32	2380.78	856.25	2393.02	860.97	2395.81	861.15	2409.62	862.1
2422.05	862.5	2430.09	862.75	2445.1	862.94	2458.07	862.98	2471.91	863.27
2480.7	863.71	2484.83	863.91	2495.65	864.45	2516.75	865.47	2521.34	867.26
2523.31	867.88	2533.84	871.77	2537.51	872.55	2544.66	874.99	2551.16	876.26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .07 2045.78     .04 2152.38     .07

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2045.78 2152.38              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0 1896.36     821       F

Downstream  Deck/Roadway Coordinates
    num=      15
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
      90     841     766     187  837.25     766   187.1  837.25  832.25
     500     830     825   500.1     830     766     900     822     766
    1100     821     766    1300     822     766    1425     824     766
    1830     838     766    1880     839     766  1880.1     839     834
    2375     860     855    2400   861.3   856.3    2410     862     850

Downstream Bridge Cross Section Data
Station Elevation Data    num=     215
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  835.12     4.9  835.65    9.29  835.96   12.92  836.34    19.8  837.45
   32.41  839.22   37.91  840.09   42.79  840.77   54.13  841.38    71.4  841.82
    77.5  841.75   90.35  842.08   91.44  842.09    95.9  842.04  113.66   841.6
  125.22  841.01  137.89  840.23   139.9  839.22  148.52  834.88   154.6   832.5
  179.26  822.57  181.58  821.59  184.61   821.1  195.79  819.87  203.93  818.88
  207.44  817.84  227.65  812.29   228.4     812  231.92  810.95  246.58   806.8
  249.65  806.79  253.63  806.81  264.59  806.69  265.62  806.67   266.2  806.66
  270.23  806.66  276.91  806.37  281.43  806.16  287.57   804.7   297.9  803.12
  309.18  802.78  316.76  802.48  322.77  802.75  335.38  803.33  343.18  803.72
   369.9  807.31  370.77  807.43  370.93  807.45   371.2  807.46  392.42  807.98
  400.09  807.76   416.7  807.43  420.48  807.34  437.12  806.87  452.71  806.36
  462.57  806.27  478.94   808.6  478.99  808.61  479.49  808.68  481.01  808.83
  496.57  811.05  500.11  811.36   507.4  811.39  523.63  812.35   536.3  812.28
  566.32  812.06  569.44  812.04  571.69  811.98  587.86  811.78  606.61  811.24
  614.91  810.81  631.97  810.43  643.13  810.18  650.05  810.52  660.86  811.06
  677.46  812.06  680.16  812.21  681.43  812.28  684.57  812.49   706.7  813.39
  712.96  813.56  735.98  814.42  752.06  814.81  768.74  815.38  779.71  815.56
  805.88  816.14  810.74  816.22  832.86  816.74  844.52  815.83  846.28  815.66
  852.51  815.12  913.62  810.11  931.58  808.61  949.24  807.16  976.19  804.89
  986.05  804.08 1018.69  801.37 1022.98  801.46 1023.98   801.6 1025.09  801.69
 1026.37  801.79 1069.38  804.46 1075.88  805.08 1096.89  805.34  1109.1  804.84
 1122.04  805.13 1153.97  805.87  1157.9  805.84 1161.71   805.8 1197.19  804.58
 1209.55  804.24 1216.17   804.1 1240.61  803.91 1267.82  803.28  1283.2  803.16
 1338.53  801.33 1348.63   801.1 1353.22  800.98 1366.04  800.32    1385  799.68
 1417.23  798.59 1417.36  798.58 1417.44  798.58 1417.76  798.57 1442.96  798.53
 1457.18  798.52 1472.39  798.49 1510.11  799.36 1517.83  799.36 1525.06  799.36
  1550.9  799.94 1571.19  799.43 1578.61   799.6 1587.74  799.97  1599.5  800.45
 1609.42  800.85 1622.06  801.17 1643.18  801.97 1656.29  802.31  1664.8  802.88
 1683.87  803.87 1718.13  806.09 1741.11   807.3 1779.67  809.39 1818.19  811.71
 1847.95  813.41  1867.5  813.65 1868.96  813.69 1899.51  814.05 1914.39  811.49
  1920.7  809.22 1930.04  805.21 1939.25  801.35 1956.67  794.89 1968.94  789.98
 1977.15  786.71 1996.07  786.23  2010.1  785.54 2022.34  785.56 2037.05  785.67
 2038.22  785.68 2045.78  785.84  2076.2  772.33 2080.31   770.3 2088.92   770.3
    2100  768.89 2121.82   770.3 2132.79  775.17 2133.99  775.65 2135.23  776.24
 2139.81  778.37 2152.38   784.2 2163.88  784.53 2174.92  784.85 2200.44  785.29
 2220.15  785.95 2225.99  786.17 2243.96  787.29 2258.93  788.71 2265.35  790.74
 2275.97  795.63 2280.42  797.96 2291.93  803.83 2312.66   812.9 2317.78  813.94
 2337.85  814.87 2338.57  814.91    2339   814.9 2345.21  814.91 2356.63  824.48
 2356.98   824.8 2357.36  825.16 2365.78  834.33 2377.03   853.8 2377.64  855.06
 2378.29  855.32 2380.78  856.25 2393.02  860.97 2395.81  861.15 2409.62   862.1
 2422.05   862.5 2430.09  862.75  2445.1  862.94 2458.07  862.98 2471.91  863.27
  2480.7  863.71 2484.83  863.91 2495.65  864.45 2516.75  865.47 2521.34  867.26
 2523.31  867.88 2533.84  871.77 2537.51  872.55 2544.66  874.99 2551.16  876.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .07 2045.78     .04 2152.38     .07

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2045.78 2152.38              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0 1899.16     821       F
```

```
Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  1

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
********************************
    1880     834    1920     809
Downstream     num=       2
     Sta    Elev     Sta    Elev
********************************
    1880     834    1920     809

Number of Piers =  3

Pier Data
Pier Station     Upstream=    2020    Downstream=    2020
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     770       4     842
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     770       4     842

Pier Data
Pier Station     Upstream=    2170    Downstream=    2170
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     770       4     848
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     770       4     848

Pier Data
Pier Station     Upstream=    2320    Downstream=    2320
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     770       4     855
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     770       4     855

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =     .95
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
```

```
* E.G. US. (ft)          *     786.01  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     785.50  * E.G. Elev (ft)         *     785.95  *     785.78  *
* Q Total (cfs)          *    6725.00  * W.S. Elev (ft)         *     785.43  *     785.24  *
* Q Bridge (cfs)         *    6725.00  * Crit W.S. (ft)         *     778.00  *     778.00  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      16.54  *      16.35  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.69  *       5.83  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1181.80  *    1153.24  *
* Weir Submerg           *             * Froude # Chl           *       0.31  *       0.32  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    8876.97  *    8678.89  *
* Min El Weir Flow (ft)  *     821.01  * Hydr Depth (ft)        *       7.68  *       7.88  *
* Min El Prs (ft)        *     855.15  * W.P. Total (ft)        *     161.77  *     153.87  *
* Delta EG (ft)          *       0.24  * Conv. Total (cfs)      *   203566.7  *   198124.9  *
* Delta WS (ft)          *       0.27  * Top Width (ft)         *     153.91  *     146.43  *
* BR Open Area (sq ft)   *   30959.05  * Frctn Loss (ft)        *       0.17  *       0.01  *
* BR Open Vel (ft/s)     *       5.83  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.50  *       0.54  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.83  *       3.14  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     790.83  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     790.23  * E.G. Elev (ft)         *     790.78  *     790.64  *
* Q Total (cfs)          *   12150.00  * W.S. Elev (ft)         *     790.15  *     789.99  *
* Q Bridge (cfs)         *   12150.00  * Crit W.S. (ft)         *     781.28  *     781.28  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.26  *      21.10  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.09  *       5.18  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2388.89  *    2343.31  *
* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   18241.30  *   17904.51  *
* Min El Weir Flow (ft)  *     821.01  * Hydr Depth (ft)        *       8.33  *       8.19  *
* Min El Prs (ft)        *     855.15  * W.P. Total (ft)        *     314.53  *     312.94  *
* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *   405514.9  *   397071.9  *
* Delta WS (ft)          *       0.24  * Top Width (ft)         *     286.95  *     286.05  *
* BR Open Area (sq ft)   *   30959.05  * Frctn Loss (ft)        *       0.14  *       0.01  *
* BR Open Vel (ft/s)     *       5.18  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.43  *       0.44  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.16  *       2.27  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     793.23  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     792.78  * E.G. Elev (ft)         *     793.20  *     793.11  *
* Q Total (cfs)          *   13500.00  * W.S. Elev (ft)         *     792.71  *     792.61  *
* Q Bridge (cfs)         *   13500.00  * Crit W.S. (ft)         *     781.98  *     781.98  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.82  *      23.72  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.30  *       4.34  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3141.51  *    3112.13  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   25238.45  *   24951.39  *
* Min El Weir Flow (ft)  *     821.01  * Hydr Depth (ft)        *      10.49  *      10.41  *
* Min El Prs (ft)        *     855.15  * W.P. Total (ft)        *     338.37  *     337.48  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *   554555.9  *   548425.4  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *     299.52  *     299.06  *
* BR Open Area (sq ft)   *   30959.05  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       4.34  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.34  *       0.35  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.48  *       1.51  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	797.33	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	796.83	E.G. Elev (ft)	797.29	797.21
Q Total (cfs)	19700.00	W.S. Elev (ft)	796.73	796.64
Q Bridge (cfs)	19700.00	Crit W.S. (ft)	784.80	784.80
Q Weir (cfs)		Max Chl Dpth (ft)	27.84	27.75
Weir Sta Lft (ft)		Vel Total (ft/s)	4.49	4.52
Weir Sta Rgt (ft)		Flow Area (sq ft)	4383.11	4353.97
Weir Submerg		Froude # Chl	0.25	0.25
Weir Max Depth (ft)		Specif Force (cu ft)	41576.42	41198.64
Min El Weir Flow (ft)	821.01	Hydr Depth (ft)	13.77	13.69
Min El Prs (ft)	855.15	W.P. Total (ft)	374.96	374.13
Delta EG (ft)	0.14	Conv. Total (cfs)	832741.6	825822.9
Delta WS (ft)	0.15	Top Width (ft)	318.36	317.94
BR Open Area (sq ft)	30959.05	Frctn Loss (ft)	0.08	0.01
BR Open Vel (ft/s)	4.52	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.41	0.41
Br Sel Method	Energy only	Power Total (lb/ft s)	1.84	1.87

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	802.31	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	801.78	E.G. Elev (ft)	802.28	802.20
Q Total (cfs)	27700.00	W.S. Elev (ft)	801.66	801.58
Q Bridge (cfs)	27700.00	Crit W.S. (ft)	788.43	788.43
Q Weir (cfs)		Max Chl Dpth (ft)	32.77	32.69
Weir Sta Lft (ft)		Vel Total (ft/s)	4.61	4.63
Weir Sta Rgt (ft)		Flow Area (sq ft)	6008.26	5980.91
Weir Submerg		Froude # Chl	0.24	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	68741.53	68283.26
Min El Weir Flow (ft)	821.01	Hydr Depth (ft)	17.61	17.55
Min El Prs (ft)	855.15	W.P. Total (ft)	419.54	418.84
Delta EG (ft)	0.14	Conv. Total (cfs)	1242562.0	1235299.0
Delta WS (ft)	0.15	Top Width (ft)	341.16	340.81
BR Open Area (sq ft)	30959.05	Frctn Loss (ft)	0.07	0.00
BR Open Vel (ft/s)	4.63	C & E Loss (ft)	0.00	0.03
Coef of Q		Shear Total (lb/sq ft)	0.44	0.45
Br Sel Method	Energy only	Power Total (lb/ft s)	2.05	2.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	805.75	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	805.23	E.G. Elev (ft)	805.72	805.65
Q Total (cfs)	33260.00	W.S. Elev (ft)	805.09	805.01
Q Bridge (cfs)	33260.00	Crit W.S. (ft)	789.94	789.94
Q Weir (cfs)		Max Chl Dpth (ft)	36.20	36.12
Weir Sta Lft (ft)		Vel Total (ft/s)	4.62	4.63
Weir Sta Rgt (ft)		Flow Area (sq ft)	7203.73	7178.17
Weir Submerg		Froude # Chl	0.24	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	92451.39	91956.73
Min El Weir Flow (ft)	821.01	Hydr Depth (ft)	20.21	20.16
Min El Prs (ft)	855.15	W.P. Total (ft)	450.04	449.39
Delta EG (ft)	0.14	Conv. Total (cfs)	1570247.0	1563056.0
Delta WS (ft)	0.14	Top Width (ft)	423.87	422.70
BR Open Area (sq ft)	30959.05	Frctn Loss (ft)	0.07	0.00
BR Open Vel (ft/s)	4.63	C & E Loss (ft)	0.00	0.03
Coef of Q		Shear Total (lb/sq ft)	0.45	0.45
Br Sel Method	Energy only	Power Total (lb/ft s)	2.07	2.09

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than the energy inside of the bridge deck. This is not physically possible. Please review your bridge data and results for reasonableness.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	808.93	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	808.38	E.G. Elev (ft)	808.90	808.83	
Q Total (cfs)	39100.00	W.S. Elev (ft)	808.23	808.16	
Q Bridge (cfs)	39100.00	Crit W.S. (ft)	791.22	791.22	
Q Weir (cfs)		Max Chl Dpth (ft)	39.34	39.27	
Weir Sta Lft (ft)		Vel Total (ft/s)	4.68	4.70	
Weir Sta Rgt (ft)		Flow Area (sq ft)	8347.14	8322.15	
Weir Submerg		Froude # Chl	0.23	0.23	
Weir Max Depth (ft)		Specif Force (cu ft)	118120.00	117579.60	
Min El Weir Flow (ft)	821.01	Hydr Depth (ft)	22.50	22.45	
Min El Prs (ft)	855.15	W.P. Total (ft)	478.43	477.83	
Delta EG (ft)	0.14	Conv. Total (cfs)	1900167.0	1892797.0	
Delta WS (ft)	0.14	Top Width (ft)	605.79	604.77	
BR Open Area (sq ft)	30959.05	Frctn Loss (ft)	0.06	0.00	
BR Open Vel (ft/s)	4.70	C & E Loss (ft)	0.00	0.04	
Coef of Q		Shear Total (lb/sq ft)	0.46	0.46	
Br Sel Method	Energy only	Power Total (lb/ft s)	2.16	2.18	

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than the energy inside of the bridge deck. This is not physically possible. Please review your bridge data and results for reasonableness.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	812.89	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	812.32	E.G. Elev (ft)	812.86	812.80	
Q Total (cfs)	47000.00	W.S. Elev (ft)	812.15	812.09	
Q Bridge (cfs)	47000.00	Crit W.S. (ft)	792.70	792.70	
Q Weir (cfs)		Max Chl Dpth (ft)	43.26	43.19	
Weir Sta Lft (ft)		Vel Total (ft/s)	4.78	4.79	
Weir Sta Rgt (ft)		Flow Area (sq ft)	9835.66	9811.11	
Weir Submerg		Froude # Chl	0.23	0.23	
Weir Max Depth (ft)		Specif Force (cu ft)	155462.00	154862.20	
Min El Weir Flow (ft)	821.01	Hydr Depth (ft)	25.35	25.30	
Min El Prs (ft)	855.15	W.P. Total (ft)	512.87	512.34	
Delta EG (ft)	0.14	Conv. Total (cfs)	2352138.0	2344467.0	
Delta WS (ft)	0.14	Top Width (ft)	659.99	659.58	
BR Open Area (sq ft)	30959.05	Frctn Loss (ft)	0.06	0.00	
BR Open Vel (ft/s)	4.79	C & E Loss (ft)	0.00	0.04	
Coef of Q		Shear Total (lb/sq ft)	0.48	0.48	
Br Sel Method	Energy only	Power Total (lb/ft s)	2.28	2.30	

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than the energy inside of the bridge deck. This is not physically possible. Please review your bridge data and results for reasonableness.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	798.83	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	798.38	E.G. Elev (ft)	798.79	798.72	
Q Total (cfs)	20700.00	W.S. Elev (ft)	798.29	798.21	
Q Bridge (cfs)	20700.00	Crit W.S. (ft)	785.31	785.31	
Q Weir (cfs)		Max Chl Dpth (ft)	29.40	29.32	
Weir Sta Lft (ft)		Vel Total (ft/s)	4.24	4.26	
Weir Sta Rgt (ft)		Flow Area (sq ft)	4884.69	4860.02	
Weir Submerg		Froude # Chl	0.23	0.23	
Weir Max Depth (ft)		Specif Force (cu ft)	48776.63	48424.23	
Min El Weir Flow (ft)	821.01	Hydr Depth (ft)	15.00	14.94	
Min El Prs (ft)	855.15	W.P. Total (ft)	389.04	388.35	

```
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)      *   954358.7  *   948270.3  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *     325.55  *     325.20  *
* BR Open Area (sq ft)   *   30959.05  * Frctn Loss (ft)        *       0.07  *       0.00  *
* BR Open Vel (ft/s)     *       4.26  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.37  *       0.37  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.56  *       1.59  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 21.557

INPUT
Description: Downstream side of I-435, XS copied from U/S side
Station Elevation Data    num=     215
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  835.12     4.9  835.65    9.29  835.96   12.92  836.34    19.8  837.45
   32.41  839.22   37.91  840.09   42.79  840.77   54.13  841.38    71.4  841.82
    77.5  841.75   90.35  842.08   91.44  842.09    95.9  842.04  113.66   841.6
  125.22  841.01  137.89  840.23   139.9  839.22  148.52  834.88   154.6   832.5
  179.26  822.57  181.58  821.59  184.61   821.1  195.79  819.87  203.93  818.88
  207.44  817.84  227.65  812.29   228.4     812  231.92  810.95  246.58   806.8
  249.65  806.79  253.63  806.81  264.59  806.69  265.62  806.67   266.2  806.66
  270.23  806.66  276.91  806.37  281.43  806.16  287.57   804.7   297.9  803.12
  309.18  802.78  316.76  802.48  322.77  802.75  335.38  803.33  343.18  803.72
   369.9  807.31  370.77  807.43  370.93  807.45   371.2  807.46  392.42  807.98
  400.09  807.76   416.7  807.43  420.48  807.34  437.12  806.87  452.71  806.36
  462.57  806.27  478.94   808.6  478.99  808.61  479.49  808.68  481.01  808.83
  496.57  811.05  500.11  811.36   507.4  811.39  523.63  812.35   536.3  812.28
  566.32  812.06  569.44  812.04  571.69  811.98  587.86  811.78  606.61  811.24
  614.91  810.81  631.97  810.43  643.13  810.18  650.05  810.52  660.86  811.06
  677.46  812.06  680.16  812.21  681.43  812.28  684.57  812.49   706.7  813.39
  712.96  813.56  735.98  814.42  752.06  814.81  768.74  815.38  779.71  815.56
  805.88  816.14  810.74  816.22  832.86  816.74  844.52  815.83  846.28  815.66
  852.51  815.12  913.62  810.11  931.58  808.61  949.24  807.16  976.19  804.89
  986.05  804.08 1018.69  801.37 1022.98  801.46 1023.98   801.6 1025.09  801.69
 1026.37  801.79 1069.38  804.46 1075.88  805.08 1096.89  805.34  1109.1  804.84
 1122.04  805.13 1153.97  805.87  1157.9  805.84 1161.71   805.8 1197.19  804.58
 1209.55  804.24 1216.17   804.1 1240.61  803.91 1267.82  803.28  1283.2  803.16
 1338.53  801.33 1348.63   801.1 1353.22  800.98 1366.04  800.32    1385  799.68
 1417.23  798.59 1417.36  798.58 1417.44  798.58 1417.76  798.57 1442.96  798.53
 1457.18  798.52 1472.39  798.49 1510.11  799.36 1517.83  799.36 1525.06  799.36
  1550.9  799.94 1571.19  799.43 1578.61   799.6 1587.74  799.97  1599.5  800.45
 1609.42  800.85 1622.06  801.17 1643.18  801.97 1656.29  802.31  1664.8  802.88
 1683.87  803.87 1718.13  806.09 1741.11   807.3 1779.67  809.39 1818.19  811.71
 1847.95  813.41  1867.5  813.65 1868.96  813.69 1899.51  814.05 1914.39  811.49
  1920.7  809.22 1930.04  805.21 1939.25  801.35 1956.67  794.89 1968.94  789.98
 1977.15  786.71 1996.07  786.23  2010.1  785.54 2022.34  785.56 2037.05  785.67
 2038.22  785.68 2045.78  785.84  2076.2  772.33 2080.31   770.3 2088.92   770.3
    2100  768.89 2121.82   770.3 2132.79  775.17 2133.99  775.65 2135.23  776.24
 2139.81  778.37 2152.38   784.2 2163.88  784.53 2174.92  784.85 2200.44  785.29
 2220.15  785.95 2225.99  786.17 2243.96  787.29 2258.93  788.71 2265.35  790.74
 2275.97  795.63 2280.42  797.96 2291.93  803.83 2312.66   812.9 2317.78  813.94
 2337.85  814.87 2338.57  814.91    2339   814.9 2345.21  814.91 2356.63  824.48
 2356.98   824.8 2357.36  825.16 2365.78  834.33 2377.03   853.8 2377.64  855.06
 2378.29  855.32 2380.78  856.25 2393.02  860.97 2395.81  861.15 2409.62   862.1
 2422.05   862.5 2430.09  862.75  2445.1  862.94 2458.07  862.98 2471.91  863.27
  2480.7  863.71 2484.83  863.91 2495.65  864.45 2516.75  865.47 2521.34  867.26
 2523.31  867.88 2533.84  871.77 2537.51  872.55 2544.66  874.99 2551.16  876.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .07 2045.78     .04 2152.38     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2045.78 2152.38             440     625     759              .1       .3
Ineffective Flow     num=       1
```

Sta L	Sta R	Elev	Permanent
0	1899.16	821	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	785.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.040	0.070
W.S. Elev (ft)	785.23	Reach Len. (ft)	440.00	625.00	759.00
Crit W.S. (ft)	778.00	Flow Area (sq ft)		1133.49	19.99
E.G. Slope (ft/ft)	0.001157	Area (sq ft)		1133.49	19.99
Q Total (cfs)	6725.00	Flow (cfs)		6716.53	8.47
Top Width (ft)	149.67	Top Width (ft)		105.22	44.45
Vel Total (ft/s)	5.83	Avg. Vel. (ft/s)		5.93	0.42
Max Chl Dpth (ft)	16.34	Hydr. Depth (ft)		10.77	0.45
Conv. Total (cfs)	197750.4	Conv. (cfs)		197501.3	249.1
Length Wtd. (ft)	619.36	Wetted Per. (ft)		111.58	44.46
Min Ch El (ft)	768.89	Shear (lb/sq ft)		0.73	0.03
Alpha	1.03	Stream Power (lb/ft s)		4.35	0.01
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	770.46	6134.10	754.38
C & E Loss (ft)	0.05	Cum SA (acres)	139.01	455.75	172.27

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	790.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.070	0.040	0.070
W.S. Elev (ft)	789.99	Reach Len. (ft)	440.00	625.00	759.00
Crit W.S. (ft)	781.28	Flow Area (sq ft)	293.67	1641.07	449.16
E.G. Slope (ft/ft)	0.000913	Area (sq ft)	293.67	1641.07	449.16
Q Total (cfs)	12150.00	Flow (cfs)	457.77	10960.30	731.93
Top Width (ft)	294.08	Top Width (ft)	76.87	106.60	110.61
Vel Total (ft/s)	5.10	Avg. Vel. (ft/s)	1.56	6.68	1.63
Max Chl Dpth (ft)	21.10	Hydr. Depth (ft)	3.82	15.39	4.06
Conv. Total (cfs)	402054.4	Conv. (cfs)	15148.1	362686.2	24220.1
Length Wtd. (ft)	609.92	Wetted Per. (ft)	77.53	113.09	110.94
Min Ch El (ft)	768.89	Shear (lb/sq ft)	0.22	0.83	0.23
Alpha	1.56	Stream Power (lb/ft s)	0.34	5.53	0.38
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1488.58	8138.47	1691.50
C & E Loss (ft)	0.06	Cum SA (acres)	193.92	495.55	256.99

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	793.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.070	0.040	0.070
W.S. Elev (ft)	792.63	Reach Len. (ft)	440.00	625.00	759.00
Crit W.S. (ft)	781.98	Flow Area (sq ft)	504.92	1921.97	749.84
E.G. Slope (ft/ft)	0.000577	Area (sq ft)	504.92	1921.97	749.84
Q Total (cfs)	13500.00	Flow (cfs)	847.22	11340.13	1312.65
Top Width (ft)	307.13	Top Width (ft)	83.46	106.60	117.07
Vel Total (ft/s)	4.25	Avg. Vel. (ft/s)	1.68	5.90	1.75
Max Chl Dpth (ft)	23.74	Hydr. Depth (ft)	6.05	18.03	6.40
Conv. Total (cfs)	561842.8	Conv. (cfs)	35259.8	471953.2	54629.8
Length Wtd. (ft)	606.45	Wetted Per. (ft)	84.62	113.09	117.93
Min Ch El (ft)	768.89	Shear (lb/sq ft)	0.22	0.61	0.23
Alpha	1.65	Stream Power (lb/ft s)	0.36	3.61	0.40
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	2113.99	9749.05	2605.69
C & E Loss (ft)	0.03	Cum SA (acres)	241.71	523.49	354.19

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	797.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.070	0.040	0.070
W.S. Elev (ft)	796.67	Reach Len. (ft)	440.00	625.00	759.00
Crit W.S. (ft)	784.79	Flow Area (sq ft)	863.28	2353.18	1241.04
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	863.28	2353.18	1241.04

```
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 1815.51  *15134.06  * 2750.43  *
* Top Width (ft)         *  326.10  * Top Width (ft)         *   93.92  *  106.60  *  125.58  *
* Vel Total (ft/s)       *    4.42  * Avg. Vel. (ft/s)       *    2.10  *    6.43  *    2.22  *
* Max Chl Dpth (ft)      *   27.78  * Hydr. Depth (ft)       *    9.19  *   22.07  *    9.88  *
* Conv. Total (cfs)      *860845.6  * Conv. (cfs)            * 79333.7  *661324.3  *120187.7  *
* Length Wtd. (ft)       *  602.76  * Wetted Per. (ft)       *   95.84  *  113.09  *  127.36  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.29  *    0.68  *    0.32  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    0.62  *    4.38  *    0.71  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   * 3062.22  *11444.86  * 3946.46  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  361.07  *  546.34  *  455.92  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.              *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  801.63  * Reach Len. (ft)        *  440.00  *  625.00  *  759.00  *
* Crit W.S. (ft)         *  788.54  * Flow Area (sq ft)      * 1362.29  * 2881.94  * 1887.78  *
* E.G. Slope (ft/ft)     *0.000447  * Area (sq ft)           * 1964.10  * 2881.94  * 1887.78  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 3270.57  *19590.95  * 4838.48  *
* Top Width (ft)         *  662.88  * Top Width (ft)         *  421.04  *  106.60  *  135.24  *
* Vel Total (ft/s)       *    4.52  * Avg. Vel. (ft/s)       *    2.40  *    6.80  *    2.56  *
* Max Chl Dpth (ft)      *   32.74  * Hydr. Depth (ft)       *   12.71  *   27.04  *   13.96  *
* Conv. Total (cfs)      *1310848.0  * Conv. (cfs)            *154773.2  *927103.4  *228971.7  *
* Length Wtd. (ft)       *  599.73  * Wetted Per. (ft)       *  110.02  *  113.09  *  138.21  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.35  *    0.71  *    0.38  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.83  *    4.83  *    0.98  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 5219.28  *14043.20  * 6722.66  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  701.45  *  574.18  *  865.77  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  805.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.              *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  805.08  * Reach Len. (ft)        *  440.00  *  625.00  *  759.00  *
* Crit W.S. (ft)         *  790.01  * Flow Area (sq ft)      * 1746.16  * 3249.52  * 2366.06  *
* E.G. Slope (ft/ft)     *0.000394  * Area (sq ft)           * 4081.44  * 3249.52  * 2366.06  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 4410.02  *22472.38  * 6377.60  *
* Top Width (ft)         * 1070.60  * Top Width (ft)         *  821.59  *  106.60  *  142.41  *
* Vel Total (ft/s)       *    4.52  * Avg. Vel. (ft/s)       *    2.53  *    6.92  *    2.70  *
* Max Chl Dpth (ft)      *   36.19  * Hydr. Depth (ft)       *   15.13  *   30.48  *   16.61  *
* Conv. Total (cfs)      *1676076.0  * Conv. (cfs)            *222234.9  *1132454.0  *321387.2  *
* Length Wtd. (ft)       *  598.49  * Wetted Per. (ft)       *  118.94  *  113.09  *  146.17  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.36  *    0.71  *    0.40  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.91  *    4.89  *    1.07  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 7551.62  *15607.30  * 9574.03  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  955.16  *  581.16  * 1258.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  808.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.              *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  808.24  * Reach Len. (ft)        *  440.00  *  625.00  *  759.00  *
* Crit W.S. (ft)         *  791.25  * Flow Area (sq ft)      * 2122.51  * 3586.31  * 2827.39  *
* E.G. Slope (ft/ft)     *0.000365  * Area (sq ft)           * 7298.10  * 3586.31  * 2827.39  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 5627.03  *25496.13  * 7976.84  *
* Top Width (ft)         * 1436.37  * Top Width (ft)         * 1180.14  *  106.60  *  149.63  *
* Vel Total (ft/s)       *    4.58  * Avg. Vel. (ft/s)       *    2.65  *    7.11  *    2.82  *
* Max Chl Dpth (ft)      *   39.35  * Hydr. Depth (ft)       *   17.28  *   33.64  *   18.90  *
* Conv. Total (cfs)      *2046934.0  * Conv. (cfs)            *294582.0  *1334754.0  *417597.7  *
* Length Wtd. (ft)       *  597.78  * Wetted Per. (ft)       *  126.96  *  113.09  *  154.05  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.38  *    0.72  *    0.42  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *    1.01  *    5.14  *    1.18  *
```

```
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 9712.27  *16645.82  *12292.31  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1129.27  *  582.06  * 1624.52  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  812.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  812.18  * Reach Len. (ft)        *  440.00  *  625.00  *  759.00  *
* Crit W.S. (ft)         *  792.71  * Flow Area (sq ft)      * 2626.30  * 4005.67  * 3433.72  *
* E.G. Slope (ft/ft)     *0.000339  * Area (sq ft)           *12397.39  * 4005.67  * 3433.72  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 7242.04  *29555.56  *10202.40  *
* Top Width (ft)         * 1760.17  * Top Width (ft)         * 1494.94  *  106.60  *  158.62  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    2.76  *    7.38  *    2.97  *
* Max Chl Dpth (ft)      *   43.29  * Hydr. Depth (ft)       *   19.40  *   37.58  *   21.65  *
* Conv. Total (cfs)      *2552145.0  * Conv. (cfs)            *393249.8  *1604895.0  *553999.8  *
* Length Wtd. (ft)       *  597.52  * Wetted Per. (ft)       *  140.19  *  113.09  *  163.87  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.40  *    0.75  *    0.44  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    1.09  *    5.53  *    1.32  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *14141.53  *18227.02  *17259.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1396.32  *  584.59  * 2002.75  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  798.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.070  *   0.040  *   0.070  *
* W.S. Elev (ft)         *  798.25  * Reach Len. (ft)        *  440.00  *  625.00  *  759.00  *
* Crit W.S. (ft)         *  785.36  * Flow Area (sq ft)      * 1014.55  * 2521.08  * 1441.20  *
* E.G. Slope (ft/ft)     *0.000434  * Area (sq ft)           * 1014.55  * 2521.08  * 1441.20  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 2096.68  *15448.14  * 3155.18  *
* Top Width (ft)         *  333.37  * Top Width (ft)         *   98.17  *  106.60  *  128.61  *
* Vel Total (ft/s)       *    4.16  * Avg. Vel. (ft/s)       *    2.07  *    6.13  *    2.19  *
* Max Chl Dpth (ft)      *   29.36  * Hydr. Depth (ft)       *   10.33  *   23.65  *   11.21  *
* Conv. Total (cfs)      *994015.6  * Conv. (cfs)            *100682.8  *741820.8  *151511.9  *
* Length Wtd. (ft)       *  601.56  * Wetted Per. (ft)       *  100.37  *  113.09  *  130.76  *
* Min Ch El (ft)         *  768.89  * Shear (lb/sq ft)       *    0.27  *    0.60  *    0.30  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.57  *    3.70  *    0.65  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 3688.73  *12326.78  * 4730.93  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  454.67  *  556.55  *  528.07  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 21.438

INPUT
Description: ineffective due to high ground on either side.
Station Elevation Data    num=     105
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  836.16   56.62  834.27   58.92  834.24    80.1  833.61  125.69  826.76
  165.74  820.87  183.37  818.08  204.77  815.21  242.45  814.21  245.85  814.09
  291.93  812.69  323.79   810.8  349.09   810.1  374.59   809.6  402.82  807.81
  560.53  806.01  566.62   805.9  567.81  805.85  576.36  806.04  604.95  805.81
  706.87  805.96   735.1  804.91  743.11  804.33  771.59  801.82  840.45  790.13
  889.59   783.4  900.62  783.41  904.95  783.35  925.62  782.76  928.53  782.77
  981.24  783.12 1007.63  783.35 1040.74  783.19 1065.19  783.71 1096.19  783.92
 1142.62  782.93 1150.32   782.8 1152.62   782.8 1197.04  782.03 1219.52  781.73
 1285.58  780.88 1296.85  780.78 1308.98  780.76 1356.35  781.21 1388.14  781.15
 1403.38  781.27 1410.96  781.16 1450.83   780.8 1464.77  783.88 1488.33  782.52
 1565.48  783.81 1568.01  784.85 1570.92  784.98 1604.88  797.05 1645.13  801.56
 1652.59  802.34 1655.88   802.8 1662.99  802.89 1688.35  803.02 1706.67  802.78
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 1730.64  802.61 1748.53  802.39 1772.26  802.61 1795.74  801.95 1813.34  799.07
 1814.38  798.95 1831.95  797.06 1851.42  792.84 1864.92  790.85 1894.37  782.15
 1908.98  781.29 1924.61  781.38 1944.88   781.2 1956.99     781 1986.03     780
 1988.18  783.46 2004.93  783.43 2016.23  783.91 2033.16   783.9 2034.89  783.86
 2041.26  783.48 2064.09  781.92 2069.12  781.74 2087.75  778.31 2092.59  777.39
 2093.91  776.86 2097.57  775.37 2114.04  768.62    2135  768.12 2164.57  769.68
 2167.18  771.84 2174.99  779.21 2189.04  780.27 2196.05     781 2198.18  781.92
 2226.15  794.01  2229.6  795.56 2240.98  797.29 2313.38  808.59  2359.8  815.38
 2360.33  815.55 2360.61  815.65 2423.18  837.97 2478.07  856.17 2486.62  859.15

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  402.82      .1 1296.85     .09 2092.59     .04 2174.99      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2092.59 2174.99           312.93  537.21  734.83             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1900     820       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  785.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  784.83  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  776.22  * Flow Area (sq ft)      *  581.80  * 1179.08  *  117.96  *
* E.G. Slope (ft/ft)     *0.000613  * Area (sq ft)           * 2264.80  * 1179.08  *  117.96  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  493.03  * 6125.69  *  106.27  *
* Top Width (ft)         * 1008.46  * Top Width (ft)         *  896.13  *   82.40  *   29.93  *
* Vel Total (ft/s)       *    3.58  * Avg. Vel. (ft/s)       *    0.85  *    5.20  *    0.90  *
* Max Chl Dpth (ft)      *   16.71  * Hydr. Depth (ft)       *    3.02  *   14.31  *    3.94  *
* Conv. Total (cfs)      *271514.5  * Conv. (cfs)            * 19905.7  *247318.1  *  4290.7  *
* Length Wtd. (ft)       *  528.05  * Wetted Per. (ft)       *  195.03  *   87.88  *   30.80  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.11  *    0.51  *    0.15  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    0.10  *    2.67  *    0.13  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   *  759.02  * 6117.51  *  753.18  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  134.48  *  454.40  *  171.62  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  790.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  789.70  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  779.36  * Flow Area (sq ft)      * 1518.71  * 1579.94  *  290.92  *
* E.G. Slope (ft/ft)     *0.000553  * Area (sq ft)           * 6796.20  * 1579.94  *  290.92  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 2316.18  * 9470.57  *  363.25  *
* Top Width (ft)         * 1087.93  * Top Width (ft)         *  964.35  *   82.40  *   41.18  *
* Vel Total (ft/s)       *    3.58  * Avg. Vel. (ft/s)       *    1.53  *    5.99  *    1.25  *
* Max Chl Dpth (ft)      *   21.58  * Hydr. Depth (ft)       *    7.89  *   19.17  *    7.06  *
* Conv. Total (cfs)      *516755.8  * Conv. (cfs)            * 98510.3  *402795.9  * 15449.6  *
* Length Wtd. (ft)       *  515.16  * Wetted Per. (ft)       *  195.03  *   87.88  *   43.06  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.27  *    0.62  *    0.23  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.41  *    3.72  *    0.29  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 1452.77  * 8115.36  * 1685.05  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  188.66  *  494.19  *  255.67  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  792.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  792.43  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  780.07  * Flow Area (sq ft)      * 2044.39  * 1804.85  *  411.94  *
* E.G. Slope (ft/ft)     *0.000383  * Area (sq ft)           * 9479.16  * 1804.85  *  411.94  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 3165.44  * 9845.25  *  489.31  *
* Top Width (ft)         * 1133.21  * Top Width (ft)         * 1003.31  *   82.40  *   47.50  *
```

```
* Vel Total (ft/s)       *    3.17  * Avg. Vel. (ft/s)       *    1.55  *    5.45  *    1.19  *
* Max Chl Dpth (ft)      *   24.31  * Hydr. Depth (ft)       *   10.62  *   21.90  *    8.67  *
* Conv. Total (cfs)      *689487.3  * Conv. (cfs)            *161669.1  *502827.8  * 24990.4  *
* Length Wtd. (ft)       *  511.06  * Wetted Per. (ft)       *  195.03  *   87.88  *   49.94  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.25  *    0.49  *    0.20  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.39  *    2.68  *    0.23  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 2063.56  * 9722.31  * 2595.56  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  236.22  *  522.13  *  352.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  796.46  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  783.57  * Flow Area (sq ft)      * 2820.80  * 2137.04  *  623.71  *
* E.G. Slope (ft/ft)     *0.000400  * Area (sq ft)           *13635.60  * 2137.04  *  623.71  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 5527.96  *13323.77  *  848.27  *
* Top Width (ft)         * 1200.82  * Top Width (ft)         * 1057.90  *   82.40  *   60.52  *
* Vel Total (ft/s)       *    3.53  * Avg. Vel. (ft/s)       *    1.96  *    6.23  *    1.36  *
* Max Chl Dpth (ft)      *   28.34  * Hydr. Depth (ft)       *   14.65  *   25.93  *   10.31  *
* Conv. Total (cfs)      *985245.1  * Conv. (cfs)            *276466.6  *666354.4  * 42424.1  *
* Length Wtd. (ft)       *  507.25  * Wetted Per. (ft)       *  195.03  *   87.88  *   63.69  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.36  *    0.61  *    0.24  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.71  *    3.78  *    0.33  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 2988.99  *11412.64  * 3930.21  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  355.26  *  544.98  *  454.30  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  801.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  801.42  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  786.45  * Flow Area (sq ft)      * 3775.84  * 2545.65  * 1003.23  *
* E.G. Slope (ft/ft)     *0.000384  * Area (sq ft)           *19139.15  * 2545.65  * 1003.23  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 8813.26  *17489.42  * 1397.32  *
* Top Width (ft)         * 1338.31  * Top Width (ft)         * 1163.48  *   82.40  *   92.43  *
* Vel Total (ft/s)       *    3.78  * Avg. Vel. (ft/s)       *    2.33  *    6.87  *    1.39  *
* Max Chl Dpth (ft)      *   33.30  * Hydr. Depth (ft)       *   19.61  *   30.89  *   10.85  *
* Conv. Total (cfs)      *1412715.0  * Conv. (cfs)            *449481.1  *891970.1  * 71264.0  *
* Length Wtd. (ft)       *  504.52  * Wetted Per. (ft)       *  195.03  *   87.88  *   95.98  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.46  *    0.70  *    0.25  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    1.08  *    4.78  *    0.35  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 5112.70  *14004.26  * 6697.47  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  693.45  *  572.83  *  863.79  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  805.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  804.87  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  787.74  * Flow Area (sq ft)      * 4441.78  * 2830.58  * 1361.14  *
* E.G. Slope (ft/ft)     *0.000358  * Area (sq ft)           *23578.69  * 2830.58  * 1361.14  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *11155.74  *20153.81  * 1950.45  *
* Top Width (ft)         * 1553.99  * Top Width (ft)         * 1357.00  *   82.40  *  114.58  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    2.51  *    7.12  *    1.43  *
* Max Chl Dpth (ft)      *   36.75  * Hydr. Depth (ft)       *   23.06  *   34.35  *   11.88  *
* Conv. Total (cfs)      *1756744.0  * Conv. (cfs)            *589229.4  *1064494.0  *103020.0  *
* Length Wtd. (ft)       *  504.04  * Wetted Per. (ft)       *  195.03  *   87.88  *  118.41  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.51  *    0.72  *    0.26  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    1.28  *    5.13  *    0.37  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 7411.92  *15563.68  * 9541.56  *
```

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* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  944.16  *  579.80  * 1256.60  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  808.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  808.04  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  788.96  * Flow Area (sq ft)      * 5050.95  * 3091.21  * 1755.63  *
* E.G. Slope (ft/ft)     *0.000345  * Area (sq ft)           *28437.11  * 3091.21  * 1755.63  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             *13563.50  *22906.58  * 2629.92  *
* Top Width (ft)         * 1910.61  * Top Width (ft)         * 1693.36  *   82.40  *  134.85  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *    2.69  *    7.41  *    1.50  *
* Max Chl Dpth (ft)      *   39.92  * Hydr. Depth (ft)       *   26.23  *   37.51  *   13.02  *
* Conv. Total (cfs)      *2104339.0  * Conv. (cfs)           *729979.6  *1232819.0  *141540.7  *
* Length Wtd. (ft)       *  498.08  * Wetted Per. (ft)       *  195.03  *   87.88  *  138.92  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.56  *    0.76  *    0.27  *
* Alpha                  *    2.23  * Stream Power (lb/ft s) *    1.50  *    5.62  *    0.41  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 9531.79  *16597.91  *12252.38  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1114.75  *  580.70  * 1622.04  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  812.55  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  811.98  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  790.47  * Flow Area (sq ft)      * 5809.51  * 3415.76  * 2338.93  *
* E.G. Slope (ft/ft)     *0.000332  * Area (sq ft)           *35289.09  * 3415.76  * 2338.93  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *16787.10  *26518.69  * 3694.21  *
* Top Width (ft)         * 2032.57  * Top Width (ft)         * 1788.63  *   82.40  *  161.54  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    2.89  *    7.76  *    1.58  *
* Max Chl Dpth (ft)      *   43.86  * Hydr. Depth (ft)       *   30.17  *   41.45  *   14.48  *
* Conv. Total (cfs)      *2580536.0  * Conv. (cfs)           *921696.1  *1456009.0  *202830.7  *
* Length Wtd. (ft)       *  491.47  * Wetted Per. (ft)       *  195.03  *   87.88  *  165.90  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.62  *    0.80  *    0.29  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    1.78  *    6.25  *    0.46  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *13900.69  *18173.78  *17209.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1379.74  *  583.23  * 1999.96  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  798.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  798.06  * Reach Len. (ft)        *  312.93  *  537.21  *  734.83  *
* Crit W.S. (ft)         *  783.80  * Flow Area (sq ft)      * 3129.39  * 2269.07  *  729.07  *
* E.G. Slope (ft/ft)     *0.000345  * Area (sq ft)           *15353.23  * 2269.07  *  729.07  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 6103.50  *13673.78  *  922.73  *
* Top Width (ft)         * 1243.42  * Top Width (ft)         * 1090.10  *   82.40  *   70.92  *
* Vel Total (ft/s)       *    3.38  * Avg. Vel. (ft/s)       *    1.95  *    6.03  *    1.27  *
* Max Chl Dpth (ft)      *   29.94  * Hydr. Depth (ft)       *   16.25  *   27.54  *   10.28  *
* Conv. Total (cfs)      *1114754.0  * Conv. (cfs)           *328690.7  *736371.8  * 49691.4  *
* Length Wtd. (ft)       *  506.14  * Wetted Per. (ft)       *  195.03  *   87.88  *   74.22  *
* Min Ch El (ft)         *  768.12  * Shear (lb/sq ft)       *    0.35  *    0.56  *    0.21  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    0.67  *    3.35  *    0.27  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 3606.06  *12292.42  * 4712.02  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  448.67  *  555.19  *  526.33  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION
```

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RIVER: Blue River
REACH: Main               RS: 21.337

INPUT
Description:
Station Elevation Data    num=     127
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  836.27   24.69  835.38   63.52  825.16   88.81  818.52   101.6  817.34
  122.76  816.45  131.37   816.3  190.57  813.69   208.9   813.6  238.02   812.4
  275.14  811.15  312.09  809.53     322  809.15  327.71  808.78  331.73  808.65
  370.42   807.7  409.49  806.35  449.56  806.43   503.4  805.02   522.2  804.52
  550.34  803.48  560.93  803.05  634.02  804.15  711.89  804.78  729.38  804.25
  742.14  803.29  747.26  803.18   770.7  802.84  774.61  802.89  826.99  802.42
  840.58  802.64   888.5  803.01  890.03  803.02  891.49  803.02  941.37  801.64
  952.85  801.49  963.45  801.12  979.75  800.84 1004.25  800.62 1025.61  801.05
 1047.84  801.51 1052.85  801.64 1056.14  801.76 1086.49   801.8 1110.18  802.07
 1126.06  801.52 1150.28  802.36  1173.4  802.43 1180.14  802.27 1194.21  802.22
 1264.47  800.93 1280.57  800.39 1289.91  800.38 1310.61  800.26 1313.59  800.22
 1315.72  800.18 1329.53     800 1339.12  799.97 1351.93  800.11 1368.91  800.21
 1380.86  800.29 1388.24  800.32 1393.82  800.39 1419.81  800.58 1459.46  800.92
 1470.09  801.03 1479.87  801.02 1486.49  800.87 1503.87  800.59 1565.65  799.93
 1602.54  799.62 1612.81  799.82 1622.46  800.02 1661.71  800.11 1672.64  799.71
 1695.71  799.93 1706.25  799.96 1713.44  800.23 1741.83  801.26 1743.16   801.3
 1747.69  801.49 1749.33  801.65 1750.73  801.65 1754.81  801.63 1765.78  801.99
 1779.64  799.64 1782.01  801.59 1795.02  801.33 1795.69  801.32 1813.48  792.96
 1833.47  781.87 1849.74  780.62 1867.16   780.8 1868.36  780.81 1877.09   782.2
 1894.08  769.79  1895.8   768.4    1920  767.59 1941.43  768.96 1942.82  768.98
 1961.79  778.57 1971.14  783.09 1972.43  783.71 2003.54  784.13 2020.83  784.54
 2043.94  789.43 2064.62   793.8 2067.41  794.48 2088.95  799.98 2095.74  801.72
 2112.29  805.84 2113.01  806.06 2124.93  809.71 2130.16  809.75 2147.94  810.24
 2158.27  810.65 2158.52  810.65 2158.88  810.97 2174.56   824.6 2186.17   839.7
 2190.32   845.3 2197.89  847.87 2224.65   856.8 2240.38  864.93 2252.08  871.05
 2266.39   873.7 2266.54  873.73

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  634.02      .1 1380.86     .09 1877.09     .04 1971.14      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1877.09 1971.14           508.22 1114.41   731.5             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1495     820       T

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  784.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  784.33  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  147.56  * 1161.40  *   14.76  *
* E.G. Slope (ft/ft)     *0.000905  * Area (sq ft)           *  147.56  * 1161.40  *   14.76  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  153.11  * 6568.55  *    3.34  *
* Top Width (ft)         *  182.90  * Top Width (ft)          *   48.05  *   94.05  *   40.80  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)        *    1.04  *    5.66  *    0.23  *
* Max Chl Dpth (ft)      *   16.74  * Hydr. Depth (ft)        *    3.07  *   12.35  *    0.36  *
* Conv. Total (cfs)      *223603.8  * Conv. (cfs)             *  5090.8  *218401.9  *   111.1  *
* Length Wtd. (ft)       * 1103.41  * Wetted Per. (ft)        *   48.85  *  101.97  *   40.94  *
* Min Ch El (ft)         *  767.59  * Shear (lb/sq ft)        *    0.17  *    0.64  *    0.02  *
* Alpha                  *    1.21  * Stream Power (lb/ft s)  *    0.18  *    3.64  *    0.00  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)    *  750.36  * 6103.07  *  752.06  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)          *  131.09  *  453.31  *  171.02  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  789.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  789.08  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  396.14  * 1608.14  *  298.54  *
* E.G. Slope (ft/ft)     *0.000876  * Area (sq ft)           *  396.14  * 1608.14  *  298.54  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *  691.73  *11118.69  *  339.58  *
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* Top Width (ft)          *  221.81  * Top Width (ft)          *   56.61  *   94.05  *   71.14  *
* Vel Total (ft/s)        *    5.28  * Avg. Vel. (ft/s)        *    1.75  *    6.91  *    1.14  *
* Max Chl Dpth (ft)       *   21.49  * Hydr. Depth (ft)        *    7.00  *   17.10  *    4.20  *
* Conv. Total (cfs)       *410533.2  * Conv. (cfs)             * 23372.8  *375686.4  * 11474.0  *
* Length Wtd. (ft)        * 1080.55  * Wetted Per. (ft)        *   58.64  *  101.97  *   71.77  *
* Min Ch El (ft)          *  767.59  * Shear (lb/sq ft)        *    0.37  *    0.86  *    0.23  *
* Alpha                   *    1.58  * Stream Power (lb/ft s) *    0.65  *    5.96  *    0.26  *
* Frctn Loss (ft)         *    0.49  * Cum Volume (acre-ft)   * 1426.94  * 8095.70  * 1680.08  *
* C & E Loss (ft)         *    0.12  * Cum SA (acres)         *  184.99  *  493.10  *  254.72  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  792.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.55  * Wt. n-Val.              *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  791.96  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  566.61  * 1878.92  *  522.97  *
* E.G. Slope (ft/ft)      *0.000597  * Area (sq ft)           *  566.61  * 1878.92  *  522.97  *
* Q Total (cfs)           *13500.00  * Flow (cfs)             *  972.12  *11893.97  *  633.92  *
* Top Width (ft)          *  240.62  * Top Width (ft)          *   61.80  *   94.05  *   84.76  *
* Vel Total (ft/s)        *    4.55  * Avg. Vel. (ft/s)        *    1.72  *    6.33  *    1.21  *
* Max Chl Dpth (ft)       *   24.37  * Hydr. Depth (ft)        *    9.17  *   19.98  *    6.17  *
* Conv. Total (cfs)       *552681.7  * Conv. (cfs)             * 39797.8  *486931.6  * 25952.3  *
* Length Wtd. (ft)        * 1068.38  * Wetted Per. (ft)        *   64.57  *  101.97  *   85.69  *
* Min Ch El (ft)          *  767.59  * Shear (lb/sq ft)        *    0.33  *    0.69  *    0.23  *
* Alpha                   *    1.72  * Stream Power (lb/ft s) *    0.56  *    4.34  *    0.28  *
* Frctn Loss (ft)         *    0.35  * Cum Volume (acre-ft)   * 2027.48  * 9699.59  * 2587.68  *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)         *  232.40  *  521.05  *  351.64  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  796.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.72  * Wt. n-Val.              *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  795.88  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  824.50  * 2248.11  *  890.62  *
* E.G. Slope (ft/ft)      *0.000637  * Area (sq ft)           *  824.50  * 2248.11  *  890.62  *
* Q Total (cfs)           *19700.00  * Flow (cfs)             * 1721.49  *16572.68  * 1405.83  *
* Top Width (ft)          *  265.65  * Top Width (ft)          *   69.83  *   94.05  *  101.77  *
* Vel Total (ft/s)        *    4.97  * Avg. Vel. (ft/s)        *    2.09  *    7.37  *    1.58  *
* Max Chl Dpth (ft)       *   28.29  * Hydr. Depth (ft)        *   11.81  *   23.90  *    8.75  *
* Conv. Total (cfs)       *780528.1  * Conv. (cfs)             * 68206.6  *656621.6  * 55700.0  *
* Length Wtd. (ft)        * 1054.28  * Wetted Per. (ft)        *   73.51  *  101.97  *  103.14  *
* Min Ch El (ft)          *  767.59  * Shear (lb/sq ft)        *    0.45  *    0.88  *    0.34  *
* Alpha                   *    1.87  * Stream Power (lb/ft s) *    0.93  *    6.46  *    0.54  *
* Frctn Loss (ft)         *    0.41  * Cum Volume (acre-ft)   * 2937.05  *11385.60  * 3917.44  *
* C & E Loss (ft)         *    0.10  * Cum SA (acres)         *  351.21  *  543.89  *  452.93  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  801.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.84  * Wt. n-Val.              *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  800.80  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 1368.66  * 2710.09  * 1437.75  *
* E.G. Slope (ft/ft)      *0.000608  * Area (sq ft)           * 1451.72  * 2710.09  * 1437.75  *
* Q Total (cfs)           *27700.00  * Flow (cfs)             * 2882.46  *22104.54  * 2713.01  *
* Top Width (ft)          *  746.27  * Top Width (ft)          *  531.23  *   94.05  *  120.99  *
* Vel Total (ft/s)        *    5.02  * Avg. Vel. (ft/s)        *    2.11  *    8.16  *    1.89  *
* Max Chl Dpth (ft)       *   33.21  * Hydr. Depth (ft)        *    4.24  *   28.82  *   11.88  *
* Conv. Total (cfs)       *1123544.0  * Conv. (cfs)             *116916.0  *896585.7  *110042.6  *
* Length Wtd. (ft)        * 1035.63  * Wetted Per. (ft)        *  327.86  *  101.97  *  122.99  *
* Min Ch El (ft)          *  767.59  * Shear (lb/sq ft)        *    0.16  *    1.01  *    0.44  *
* Alpha                   *    2.14  * Stream Power (lb/ft s) *    0.33  *    8.23  *    0.84  *
* Frctn Loss (ft)         *    0.40  * Cum Volume (acre-ft)   * 5038.74  *13971.85  * 6676.88  *
* C & E Loss (ft)         *    0.11  * Cum SA (acres)         *  687.36  *  571.74  *  861.99  *
*****************************************************************************************************
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Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  805.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.87  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  804.25  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2652.83  * 3035.35  * 1879.89  *
* E.G. Slope (ft/ft)     *0.000564  * Area (sq ft)           * 4772.82  * 3035.35  * 1879.89  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 3746.69  *25715.44  * 3797.88  *
* Top Width (ft)         * 1494.16  * Top Width (ft)         * 1265.33  *   94.05  *  134.78  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *    1.41  *    8.47  *    2.02  *
* Max Chl Dpth (ft)      *   36.66  * Hydr. Depth (ft)       *    6.94  *   32.27  *   13.95  *
* Conv. Total (cfs)      *1400754.0  * Conv. (cfs)           *157792.8  *1083013.0  *159948.7  *
* Length Wtd. (ft)       * 1013.24  * Wetted Per. (ft)       *  387.95  *  101.97  *  137.20  *
* Min Ch El (ft)         *  767.59  * Shear (lb/sq ft)       *    0.24  *    1.05  *    0.48  *
* Alpha                  *    2.91  * Stream Power (lb/ft s) *    0.34  *    8.88  *    0.97  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   * 7310.08  *15527.51  * 9514.22  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  934.74  *  578.72  * 1254.49  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  808.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  807.58  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3924.96  * 3348.48  * 2349.75  *
* E.G. Slope (ft/ft)     *0.000473  * Area (sq ft)           * 9483.98  * 3348.48  * 2349.75  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 6593.66  *27745.63  * 4760.72  *
* Top Width (ft)         * 1744.19  * Top Width (ft)         * 1503.30  *   94.05  *  146.85  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    1.68  *    8.29  *    2.03  *
* Max Chl Dpth (ft)      *   39.99  * Hydr. Depth (ft)       *   10.27  *   35.60  *   16.00  *
* Conv. Total (cfs)      *1797551.0  * Conv. (cfs)           *303131.4  *1275554.0  *218865.1  *
* Length Wtd. (ft)       *  980.63  * Wetted Per. (ft)       *  387.95  *  101.97  *  149.72  *
* Min Ch El (ft)         *  767.59  * Shear (lb/sq ft)       *    0.30  *    0.97  *    0.46  *
* Alpha                  *    3.01  * Stream Power (lb/ft s) *    0.50  *    8.04  *    0.94  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   * 9395.58  *16558.20  *12217.75  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         * 1103.27  *  579.61  * 1619.66  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
*************************************************************************************************
* E.G. Elev (ft)         *  812.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  811.65  * Reach Len. (ft)        *  508.22  * 1114.41  *  731.50  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5480.42  * 3731.35  * 3021.32  *
* E.G. Slope (ft/ft)     *0.000404  * Area (sq ft)           *15854.39  * 3731.35  * 3021.32  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             *10627.93  *30707.88  * 5664.19  *
* Top Width (ft)         * 1899.51  * Top Width (ft)         * 1616.93  *   94.05  *  188.53  *
* Vel Total (ft/s)       *    3.84  * Avg. Vel. (ft/s)       *    1.94  *    8.23  *    1.87  *
* Max Chl Dpth (ft)      *   44.06  * Hydr. Depth (ft)       *   14.34  *   39.67  *   16.03  *
* Conv. Total (cfs)      *2338358.0  * Conv. (cfs)           *528763.8  *1527787.0  *281806.6  *
* Length Wtd. (ft)       *  948.75  * Wetted Per. (ft)       *  387.95  *  101.97  *  192.11  *
* Min Ch El (ft)         *  767.59  * Shear (lb/sq ft)       *    0.36  *    0.92  *    0.40  *
* Alpha                  *    3.08  * Stream Power (lb/ft s) *    0.69  *    7.60  *    0.74  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *13716.99  *18129.71  *17164.37  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1367.51  *  582.15  * 1997.01  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
*************************************************************************************************
* E.G. Elev (ft)         *  798.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.090  *   0.040  *   0.100  *
```

W.S. Elev (ft)	797.55	Reach Len. (ft)	508.22	1114.41	731.50
Crit W.S. (ft)		Flow Area (sq ft)	943.84	2404.86	1065.67
E.G. Slope (ft/ft)	0.000542	Area (sq ft)	943.84	2404.86	1065.67
Q Total (cfs)	20700.00	Flow (cfs)	1921.28	17102.33	1676.39
Top Width (ft)	275.72	Top Width (ft)	73.38	94.05	108.29
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)	2.04	7.11	1.57
Max Chl Dpth (ft)	29.96	Hydr. Depth (ft)	12.86	25.57	9.84
Conv. Total (cfs)	889237.9	Conv. (cfs)	82535.0	734687.9	72015.0
Length Wtd. (ft)	1049.30	Wetted Per. (ft)	77.43	101.97	109.88
Min Ch El (ft)	767.59	Shear (lb/sq ft)	0.41	0.80	0.33
Alpha	1.93	Stream Power (lb/ft s)	0.84	5.67	0.52
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	3547.52	12263.60	4696.88
C & E Loss (ft)	0.09	Cum SA (acres)	444.49	554.10	524.82

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 21.126

INPUT
Description: Upstream side of MOPAC102
Station Elevation Data num= 247

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	836.14	28.9	827.65	33.47	826.61	46.7	824.13	58.15	821.17
64.65	819.89	70.99	818.65	78.19	818.72	100.89	819.6	103.06	819.67
110.83	819.96	116.54	820.09	124.79	819.86	152.15	818.97	152.87	818.95
153.07	818.94	153.23	818.93	153.66	818.89	168.05	817.13	174.66	815.28
189.31	811.3	189.69	811.29	189.96	811.28	202.65	810.78	213.5	810.57
214.88	810.53	218	810.37	229.38	809.87	236.9	809.6	250.46	809.81
259.37	809.95	297.66	810.03	302.86	810.07	307.3	809.96	332.13	810.65
347.27	810.91	356.46	810.3	360.67	810.11	380.73	808.87	399.19	806.8
415.37	805.87	427.24	805.1	434.74	804.87	446.53	804.09	465.31	803.98
467.22	803.92	467.71	803.88	470.43	803.68	483.68	802.48	502.39	800.79
503.4	800.78	504.31	800.77	508.7	800.71	514.9	800.98	528.63	802.18
538.96	801.92	548	802.62	551.02	802.6	571.96	803.41	616.38	803.24
617.34	803.25	618.49	803.23	622.02	803.18	626	803.12	626.18	803.12
669.16	802.54	685.75	802.93	712.79	803.04	719.75	802.47	725.23	802.02
737.29	800.41	743.25	800.55	746.47	800.73	755.83	801.2	756.62	801.39
775.7	805.87	776.67	805.96	783.03	806.69	786.72	807.1	787.14	807.16
795.76	807.21	799.3	807.23	806.2	806.26	810.82	805.57	814.97	804.62
822.98	802.99	826.34	802.14	829.38	801.22	836.69	799.19	839	798.46
852.94	798.22	856.13	798.24	875.7	798.24	881.26	798.27	898.92	798.29
906.13	798.33	918.19	798.42	928.12	798.5	939.67	798.31	953.17	798.13
966.25	797.92	970.98	797.84	981.01	797.05	995.94	796.92	1004.89	796.95
1016.22	796.85	1023.55	796.86	1035.67	796.74	1062.48	796.48	1070.7	796.39
1079.59	796.31	1098.71	797.13	1106.88	797.48	1108.09	797.48	1114.41	797.57
1124.38	797.77	1138.59	797.46	1141.89	797.43	1157.82	796.74	1158.71	796.73
1163.53	795.94	1168.6	795.06	1173.86	794.16	1189.97	790.64	1193.41	789.81
1205.87	784.83	1208.14	783.69	1216.13	782.09	1221.29	780.79	1224.87	779.88
1230.93	778.31	1236.84	777.83	1241.59	770.92	1245.13	767.63	1246.19	766.46
1249.23	766.51	1250.23	766.52	1251.73	766.54	1266.84	766.66	1290	766.5
1327.62	767.4	1336.5	767.51	1337.99	767.53	1351.49	771.58	1352.75	772.2
1365.85	781.62	1405.05	781.05	1409.82	780.95	1413.61	781.03	1416.29	782.45
1419.92	783.89	1432.99	789.25	1436.51	790.36	1443.99	793.31	1453.42	795.07
1463.06	797.28	1473.2	798.62	1473.56	798.63	1493.53	799.06	1495.04	799.12
1496.66	799.18	1497.72	799.2	1500.93	798.38	1520.53	787.72	1521.07	787.46
1524.42	786.8	1546.62	782.4	1549.97	782.23	1579.29	780.74	1590.55	780.14
1593.62	780.06	1657.75	781.54	1663.69	781.65	1710.75	782.05	1713.15	782.17
1717.5	782.16	1751.1	782.83	1757.32	783.12	1787.55	783.83	1809.76	784.07
1841.87	784.49	1854.46	784.59	1865.63	784.82	1893.6	784.81	1913.31	784.81
1918.04	784.53	1922	784.27	1939.46	783.53	1950.55	783.4	1959.64	783.28
1978.03	782.59	1990.28	782.04	1999.96	781.5	2005.98	778.15	2013.1	773.99
2016.97	771.73	2030.74	776.76	2035.45	779.05	2043.73	780.93	2052.35	783.3
2054.89	783.03	2058.13	782.85	2062.46	782.86	2067.02	780.99	2071.45	779.46
2072.86	779.47	2080.22	779.96	2096.72	780.67	2096.95	780.67	2097.12	780.68
2097.32	780.69	2099.27	780.71	2113.89	783.6	2117.45	785.17	2132.19	788.65
2141.35	791.22	2152.83	795.09	2160.52	796.06	2175.71	797.55	2178.24	799.93
2196.19	800.83	2197.84	801.41	2198.7	801.58	2206.42	802.32	2232.6	813
2237.4	814.86	2240.32	816.46	2250.02	816.59	2257.17	816.54	2259.63	816.67
2261.75	816.53	2285.62	814.95	2294.02	814.82	2295.71	814.76	2298.79	819

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 2305.15  827.25 2312.64  834.13 2320.21  842.15 2327.53   843.9 2335.05  845.44
 2342.57  846.99 2374.38  852.13  2375.5  852.33  2376.2  852.46 2376.61  852.56
 2390.19  855.17 2418.97   859.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06  822.98      .1 1236.84     .04 1365.85    .105

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1236.84 1365.85               50      50      50             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     810     815       F
 1484.74 2418.97     815       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  784.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  784.12  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  772.16  * Flow Area (sq ft)      *  103.48  * 2010.14  *  145.60  *
* E.G. Slope (ft/ft)     *0.000221  * Area (sq ft)           *  103.48  * 2010.14  * 1328.63  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *   51.85  * 6614.73  *   58.42  *
* Top Width (ft)         *  677.94  * Top Width (ft)         *   29.55  *  129.01  *  519.38  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)       *    0.50  *    3.29  *    0.40  *
* Max Chl Dpth (ft)      *   17.66  * Hydr. Depth (ft)       *    3.50  *   15.58  *    2.67  *
* Conv. Total (cfs)      *452267.2  * Conv. (cfs)            *  3487.1  *444851.4  *  3928.7  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)       *   30.30  *  138.24  *   55.30  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.05  *    0.20  *    0.04  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *    0.02  *    0.66  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  748.89  * 6062.50  *  740.78  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  130.64  *  450.46  *  166.32  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  789.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  788.86  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  774.54  * Flow Area (sq ft)      *  270.32  * 2622.47  *  432.32  *
* E.G. Slope (ft/ft)     *0.000279  * Area (sq ft)           *  270.32  * 2622.47  * 4392.73  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *  229.29  *11569.49  *  351.22  *
* Top Width (ft)         *  850.78  * Top Width (ft)         *   41.06  *  129.01  *  680.71  *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)       *    0.85  *    4.41  *    0.81  *
* Max Chl Dpth (ft)      *   22.40  * Hydr. Depth (ft)       *    6.58  *   20.33  *    6.53  *
* Conv. Total (cfs)      *727698.8  * Conv. (cfs)            * 13732.9  *692930.3  * 21035.6  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)       *   42.76  *  138.24  *   67.81  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.11  *    0.33  *    0.11  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.09  *    1.46  *    0.09  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1423.05  * 8041.59  * 1640.69  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  184.42  *  490.25  *  248.41  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  792.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  791.81  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  775.06  * Flow Area (sq ft)      *  405.78  * 3002.72  *  639.75  *
* E.G. Slope (ft/ft)     *0.000211  * Area (sq ft)           *  405.78  * 3002.72  * 6434.79  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  334.90  *12622.76  *  542.34  *
* Top Width (ft)         *  885.66  * Top Width (ft)         *   52.22  *  129.01  *  704.43  *
* Vel Total (ft/s)       *    3.33  * Avg. Vel. (ft/s)       *    0.83  *    4.20  *    0.85  *
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* Max Chl Dpth (ft)      *   25.35  * Hydr. Depth (ft)       *    7.77  *   23.28  *    8.61  *
* Conv. Total (cfs)      *928701.6  * Conv. (cfs)            * 23038.4  *868353.8  * 37309.4  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)       *   54.33  *  138.24  *   76.47  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.10  *    0.29  *    0.11  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.08  *    1.20  *    0.09  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2021.81  * 9637.15  * 2529.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  231.73  *  518.19  *  345.01  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  796.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.              *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  795.72  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  777.27  * Flow Area (sq ft)      *  646.34  * 3506.87  *  957.58  *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *  646.34  * 3506.87  * 9252.57  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *  649.66  *18022.96  * 1027.38  *
* Top Width (ft)         *  943.42  * Top Width (ft)         *   72.03  *  129.01  *  742.38  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    1.01  *    5.14  *    1.07  *
* Max Chl Dpth (ft)      *   29.26  * Hydr. Depth (ft)       *    8.97  *   27.18  *   10.59  *
* Conv. Total (cfs)      *1229357.0  * Conv. (cfs)            * 40541.3  *1124703.0  * 64112.3  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)       *   74.52  *  138.24  *   93.05  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.14  *    0.41  *    0.16  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.14  *    2.09  *    0.18  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 2928.47  *11311.99  * 3832.27  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  350.38  *  541.04  *  445.84  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  801.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.              *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  800.64  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  779.76  * Flow Area (sq ft)      * 2036.38  * 4142.30  * 1480.26  *
* E.G. Slope (ft/ft)     *0.000271  * Area (sq ft)           * 2037.64  * 4142.30  *13112.22  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1453.20  *24425.03  * 1821.77  *
* Top Width (ft)         * 1370.38  * Top Width (ft)         *  414.76  *  129.01  *  826.62  *
* Vel Total (ft/s)       *    3.62  * Avg. Vel. (ft/s)       *    0.71  *    5.90  *    1.23  *
* Max Chl Dpth (ft)      *   34.18  * Hydr. Depth (ft)       *    5.02  *   32.11  *   12.45  *
* Conv. Total (cfs)      *1683522.0  * Conv. (cfs)            * 88321.2  *1484479.0  *110721.5  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)       *  408.36  *  138.24  *  121.82  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.08  *    0.51  *    0.21  *
* Alpha                  *    2.35  * Stream Power (lb/ft s) *    0.06  *    2.99  *    0.25  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 5018.38  *13884.20  * 6554.71  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  681.84  *  568.89  *  854.03  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  804.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.              *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  804.19  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  781.37  * Flow Area (sq ft)      * 3497.85  * 4599.95  * 1902.01  *
* E.G. Slope (ft/ft)     *0.000239  * Area (sq ft)           * 4015.25  * 4599.95  *16086.41  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 3313.69  *27345.28  * 2601.04  *
* Top Width (ft)         * 1717.47  * Top Width (ft)         *  743.30  *  129.01  *  845.16  *
* Vel Total (ft/s)       *    3.33  * Avg. Vel. (ft/s)       *    0.95  *    5.94  *    1.37  *
* Max Chl Dpth (ft)      *   37.73  * Hydr. Depth (ft)       *    8.33  *   35.66  *   16.00  *
```

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* Conv. Total (cfs)      *2150142.0  * Conv. (cfs)            *214218.1  *1767776.0  *168147.8  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)        *  423.18  *  138.24  *  121.82  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)        *    0.12  *    0.50  *    0.23  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *    0.12  *    2.95  *    0.32  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 7258.82  *15429.84  * 9363.37  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  923.02  *  575.86  * 1246.26  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  807.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  807.51  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  783.13  * Flow Area (sq ft)      * 4911.25  * 5028.77  * 2297.19  *
* E.G. Slope (ft/ft)     *0.000217  * Area (sq ft)           * 6643.50  * 5028.77  *18909.17  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 5514.72  *30194.37  * 3390.91  *
* Top Width (ft)         * 1826.34  * Top Width (ft)         *  844.02  *  129.01  *  853.30  *
* Vel Total (ft/s)       *    3.20  * Avg. Vel. (ft/s)       *    1.12  *    6.00  *    1.48  *
* Max Chl Dpth (ft)      *   41.05  * Hydr. Depth (ft)       *   11.51  *   38.98  *   19.32  *
* Conv. Total (cfs)      *2655780.0  * Conv. (cfs)            *374574.8  *2050885.0  *230320.0  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)        *  430.42  *  138.24  *  121.82  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)        *    0.15  *    0.49  *    0.26  *
* Alpha                  *    2.76  * Stream Power (lb/ft s) *    0.17  *    2.96  *    0.38  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 9301.50  *16451.04  *12039.25  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         * 1089.58  *  576.76  * 1611.26  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  812.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.099  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  811.59  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  785.05  * Flow Area (sq ft)      * 6652.19  * 5554.96  * 2782.10  *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *10399.02  * 5554.96  *22409.91  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 8679.93  *33884.16  * 4435.91  *
* Top Width (ft)         * 2040.92  * Top Width (ft)         * 1048.61  *  129.01  *  863.30  *
* Vel Total (ft/s)       *    3.14  * Avg. Vel. (ft/s)       *    1.30  *    6.10  *    1.59  *
* Max Chl Dpth (ft)      *   45.13  * Hydr. Depth (ft)       *   15.58  *   43.06  *   23.40  *
* Conv. Total (cfs)      *3357949.0  * Conv. (cfs)            *620143.8  *2420879.0  *316926.7  *
* Length Wtd. (ft)       *   14.00  * Wetted Per. (ft)        *  430.42  *  138.24  *  121.82  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)        *    0.19  *    0.49  *    0.28  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    0.25  *    3.00  *    0.45  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *13563.83  *18010.92  *16950.84  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         * 1351.96  *  579.29  * 1988.18  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  797.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  797.41  * Reach Len. (ft)        *   14.00  *   14.00  *   14.00  *
* Crit W.S. (ft)         *  777.60  * Flow Area (sq ft)      *  861.97  * 3724.66  * 1116.43  *
* E.G. Slope (ft/ft)     *0.000228  * Area (sq ft)           *  861.97  * 3724.66  *10528.05  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *  717.91  *18797.06  * 1185.03  *
```

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* Top Width (ft)          * 1121.75  * Top Width (ft)          *  223.06  *  129.01  *  769.68  *
* Vel Total (ft/s)        *    3.63  * Avg. Vel. (ft/s)        *    0.83  *    5.05  *    1.06  *
* Max Chl Dpth (ft)       *   30.95  * Hydr. Depth (ft)        *    3.86  *   28.87  *   11.37  *
* Conv. Total (cfs)       *1369400.0  * Conv. (cfs)            * 47493.2  *1243511.0  * 78395.1  *
* Length Wtd. (ft)        *   14.00  * Wetted Per. (ft)        *  225.69  *  138.24  *  101.01  *
* Min Ch El (ft)          *  766.46  * Shear (lb/sq ft)        *    0.05  *    0.38  *    0.16  *
* Alpha                   *    1.76  * Stream Power (lb/ft s) *    0.05  *    1.94  *    0.17  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    * 3536.99  *12185.19  * 4599.54  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  442.76  *  551.25  *  517.45  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 21.122

INPUT
Description: MOPAC @ 102nd Street
Distance from Upstream XS =      14
Deck/Roadway Width        =      13
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
     775   805.5     760     785   807.6     760    1163   807.6     760
  1163.1     808  797.07    1460     808  797.07  1460.1   807.6     760
    1495   807.6     760    1501     795     760

Upstream Bridge Cross Section Data
Station Elevation Data    num=     247
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  836.14    28.9  827.65   33.47  826.61    46.7  824.13   58.15  821.17
   64.65  819.89   70.99  818.65   78.19  818.72  100.89   819.6  103.06  819.67
  110.83  819.96  116.54  820.09  124.79  819.86  152.15  818.97  152.87  818.95
  153.07  818.94  153.23  818.93  153.66  818.89  168.05  817.13  174.66  815.28
  189.31   811.3  189.69  811.29  189.96  811.28  202.65  810.78   213.5  810.57
  214.88  810.53     218  810.37  229.38  809.87   236.9   809.6  250.46  809.81
  259.37  809.95  297.66  810.03  302.86  810.07   307.3  809.96  332.13  810.65
  347.27  810.91  356.46   810.3  360.67  810.11  380.73  808.87  399.19   806.8
  415.37  805.87  427.24   805.1  434.74  804.87  446.53  804.09  465.31  803.98
  467.22  803.92  467.71  803.88  470.43  803.68  483.68  802.48  502.39  800.79
   503.4  800.78  504.31  800.77   508.7  800.71   514.9  800.98  528.63  802.18
  538.96  801.92     548  802.62  551.02   802.6  571.96  803.41  616.38  803.24
  617.34  803.25  618.49  803.23  622.02  803.18     626  803.12  626.18  803.12
  669.16  802.54  685.75  802.93  712.79  803.04  719.75  802.47  725.23  802.02
  737.29  800.41  743.25  800.55  746.47  800.73  755.83   801.2  756.62  801.39
   775.7  805.87  776.67  805.96  783.03  806.69  786.72   807.1  787.14  807.16
  795.76  807.21   799.3  807.23   806.2  806.26  810.82  805.57  814.97  804.62
  822.98  802.99  826.34  802.14  829.38  801.22  836.69  799.19     839  798.46
  852.94  798.22  856.13  798.24   875.7  798.24  881.26  798.27  898.92  798.29
  906.13  798.33  918.19  798.42  928.12   798.5  939.67  798.31  953.17  798.13
  966.25  797.92  970.98  797.84  981.01  797.05  995.94  796.92 1004.89  796.95
 1016.22  796.85 1023.55  796.86 1035.67  796.74 1062.48  796.48  1070.7  796.39
 1079.59  796.31 1098.71  797.13 1106.88  797.48 1108.09  797.48 1114.41  797.57
 1124.38  797.77 1138.59  797.46 1141.89  797.43 1157.82  796.74 1158.71  796.73
 1163.53  795.94  1168.6  795.06 1173.86  794.16 1189.97  790.64 1193.41  789.81
 1205.87  784.83 1208.14  783.69 1216.13  782.09 1221.29  780.79 1224.87  779.88
 1230.93  778.31 1236.84  777.83 1241.59  770.92 1245.13  767.63 1246.19  766.46
 1249.23  766.51 1250.23  766.52 1251.73  766.54 1266.84  766.66    1290   766.5
 1327.62   767.4  1336.5  767.51 1337.99  767.53 1351.49  771.58 1352.75   772.2
 1365.85  781.62 1405.05  781.05 1409.82  780.95 1413.61  781.03 1416.29  782.45
 1419.92  783.89 1432.99  789.25 1436.51  790.36 1443.99  793.31 1453.42  795.07
 1463.06  797.28  1473.2  798.62 1473.56  798.63 1493.53  799.06 1495.04  799.12
 1496.66  799.18 1497.72   799.2 1500.93  798.38 1520.53  787.72 1521.07  787.46
 1524.42   786.8 1546.62   782.4 1549.97  782.23 1579.29  780.74 1590.55  780.14
 1593.62  780.06 1657.75  781.54 1663.69  781.65 1710.75  782.05 1713.15  782.17
  1717.5  782.16  1751.1  782.83 1757.32  783.12 1787.55  783.83 1809.76  784.07
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 1841.87  784.49 1854.46  784.59 1865.63  784.82  1893.6  784.81 1913.31  784.81
 1918.04  784.53    1922  784.27 1939.46  783.53 1950.55   783.4 1959.64  783.28
 1978.03  782.59 1990.28  782.04 1999.96   781.5 2005.98  778.15  2013.1  773.99
 2016.97  771.73 2030.74  776.76 2035.45  779.05 2043.73  780.93 2052.35   783.3
 2054.89  783.03 2058.13  782.85 2062.46  782.86 2067.02  780.99 2071.45  779.46
 2072.86  779.47 2080.22  779.96 2096.72  780.67 2096.95  780.67 2097.12  780.68
 2097.32  780.69 2099.27  780.71 2113.89   783.6 2117.45  785.17 2132.19  788.65
 2141.35  791.22 2152.83  795.09 2160.52  796.06 2175.71  797.55 2178.24  799.93
 2196.19  800.83 2197.84  801.41  2198.7  801.58 2206.42  802.32  2232.6     813
  2237.4  814.86 2240.32  816.46 2250.02  816.59 2257.17  816.54 2259.63  816.67
 2261.75  816.53 2285.62  814.95 2294.02  814.82 2295.71  814.76 2298.79     819
 2305.15  827.25 2312.64  834.13 2320.21  842.15 2327.53   843.9 2335.05  845.44
 2342.57  846.99 2374.38  852.13  2375.5  852.33  2376.2  852.46 2376.61  852.56
 2390.19  855.17 2418.97   859.7

Manning's n Values         num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06  822.98      .1 1236.84     .04 1365.85    .105

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1236.84 1365.85            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     810     815        F
 1484.74 2418.97     815        F

Downstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***************************************************************************
     775   805.5     760     785   807.6     760    1163   807.6     760
  1163.1     808  797.07    1460     808  797.07  1460.1   807.6     760
    1495   807.6     760    1501     795     760

Downstream Bridge Cross Section Data
Station Elevation Data    num=     247
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  836.14    28.9  827.65   33.47  826.61    46.7  824.13   58.15  821.17
   64.65  819.89   70.99  818.65   78.19  818.72  100.89   819.6  103.06  819.67
  110.83  819.96  116.54  820.09  124.79  819.86  152.15  818.97  152.87  818.95
  153.07  818.94  153.23  818.93  153.66  818.89  168.05  817.13  174.66  815.28
  189.31   811.3  189.69  811.29  189.96  811.28  202.65  810.78   213.5  810.57
  214.88  810.53     218  810.37  229.38  809.87   236.9   809.6  250.46  809.81
  259.37  809.95  297.66  810.03  302.86  810.07   307.3  809.96  332.13  810.65
  347.27  810.91  356.46   810.3  360.67  810.11  380.73  808.87  399.19   806.8
  415.37  805.87  427.24   805.1  434.74  804.87  446.53  804.09  465.31  803.98
  467.22  803.92  467.71  803.88  470.43  803.68  483.68  802.48  502.39  800.79
   503.4  800.78  504.31  800.77   508.7  800.71   514.9  800.98  528.63  802.18
  538.96  801.92     548  802.62  551.02   802.6  571.96  803.41  616.38  803.24
  617.34  803.25  618.49  803.23  622.02  803.18     626  803.12  626.18  803.12
  669.16  802.54  685.75  802.93  712.79  803.04  719.75  802.47  725.23  802.02
  737.29  800.41  743.25  800.55  746.47  800.73  755.83   801.2  756.62  801.39
   775.7  805.87  776.67  805.96  783.03  806.69  786.72   807.1  787.14  807.16
  795.76  807.21   799.3  807.23   806.2  806.26  810.82  805.57  814.97  804.62
  822.98  802.99  826.34  802.14  829.38  801.22  836.69  799.19     839  798.46
  852.94  798.22  856.13  798.24   875.7  798.24  881.26  798.27  898.92  798.29
  906.13  798.33  918.19  798.42  928.12   798.5  939.67  798.31  953.17  798.13
  966.25  797.92  970.98  797.84  981.01  797.05  995.94  796.92 1004.89  796.95
 1016.22  796.85 1023.55  796.86 1035.67  796.74 1062.48  796.48  1070.7  796.39
 1079.59  796.31 1098.71  797.13 1106.88  797.48 1108.09  797.48 1114.41  797.57
 1124.38  797.77 1138.59  797.46 1141.89  797.43 1157.82  796.74 1158.71  796.73
 1163.53  795.94  1168.6  795.06 1173.86  794.16 1189.97  790.64 1193.41  789.81
 1205.87  784.83 1208.14  783.69 1216.13  782.09 1221.29  780.79 1224.87  779.88
 1230.93  778.31 1236.84  777.83 1241.59  770.92 1245.13  767.63 1246.19  766.46
 1249.23  766.51 1250.23  766.52 1251.73  766.54 1266.84  766.66    1290   766.5
 1327.62   767.4  1336.5  767.51 1337.99  767.53 1351.49  771.58 1352.75   772.2
 1365.85  781.62 1405.05  781.05 1409.82  780.95 1413.61  781.03 1416.29  782.45
 1419.92  783.89 1432.99  789.25 1436.51  790.36 1443.99  793.31 1453.42  795.07
 1463.06  797.28  1473.2  798.62 1473.56  798.63 1493.53  799.06 1495.04  799.12
 1496.66  799.18 1497.72   799.2 1499.41  798.32 1520.53  787.72 1521.07  787.46
 1524.42   786.8 1546.62   782.4 1549.97  782.23 1579.29  780.74 1590.55  780.14
 1593.62  780.06 1657.75  781.54 1663.69  781.65 1710.75  782.05 1713.15  782.17
  1717.5  782.16  1751.1  782.83 1757.32  783.12 1787.55  783.83 1809.76  784.07
 1841.87  784.49 1854.46  784.59 1865.63  784.82  1893.6  784.81 1913.31  784.81
```

```
 1918.04  784.53    1922  784.27 1939.46  783.53 1950.55   783.4 1959.64  783.28
 1978.03  782.59 1990.28  782.04 1999.96   781.5 2005.98  778.15  2013.1  773.99
 2016.97  771.73 2030.74  776.76 2035.45  779.05 2043.73  780.93 2052.35   783.3
 2054.89  783.03 2058.13  782.85 2062.46  782.86 2067.02  780.99 2071.45  779.46
 2072.86  779.47 2080.22  779.96 2096.72  780.67 2096.95  780.67 2097.12  780.68
 2097.32  780.69 2099.27  780.71 2113.89   783.6 2117.45  785.17 2132.19  788.65
 2141.35  791.22 2152.83  795.09 2160.52  796.06 2175.71  797.55 2178.24  799.93
 2196.19  800.83 2197.84  801.41  2198.7  801.58 2206.42  802.32  2232.6     813
  2237.4  814.86 2240.32  816.46 2250.02  816.59 2257.17  816.54 2259.63  816.67
 2261.75  816.53 2285.62  814.95 2294.02  814.82 2295.71  814.76 2298.79     819
 2305.15  827.25 2312.64  834.13 2320.21  842.15 2327.53   843.9 2335.05  845.44
 2342.57  846.99 2374.38  852.13  2375.5  852.33  2376.2  852.46 2376.61  852.56
 2390.19  855.17 2418.97   859.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06  822.98      .1 1236.84     .04 1365.85      .1

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1236.84 1365.85            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     810     815       F
 1482.42 2418.97     815       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  10

Pier Data
Pier Station     Upstream=    1180    Downstream=    1180
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1195    Downstream=    1195
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1199    Downstream=    1199
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1256    Downstream=    1256
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     760       8     800
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
       8     760       8     800

Pier Data
Pier Station     Upstream=    1326    Downstream=    1326
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     760       8     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     760       8     800

Pier Data
Pier Station     Upstream=    1383    Downstream=    1383
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1387    Downstream=    1387
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1409    Downstream=    1409
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1413    Downstream=    1413
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1435    Downstream=    1435
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
       Yarnell                 KVal =    1.25
```

Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	784.28	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	784.12	E.G. Elev (ft)	784.27	784.26
Q Total (cfs)	6725.00	W.S. Elev (ft)	784.05	784.04
Q Bridge (cfs)	6725.00	Crit W.S. (ft)	772.75	772.75
Q Weir (cfs)		Max Chl Dpth (ft)	17.59	17.58
Weir Sta Lft (ft)		Vel Total (ft/s)	3.45	3.45
Weir Sta Rgt (ft)		Flow Area (sq ft)	1948.89	1947.54
Weir Submerg		Froude # Chl	0.17	0.17
Weir Max Depth (ft)		Specif Force (cu ft)	15128.86	15114.78
Min El Weir Flow (ft)	807.61	Hydr Depth (ft)	10.32	10.31
Min El Prs (ft)	797.07	W.P. Total (ft)	290.70	290.58
Delta EG (ft)	0.04	Conv. Total (cfs)	285206.9	285127.2
Delta WS (ft)	0.04	Top Width (ft)	188.89	188.86
BR Open Area (sq ft)	4843.87	Frctn Loss (ft)	0.01	0.01
BR Open Vel (ft/s)	3.45	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.23	0.23
Br Sel Method	Energy only	Power Total (lb/ft s)	0.80	0.80

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	789.15	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	788.86	E.G. Elev (ft)	789.14	789.13
Q Total (cfs)	12150.00	W.S. Elev (ft)	788.76	788.75
Q Bridge (cfs)	12150.00	Crit W.S. (ft)	775.40	775.40
Q Weir (cfs)		Max Chl Dpth (ft)	22.30	22.29
Weir Sta Lft (ft)		Vel Total (ft/s)	4.20	4.21
Weir Sta Rgt (ft)		Flow Area (sq ft)	2889.71	2887.79
Weir Submerg		Froude # Chl	0.20	0.20
Weir Max Depth (ft)		Specif Force (cu ft)	27526.42	27496.88
Min El Weir Flow (ft)	807.61	Hydr Depth (ft)	13.78	13.77
Min El Prs (ft)	797.07	W.P. Total (ft)	372.22	372.04
Delta EG (ft)	0.06	Conv. Total (cfs)	436591.4	436904.0
Delta WS (ft)	0.06	Top Width (ft)	209.77	209.73
BR Open Area (sq ft)	4843.87	Frctn Loss (ft)	0.01	0.01
BR Open Vel (ft/s)	4.21	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.38	0.37
Br Sel Method	Energy only	Power Total (lb/ft s)	1.58	1.58

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	792.07	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	791.81	E.G. Elev (ft)	792.06	792.05

```
* Q Total (cfs)          *   13500.00  * W.S. Elev (ft)         *     791.73  *     791.72  *
* Q Bridge (cfs)         *   13500.00  * Crit W.S. (ft)         *     775.98  *     775.98  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.27  *      25.26  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.82  *       3.83  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3530.02  *    3528.49  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   37097.89  *   37068.73  *
* Min El Weir Flow (ft)  *     807.61  * Hydr Depth (ft)        *      15.69  *      15.69  *
* Min El Prs (ft)        *     797.07  * W.P. Total (ft)        *     438.48  *     438.31  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *   543049.4  *   543871.3  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *     225.00  *     224.95  *
* BR Open Area (sq ft)   *    4843.87  * Frctn Loss (ft)        *       0.01  *       0.01  *
* BR Open Vel (ft/s)     *       3.83  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.31  *       0.31  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.19  *       1.18  *
*******************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*******************************************************************************************
* E.G. US. (ft)          *     796.09  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     795.72  * E.G. Elev (ft)         *     796.12  *     796.12  *
* Q Total (cfs)          *   19700.00  * W.S. Elev (ft)         *     795.65  *     795.65  *
* Q Bridge (cfs)         *   19700.00  * Crit W.S. (ft)         *     778.39  *     778.39  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.19  *      29.19  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.41  *       4.41  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4471.24  *    4471.24  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   54130.54  *   54117.84  *
* Min El Weir Flow (ft)  *     807.61  * Hydr Depth (ft)        *      17.28  *      17.28  *
* Min El Prs (ft)        *     797.07  * W.P. Total (ft)        *     549.47  *     549.47  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *   694626.1  *   696410.3  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     258.80  *     258.80  *
* BR Open Area (sq ft)   *    4843.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.41  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.41  *       0.41  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.80  *       1.79  *
*******************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     801.12  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     800.64  * E.G. Elev (ft)         *     801.08  *     801.05  *
* Q Total (cfs)          *   27700.00  * W.S. Elev (ft)         *     800.26  *     800.23  *
* Q Bridge (cfs)         *   27700.00  * Crit W.S. (ft)         *     781.19  *     781.19  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.80  *      33.77  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.72  *       5.72  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4843.87  *    4843.87  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   78968.39  *   78821.12  *
* Min El Weir Flow (ft)  *     807.61  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     797.07  * W.P. Total (ft)        *     850.47  *     850.47  *
* Delta EG (ft)          *       0.19  * Conv. Total (cfs)      *   579471.1  *   581104.3  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    4843.87  * Frctn Loss (ft)        *       0.03  *       0.01  *
* BR Open Vel (ft/s)     *       5.72  * C & E Loss (ft)        *       0.00  *       0.10  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.81  *       0.81  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.65  *       4.62  *
*******************************************************************************************
```

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Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     804.65  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     804.19  * E.G. Elev (ft)          *     804.56  *     804.52  *
* Q Total (cfs)          *   33260.00  * W.S. Elev (ft)          *     803.38  *     803.35  *
* Q Bridge (cfs)         *   33260.00  * Crit W.S. (ft)          *     783.14  *     783.16  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *      36.92  *      36.89  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)        *       6.87  *       6.87  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)       *    4843.87  *    4843.87  *
* Weir Submerg           *             * Froude # Chl            *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)    *   96772.29  *   96560.12  *
* Min El Weir Flow (ft)  *     807.61  * Hydr Depth (ft)         *             *             *
* Min El Prs (ft)        *     797.07  * W.P. Total (ft)         *     850.47  *     850.47  *
* Delta EG (ft)          *       0.35  * Conv. Total (cfs)       *   579471.1  *   581104.2  *
* Delta WS (ft)          *       0.37  * Top Width (ft)          *             *             *
* BR Open Area (sq ft)   *    4843.87  * Frctn Loss (ft)         *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       6.87  * C & E Loss (ft)         *       0.00  *       0.21  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       1.17  *       1.16  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)   *       8.04  *       8.00  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     807.95  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     807.51  * E.G. Elev (ft)          *     807.82  *     807.76  *
* Q Total (cfs)          *   39100.00  * W.S. Elev (ft)          *     806.19  *     806.14  *
* Q Bridge (cfs)         *   39100.00  * Crit W.S. (ft)          *     784.80  *     784.82  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *      39.73  *      39.68  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)        *       8.07  *       8.07  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)       *    4843.87  *    4843.87  *
* Weir Submerg           *             * Froude # Chl            *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)    *  113711.10  *  113417.90  *
* Min El Weir Flow (ft)  *     807.61  * Hydr Depth (ft)         *             *             *
* Min El Prs (ft)        *     797.07  * W.P. Total (ft)         *     850.47  *     850.47  *
* Delta EG (ft)          *       0.55  * Conv. Total (cfs)       *   579471.1  *   581104.3  *
* Delta WS (ft)          *       0.57  * Top Width (ft)          *             *             *
* BR Open Area (sq ft)   *    4843.87  * Frctn Loss (ft)         *       0.06  *       0.01  *
* BR Open Vel (ft/s)     *       8.07  * C & E Loss (ft)         *       0.00  *       0.35  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       1.62  *       1.61  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)   *      13.07  *      12.99  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
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        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     812.02  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     811.59  * E.G. Elev (ft)         *     811.89  *     811.81  *
* Q Total (cfs)          *   47000.00  * W.S. Elev (ft)         *     810.28  *     810.18  *
* Q Bridge (cfs)         *   42729.36  * Crit W.S. (ft)         *     786.71  *     786.73  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.82  *      43.72  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.20  *       7.28  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6531.63  *    6458.16  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  137699.20  *  137115.60  *
* Min El Weir Flow (ft)  *     807.61  * Hydr Depth (ft)        *       9.68  *       9.60  *
* Min El Prs (ft)        *     797.07  * W.P. Total (ft)        *    1525.83  *    1523.51  *
* Delta EG (ft)          *       0.58  * Conv. Total (cfs)       *   584864.2  *   580938.7  *
* Delta WS (ft)          *       0.60  * Top Width (ft)         *    1967.58  *    1959.24  *
* BR Open Area (sq ft)   *    4843.87  * Frctn Loss (ft)        *       0.08  *       0.01  *
* BR Open Vel (ft/s)     *       8.82  * C & E Loss (ft)        *       0.00  *       0.36  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.73  *       1.73  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      12.42  *      12.61  *
*********************************************************************************************

Note:   Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
        The Yarnell answer has been disregarded.
Note:   Momentum answer is not valid if the water surface is above the low chord or if there is weir
        flow.  The momentum answer has been disregarded.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
        additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     797.77  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     797.41  * E.G. Elev (ft)         *     797.75  *     797.73  *
* Q Total (cfs)          *   20700.00  * W.S. Elev (ft)         *     797.29  *     797.28  *
* Q Bridge (cfs)         *   20700.00  * Crit W.S. (ft)         *     778.77  *     778.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      30.83  *      30.82  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.27  *       4.27  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4843.87  *    4843.87  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   61928.07  *   61845.97  *
* Min El Weir Flow (ft)  *     807.61  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     797.07  * W.P. Total (ft)        *     850.47  *     850.47  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)       *   579471.1  *   581104.3  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    4843.87  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.27  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.45  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.94  *       1.93  *
*********************************************************************************************

Note:   Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
        The Yarnell answer has been disregarded.
Note:   Momentum answer is not valid if the water surface is above the low chord or if there is weir
        flow.  The momentum answer has been disregarded.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 21.116
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INPUT
Description: Downstream side of MOPAC102, XS copied from U/S side
Station Elevation Data    num=     247
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  836.14    28.9  827.65   33.47  826.61    46.7  824.13   58.15  821.17
   64.65  819.89   70.99  818.65   78.19  818.72  100.89   819.6  103.06  819.67
  110.83  819.96  116.54  820.09  124.79  819.86  152.15  818.97  152.87  818.95
  153.07  818.94  153.23  818.93  153.66  818.89  168.05  817.13  174.66  815.28
  189.31   811.3  189.69  811.29  189.96  811.28  202.65  810.78   213.5  810.57
  214.88  810.53     218  810.37  229.38  809.87   236.9   809.6  250.46  809.81
  259.37  809.95  297.66  810.03  302.86  810.07   307.3  809.96  332.13  810.65
  347.27  810.91  356.46   810.3  360.67  810.11  380.73  808.87  399.19   806.8
  415.37  805.87  427.24   805.1  434.74  804.87  446.53  804.09  465.31  803.98
  467.22  803.92  467.71  803.88  470.43  803.68  483.68  802.48  502.39  800.79
   503.4  800.78  504.31  800.77   508.7  800.71   514.9  800.98  528.63  802.18
  538.96  801.92     548  802.62  551.02   802.6  571.96  803.41  616.38  803.24
  617.34  803.25  618.49  803.23  622.02  803.18     626  803.12  626.18  803.12
  669.16  802.54  685.75  802.93  712.79  803.04  719.75  802.47  725.23  802.02
  737.29  800.41  743.25  800.55  746.47  800.73  755.83   801.2  756.62  801.39
   775.7  805.87  776.67  805.96  783.03  806.69  786.72   807.1  787.14  807.16
  795.76  807.21   799.3  807.23   806.2  806.26  810.82  805.57  814.97  804.62
  822.98  802.99  826.34  802.14  829.38  801.22  836.69  799.19     839  798.46
  852.94  798.22  856.13  798.24   875.7  798.24  881.26  798.27  898.92  798.29
  906.13  798.33  918.19  798.42  928.12   798.5  939.67  798.31  953.17  798.13
  966.25  797.92  970.98  797.84  981.01  797.05  995.94  796.92 1004.89  796.95
 1016.22  796.85 1023.55  796.86 1035.67  796.74 1062.48  796.48  1070.7  796.39
 1079.59  796.31 1098.71  797.13 1106.88  797.48 1108.09  797.48 1114.41  797.57
 1124.38  797.77 1138.59  797.46 1141.89  797.43 1157.82  796.74 1158.71  796.73
 1163.53  795.94  1168.6  795.06 1173.86  794.16 1189.97  790.64 1193.41  789.81
 1205.87  784.83 1208.14  783.69 1216.13  782.09 1221.29  780.79 1224.87  779.88
 1230.93  778.31 1236.84  777.83 1241.59  770.92 1245.13  767.63 1246.19  766.46
 1249.23  766.51 1250.23  766.52 1251.73  766.54 1266.84  766.66    1290   766.5
 1327.62   767.4  1336.5  767.51 1337.99  767.53 1351.49  771.58 1352.75   772.2
 1365.85  781.62 1405.05  781.05 1409.82  780.95 1413.61  781.03 1416.29  782.45
 1419.92  783.89 1432.99  789.25 1436.51  790.36 1443.99  793.31 1453.42  795.07
 1463.06  797.28  1473.2  798.62 1473.56  798.63 1493.53  799.06 1495.04  799.12
 1496.66  799.18 1497.72   799.2 1499.41  798.32 1520.53  787.72 1521.07  787.46
 1524.42   786.8 1546.62   782.4 1549.97  782.23 1579.29  780.74 1590.55  780.14
 1593.62  780.06 1657.75  781.54 1663.69  781.65 1710.75  782.05 1713.15  782.17
  1717.5  782.16  1751.1  782.83 1757.32  783.12 1787.55  783.83 1809.76  784.07
 1841.87  784.49 1854.46  784.59 1865.63  784.82  1893.6  784.81 1913.31  784.81
 1918.04  784.53    1922  784.27 1939.46  783.53 1950.55   783.4 1959.64  783.28
 1978.03  782.59 1990.28  782.04 1999.96   781.5 2005.98  778.15  2013.1  773.99
 2016.97  771.73 2030.74  776.76 2035.45  779.05 2043.73  780.93 2052.35   783.3
 2054.89  783.03 2058.13  782.85 2062.46  782.86 2067.02  780.99 2071.45  779.46
 2072.86  779.47 2080.22  779.96 2096.72  780.67 2096.95  780.67 2097.12  780.68
 2097.32  780.69 2099.27  780.71 2113.89   783.6 2117.45  785.17 2132.19  788.65
 2141.35  791.22 2152.83  795.09 2160.52  796.06 2175.71  797.55 2178.24  799.93
 2196.19  800.83 2197.84  801.41  2198.7  801.58 2206.42  802.32  2232.6     813
  2237.4  814.86 2240.32  816.46 2250.02  816.59 2257.17  816.54 2259.63  816.67
 2261.75  816.53 2285.62  814.95 2294.02  814.82 2295.71  814.76 2298.79     819
 2305.15  827.25 2312.64  834.13 2320.21  842.15 2327.53   843.9 2335.05  845.44
 2342.57  846.99 2374.38  852.13  2375.5  852.33  2376.2  852.46 2376.61  852.56
 2390.19  855.17 2418.97   859.7

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06  822.98      .1 1236.84     .04 1365.85      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1236.84 1365.85             1276     930     726             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     810     815       F
 1482.42 2418.97     815       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  784.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  784.07  * Reach Len. (ft)        * 1276.00  *  930.00  *  726.00  *
* Crit W.S. (ft)         *  772.16  * Flow Area (sq ft)      *  102.24  * 2004.69  *  143.29  *
* E.G. Slope (ft/ft)     *0.000223  * Area (sq ft)           *  102.24  * 2004.69  * 1306.79  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *   51.14  * 6613.79  *   60.07  *
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* Top Width (ft)          *  673.21  * Top Width (ft)          *   29.46  *  129.01  *  514.74  *
* Vel Total (ft/s)        *    2.99  * Avg. Vel. (ft/s)        *    0.50  *    3.30  *    0.42  *
* Max Chl Dpth (ft)       *   17.61  * Hydr. Depth (ft)        *    3.47  *   15.54  *    2.63  *
* Conv. Total (cfs)       *450290.2  * Conv. (cfs)             *  3424.5  *442843.5  *  4022.3  *
* Length Wtd. (ft)        *  921.01  * Wetted Per. (ft)        *   30.21  *  138.24  *   55.19  *
* Min Ch El (ft)          *  766.46  * Shear (lb/sq ft)        *    0.05  *    0.20  *    0.04  *
* Alpha                   *    1.20  * Stream Power (lb/ft s) *    0.02  *    0.67  *    0.02  *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)    *  748.78  * 6060.40  *  740.14  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  130.60  *  450.32  *  166.07  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  789.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  788.80  * Reach Len. (ft)        * 1276.00  *  930.00  *  726.00  *
* Crit W.S. (ft)          *  774.54  * Flow Area (sq ft)      *  267.82  * 2614.63  *  428.30  *
* E.G. Slope (ft/ft)      *0.000281  * Area (sq ft)           *  267.82  * 2614.63  * 4351.45  *
* Q Total (cfs)           *12150.00  * Flow (cfs)             *  227.26  *11557.64  *  365.10  *
* Top Width (ft)          *  850.32  * Top Width (ft)         *   40.91  *  129.01  *  680.40  *
* Vel Total (ft/s)        *    3.67  * Avg. Vel. (ft/s)        *    0.85  *    4.42  *    0.85  *
* Max Chl Dpth (ft)       *   22.34  * Hydr. Depth (ft)        *    6.55  *   20.27  *    6.48  *
* Conv. Total (cfs)       *724817.8  * Conv. (cfs)             * 13557.2  *689480.0  * 21780.5  *
* Length Wtd. (ft)        *  908.81  * Wetted Per. (ft)        *   42.60  *  138.24  *   67.65  *
* Min Ch El (ft)          *  766.46  * Shear (lb/sq ft)        *    0.11  *    0.33  *    0.11  *
* Alpha                   *    1.38  * Stream Power (lb/ft s) *    0.09  *    1.47  *    0.09  *
* Frctn Loss (ft)         *    0.32  * Cum Volume (acre-ft)    * 1422.74  * 8038.84  * 1638.57  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  184.38  *  490.11  *  248.08  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  792.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.26  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  791.76  * Reach Len. (ft)        * 1276.00  *  930.00  *  726.00  *
* Crit W.S. (ft)          *  775.06  * Flow Area (sq ft)      *  403.30  * 2996.57  *  636.21  *
* E.G. Slope (ft/ft)      *0.000212  * Area (sq ft)           *  403.30  * 2996.57  * 6402.47  *
* Q Total (cfs)           *13500.00  * Flow (cfs)             *  332.97  *12601.21  *  565.82  *
* Top Width (ft)          *  885.72  * Top Width (ft)         *   52.01  *  129.01  *  704.70  *
* Vel Total (ft/s)        *    3.34  * Avg. Vel. (ft/s)        *    0.83  *    4.21  *    0.89  *
* Max Chl Dpth (ft)       *   25.30  * Hydr. Depth (ft)        *    7.75  *   23.23  *    8.57  *
* Conv. Total (cfs)       *927116.7  * Conv. (cfs)             * 22866.5  *865391.9  * 38858.2  *
* Length Wtd. (ft)        *  903.58  * Wetted Per. (ft)        *   54.11  *  138.24  *   76.34  *
* Min Ch El (ft)          *  766.46  * Shear (lb/sq ft)        *    0.10  *    0.29  *    0.11  *
* Alpha                   *    1.48  * Stream Power (lb/ft s) *    0.08  *    1.21  *    0.10  *
* Frctn Loss (ft)         *    0.22  * Cum Volume (acre-ft)    * 2021.35  * 9634.00  * 2526.14  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  231.67  *  518.06  *  344.67  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  796.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.38  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  795.65  * Reach Len. (ft)        * 1276.00  *  930.00  *  726.00  *
* Crit W.S. (ft)          *  777.27  * Flow Area (sq ft)      *  641.82  * 3498.76  *  951.90  *
* E.G. Slope (ft/ft)      *0.000258  * Area (sq ft)           *  641.82  * 3498.76  * 9210.73  *
* Q Total (cfs)           *19700.00  * Flow (cfs)             *  645.27  *17982.72  * 1072.01  *
* Top Width (ft)          *  943.39  * Top Width (ft)         *   71.67  *  129.01  *  742.71  *
* Vel Total (ft/s)        *    3.87  * Avg. Vel. (ft/s)        *    1.01  *    5.14  *    1.13  *
* Max Chl Dpth (ft)       *   29.19  * Hydr. Depth (ft)        *    8.96  *   27.12  *   10.56  *
* Conv. Total (cfs)       *1227358.0  * Conv. (cfs)             * 40202.1  *1120368.0  * 66788.6  *
* Length Wtd. (ft)        *  899.41  * Wetted Per. (ft)        *   74.16  *  138.24  *   92.77  *
```

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* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.14  *    0.41  *    0.17  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *    0.14  *    2.09  *    0.19  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 2927.76  *11308.30  * 3827.76  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  350.30  *  540.90  *  445.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  800.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  800.45  * Reach Len. (ft)        * 1276.00  *  930.00  *  726.00  *
* Crit W.S. (ft)         *  779.76  * Flow Area (sq ft)      * 1958.29  * 4117.43  * 1453.61  *
* E.G. Slope (ft/ft)     *0.000276  * Area (sq ft)           * 1958.33  * 4117.43  *12962.62  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1376.84  *24424.48  * 1898.68  *
* Top Width (ft)         * 1358.49  * Top Width (ft)         *  406.71  *  129.01  *  822.77  *
* Vel Total (ft/s)       *    3.68  * Avg. Vel. (ft/s)       *    0.70  *    5.93  *    1.31  *
* Max Chl Dpth (ft)      *   33.99  * Hydr. Depth (ft)       *    4.84  *   31.92  *   12.47  *
* Conv. Total (cfs)      *1666744.0  * Conv. (cfs)           * 82846.0  *1469652.0  *114246.1  *
* Length Wtd. (ft)       *  897.47  * Wetted Per. (ft)       *  407.64  *  138.24  *  119.50  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.08  *    0.51  *    0.21  *
* Alpha                  *    2.30  * Stream Power (lb/ft s) *    0.06  *    3.05  *    0.27  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   * 5017.03  *13880.13  * 6548.50  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  681.67  *  568.83  *  853.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  804.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  803.83  * Reach Len. (ft)        * 1276.00  *  930.00  *  726.00  *
* Crit W.S. (ft)         *  781.39  * Flow Area (sq ft)      * 3344.69  * 4552.78  * 1846.99  *
* E.G. Slope (ft/ft)     *0.000249  * Area (sq ft)           * 3748.78  * 4552.78  *15786.94  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 3140.60  *27431.10  * 2688.30  *
* Top Width (ft)         * 1689.77  * Top Width (ft)         *  716.50  *  129.01  *  844.26  *
* Vel Total (ft/s)       *    3.41  * Avg. Vel. (ft/s)       *    0.94  *    6.03  *    1.46  *
* Max Chl Dpth (ft)      *   37.36  * Hydr. Depth (ft)       *    8.00  *   35.29  *   15.84  *
* Conv. Total (cfs)      *2106904.0  * Conv. (cfs)           *198946.1  *1737664.0  *170294.3  *
* Length Wtd. (ft)       *  902.78  * Wetted Per. (ft)       *  421.35  *  138.24  *  119.50  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.12  *    0.51  *    0.24  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    0.12  *    3.09  *    0.35  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 7256.67  *15425.59  * 9355.93  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  922.71  *  575.81  * 1245.91  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  807.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  806.94  * Reach Len. (ft)        * 1276.00  *  930.00  *  726.00  *
* Crit W.S. (ft)         *  783.15  * Flow Area (sq ft)      * 4665.94  * 4954.63  * 2210.09  *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           * 6163.50  * 4954.63  *18428.58  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 5226.52  *30385.41  * 3488.07  *
* Top Width (ft)         * 1803.72  * Top Width (ft)         *  822.81  *  129.01  *  851.89  *
* Vel Total (ft/s)       *    3.30  * Avg. Vel. (ft/s)       *    1.12  *    6.13  *    1.58  *
* Max Chl Dpth (ft)      *   40.48  * Hydr. Depth (ft)       *   10.93  *   38.41  *   18.96  *
* Conv. Total (cfs)      *2574551.0  * Conv. (cfs)           *344141.9  *2000737.0  *229672.7  *
* Length Wtd. (ft)       *  911.14  * Wetted Per. (ft)       *  430.42  *  138.24  *  119.50  *
* Min Ch El (ft)         *  766.46  * Shear (lb/sq ft)       *    0.16  *    0.52  *    0.27  *
* Alpha                  *    2.71  * Stream Power (lb/ft s) *    0.17  *    3.16  *    0.42  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 9298.29  *16446.62  *12030.67  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1089.23  *  576.71  * 1610.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	811.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.099	0.040	0.100
W.S. Elev (ft)	810.99	Reach Len. (ft)	1276.00	930.00	726.00
Crit W.S. (ft)	785.04	Flow Area (sq ft)	6395.57	5477.40	2682.45
E.G. Slope (ft/ft)	0.000207	Area (sq ft)	9770.34	5477.40	21900.75
Q Total (cfs)	47000.00	Flow (cfs)	8366.44	34064.57	4568.99
Top Width (ft)	2030.41	Top Width (ft)	1039.57	129.01	861.83
Vel Total (ft/s)	3.23	Avg. Vel. (ft/s)	1.31	6.22	1.70
Max Chl Dpth (ft)	44.53	Hydr. Depth (ft)	14.98	42.46	23.01
Conv. Total (cfs)	3262801.0	Conv. (cfs)	580808.8	2364807.0	317185.5
Length Wtd. (ft)	923.35	Wetted Per. (ft)	430.42	138.24	119.50
Min Ch El (ft)	766.46	Shear (lb/sq ft)	0.19	0.51	0.29
Alpha	2.74	Stream Power (lb/ft s)	0.25	3.19	0.50
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	13556.19	18006.06	16927.19
C & E Loss (ft)	0.01	Cum SA (acres)	1350.81	579.14	1987.19

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	797.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.100	0.040	0.100
W.S. Elev (ft)	797.33	Reach Len. (ft)	1276.00	930.00	726.00
Crit W.S. (ft)	777.60	Flow Area (sq ft)	846.18	3715.44	1109.43
E.G. Slope (ft/ft)	0.000229	Area (sq ft)	846.18	3715.44	10480.19
Q Total (cfs)	20700.00	Flow (cfs)	714.69	18747.69	1237.62
Top Width (ft)	1117.61	Top Width (ft)	218.83	129.01	769.76
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)	0.84	5.05	1.12
Max Chl Dpth (ft)	30.87	Hydr. Depth (ft)	3.87	28.80	11.36
Conv. Total (cfs)	1367346.0	Conv. (cfs)	47209.3	1238385.0	81751.5
Length Wtd. (ft)	897.76	Wetted Per. (ft)	221.46	138.24	100.46
Min Ch El (ft)	766.46	Shear (lb/sq ft)	0.05	0.38	0.16
Alpha	1.74	Stream Power (lb/ft s)	0.05	1.94	0.18
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	3536.12	12181.30	4594.40
C & E Loss (ft)	0.02	Cum SA (acres)	442.67	551.19	517.12

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 20.940

INPUT
Description: Ineffective are due to high ground D/S.
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	856.93	10.82	855.86	13.26	855.47	42.61	853.4	56.97	852.7
68.08	851.63	85.18	850.75	93.46	849.31	110.53	846.12	131.6	842.74
141.12	840.84	160.41	837.34	165.77	836.23	167.28	835.82	179.41	831.86
196.8	826.36	226.42	813.91	227.01	813.66	227.66	813.39	228.77	813.17
258.81	806.7	271.82	806	282.27	805.79	318.01	803.64	343.73	803.62
365.21	803.28	403.83	801.2	421.31	800.24	423.95	800.09	424.65	800.05
456.5	800.65	483.18	801.14	489.04	801.28	489.62	801.27	490.57	801.27
494.09	801.33	553.19	801.2	576.56	779.97	577.49	779.1	577.6	779
578.01	778.8	598.41	767.15	620	765.53	644.03	766.24	655.81	771.01
658.18	772.39	663.33	775.33	671.96	779.66	678.77	779.89	689.53	780.27
733.17	781.08	754.91	780.55	794.29	779.6	815.65	778.99	847.66	778.94
877.19	779.18	919.92	783.07	933.82	783.95	970.65	784.4	997.21	784.39
1013.31	784.38	1080.6	784.04	1109.08	783.92	1161.33	784.09	1202.1	784.56
1219.45	784.53	1226.91	784.62	1243.11	784.64	1301.84	783.94	1330.75	783.18
1357.8	782.53	1371.46	784.63	1382.08	785.9	1399.98	794.42	1403.3	795.97
1406.3	797.26	1409.88	798.78	1429.63	807.15	1433.32	807.61	1437.51	808.14
1441.05	808.13	1441.98	808.13	1445.8	808.13	1449.57	807.28	1453.45	806.38

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 1468.05  801.35 1475.16  798.86 1489.08   790.8 1499.65  784.53 1505.95  783.71
 1523.01  781.47 1552.68  780.86 1574.72  780.68 1590.86  780.87 1622.53  781.26
 1633.88  783.31 1644.63  786.22 1668.81  787.62  1672.8   787.4 1681.88  787.81
 1703.04  788.11 1708.33  788.15 1712.83     788 1730.09  787.26  1740.1  786.87
  1770.4  788.16 1791.01  788.94 1799.81  788.93 1809.83  789.66 1818.28  789.36
 1829.82  789.52 1843.74  789.95 1849.59  788.95 1854.25  788.49 1864.28  786.74
 1871.78  785.89 1880.45  784.79 1901.37  784.08 1913.29  783.18 1926.22  782.53
 1938.81  782.54  1949.1  782.51 1962.45  782.62 1975.15  782.45  1997.7  780.96
 1999.17  780.85 2009.93  775.76 2012.28  774.95 2018.87  777.84 2026.26  780.73
 2029.04  781.08 2043.02  783.21 2062.28   782.3 2079.28  781.53 2090.36  785.68
  2105.9  790.56 2119.54  797.98 2128.12  803.28 2133.57  803.62 2141.57  804.36
 2158.31  803.47 2164.84  803.13 2169.56  803.43 2174.73  803.72 2178.93  806.93
  2190.9   816.1 2202.48  832.97  2203.1  833.93 2205.45  834.37 2258.04  845.28
 2262.12  846.06 2299.79  854.83 2301.06  855.17 2332.94  860.27 2343.87  862.17
 2347.67  862.77 2364.25  864.96 2369.87  865.55 2380.36  866.55 2392.43  867.49
  2402.4  867.69 2416.76   866.7 2422.87  866.35

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0      .1   577.6     .04  671.96    .105 1429.63      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          577.6  671.96           975.76  907.93  397.18             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  938.95 2422.87     815       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  783.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  783.64  * Reach Len. (ft)        *  975.76  *  907.93  *  397.18  *
* Crit W.S. (ft)         *  773.99  * Flow Area (sq ft)      *   11.73  * 1328.04  *  883.01  *
* E.G. Slope (ft/ft)     *0.000489  * Area (sq ft)           *   11.73  * 1328.04  * 1560.11  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *    5.50  * 6090.58  *  628.92  *
* Top Width (ft)         *  714.32  * Top Width (ft)         *    5.08  *   94.36  *  614.88  *
* Vel Total (ft/s)       *    3.03  * Avg. Vel. (ft/s)       *    0.47  *    4.59  *    0.71  *
* Max Chl Dpth (ft)      *   18.11  * Hydr. Depth (ft)       *    2.31  *   14.07  *    3.44  *
* Conv. Total (cfs)      *304113.3  * Conv. (cfs)            *   248.6  *275424.1  * 28440.6  *
* Length Wtd. (ft)       *  876.53  * Wetted Per. (ft)       *    6.88  *  100.68  *  257.17  *
* Min Ch El (ft)         *  765.53  * Shear (lb/sq ft)       *    0.05  *    0.40  *    0.10  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    0.02  *    1.85  *    0.07  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *  747.11  * 6024.83  *  716.25  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  130.10  *  447.94  *  156.65  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  788.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  788.41  * Reach Len. (ft)        *  975.76  *  907.93  *  397.18  *
* Crit W.S. (ft)         *  777.26  * Flow Area (sq ft)      *   48.52  * 1778.65  * 2155.47  *
* E.G. Slope (ft/ft)     *0.000450  * Area (sq ft)           *   48.52  * 1778.65  * 6555.98  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *   35.08  * 9511.45  * 2603.47  *
* Top Width (ft)         * 1348.46  * Top Width (ft)         *   10.33  *   94.36  * 1243.76  *
* Vel Total (ft/s)       *    3.05  * Avg. Vel. (ft/s)       *    0.72  *    5.35  *    1.21  *
* Max Chl Dpth (ft)      *   22.88  * Hydr. Depth (ft)       *    4.70  *   18.85  *    8.07  *
* Conv. Total (cfs)      *572526.4  * Conv. (cfs)            *  1653.0  *448193.8  *122679.6  *
* Length Wtd. (ft)       *  828.96  * Wetted Per. (ft)       *   13.98  *  100.68  *  267.24  *
* Min Ch El (ft)         *  765.53  * Shear (lb/sq ft)       *    0.10  *    0.50  *    0.23  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    0.07  *    2.66  *    0.27  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 1418.11  * 7991.94  * 1547.68  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  183.63  *  487.73  *  232.04  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	791.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.100	0.040	0.105
W.S. Elev (ft)	791.54	Reach Len. (ft)	975.76	907.93	397.18
Crit W.S. (ft)	777.96	Flow Area (sq ft)	86.16	2073.26	2989.06
E.G. Slope (ft/ft)	0.000289	Area (sq ft)	86.16	2073.26	10650.75
Q Total (cfs)	13500.00	Flow (cfs)	60.45	9841.39	3598.16
Top Width (ft)	1449.97	Top Width (ft)	13.77	94.36	1341.84
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)	0.70	4.75	1.20
Max Chl Dpth (ft)	26.01	Hydr. Depth (ft)	6.26	21.97	11.20
Conv. Total (cfs)	793747.0	Conv. (cfs)	3554.5	578635.1	211557.4
Length Wtd. (ft)	807.88	Wetted Per. (ft)	18.62	100.68	267.24
Min Ch El (ft)	765.53	Shear (lb/sq ft)	0.08	0.37	0.20
Alpha	2.45	Stream Power (lb/ft s)	0.06	1.77	0.24
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	2014.18	9579.88	2384.03
C & E Loss (ft)	0.03	Cum SA (acres)	230.71	515.67	327.61

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	795.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.100	0.040	0.105
W.S. Elev (ft)	795.43	Reach Len. (ft)	975.76	907.93	397.18
Crit W.S. (ft)	781.82	Flow Area (sq ft)	148.17	2440.91	4029.33
E.G. Slope (ft/ft)	0.000312	Area (sq ft)	148.17	2440.91	15922.01
Q Total (cfs)	19700.00	Flow (cfs)	129.43	13421.36	6149.21
Top Width (ft)	1476.38	Top Width (ft)	18.06	94.36	1363.96
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	0.87	5.50	1.53
Max Chl Dpth (ft)	29.90	Hydr. Depth (ft)	8.20	25.87	15.09
Conv. Total (cfs)	1114909.0	Conv. (cfs)	7324.7	759573.5	348010.7
Length Wtd. (ft)	789.39	Wetted Per. (ft)	24.42	100.68	267.24
Min Ch El (ft)	765.53	Shear (lb/sq ft)	0.12	0.47	0.29
Alpha	2.41	Stream Power (lb/ft s)	0.10	2.60	0.45
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	2916.19	11244.90	3618.32
C & E Loss (ft)	0.04	Cum SA (acres)	348.99	538.52	427.91

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	800.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.100	0.040	0.105
W.S. Elev (ft)	800.25	Reach Len. (ft)	975.76	907.93	397.18
Crit W.S. (ft)	784.40	Flow Area (sq ft)	249.50	2895.88	5316.65
E.G. Slope (ft/ft)	0.000309	Area (sq ft)	249.50	2895.88	22567.17
Q Total (cfs)	27700.00	Flow (cfs)	255.87	17740.27	9703.86
Top Width (ft)	1525.54	Top Width (ft)	37.75	94.36	1393.44
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)	1.03	6.13	1.83
Max Chl Dpth (ft)	34.72	Hydr. Depth (ft)	6.61	30.69	19.91
Conv. Total (cfs)	1576895.0	Conv. (cfs)	14565.9	1009912.0	552417.7
Length Wtd. (ft)	773.52	Wetted Per. (ft)	45.97	100.68	267.24
Min Ch El (ft)	765.53	Shear (lb/sq ft)	0.10	0.55	0.38
Alpha	2.35	Stream Power (lb/ft s)	0.11	3.39	0.70
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	4984.69	13805.27	6252.42
C & E Loss (ft)	0.04	Cum SA (acres)	675.16	566.45	835.22

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	804.03	Element	Left OB	Channel	Right OB

```
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  803.62  * Reach Len. (ft)        *  975.76  *  907.93  *  397.18  *
* Crit W.S. (ft)         *  785.64  * Flow Area (sq ft)      *  790.71  * 3213.49  * 6215.31  *
* E.G. Slope (ft/ft)     *0.000293  * Area (sq ft)           *  790.71  * 3213.49  *27301.22  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             *  442.08  *20554.60  *12263.32  *
* Top Width (ft)         * 1767.05  * Top Width (ft)         *  233.82  *   94.36  * 1438.87  *
* Vel Total (ft/s)       *    3.25  * Avg. Vel. (ft/s)       *    0.56  *    6.40  *    1.97  *
* Max Chl Dpth (ft)      *   38.09  * Hydr. Depth (ft)       *    3.38  *   34.06  *   23.28  *
* Conv. Total (cfs)      *1943673.0  * Conv. (cfs)           * 25834.8  *1201185.0  *716653.3  *
* Length Wtd. (ft)       *  766.19  * Wetted Per. (ft)       *  242.51  *  100.68  *  267.24  *
* Min Ch El (ft)         *  765.53  * Shear (lb/sq ft)       *    0.06  *    0.58  *    0.43  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *    0.03  *    3.73  *    0.84  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 7190.19  *15342.68  * 8996.86  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  908.79  *  573.42  * 1226.88  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  807.16  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  806.73  * Reach Len. (ft)        *  975.76  *  907.93  *  397.18  *
* Crit W.S. (ft)         *  786.82  * Flow Area (sq ft)      * 1684.80  * 3507.36  * 7046.82  *
* E.G. Slope (ft/ft)     *0.000277  * Area (sq ft)           * 1684.80  * 3507.36  *31879.66  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 1241.89  *23145.09  *14713.03  *
* Top Width (ft)         * 1896.74  * Top Width (ft)         *  318.95  *   94.36  * 1483.44  *
* Vel Total (ft/s)       *    3.19  * Avg. Vel. (ft/s)       *    0.74  *    6.60  *    2.09  *
* Max Chl Dpth (ft)      *   41.20  * Hydr. Depth (ft)       *    5.28  *   37.17  *   26.39  *
* Conv. Total (cfs)      *2347835.0  * Conv. (cfs)           * 74571.4  *1389792.0  *883472.3  *
* Length Wtd. (ft)       *  762.94  * Wetted Per. (ft)       *  327.72  *  100.68  *  267.24  *
* Min Ch El (ft)         *  765.53  * Shear (lb/sq ft)       *    0.09  *    0.60  *    0.46  *
* Alpha                  *    2.69  * Stream Power (lb/ft s) *    0.07  *    3.98  *    0.95  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   * 9183.34  *16356.28  *11611.43  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         * 1072.50  *  574.32  * 1591.44  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  811.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  810.80  * Reach Len. (ft)        *  975.76  *  907.93  *  397.18  *
* Crit W.S. (ft)         *  788.22  * Flow Area (sq ft)      * 3019.31  * 3890.83  * 8131.84  *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           * 3019.31  * 3890.83  *37990.31  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 3009.87  *26201.91  *17788.22  *
* Top Width (ft)         * 1944.19  * Top Width (ft)         *  337.81  *   94.36  * 1512.02  *
* Vel Total (ft/s)       *    3.12  * Avg. Vel. (ft/s)       *    1.00  *    6.73  *    2.19  *
* Max Chl Dpth (ft)      *   45.27  * Hydr. Depth (ft)       *    8.94  *   41.23  *   30.46  *
* Conv. Total (cfs)      *2963588.0  * Conv. (cfs)           *189787.5  *1652163.0  *1121637.0  *
* Length Wtd. (ft)       *  761.55  * Wetted Per. (ft)       *  347.03  *  100.68  *  267.24  *
* Min Ch El (ft)         *  765.53  * Shear (lb/sq ft)       *    0.14  *    0.61  *    0.48  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    0.14  *    4.09  *    1.05  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *13368.86  *17906.05  *16428.10  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1330.64  *  576.76  * 1967.41  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  797.46  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.100  *   0.040  *   0.105  *
* W.S. Elev (ft)         *  797.16  * Reach Len. (ft)        *  975.76  *  907.93  *  397.18  *
* Crit W.S. (ft)         *  782.21  * Flow Area (sq ft)      *  180.93  * 2603.54  * 4489.48  *
* E.G. Slope (ft/ft)     *0.000265  * Area (sq ft)           *  180.93  * 2603.54  *18281.33  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *  155.57  *13763.00  * 6781.42  *
* Top Width (ft)         * 1488.33  * Top Width (ft)         *   19.96  *   94.36  * 1374.02  *
* Vel Total (ft/s)       *    2.85  * Avg. Vel. (ft/s)       *    0.86  *    5.29  *    1.51  *
* Max Chl Dpth (ft)      *   31.63  * Hydr. Depth (ft)       *    9.07  *   27.59  *   16.82  *
```

```
* Conv. Total (cfs)      *1272076.0  * Conv. (cfs)            *  9560.5  *845776.8  *416738.4  *
* Length Wtd. (ft)       *  782.93  * Wetted Per. (ft)        *   26.98  *  100.68  *  267.24  *
* Min Ch El (ft)         *  765.53  * Shear (lb/sq ft)        *    0.11  *    0.43  *    0.28  *
* Alpha                  *    2.39  * Stream Power (lb/ft s) *    0.10  *    2.26  *    0.42  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)    * 3521.08  *12113.84  * 4354.72  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *  439.17  *  548.81  *  499.25  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 20.768

INPUT
Description: Ineffective are due to high ground D/S.
Station Elevation Data    num=     206
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  865.19    9.34  864.48   21.01  863.21   35.99  861.36   53.76  858.89
   57.24   858.6   59.73  858.36   75.82  858.06  101.82  857.33   109.6  857.23
  119.37  857.41  128.52   856.5  134.21  855.83  140.56   854.1  152.49   852.8
  154.97  852.52  156.29  852.44   164.4  851.56  167.28  851.13  169.74  850.99
  170.06  850.98  186.05  849.93  202.32  848.38   211.1  848.99  214.78  849.37
  228.65  850.49  230.13  850.62   231.4  850.63  240.67  850.54  244.53  850.39
  259.75  850.14  261.64  849.95  263.88  849.68  269.88  848.97  272.31  848.97
  281.81  846.91  285.43  846.76  288.13  846.59  292.03  846.35  293.58  846.14
  300.91  846.04  306.61  845.78  309.88  845.17  312.27  844.66  313.66  844.72
  330.02  845.64  335.84  845.71  338.41  845.68  341.74  845.76  347.81  845.51
  353.39  845.52  361.22  845.54  384.47  845.64   390.5  845.67  401.34  845.74
  408.88   845.3  424.28  845.38  425.73  845.39  429.11  844.48  457.37  838.71
  471.87   838.6  480.77  839.46  495.78   838.4  513.32   837.1  521.58   836.2
  547.72  833.42  548.35  833.34  555.04  832.78  561.07  832.04  564.32  830.09
  572.38  829.64  574.47  830.52  577.58  829.12  582.31  824.67  584.09  823.15
  584.79  821.84  596.56  817.55  599.49  816.51  601.27  815.61   613.8  809.05
  633.28  800.92  633.49  800.82  669.18  796.41  675.82  795.66  679.64   793.8
  695.99  785.93   707.1     785  712.55   784.9  733.35  784.69  742.57  785.13
  751.05  784.74  761.78  785.07  769.29  785.03  779.86  778.37   786.8  773.25
  789.84  772.17  805.45  769.06  814.12  766.95  826.07  766.59     850  764.64
  884.43  764.96   884.9  764.95  886.18  764.89  887.15  764.87   890.2  767.13
  910.95  772.25  914.92  773.53  915.72  774.09  925.61  780.91  927.14     781
   981.7  781.01  991.14  780.93 1021.09  780.72 1046.37   780.7  1081.2  780.95
 1092.72  781.03 1103.36  781.06 1187.15  781.14 1275.11  779.21    1294  778.88
 1303.83  779.42 1337.54  782.02 1350.22  782.55 1380.75  783.09 1408.02  785.04
 1415.37  785.57 1420.18  785.74 1447.83  786.96 1475.66  787.78 1509.95  790.28
 1517.89  790.93 1524.98  790.36 1549.77  788.86 1560.86  788.64 1578.73  788.32
  1583.6  788.18 1601.95   785.9 1603.16  785.82 1616.61   786.9 1623.09  787.26
 1641.49   788.4 1642.77  788.64 1644.08  789.27 1669.36  801.89 1676.99  805.21
 1680.83  806.77 1684.03  807.27 1688.09  807.89 1691.67  807.89    1696  807.89
 1704.29   805.9 1704.74  805.79 1704.97  805.68  1725.5  795.84 1742.87  788.84
 1749.73  786.21 1758.29  784.57 1771.08   782.1 1791.01  781.05  1802.2  780.48
 1818.26  780.45 1876.95  780.18 1885.11   780.1 1887.29  780.52 1910.88  781.75
 1914.31   781.8 1938.67  781.95  1943.1  782.02 1948.16  782.32 1955.98  782.09
 1992.25  784.79 2027.35  787.46 2034.66  788.13 2066.22  796.17 2084.84  800.59
 2100.91  801.15  2116.8  801.53 2159.65  800.82 2165.27  800.61 2177.05  796.24
 2194.41  790.16 2199.33  788.49 2215.21  783.95 2254.18  782.86 2256.77  782.79
 2258.26  782.73 2268.89   782.7  2282.6  782.57 2315.93  782.32 2353.68  781.92
 2357.01  781.92 2370.75  783.76 2532.11  797.75 2546.76  805.46 2548.37  806.69
 2558.34  812.98 2581.63   827.6 2628.97  842.33 2642.99  845.28 2658.77  847.68
 2662.24   848.1 2673.53  849.14  2679.1  849.65 2687.71  850.49 2693.89  850.79
 2697.92  851.05

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************************
       0     .09  521.58      .1  769.29     .04  925.61     .09 1704.29      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        769.29  925.61           497.45  754.93  471.22              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1101.76 2697.92     814       F
```

```
CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  783.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.             *          *   0.040  *   0.090  *
* W.S. Elev (ft)         *  783.50  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  771.48  * Flow Area (sq ft)      *          * 2213.83  *  458.67  *
* E.G. Slope (ft/ft)     *0.000192  * Area (sq ft)           *          * 2213.83  * 1827.97  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)              *          * 6526.21  *  198.79  *
* Top Width (ft)         *  963.29  * Top Width (ft)         *          *  153.89  *  809.40  *
* Vel Total (ft/s)       *    2.52  * Avg. Vel. (ft/s)       *          *    2.95  *    0.43  *
* Max Chl Dpth (ft)      *   18.86  * Hydr. Depth (ft)       *          *   14.39  *    2.60  *
* Conv. Total (cfs)      *484871.7  * Conv. (cfs)            *          *470539.3  * 14332.4  *
* Length Wtd. (ft)       *  746.56  * Wetted Per. (ft)       *          *  161.76  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *          *    0.16  *    0.03  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *          *    0.48  *    0.01  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *  746.98  * 5987.91  *  700.80  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  130.04  *  445.35  *  150.16  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  788.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  788.28  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  773.87  * Flow Area (sq ft)      *  247.90  * 2960.02  * 1301.62  *
* E.G. Slope (ft/ft)     *0.000207  * Area (sq ft)           *  247.90  * 2960.02  * 6409.79  *
* Q Total (cfs)          *12150.00  * Flow (cfs)              *  113.84  *10862.67  * 1173.49  *
* Top Width (ft)         * 1364.96  * Top Width (ft)         *   78.19  *  156.32  * 1130.45  *
* Vel Total (ft/s)       *    2.69  * Avg. Vel. (ft/s)       *    0.46  *    3.67  *    0.90  *
* Max Chl Dpth (ft)      *   23.64  * Hydr. Depth (ft)       *    3.17  *   18.94  *    7.39  *
* Conv. Total (cfs)      *844095.8  * Conv. (cfs)            *  7908.9  *754661.2  * 81525.6  *
* Length Wtd. (ft)       *  723.94  * Wetted Per. (ft)       *   78.79  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.04  *    0.23  *    0.10  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.02  *    0.85  *    0.09  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 1414.79  * 7942.56  * 1488.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  182.63  *  485.12  *  221.22  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  791.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  791.46  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  774.37  * Flow Area (sq ft)      *  506.61  * 3456.31  * 1860.86  *
* E.G. Slope (ft/ft)     *0.000138  * Area (sq ft)           *  506.61  * 3456.31  *10327.33  *
* Q Total (cfs)          *13500.00  * Flow (cfs)              *  288.09  *11474.86  * 1737.05  *
* Top Width (ft)         * 1544.17  * Top Width (ft)         *   84.79  *  156.32  * 1303.06  *
* Vel Total (ft/s)       *    2.32  * Avg. Vel. (ft/s)       *    0.57  *    3.32  *    0.93  *
* Max Chl Dpth (ft)      *   26.82  * Hydr. Depth (ft)       *    5.98  *   22.11  *   10.56  *
* Conv. Total (cfs)      *1149567.0  * Conv. (cfs)            * 24532.0  *977119.7  *147914.8  *
* Length Wtd. (ft)       *  711.51  * Wetted Per. (ft)       *   86.11  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.05  *    0.18  *    0.09  *
* Alpha                  *    1.77  * Stream Power (lb/ft s) *    0.03  *    0.60  *    0.08  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 2007.55  * 9522.25  * 2288.39  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  229.61  *  513.06  *  315.55  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  795.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
```

```
* W.S. Elev (ft)         *  795.36  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  776.45  * Flow Area (sq ft)      *  852.95  * 4065.80  * 2547.67  *
* E.G. Slope (ft/ft)     *0.000154  * Area (sq ft)           *  852.95  * 4065.80  *15581.26  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *  680.04  *15917.15  * 3102.81  *
* Top Width (ft)         * 1641.13  * Top Width (ft)         *   92.85  *  156.32  * 1391.96  *
* Vel Total (ft/s)       *    2.64  * Avg. Vel. (ft/s)       *    0.80  *    3.91  *    1.22  *
* Max Chl Dpth (ft)      *   30.72  * Hydr. Depth (ft)       *    9.19  *   26.01  *   14.46  *
* Conv. Total (cfs)      *1585274.0  * Conv. (cfs)           * 54723.6  *1280865.0  *249685.4  *
* Length Wtd. (ft)       *  700.23  * Wetted Per. (ft)       *   95.07  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.09  *    0.24  *    0.14  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.07  *    0.93  *    0.17  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 2904.98  *11177.09  * 3474.69  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  347.74  *  535.91  *  415.35  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  800.43  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  800.19  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  778.77  * Flow Area (sq ft)      * 1390.08  * 4821.32  * 3399.03  *
* E.G. Slope (ft/ft)     *0.000158  * Area (sq ft)           * 1390.08  * 4821.32  *22543.78  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1239.26  *21386.70  * 5074.05  *
* Top Width (ft)         * 1764.47  * Top Width (ft)         *  130.71  *  156.32  * 1477.44  *
* Vel Total (ft/s)       *    2.88  * Avg. Vel. (ft/s)       *    0.89  *    4.44  *    1.49  *
* Max Chl Dpth (ft)      *   35.55  * Hydr. Depth (ft)       *   10.63  *   30.84  *   19.30  *
* Conv. Total (cfs)      *2203976.0  * Conv. (cfs)           * 98602.8  *1701652.0  *403721.0  *
* Length Wtd. (ft)       *  690.39  * Wetted Per. (ft)       *  133.28  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.10  *    0.29  *    0.19  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.09  *    1.28  *    0.28  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 4966.33  *13724.84  * 6046.76  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  673.27  *  563.83  *  822.13  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  803.83  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  803.57  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  780.21  * Flow Area (sq ft)      * 1856.29  * 5349.48  * 3994.19  *
* E.G. Slope (ft/ft)     *0.000151  * Area (sq ft)           * 1856.29  * 5349.48  *27776.65  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 1853.38  *24904.73  * 6501.89  *
* Top Width (ft)         * 1880.09  * Top Width (ft)         *  142.36  *  156.32  * 1581.41  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.00  *    4.66  *    1.63  *
* Max Chl Dpth (ft)      *   38.93  * Hydr. Depth (ft)       *   13.04  *   34.22  *   22.67  *
* Conv. Total (cfs)      *2702427.0  * Conv. (cfs)           *150589.9  *2023549.0  *528288.6  *
* Length Wtd. (ft)       *  684.67  * Wetted Per. (ft)       *  145.52  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.12  *    0.31  *    0.21  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.12  *    1.43  *    0.35  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 7160.54  *15253.44  * 8745.76  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  904.58  *  570.81  * 1213.11  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  806.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  806.68  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  782.47  * Flow Area (sq ft)      * 2311.01  * 5836.05  * 4542.48  *
* E.G. Slope (ft/ft)     *0.000149  * Area (sq ft)           * 2311.01  * 5836.05  *32729.95  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 2554.50  *28555.56  * 7989.94  *
* Top Width (ft)         * 1908.47  * Top Width (ft)         *  149.82  *  156.32  * 1602.34  *
* Vel Total (ft/s)       *    3.08  * Avg. Vel. (ft/s)       *    1.11  *    4.89  *    1.76  *
* Max Chl Dpth (ft)      *   42.04  * Hydr. Depth (ft)       *   15.43  *   37.33  *   25.79  *
```

```
* Conv. Total (cfs)      *3203400.0  * Conv. (cfs)            *209285.8  *2339511.0  *654602.7  *
* Length Wtd. (ft)       *  690.98  * Wetted Per. (ft)       *  153.60  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.14  *    0.33  *    0.24  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    0.15  *    1.61  *    0.42  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   * 9138.59  *16258.91  *11316.88  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1067.25  *  571.71  * 1577.37  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  811.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  810.74  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  784.30  * Flow Area (sq ft)      * 2937.15  * 6469.56  * 5256.36  *
* E.G. Slope (ft/ft)     *0.000144  * Area (sq ft)           * 2937.15  * 6469.56  *39302.12  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 3598.11  *33372.03  *10029.86  *
* Top Width (ft)         * 1944.20  * Top Width (ft)         *  158.71  *  156.32  * 1629.17  *
* Vel Total (ft/s)       *    3.21  * Avg. Vel. (ft/s)       *    1.23  *    5.16  *    1.91  *
* Max Chl Dpth (ft)      *   46.10  * Hydr. Depth (ft)       *   18.51  *   41.39  *   29.84  *
* Conv. Total (cfs)      *3912315.0  * Conv. (cfs)            *299509.4  *2777912.0  *834893.4  *
* Length Wtd. (ft)       *  680.07  * Wetted Per. (ft)       *  163.38  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.16  *    0.35  *    0.27  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.20  *    1.83  *    0.51  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *13302.15  *17798.08  *16075.72  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1325.07  *  574.15  * 1953.09  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  797.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.100  *   0.040  *   0.090  *
* W.S. Elev (ft)         *  797.10  * Reach Len. (ft)        *  497.45  *  754.93  *  471.22  *
* Crit W.S. (ft)         *  776.76  * Flow Area (sq ft)      * 1024.23  * 4337.44  * 2853.77  *
* E.G. Slope (ft/ft)     *0.000133  * Area (sq ft)           * 1024.23  * 4337.44  *18034.29  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *  785.53  *16438.56  * 3475.90  *
* Top Width (ft)         * 1693.19  * Top Width (ft)         *  105.66  *  156.32  * 1431.21  *
* Vel Total (ft/s)       *    2.52  * Avg. Vel. (ft/s)       *    0.77  *    3.79  *    1.22  *
* Max Chl Dpth (ft)      *   32.46  * Hydr. Depth (ft)       *    9.69  *   27.75  *   16.20  *
* Conv. Total (cfs)      *1796481.0  * Conv. (cfs)            * 68173.7  *1426646.0  *301661.6  *
* Length Wtd. (ft)       *  696.30  * Wetted Per. (ft)       *  108.04  *  164.63  *  176.16  *
* Min Ch El (ft)         *  764.64  * Shear (lb/sq ft)       *    0.08  *    0.22  *    0.13  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    0.06  *    0.83  *    0.16  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 3507.58  *12041.51  * 4189.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  437.77  *  546.20  *  486.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 20.625

INPUT
Description: Ineffective are due to high ground D/S.
Station Elevation Data    num=     201
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   843.94     7.47   844.23    14.97    844.3    17.7   844.24    28.35   844.23
   37.91   844.23    42.43   844.28    46.72   844.42   49.65   844.34    61.52   844.44
   69.75   844.24    75.82   844.18    78.49   844.24   82.23   844.55    92.74   845.78
   95.66   845.89   100.82   846.02   102.58    845.9  109.43   845.76    120.3    845.6
  122.96   845.47   155.42   843.78   158.85   843.53  159.88   843.47   160.75   843.41
  164.12   843.14   178.75   841.51   183.27    841.7  188.16   842.12   191.14   842.01
```

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  197.16  842.45  203.07  842.95   205.1  843.14   210.8  843.35  218.93  843.25
  231.28   843.1  244.01  841.75  252.01  840.41  259.31  839.31  273.11  836.79
   276.5  836.11  282.21   835.3   291.6  829.61  294.17  826.13  306.52  822.14
  311.95  820.36  318.17  817.35  323.17  813.89  327.41  811.87  342.07  806.42
  347.45  804.33   367.6  796.83  376.56  795.69  400.48  793.41  411.41  789.98
  427.39  784.96  447.75     784  460.26  783.46  466.67  783.24  508.72  781.94
  522.93  781.38   529.5  781.16  577.72  780.49  582.05  780.43  583.94   780.5
  586.55  780.54  589.71  780.56  631.32  781.19  648.72  781.03  668.25  781.06
  673.04  780.86  679.64  780.43  688.73  780.12  698.73  779.64  724.27  779.68
  724.48  779.69  724.65  779.69   789.4  780.98  799.99  780.88  827.49  781.29
  849.36  781.43  866.48  780.46  866.53  780.46  883.25  780.72  885.59  780.61
  893.83  779.08  896.37  778.36     910     773     920     765     950   763.9
     980     765     990     773 1003.64  779.14  1006.6  783.31  1007.8   783.3
  1028.3   783.1 1095.61  783.08 1107.47  783.03 1110.65  782.95 1136.73  781.94
 1138.42  781.89 1141.25  782.73 1170.21  790.62 1191.85  801.02 1203.95  807.21
 1209.19  807.68 1211.87  807.95 1214.67  807.95 1220.06  807.94 1227.11  807.33
 1227.75  807.27 1230.04  806.27 1248.02  798.55 1254.17  795.86 1268.62  790.12
  1280.8  785.34 1304.28  781.63 1305.38  781.45  1307.1  781.46 1308.27  781.46
 1310.61  781.48 1375.47  780.98 1384.25  781.32 1401.35  781.76 1412.31  783.89
 1427.58  787.02 1440.55  786.52 1460.72  787.05 1470.37  786.98 1479.12   786.8
 1523.24  785.87 1545.62  785.61 1577.32     785 1586.15  784.63  1612.7  783.39
 1698.63  779.46 1725.15  780.08  1732.4  780.32 1755.91  784.76 1816.56  797.65
  1845.7  801.57 1847.36  801.82 1849.08  801.78 1863.83   801.6 1881.93  801.83
 1914.45  802.35 1921.39  802.38  1958.2  802.56 1969.27  802.38 1978.05   802.2
 1996.24     802 2010.42  802.38 2021.15  802.16  2052.5  800.01 2055.66  799.14
  2056.6  798.82 2058.58  798.32 2066.76  795.05 2082.48  790.76 2096.06  785.94
 2135.91  784.21 2151.93  783.47 2154.29  783.55  2188.2  783.86 2210.31  788.02
 2242.51  793.99 2258.04   796.8 2280.94  787.28 2285.96  786.59 2302.72  784.42
 2318.92  784.07 2345.87  784.45 2368.37  784.52 2387.43  784.72 2399.85  784.87
 2414.01  785.44 2428.21  785.36 2438.98  785.88 2461.44  786.73 2481.55  794.36
 2490.65  797.85 2495.82   799.4 2511.66  806.32 2539.49  818.12 2540.54  818.53
 2540.87  818.69 2570.38   828.9 2571.72  829.27 2573.58  829.88 2589.13  833.72
  2604.5  837.52 2606.42     838 2630.83  841.12  2645.7  842.55 2654.27  844.22
 2677.06  848.08 2678.17  848.23  2678.9  848.34 2699.94  851.27 2714.31  852.13
 2716.45  852.32

Manning's n Values         num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0      .1  883.25     .04  1006.6      .1 1849.08     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        883.25  1006.6           264.51  400.04  304.15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  719.72     805       T
 1060.13 2716.45     813       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    1850    1900     810    1950    2000     810

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  783.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  783.19  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)         *  771.50  * Flow Area (sq ft)      *  406.19  * 1658.42  *    3.46  *
* E.G. Slope (ft/ft)     *0.000388  * Area (sq ft)           *  947.98  * 1658.42  *  517.47  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  218.03  * 6506.78  *    0.19  *
* Top Width (ft)         *  907.05  * Top Width (ft)         *  414.99  *  123.27  *  368.80  *
* Vel Total (ft/s)       *    3.25  * Avg. Vel. (ft/s)       *    0.54  *    3.92  *    0.06  *
* Max Chl Dpth (ft)      *   19.29  * Hydr. Depth (ft)       *    2.48  *   13.45  *    0.08  *
* Conv. Total (cfs)      *341380.1  * Conv. (cfs)            * 11067.7  *330302.5  *     9.9  *
* Length Wtd. (ft)       *  395.04  * Wetted Per. (ft)       *  163.58  *  133.59  *   41.13  *
* Min Ch El (ft)         *  763.90  * Shear (lb/sq ft)       *    0.06  *    0.30  *    0.00  *
* Alpha                  *    1.41  * Stream Power (lb/ft s) *    0.03  *    1.18  *    0.00  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  741.56  * 5954.36  *  688.12  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  127.67  *  442.95  *  143.79  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  788.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.31  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  787.95  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)          *  774.75  * Flow Area (sq ft)      * 1185.08  * 2245.93  *  257.68  *
* E.G. Slope (ft/ft)      *0.000379  * Area (sq ft)           * 3099.45  * 2245.93  * 3871.51  *
* Q Total (cfs)           *12150.00  * Flow (cfs)             * 1283.79  *10653.67  *  212.54  *
* Top Width (ft)          * 1544.28  * Top Width (ft)         *  465.39  *  123.35  *  955.54  *
* Vel Total (ft/s)        *    3.29  * Avg. Vel. (ft/s)       *    1.08  *    4.74  *    0.82  *
* Max Chl Dpth (ft)       *   24.05  * Hydr. Depth (ft)       *    7.25  *   18.21  *    4.81  *
* Conv. Total (cfs)       *623987.7  * Conv. (cfs)            * 65931.6  *547140.4  * 10915.6  *
* Length Wtd. (ft)        *  382.53  * Wetted Per. (ft)       *  163.58  *  133.73  *   53.53  *
* Min Ch El (ft)          *  763.90  * Shear (lb/sq ft)       *    0.17  *    0.40  *    0.11  *
* Alpha                   *    1.83  * Stream Power (lb/ft s) *    0.19  *    1.89  *    0.09  *
* Frctn Loss (ft)         *    0.14  * Cum Volume (acre-ft)   * 1395.68  * 7897.44  * 1432.96  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  179.53  *  482.69  *  209.94  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  791.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.23  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  791.24  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)          *  775.46  * Flow Area (sq ft)      * 1722.23  * 2651.10  *  433.51  *
* E.G. Slope (ft/ft)      *0.000241  * Area (sq ft)           * 4645.30  * 2651.10  * 7140.38  *
* Q Total (cfs)           *13500.00  * Flow (cfs)             * 1907.00  *11190.04  *  402.97  *
* Top Width (ft)          * 1633.53  * Top Width (ft)         *  475.85  *  123.35  * 1034.33  *
* Vel Total (ft/s)        *    2.81  * Avg. Vel. (ft/s)       *    1.11  *    4.22  *    0.93  *
* Max Chl Dpth (ft)       *   27.34  * Hydr. Depth (ft)       *   10.53  *   21.49  *    8.10  *
* Conv. Total (cfs)       *870264.8  * Conv. (cfs)            *122932.6  *721355.3  * 25976.9  *
* Length Wtd. (ft)        *  376.16  * Wetted Per. (ft)       *  163.58  *  133.73  *   53.53  *
* Min Ch El (ft)          *  763.90  * Shear (lb/sq ft)       *    0.16  *    0.30  *    0.12  *
* Alpha                   *    1.90  * Stream Power (lb/ft s) *    0.18  *    1.26  *    0.11  *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)   * 1978.13  * 9469.33  * 2193.91  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  226.41  *  510.64  *  302.91  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)          *  795.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.31  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  795.10  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)          *  778.30  * Flow Area (sq ft)      * 2353.14  * 3126.99  *  640.03  *
* E.G. Slope (ft/ft)      *0.000267  * Area (sq ft)           * 6515.25  * 3126.99  *11305.10  *
* Q Total (cfs)           *19700.00  * Flow (cfs)             * 3377.33  *15510.64  *  812.03  *
* Top Width (ft)          * 1748.51  * Top Width (ft)         *  500.46  *  123.35  * 1124.69  *
* Vel Total (ft/s)        *    3.22  * Avg. Vel. (ft/s)       *    1.44  *    4.96  *    1.27  *
* Max Chl Dpth (ft)       *   31.20  * Hydr. Depth (ft)       *   14.39  *   25.35  *   11.96  *
* Conv. Total (cfs)       *1206385.0  * Conv. (cfs)           *206820.1  *949837.9  * 49726.8  *
* Length Wtd. (ft)        *  370.43  * Wetted Per. (ft)       *  163.58  *  133.73  *   53.53  *
* Min Ch El (ft)          *  763.90  * Shear (lb/sq ft)       *    0.24  *    0.39  *    0.20  *
* Alpha                   *    1.91  * Stream Power (lb/ft s) *    0.34  *    1.93  *    0.25  *
* Frctn Loss (ft)         *    0.09  * Cum Volume (acre-ft)   * 2862.90  *11114.76  * 3329.27  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  344.36  *  533.48  *  401.74  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  800.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.38  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  799.91  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)          *  782.18  * Flow Area (sq ft)      * 3139.62  * 3720.22  *  897.48  *
* E.G. Slope (ft/ft)      *0.000268  * Area (sq ft)           * 8995.65  * 3720.22  *16942.27  *
* Q Total (cfs)           *27700.00  * Flow (cfs)             * 5479.66  *20789.00  * 1431.33  *
```

```
* Top Width (ft)          * 1862.76  * Top Width (ft)          *  523.91  *  123.35  * 1215.50  *
* Vel Total (ft/s)        *    3.57  * Avg. Vel. (ft/s)        *    1.75  *    5.59  *    1.59  *
* Max Chl Dpth (ft)       *   36.01  * Hydr. Depth (ft)        *   19.20  *   30.16  *   16.77  *
* Conv. Total (cfs)       *1690574.0  * Conv. (cfs)            *334432.5  *1268785.0  * 87356.5  *
* Length Wtd. (ft)        *  364.91  * Wetted Per. (ft)        *  163.58  *  133.73  *   53.53  *
* Min Ch El (ft)          *  763.90  * Shear (lb/sq ft)        *    0.32  *    0.47  *    0.28  *
* Alpha                   *    1.90  * Stream Power (lb/ft s) *    0.56  *    2.61  *    0.45  *
* Frctn Loss (ft)         *    0.09  * Cum Volume (acre-ft)   * 4907.03  *13650.83  * 5833.18  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  669.53  *  561.41  *  807.56  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)          *  803.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.41  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  803.28  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)          *  783.88  * Flow Area (sq ft)      * 3690.73  * 4135.93  * 1077.88  *
* E.G. Slope (ft/ft)      *0.000258  * Area (sq ft)           *10776.56  * 4135.93  *21250.84  *
* Q Total (cfs)           *33260.00  * Flow (cfs)             * 7035.19  *24320.30  * 1904.50  *
* Top Width (ft)          * 2013.66  * Top Width (ft)         *  532.97  *  123.35  * 1357.34  *
* Vel Total (ft/s)        *    3.74  * Avg. Vel. (ft/s)        *    1.91  *    5.88  *    1.77  *
* Max Chl Dpth (ft)       *   39.38  * Hydr. Depth (ft)        *   22.57  *   33.53  *   20.14  *
* Conv. Total (cfs)       *2070211.0  * Conv. (cfs)            *437893.3  *1513775.0  *118542.4  *
* Length Wtd. (ft)        *  362.05  * Wetted Per. (ft)        *  163.58  *  133.73  *   53.53  *
* Min Ch El (ft)          *  763.90  * Shear (lb/sq ft)        *    0.36  *    0.50  *    0.32  *
* Alpha                   *    1.88  * Stream Power (lb/ft s) *    0.69  *    2.93  *    0.57  *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)   * 7088.41  *15171.25  * 8480.58  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  900.72  *  568.39  * 1197.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)          *  806.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.61  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  806.18  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)          *  785.25  * Flow Area (sq ft)      * 4605.01  * 4493.52  * 1233.06  *
* E.G. Slope (ft/ft)      *0.000324  * Area (sq ft)           *12332.72  * 4493.52  *25213.36  *
* Q Total (cfs)           *39100.00  * Flow (cfs)             * 5120.10  *31308.09  * 2671.81  *
* Top Width (ft)          * 2040.29  * Top Width (ft)         *  540.55  *  123.35  * 1376.39  *
* Vel Total (ft/s)        *    3.78  * Avg. Vel. (ft/s)        *    1.11  *    6.97  *    2.17  *
* Max Chl Dpth (ft)       *   42.27  * Hydr. Depth (ft)        *    8.52  *   36.43  *   23.03  *
* Conv. Total (cfs)       *2170721.0  * Conv. (cfs)            *284253.3  *1738136.0  *148331.0  *
* Length Wtd. (ft)        *  365.76  * Wetted Per. (ft)        *  543.89  *  133.73  *   53.53  *
* Min Ch El (ft)          *  763.90  * Shear (lb/sq ft)        *    0.17  *    0.68  *    0.47  *
* Alpha                   *    2.75  * Stream Power (lb/ft s) *    0.19  *    4.74  *    1.01  *
* Frctn Loss (ft)         *    0.09  * Cum Volume (acre-ft)   * 9054.97  *16169.40  *11003.47  *
* C & E Loss (ft)         *    0.08  * Cum SA (acres)         * 1063.31  *  569.29  * 1561.26  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)          *  810.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.56  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  810.33  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)          *  786.79  * Flow Area (sq ft)      * 6871.44  * 5005.49  * 1455.24  *
* E.G. Slope (ft/ft)      *0.000277  * Area (sq ft)           *14599.37  * 5005.49  *31057.62  *
* Q Total (cfs)           *47000.00  * Flow (cfs)             * 9092.45  *34651.52  * 3256.02  *
* Top Width (ft)          * 2189.54  * Top Width (ft)         *  551.69  *  123.35  * 1514.51  *
* Vel Total (ft/s)        *    3.53  * Avg. Vel. (ft/s)        *    1.32  *    6.92  *    2.24  *
* Max Chl Dpth (ft)       *   46.43  * Hydr. Depth (ft)        *   12.46  *   40.58  *   27.19  *
* Conv. Total (cfs)       *2822018.0  * Conv. (cfs)            *545937.6  *2080579.0  *195501.2  *
* Length Wtd. (ft)        *  360.12  * Wetted Per. (ft)        *  555.77  *  133.73  *   53.53  *
* Min Ch El (ft)          *  763.90  * Shear (lb/sq ft)        *    0.21  *    0.65  *    0.47  *
* Alpha                   *    2.90  * Stream Power (lb/ft s) *    0.28  *    4.49  *    1.05  *
```

```
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *13202.02  *17698.64  *15695.16  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1321.02  *  571.72  * 1936.08  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  797.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  796.87  * Reach Len. (ft)        *  264.51  *  400.04  *  304.15  *
* Crit W.S. (ft)         *  778.72  * Flow Area (sq ft)      * 2642.85  * 3345.51  *  734.86  *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           * 7416.51  * 3345.51  *13332.54  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 3773.93  *15984.69  *  941.37  *
* Top Width (ft)         * 1802.61  * Top Width (ft)         *  515.75  *  123.35  * 1163.51  *
* Vel Total (ft/s)       *    3.08  * Avg. Vel. (ft/s)       *    1.43  *    4.78  *    1.28  *
* Max Chl Dpth (ft)      *   32.97  * Hydr. Depth (ft)       *   16.16  *   27.12  *   13.73  *
* Conv. Total (cfs)      *1376608.0  * Conv. (cfs)           *250977.3  *1063027.0  * 62603.9  *
* Length Wtd. (ft)       *  368.15  * Wetted Per. (ft)       *  163.58  *  133.73  *   53.53  *
* Min Ch El (ft)         *  763.90  * Shear (lb/sq ft)       *    0.23  *    0.35  *    0.19  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.33  *    1.69  *    0.25  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 3459.38  *11974.93  * 4019.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  434.22  *  543.77  *  472.43  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 20.549

INPUT
Description: Ineffective are due to high ground D/S.
Station Elevation Data    num=     175
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   860.16    19.39   860.29    25.7   859.92    34.08   859.05    34.37   859.03
   34.57   859.01    39.28   858.38   44.16   857.88    51.28   856.74    58.14   855.65
   59.07   855.53    63.75   854.21   64.33   854.18    74.72   853.95    86.49   853.51
   88.59   853.46    88.98   853.47   97.15   853.03   111.89   852.04   119.12   851.67
  126.06   851.29   129.97   851.23  143.08   850.68   151.04   850.36   156.99   849.97
  157.63   849.93   158.92   849.75  161.17   849.36   191.71   844.53    193.1   844.28
  193.84   844.15   200.17   843.33  221.36   840.33   225.36   839.73   226.47   839.55
  228.81   838.98   239.95   835.43   243.4   833.88   254.77   828.95   260.76   827.43
  267.69   825.14    272.6   825.91  277.15   826.71   280.85   824.22   285.74   821.08
  286.87   819.42   290.62   816.91  297.88   808.85   307.42   802.38   316.61   797.29
   324.5   792.76   334.47   791.93  359.38    790.5   364.24   788.88   384.04   782.15
  384.98   782.09   410.26   780.02  418.16   779.64   426.39   779.67   457.03   779.62
  466.04   779.58   468.17    779.6  470.64   779.65   509.93   779.32   521.56   777.35
     535      773      545      765     575    763.5      605      765      615      773
  634.68   779.84   636.59   781.14  637.61   781.19   678.29   782.63    692.3   782.92
  693.11   782.95   693.66   782.96  694.22   782.96   696.66   782.97   773.37   782.86
  809.77    783.3   840.75   783.19  898.62   782.84   910.74   783.21   927.23   782.83
  943.95   782.79   956.14   783.19  972.89    784.2  1006.33   785.59  1014.48    785.8
 1016.65   785.85  1018.44   786.06 1019.54   786.46  1053.98   798.79  1072.82   806.99
 1076.37    807.4  1081.34   807.98  1083.1   807.98  1089.57   807.98   1092.5   807.55
  1097.2   806.86  1108.91   802.16 1122.29   794.14  1221.96   780.93  1266.78   782.89
 1278.24   783.43  1289.82    783.2 1300.38   783.13  1314.27   783.75  1322.05   784.14
 1335.42   783.93   1353.4   783.78 1363.77   783.95  1399.22   783.97   1408.6    783.9
 1435.04   783.47   1453.2   782.93 1459.76   783.14  1464.72   783.08  1475.77   782.84
 1493.02   781.98  1561.34    779.8 1574.35   781.13  1589.38   782.14  1625.29   789.82
 1665.33   794.76  1682.21   797.73 1693.74   799.69  1699.02   799.72  1730.62   800.16
 1750.17   800.29  1818.71   800.82 1830.02   800.96  1837.24   800.96  1839.43   800.98
 1841.08   800.95  1854.96   801.08 1963.15   802.19  2022.68   801.53  2054.96   801.12
 2055.05   801.08   2075.2    791.9 2084.56   791.52  2100.36   791.48  2164.12   790.48
 2204.66   789.83  2213.88   789.63 2228.13   789.53  2284.18   797.82  2292.15   799.57
 2301.64   799.67  2335.69   799.68 2356.76   800.57   2368.8    801.1  2377.75   808.72
 2381.51   811.74  2388.75   816.33 2389.12   816.51  2415.92   830.34  2427.36   834.98
 2444.27   838.24  2462.69   842.06  2475.5   846.56  2487.49   850.57  2507.64   857.83
 2513.25    859.7  2516.93   860.36 2522.95   861.15  2551.54   865.09  2573.08   867.56
 2577.64   868.03  2581.12   868.26 2588.72    868.4  2617.27   868.67  2622.66   868.47
```

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0      .1  521.56     .04  634.68      .1 1750.17     .06 2100.36      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        521.56  634.68          1068.21  790.37  448.77             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  806.23 2622.66     812       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
    1700    1750     810    1800    1850     810

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  783.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.23  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  783.05  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)          *  771.33  * Flow Area (sq ft)      *  451.92  * 1645.23  *   69.18  *
* E.G. Slope (ft/ft)      *0.000341  * Area (sq ft)           *  451.92  * 1645.23  *  364.68  *
* Q Total (cfs)           * 6725.00  * Flow (cfs)             *  270.18  * 6443.72  *   11.10  *
* Top Width (ft)          *  682.64  * Top Width (ft)         *  140.17  *  113.12  *  429.35  *
* Vel Total (ft/s)        *    3.10  * Avg. Vel. (ft/s)       *    0.60  *    3.92  *    0.16  *
* Max Chl Dpth (ft)       *   19.55  * Hydr. Depth (ft)       *    3.22  *   14.54  *    0.45  *
* Conv. Total (cfs)       *364073.3  * Conv. (cfs)            * 14627.0  *348845.4  *   600.9  *
* Length Wtd. (ft)        *  796.66  * Wetted Per. (ft)       *  140.58  *  120.65  *  154.78  *
* Min Ch El (ft)          *  763.50  * Shear (lb/sq ft)       *    0.07  *    0.29  *    0.01  *
* Alpha                   *    1.53  * Stream Power (lb/ft s) *    0.04  *    1.14  *    0.00  *
* Frctn Loss (ft)         *    0.14  * Cum Volume (acre-ft)   *  737.31  * 5939.19  *  685.04  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *  125.99  *  441.87  *  141.00  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  788.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  787.83  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)          *  774.64  * Flow Area (sq ft)      * 1155.87  * 2186.20  *  887.78  *
* E.G. Slope (ft/ft)      *0.000334  * Area (sq ft)           * 1155.87  * 2186.20  * 3965.79  *
* Q Total (cfs)           *12150.00  * Flow (cfs)             * 1195.32  *10234.91  *  719.77  *
* Top Width (ft)          * 1102.15  * Top Width (ft)         *  154.24  *  113.12  *  834.79  *
* Vel Total (ft/s)        *    2.87  * Avg. Vel. (ft/s)       *    1.03  *    4.68  *    0.81  *
* Max Chl Dpth (ft)       *   24.33  * Hydr. Depth (ft)       *    7.49  *   19.33  *    5.18  *
* Conv. Total (cfs)       *665113.1  * Conv. (cfs)            * 65433.9  *560277.4  * 39401.7  *
* Length Wtd. (ft)        *  795.14  * Wetted Per. (ft)       *  155.44  *  120.65  *  171.98  *
* Min Ch El (ft)          *  763.50  * Shear (lb/sq ft)       *    0.15  *    0.38  *    0.11  *
* Alpha                   *    2.26  * Stream Power (lb/ft s) *    0.16  *    1.77  *    0.09  *
* Frctn Loss (ft)         *    0.17  * Cum Volume (acre-ft)   * 1382.76  * 7877.09  * 1405.60  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  177.65  *  481.61  *  203.68  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)          *  791.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.21  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)          *  791.17  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)          *  775.33  * Flow Area (sq ft)      * 1690.73  * 2563.96  * 1460.67  *
* E.G. Slope (ft/ft)      *0.000209  * Area (sq ft)           * 1690.73  * 2563.96  * 6941.88  *
* Q Total (cfs)           *13500.00  * Flow (cfs)             * 1642.44  *10552.83  * 1304.73  *
* Top Width (ft)          * 1295.72  * Top Width (ft)         *  173.87  *  113.12  * 1008.73  *
* Vel Total (ft/s)        *    2.36  * Avg. Vel. (ft/s)       *    0.97  *    4.12  *    0.89  *
```

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* Max Chl Dpth (ft)      *   27.67  * Hydr. Depth (ft)       *    9.72  *   22.67  *    8.51  *
* Conv. Total (cfs)      *934840.1  * Conv. (cfs)            *113734.7  *730756.3  * 90349.1  *
* Length Wtd. (ft)       *  791.99  * Wetted Per. (ft)       *  175.53  *  120.65  *  171.98  *
* Min Ch El (ft)         *  763.50  * Shear (lb/sq ft)       *    0.13  *    0.28  *    0.11  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.12  *    1.14  *    0.10  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 1958.89  * 9445.38  * 2144.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  224.43  *  509.55  *  295.78  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  795.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  795.04  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)         *  778.15  * Flow Area (sq ft)      * 2440.45  * 3001.34  * 2123.96  *
* E.G. Slope (ft/ft)     *0.000227  * Area (sq ft)           * 2440.45  * 3001.34  *11199.00  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 2861.12  *14300.84  * 2538.04  *
* Top Width (ft)         * 1466.13  * Top Width (ft)         *  201.03  *  113.12  * 1151.99  *
* Vel Total (ft/s)       *    2.60  * Avg. Vel. (ft/s)       *    1.17  *    4.76  *    1.19  *
* Max Chl Dpth (ft)      *   31.54  * Hydr. Depth (ft)       *   12.14  *   26.53  *   12.38  *
* Conv. Total (cfs)      *1308827.0  * Conv. (cfs)            *190086.7  *950118.1  *168622.2  *
* Length Wtd. (ft)       *  789.51  * Wetted Per. (ft)       *  203.35  *  120.65  *  171.98  *
* Min Ch El (ft)         *  763.50  * Shear (lb/sq ft)       *    0.17  *    0.35  *    0.17  *
* Alpha                  *    2.49  * Stream Power (lb/ft s) *    0.20  *    1.68  *    0.21  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 2835.71  *11086.62  * 3250.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  342.23  *  532.40  *  393.79  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  800.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  799.87  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)         *  781.54  * Flow Area (sq ft)      * 3433.22  * 3548.40  * 2953.60  *
* E.G. Slope (ft/ft)     *0.000219  * Area (sq ft)           * 3433.22  * 3548.40  *16999.36  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 4810.04  *18570.42  * 4319.54  *
* Top Width (ft)         * 1614.37  * Top Width (ft)         *  209.61  *  113.12  * 1291.64  *
* Vel Total (ft/s)       *    2.79  * Avg. Vel. (ft/s)       *    1.40  *    5.23  *    1.46  *
* Max Chl Dpth (ft)      *   36.37  * Hydr. Depth (ft)       *   16.38  *   31.37  *   17.22  *
* Conv. Total (cfs)      *1873405.0  * Conv. (cfs)            *325312.2  *1255954.0  *292139.0  *
* Length Wtd. (ft)       *  788.75  * Wetted Per. (ft)       *  213.20  *  120.65  *  171.98  *
* Min Ch El (ft)         *  763.50  * Shear (lb/sq ft)       *    0.22  *    0.40  *    0.23  *
* Alpha                  *    2.45  * Stream Power (lb/ft s) *    0.31  *    2.10  *    0.34  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   * 4869.29  *13617.45  * 5714.69  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  667.31  *  560.32  *  798.81  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  803.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.              *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  803.26  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)         *  783.78  * Flow Area (sq ft)      * 4153.97  * 3931.83  * 3535.08  *
* E.G. Slope (ft/ft)     *0.000205  * Area (sq ft)           * 4153.97  * 3931.83  *21962.70  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 6269.87  *21344.51  * 5645.62  *
* Top Width (ft)         * 1923.32  * Top Width (ft)         *  215.44  *  113.12  * 1594.76  *
* Vel Total (ft/s)       *    2.86  * Avg. Vel. (ft/s)       *    1.51  *    5.43  *    1.60  *
* Max Chl Dpth (ft)      *   39.76  * Hydr. Depth (ft)       *   19.28  *   34.76  *   20.61  *
* Conv. Total (cfs)      *2322096.0  * Conv. (cfs)            *437740.4  *1490199.0  *394157.3  *
* Length Wtd. (ft)       *  789.45  * Wetted Per. (ft)       *  219.95  *  120.65  *  171.98  *
* Min Ch El (ft)         *  763.50  * Shear (lb/sq ft)       *    0.24  *    0.42  *    0.26  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.37  *    2.27  *    0.42  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   * 7043.07  *15134.20  * 8329.72  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  898.45  *  567.30  * 1186.91  *
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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  806.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  806.28  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)         *  785.25  * Flow Area (sq ft)      * 4810.91  * 4273.23  * 4052.83  *
* E.G. Slope (ft/ft)     *0.000201  * Area (sq ft)           * 4810.91  * 4273.23  *26802.94  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 7801.96  *24278.49  * 7019.55  *
* Top Width (ft)         * 1945.77  * Top Width (ft)         *  219.89  *  113.12  * 1612.76  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)       *    1.62  *    5.68  *    1.73  *
* Max Chl Dpth (ft)      *   42.78  * Hydr. Depth (ft)       *   21.88  *   37.78  *   23.62  *
* Conv. Total (cfs)      *2757205.0  * Conv. (cfs)           *550168.9  *1712040.0  *494995.8  *
* Length Wtd. (ft)       *  789.46  * Wetted Per. (ft)       *  225.33  *  120.65  *  171.98  *
* Min Ch El (ft)         *  763.50  * Shear (lb/sq ft)       *    0.27  *    0.44  *    0.30  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *    0.43  *    2.53  *    0.51  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   * 9002.92  *16129.14  *10821.87  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1061.00  *  568.20  * 1550.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  810.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  810.39  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)         *  786.78  * Flow Area (sq ft)      * 5726.65  * 4738.26  * 4758.06  *
* E.G. Slope (ft/ft)     *0.000191  * Area (sq ft)           * 5726.65  * 4738.26  *33561.09  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 9967.31  *28097.50  * 8935.19  *
* Top Width (ft)         * 2083.34  * Top Width (ft)         *  225.07  *  113.12  * 1745.15  *
* Vel Total (ft/s)       *    3.09  * Avg. Vel. (ft/s)       *    1.74  *    5.93  *    1.88  *
* Max Chl Dpth (ft)      *   46.89  * Hydr. Depth (ft)       *   25.44  *   41.89  *   27.74  *
* Conv. Total (cfs)      *3401853.0  * Conv. (cfs)           *721432.2  *2033693.0  *646727.8  *
* Length Wtd. (ft)       *  790.50  * Wetted Per. (ft)       *  231.98  *  120.65  *  171.98  *
* Min Ch El (ft)         *  763.50  * Shear (lb/sq ft)       *    0.29  *    0.47  *    0.33  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    0.51  *    2.78  *    0.62  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *13140.30  *17653.90  *15469.56  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1318.66  *  570.64  * 1924.70  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  797.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.100  *   0.040  *   0.100  *
* W.S. Elev (ft)         *  796.83  * Reach Len. (ft)        * 1068.21  *  790.37  *  448.77  *
* Crit W.S. (ft)         *  778.54  * Flow Area (sq ft)      * 2802.93  * 3203.73  * 2430.90  *
* E.G. Slope (ft/ft)     *0.000189  * Area (sq ft)           * 2802.93  * 3203.73  *13290.76  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 3250.44  *14549.25  * 2900.31  *
* Top Width (ft)         * 1503.43  * Top Width (ft)         *  204.14  *  113.12  * 1186.16  *
* Vel Total (ft/s)       *    2.45  * Avg. Vel. (ft/s)       *    1.16  *    4.54  *    1.19  *
* Max Chl Dpth (ft)      *   33.33  * Hydr. Depth (ft)       *   13.73  *   28.32  *   14.17  *
* Conv. Total (cfs)      *1507106.0  * Conv. (cfs)           *236654.9  *1059289.0  *211162.8  *
* Length Wtd. (ft)       *  789.02  * Wetted Per. (ft)       *  206.94  *  120.65  *  171.98  *
* Min Ch El (ft)         *  763.50  * Shear (lb/sq ft)       *    0.16  *    0.31  *    0.17  *
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    0.18  *    1.42  *    0.20  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 3428.35  *11944.86  * 3926.55  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  432.03  *  542.69  *  464.23  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION
```

RIVER: Blue River
REACH: Main RS: 20.400

INPUT
Description: Upstream of MOPAC98
Station Elevation Data num= 217

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	857.44	11.81	856.04	21.87	854.77	33.66	853.43	41.7	852.54
56.1	849.8	70.04	848.55	72.44	848.44	96.17	847.03	102.37	847.27
102.43	847.27	115.8	847.63	125.71	846.26	133.8	845.47	147.77	843.09
169.47	842.97	170.48	842.92	170.95	842.94	178.13	842.22	190.04	841.21
192.32	840.89	195.66	840.4	205.84	838.89	218.53	837.91	231.71	836.74
233.59	836.53	235.17	836.5	235.69	836.5	237.08	836.44	238.9	836.4
257.91	836.46	261.84	836.13	274.73	836.43	282.81	836.16	295.49	835.58
305	835.39	308.83	835.28	317.44	835.64	328.58	835.32	343.93	834.27
366.76	833.34	373.05	833.09	388.47	832.43	403.18	832.02	415.57	831.85
423.54	832.28	428.23	832.14	429.6	832.01	430.9	832.01	432.31	832.03
433.83	832.06	458.59	832.48	464.04	831.73	505.46	826.21	512.76	825.37
516.87	825.33	522.49	825.38	525.93	825.38	536.89	825.16	558.47	823.73
562.21	823.11	573.14	822.01	597.7	817.07	598.52	817.02	599.02	817.02
611.24	817.19	614.99	819.07	623.39	823.92	625.24	823.73	628.88	823.9
632.37	824.13	634.31	824.55	647.35	823.97	647.54	823.91	647.73	823.89
648.52	823.89	657.43	824.49	660.44	821.64	665.57	814.62	676.56	801.54
678.81	801.07	695.38	798.87	695.68	798.83	696.58	798.71	696.86	798.66
697.24	798.73	715.35	803.01	736.96	798.4	739.68	798.37	740.64	798.44
743.18	799.03	746.72	800.05	757.65	800.08	776.59	798.65	777.91	800.76
782.31	797.63	798.37	795.84	816.45	791.74	816.61	791.7	817.3	791.47
838.84	783.59	843.28	781.78	855.58	777.92	869.59	776.78	871.14	776.37
872.8	776.03	889.34	776.44	894.76	774.09	906.92	768.8	908.58	768.47
909.68	768.05	910.78	767.63	913.56	766.56	914.28	766.3	923.01	763.13
925.63	762.19	926.24	763.64	927.74	762.19	960	761.8	991.84	762.19
996.45	762.19	997.73	762.19	1004.16	764.48	1016.28	768.9	1017.75	769.39
1020.13	770.54	1030.25	774.72	1040.96	779.07	1044.48	778.93	1045.35	778.98
1046.68	777.22	1049.82	778.71	1059.68	779.26	1061.28	779.22	1069.38	782.8
1076.64	784.85	1076.99	784.99	1086.56	788.76	1096.19	792.6	1100.63	800.24
1128	805	1135	808	1160	808	1167.82	805.42	1195.26	792.9
1246.16	790.91	1342.27	781.07	1344.46	781	1351.76	781.1	1429.93	780.86
1433.2	780.87	1443.24	781.09	1492.72	782.29	1509.92	782.74	1546.94	783.83
1554.26	783.91	1559.98	784.07	1576.04	784.51	1606.78	794.73	1621.97	799.94
1648	800.78	1650.63	800.84	1654.16	800.78	1677.92	800.02	1699.01	800.42
1715.2	800.49	1758.35	800.27	1767.93	800.33	1777.34	800.56	1832.33	799.85
1842.29	799.78	1844.09	799.79	1931.59	800.17	1934.47	800.1	1984.39	799.1
1989.16	799.16	1997.27	798.96	2042.72	797.28	2049.48	796.73	2067.58	797.37
2093.99	798.76	2104.17	799.27	2135.2	799.45	2159.4	800.16	2185.34	800.41
2196.12	800.72	2217.69	801.24	2237.6	801.32	2274.98	801.08	2289.39	801.43
2302.75	801.44	2312	801.35	2321.86	801.47	2386.48	802	2394.69	802.22
2414.61	802.6	2468.1	803.93	2482.7	804.26	2485.45	804.35	2487.88	804.47
2537.95	805.7	2546.72	806.12	2581.76	809.77	2584.68	810.06	2622.03	811.86
2666.35	826.74	2666.47	826.76	2666.54	826.78	2692.22	833.35	2726.47	838.89
2731.37	839.77	2737.94	840.91	2754.27	843.94	2764.8	845.75	2783.38	851.43
2789.84	853.64	2799.54	855.33						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	558.47	.14	889.34	.038	1040.96	.125	1758.35	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
889.34 1040.96 41.5 41.5 41.5 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	778.38	804	F
1135	2799.54	812	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1700	1750	810	1800	1850	810

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	783.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.140	0.038	0.125
W.S. Elev (ft)	783.00	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)	768.04	Flow Area (sq ft)	252.77	2565.15	101.66

```
* E.G. Slope (ft/ft)     *0.000107  * Area (sq ft)           *  252.77  * 2565.15  *  397.49  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *   81.66  * 6615.85  *   27.49  *
* Top Width (ft)         *  425.04  * Top Width (ft)         *   49.05  *  151.62  *  224.37  *
* Vel Total (ft/s)       *    2.30  * Avg. Vel. (ft/s)       *    0.32  *    2.58  *    0.27  *
* Max Chl Dpth (ft)      *   21.20  * Hydr. Depth (ft)       *    5.15  *   16.92  *    3.49  *
* Conv. Total (cfs)      *650680.7  * Conv. (cfs)            *  7900.7  *640120.2  *  2659.8  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *   50.02  *  159.11  *   31.14  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.03  *    0.11  *    0.02  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *    0.01  *    0.28  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  728.67  * 5900.99  *  681.11  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  123.67  *  439.46  *  137.64  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  787.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  787.73  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  770.61  * Flow Area (sq ft)      *  514.68  * 3282.49  *  274.90  *
* E.G. Slope (ft/ft)     *0.000148  * Area (sq ft)           *  514.68  * 3282.49  * 1846.16  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *  267.89  *11750.75  *  131.36  *
* Top Width (ft)         *  564.91  * Top Width (ft)         *   61.81  *  151.62  *  351.48  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)       *    0.52  *    3.58  *    0.48  *
* Max Chl Dpth (ft)      *   25.93  * Hydr. Depth (ft)       *    8.33  *   21.65  *    6.40  *
* Conv. Total (cfs)      *998287.1  * Conv. (cfs)            * 22011.0  *965483.4  * 10792.7  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *   63.63  *  159.11  *   45.80  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.07  *    0.19  *    0.06  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.04  *    0.68  *    0.03  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1362.27  * 7827.48  * 1375.66  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  175.00  *  479.20  *  197.57  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  791.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  791.08  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  771.16  * Flow Area (sq ft)      *  737.10  * 3790.42  *  433.06  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           *  737.10  * 3790.42  * 3109.70  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  382.94  *12902.51  *  214.55  *
* Top Width (ft)         *  627.98  * Top Width (ft)         *   70.97  *  151.62  *  405.38  *
* Vel Total (ft/s)       *    2.72  * Avg. Vel. (ft/s)       *    0.52  *    3.40  *    0.50  *
* Max Chl Dpth (ft)      *   29.28  * Hydr. Depth (ft)       *   10.39  *   25.00  *    8.42  *
* Conv. Total (cfs)      *1283941.0  * Conv. (cfs)            * 36420.2  *1227115.0  * 20405.5  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *   73.38  *  159.11  *   54.88  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.07  *    0.16  *    0.05  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.04  *    0.56  *    0.03  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1929.12  * 9387.73  * 2092.97  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  221.43  *  507.15  *  288.49  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  795.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  794.89  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  773.43  * Flow Area (sq ft)      * 1036.33  * 4368.64  *  642.31  *
* E.G. Slope (ft/ft)     *0.000143  * Area (sq ft)           * 1036.33  * 4368.64  * 4830.27  *
```

```
* Q Total (cfs)          *19700.00  * Flow (cfs)             *  672.37  *18591.99  *  435.64  *
* Top Width (ft)         *  711.34  * Top Width (ft)         *   86.79  *  151.62  *  472.92  *
* Vel Total (ft/s)       *    3.26  * Avg. Vel. (ft/s)       *    0.65  *    4.26  *    0.68  *
* Max Chl Dpth (ft)      *   33.09  * Hydr. Depth (ft)       *   11.94  *   28.81  *   11.36  *
* Conv. Total (cfs)      *1647366.0  * Conv. (cfs)            * 56225.4  *1554712.0  * 36429.5  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *   89.67  *  159.11  *   61.63  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.10  *    0.25  *    0.09  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.07  *    1.04  *    0.06  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 2793.08  *11019.76  * 3168.13  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  338.70  *  530.00  *  385.42  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  800.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  799.64  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  775.93  * Flow Area (sq ft)      * 1516.02  * 5088.85  *  917.55  *
* E.G. Slope (ft/ft)     *0.000165  * Area (sq ft)           * 1539.71  * 5088.85  * 7346.90  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1162.21  *25737.35  *  800.43  *
* Top Width (ft)         *  985.41  * Top Width (ft)         *  149.35  *  151.62  *  684.44  *
* Vel Total (ft/s)       *    3.68  * Avg. Vel. (ft/s)       *    0.77  *    5.06  *    0.87  *
* Max Chl Dpth (ft)      *   37.84  * Hydr. Depth (ft)       *   13.80  *   33.56  *   15.47  *
* Conv. Total (cfs)      *2157853.0  * Conv. (cfs)            * 90537.4  *2004961.0  * 62354.4  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  113.58  *  159.11  *   67.13  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.14  *    0.33  *    0.14  *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *    0.11  *    1.66  *    0.12  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 4808.32  *13539.09  * 5589.28  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  662.90  *  557.92  *  788.63  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  803.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  802.98  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  777.46  * Flow Area (sq ft)      * 1886.33  * 5595.44  * 1138.46  *
* E.G. Slope (ft/ft)     *0.000169  * Area (sq ft)           * 2182.13  * 5595.44  *10801.39  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 1683.25  *30573.93  * 1002.83  *
* Top Width (ft)         * 1597.73  * Top Width (ft)         *  213.76  *  151.62  * 1232.35  *
* Vel Total (ft/s)       *    3.86  * Avg. Vel. (ft/s)       *    0.89  *    5.46  *    0.88  *
* Max Chl Dpth (ft)      *   41.18  * Hydr. Depth (ft)       *   17.00  *   36.90  *   15.09  *
* Conv. Total (cfs)      *2554866.0  * Conv. (cfs)            *129298.5  *2348536.0  * 77032.1  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  114.94  *  159.11  *   83.83  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.17  *    0.37  *    0.14  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.15  *    2.03  *    0.13  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 6965.39  *15047.77  * 8160.94  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  893.19  *  564.90  * 1172.35  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  806.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  805.95  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  778.95  * Flow Area (sq ft)      * 2820.34  * 6045.02  * 1385.92  *
* E.G. Slope (ft/ft)     *0.000178  * Area (sq ft)           * 2820.34  * 6045.02  *14663.04  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 2154.54  *35659.45  * 1286.01  *
```

```
* Top Width (ft)         * 1734.30  * Top Width (ft)         *  216.48  *  151.62  * 1366.19  *
* Vel Total (ft/s)       *    3.81  * Avg. Vel. (ft/s)       *    0.76  *    5.90  *    0.93  *
* Max Chl Dpth (ft)      *   44.15  * Hydr. Depth (ft)       *   13.03  *   39.87  *   15.53  *
* Conv. Total (cfs)      *2929124.0  * Conv. (cfs)           *161404.4  *2671380.0  * 96339.7  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  225.26  *  159.11  *   98.01  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.14  *    0.42  *    0.16  *
* Alpha                  *    2.19  * Stream Power (lb/ft s) *    0.11  *    2.49  *    0.15  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 8909.35  *16035.54  *10608.27  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1055.65  *  565.80  * 1535.48  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  810.57  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  810.03  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  780.70  * Flow Area (sq ft)      * 3710.42  * 6663.51  * 1764.62  *
* E.G. Slope (ft/ft)     *0.000177  * Area (sq ft)           * 3710.42  * 6663.51  *20410.79  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 3339.64  *41808.14  * 1852.22  *
* Top Width (ft)         * 1914.94  * Top Width (ft)         *  219.91  *  151.62  * 1543.40  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    0.90  *    6.27  *    1.05  *
* Max Chl Dpth (ft)      *   48.23  * Hydr. Depth (ft)       *   16.87  *   43.95  *   18.76  *
* Conv. Total (cfs)      *3532498.0  * Conv. (cfs)           *251005.3  *3142280.0  *139212.3  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  230.59  *  159.11  *  103.21  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.18  *    0.46  *    0.19  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    0.16  *    2.90  *    0.20  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *13024.59  *17550.46  *15191.54  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1313.20  *  568.24  * 1907.76  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  796.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  796.68  * Reach Len. (ft)        *   16.00  *   16.00  *   16.00  *
* Crit W.S. (ft)         *  773.77  * Flow Area (sq ft)      * 1199.88  * 4639.27  *  744.20  *
* E.G. Slope (ft/ft)     *0.000128  * Area (sq ft)           * 1199.88  * 4639.27  * 5683.50  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *  747.40  *19437.40  *  515.19  *
* Top Width (ft)         *  733.19  * Top Width (ft)         *   98.49  *  151.62  *  483.08  *
* Vel Total (ft/s)       *    3.14  * Avg. Vel. (ft/s)       *    0.62  *    4.19  *    0.69  *
* Max Chl Dpth (ft)      *   34.88  * Hydr. Depth (ft)       *   12.18  *   30.60  *   12.92  *
* Conv. Total (cfs)      *1830158.0  * Conv. (cfs)           * 66080.5  *1718528.0  * 45549.8  *
* Length Wtd. (ft)       *   16.00  * Wetted Per. (ft)       *  101.52  *  159.11  *   63.70  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.09  *    0.23  *    0.09  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.06  *    0.98  *    0.06  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 3379.27  *11873.70  * 3828.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  428.32  *  540.29  *  455.63  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 20.395
```

```
INPUT
Description: MOPAC @ 98th
Distance from Upstream XS =      16
Deck/Roadway Width        =    13.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
       0   806.5     760     803   806.5     760   803.1   807.3  796.34
    1100   807.3  796.34  1100.1     808     760    1160     808     760
    1167     805     760

Upstream Bridge Cross Section Data
Station Elevation Data    num=     217
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  857.44   11.81  856.04   21.87  854.77   33.66  853.43    41.7  852.54
    56.1   849.8   70.04  848.55   72.44  848.44   96.17  847.03  102.37  847.27
  102.43  847.27   115.8  847.63  125.71  846.26   133.8  845.47  147.77  843.09
  169.47  842.97  170.48  842.92  170.95  842.94  178.13  842.22  190.04  841.21
  192.32  840.89  195.66   840.4  205.84  838.89  218.53  837.91  231.71  836.74
  233.59  836.53  235.17   836.5  235.69   836.5  237.08  836.44   238.9   836.4
  257.91  836.46  261.84  836.13  274.73  836.43  282.81  836.16  295.49  835.58
     305  835.39  308.83  835.28  317.44  835.64  328.58  835.32  343.93  834.27
  366.76  833.34  373.05  833.09  388.47  832.43  403.18  832.02  415.57  831.85
  423.54  832.28  428.23  832.14   429.6  832.01   430.9  832.01  432.31  832.03
  433.83  832.06  458.59  832.48  464.04  831.73  505.46  826.21  512.76  825.37
  516.87  825.33  522.49  825.38  525.93  825.38  536.89  825.16  558.47  823.73
  562.21  823.11  573.14  822.01   597.7  817.07  598.52  817.02  599.02  817.02
  611.24  817.19  614.99  819.07  623.39  823.92  625.24  823.73  628.88   823.9
  632.37  824.13  634.31  824.55  647.35  823.97  647.54  823.91  647.73  823.89
  648.52  823.89  657.43  824.49  660.44  821.64  665.57  814.62  676.56  801.54
  678.81  801.07  695.38  798.87  695.68  798.83  696.58  798.71  696.86  798.66
  697.24  798.73  715.35  803.01  736.96   798.4  739.68  798.37  740.64  798.44
  743.18  799.03  746.72  800.05  757.65  800.08  776.59  798.65  777.91  800.76
  782.31  797.63  798.37  795.84  816.45  791.74  816.61   791.7   817.3  791.47
  838.84  783.59  843.28  781.78  855.58  777.92  869.59  776.78  871.14  776.37
   872.8  776.03  889.34  776.44  894.76  774.09  906.92   768.8  908.58  768.47
  909.68  768.05  910.78  767.63  913.56  766.56  914.28   766.3  923.01  763.13
  925.63  762.19  926.24  763.64  927.74  762.19     960   761.8  991.84  762.19
  996.45  762.19  997.73  762.19 1004.16  764.48 1016.28   768.9 1017.75  769.39
 1020.13  770.54 1030.25  774.72 1040.96  779.07 1044.48  778.93 1045.35  778.98
 1046.68  777.22 1049.82  778.71 1059.68  779.26 1061.28  779.22 1069.38   782.8
 1076.64  784.85 1076.99  784.99 1086.56  788.76 1096.19   792.6 1100.63  800.24
    1128     805    1135     808    1160     808 1167.82  805.42 1195.26   792.9
 1246.16  790.91 1342.27  781.07 1344.46     781 1351.76   781.1 1429.93  780.86
  1433.2  780.87 1443.24  781.09 1492.72  782.29 1509.92  782.74 1546.94  783.83
 1554.26  783.91 1559.98  784.07 1576.04  784.51 1606.78  794.73 1621.97  799.94
    1648  800.78 1650.63  800.84 1654.16  800.78 1677.92  800.02 1699.01  800.42
  1715.2  800.49 1758.35  800.27 1767.93  800.33 1777.34  800.56 1832.33  799.85
 1842.29  799.78 1844.09  799.79 1931.59  800.17 1934.47   800.1 1984.39   799.1
 1989.16  799.16 1997.27  798.96 2042.72  797.28 2049.48  796.73 2067.58  797.37
 2093.99  798.76 2104.17  799.27  2135.2  799.45  2159.4  800.16 2185.34  800.41
 2196.12  800.72 2217.69  801.24  2237.6  801.32 2274.98  801.08 2289.39  801.43
 2302.75  801.44    2312  801.35 2321.86  801.47 2386.48     802 2394.69  802.22
 2414.61   802.6  2468.1  803.93  2482.7  804.26 2485.45  804.35 2487.88  804.47
 2537.95   805.7 2546.72  806.12 2581.76  809.77 2584.68  810.06 2622.03  811.86
 2666.35  826.74 2666.47  826.76 2666.54  826.78 2692.22  833.35 2726.47  838.89
 2731.37  839.77 2737.94  840.91 2754.27  843.94  2764.8  845.75 2783.38  851.43
 2789.84  853.64 2799.54  855.33

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  558.47     .14  889.34    .038 1040.96    .125 1758.35     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
         889.34 1040.96           .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  778.38     804       F
    1135 2799.54     812       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************
```

```
    1700    1750     810    1800    1850     810

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       0   806.5     760     803   806.5     760   803.1   807.3  796.34
    1100   807.3  796.34  1100.1     808     760    1160     808     760
    1167     805     760

Downstream Bridge Cross Section Data
Station Elevation Data    num=     217
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  857.44   11.81  856.04   21.87  854.77   33.66  853.43    41.7  852.54
    56.1   849.8   70.04  848.55   72.44  848.44   96.17  847.03  102.37  847.27
  102.43  847.27   115.8  847.63  125.71  846.26   133.8  845.47  147.77  843.09
  169.47  842.97  170.48  842.92  170.95  842.94  178.13  842.22  190.04  841.21
  192.32  840.89  195.66   840.4  205.84  838.89  218.53  837.91  231.71  836.74
  233.59  836.53  235.17   836.5  235.69   836.5  237.08  836.44   238.9   836.4
  257.91  836.46  261.84  836.13  274.73  836.43  282.81  836.16  295.49  835.58
     305  835.39  308.83  835.28  317.44  835.64  328.58  835.32  343.93  834.27
  366.76  833.34  373.05  833.09  388.47  832.43  403.18  832.02  415.57  831.85
  423.54  832.28  428.23  832.14   429.6  832.01   430.9  832.01  432.31  832.03
  433.83  832.06  458.59  832.48  464.04  831.73  505.46  826.21  512.76  825.37
  516.87  825.33  522.49  825.38  525.93  825.38  536.89  825.16  558.47  823.73
  562.21  823.11  573.14  822.01   597.7  817.07  598.52  817.02  599.02  817.02
  611.24  817.19  614.99  819.07  623.39  823.92  625.24  823.73  628.88   823.9
  632.37  824.13  634.31  824.55  647.35  823.97  647.54  823.91  647.73  823.89
  648.52  823.89  657.43  824.49  660.44  821.64  665.57  814.62  676.56  801.54
  678.81  801.07  695.38  798.87  695.68  798.83  696.58  798.71  696.86  798.66
  697.24  798.73  715.35  803.01  736.96   798.4  739.68  798.37  740.64  798.44
  743.18  799.03  746.72  800.05  757.65  800.08  776.59  798.65  777.91  800.76
  782.31  797.63  798.37  795.84  816.45  791.74  816.61   791.7   817.3  791.47
  838.84  783.59  843.28  781.78  855.58  777.92  869.59  776.78  871.14  776.37
   872.8  776.03  889.34  776.44  894.76  774.09  906.92   768.8  908.58  768.47
  909.68  768.05  910.78  767.63  913.56  766.56  914.28   766.3  923.01  763.13
  925.63  762.19  926.24  763.64  927.74  762.19     960   761.8  991.84  762.19
  996.45  762.19  997.73  762.19 1004.16  764.48 1016.28   768.9 1017.75  769.39
 1020.13  770.54 1030.25  774.72 1040.96  779.07 1044.48  778.93 1045.35  778.98
 1046.68  777.22 1049.82  778.71 1059.68  779.26 1061.28  779.22 1069.38   782.8
 1076.64  784.85 1076.99  784.99 1086.56  788.76 1096.19   792.6 1100.63  800.24
    1128     805    1135     808    1160     808 1167.82  805.42 1195.26   792.9
 1246.16  790.91 1342.27  781.07 1344.46     781 1351.76   781.1 1429.93  780.86
  1433.2  780.87 1443.24  781.09 1492.72  782.29 1509.92  782.74 1546.94  783.83
 1554.26  783.91 1559.98  784.07 1576.04  784.51 1606.78  794.73 1621.97  799.94
    1648  800.78 1650.63  800.84 1654.16  800.78 1677.92  800.02 1699.01  800.42
  1715.2  800.49 1758.35  800.27 1767.93  800.33 1777.34  800.56 1832.33  799.85
 1842.29  799.78 1844.09  799.79 1931.59  800.17 1934.47   800.1 1984.39   799.1
 1989.16  799.16 1997.27  798.96 2042.72  797.28 2049.48  796.73 2067.58  797.37
 2093.99  798.76 2104.17  799.27  2135.2  799.45  2159.4  800.16 2185.34  800.41
 2196.12  800.72 2217.69  801.24  2237.6  801.32 2274.98  801.08 2289.39  801.43
 2302.75  801.44    2312  801.35 2321.86  801.47 2386.48     802 2394.69  802.22
 2414.61   802.6  2468.1  803.93  2482.7  804.26 2485.45  804.35 2487.88  804.47
 2537.95   805.7 2546.72  806.12 2581.76  809.77 2584.68  810.06 2622.03  811.86
 2666.35  826.74 2666.47  826.76 2666.54  826.78 2692.22  833.35 2726.47  838.89
 2731.37  839.77 2737.94  840.91 2754.27  843.94  2764.8  845.75 2783.38  851.43
 2789.84  853.64 2799.54  855.33

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  558.47     .14  889.34    .038 1040.96    .125 1758.35     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        889.34 1040.96             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  777.89     804       F
    1135 2799.54     812       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    1700    1750     810    1800    1850     810

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
```

```
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Piers =  11

Pier Data
Pier Station     Upstream=     819    Downstream=     819
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=     829    Downstream=     829
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=     833    Downstream=     833
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=     885    Downstream=     885
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     760       8     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     760       8     800

Pier Data
Pier Station     Upstream=     955    Downstream=     955
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     760       8     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     760       8     800

Pier Data
Pier Station     Upstream=    1012    Downstream=    1012
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2     760       2     800

Pier Data
```

```
Pier Station     Upstream=    1016    Downstream=    1016
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1032    Downstream=    1032
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1048    Downstream=    1048
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1064    Downstream=    1064
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800

Pier Data
Pier Station     Upstream=    1080    Downstream=    1080
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       2     760       2     800

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     783.10  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     783.00  * E.G. Elev (ft)         *     783.09  *     783.09  *
```

```
* Q Total (cfs)          *    6725.00  * W.S. Elev (ft)         *     782.97  *     782.97  *
* Q Bridge (cfs)         *    6725.00  * Crit W.S. (ft)         *     768.44  *     768.44  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.17  *      21.17  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.59  *       2.59  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2601.31  *    2600.50  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *       0.12  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   22626.91  *   22616.74  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *      12.77  *      12.77  *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     358.84  *     358.76  *
* Delta EG (ft)          *       0.02  * Conv. Total (cfs)      *   394982.3  *   394852.5  *
* Delta WS (ft)          *       0.02  * Top Width (ft)         *     203.63  *     203.60  *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *       0.00  *       0.00  *
* BR Open Vel (ft/s)     *       2.59  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.13  *       0.13  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.34  *       0.34  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     787.92  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     787.73  * E.G. Elev (ft)         *     787.93  *     787.93  *
* Q Total (cfs)          *   12150.00  * W.S. Elev (ft)         *     787.70  *     787.70  *
* Q Bridge (cfs)         *   12150.00  * Crit W.S. (ft)         *     771.14  *     771.14  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.90  *      25.90  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.36  *       3.36  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3621.46  *    3621.46  *
* Weir Submerg           *             * Froude # Chl           *       0.15  *       0.15  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   38153.89  *   38153.89  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *      16.15  *      16.15  *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     454.93  *     454.93  *
* Delta EG (ft)          *       0.03  * Conv. Total (cfs)      *   557162.3  *   557162.3  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     224.26  *     224.26  *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.36  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.24  *       0.24  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.79  *       0.79  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     791.25  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     791.08  * E.G. Elev (ft)         *     791.26  *     791.26  *
* Q Total (cfs)          *   13500.00  * W.S. Elev (ft)         *     791.05  *     791.05  *
* Q Bridge (cfs)         *   13500.00  * Crit W.S. (ft)         *     771.75  *     771.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.25  *      29.25  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.07  *       3.07  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4403.08  *    4403.08  *
* Weir Submerg           *             * Froude # Chl           *       0.13  *       0.13  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   51660.45  *   51660.45  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *      18.32  *      18.32  *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     539.80  *     539.80  *
* Delta EG (ft)          *       0.02  * Conv. Total (cfs)      *   679301.9  *   679301.9  *
* Delta WS (ft)          *       0.02  * Top Width (ft)         *     240.31  *     240.31  *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.07  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.20  *       0.20  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.62  *       0.62  *
*********************************************************************************************
```

```
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     795.16  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     794.89  * E.G. Elev (ft)         *     795.17  *     795.17  *
* Q Total (cfs)          *   19700.00  * W.S. Elev (ft)         *     794.86  *     794.86  *
* Q Bridge (cfs)         *   19700.00  * Crit W.S. (ft)         *     774.15  *     774.15  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.06  *      33.06  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.68  *       3.68  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5356.31  *    5356.31  *
* Weir Submerg           *             * Froude # Chl           *       0.14  *       0.14  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   71379.02  *   71379.02  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *      20.57  *      20.57  *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     645.46  *     645.46  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *   823364.4  *   823364.4  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     260.41  *     260.41  *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.68  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.30  *       0.30  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.09  *       1.09  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     800.01  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     799.64  * E.G. Elev (ft)         *     799.99  *     799.97  *
* Q Total (cfs)          *   27700.00  * W.S. Elev (ft)         *     799.43  *     799.41  *
* Q Bridge (cfs)         *   27700.00  * Crit W.S. (ft)         *     776.76  *     776.76  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      37.63  *      37.61  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.82  *       4.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5743.47  *    5743.47  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   99708.95  *   99591.18  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     942.58  *     942.58  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *   710384.8  *   710384.8  *
* Delta WS (ft)          *       0.11  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       4.82  * C & E Loss (ft)        *       0.00  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.58  *       0.58  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.79  *       2.79  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     803.41  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     802.98  * E.G. Elev (ft)         *     803.37  *     803.34  *
```

```
* Q Total (cfs)          *   33260.00  * W.S. Elev (ft)         *     802.56  *     802.53  *
* Q Bridge (cfs)         *   33260.00  * Crit W.S. (ft)         *     778.40  *     778.40  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.76  *      40.73  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.79  *       5.79  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5743.47  *    5743.47  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  119926.80  *  119756.80  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     942.58  *     942.58  *
* Delta EG (ft)          *       0.19  * Conv. Total (cfs)      *   710384.8  *   710384.8  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *       0.03  *       0.01  *
* BR Open Vel (ft/s)     *       5.79  * C & E Loss (ft)        *       0.00  *       0.11  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.83  *       0.83  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.83  *       4.83  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     806.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     805.95  * E.G. Elev (ft)         *     806.37  *     806.33  *
* Q Total (cfs)          *   39100.00  * W.S. Elev (ft)         *     805.26  *     805.22  *
* Q Bridge (cfs)         *   39100.00  * Crit W.S. (ft)         *     779.95  *     779.95  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.46  *      43.42  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.81  *       6.81  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5743.47  *    5743.48  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  138207.50  *  137972.60  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     942.58  *     942.58  *
* Delta EG (ft)          *       0.30  * Conv. Total (cfs)      *   710384.6  *   710384.9  *
* Delta WS (ft)          *       0.31  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       6.81  * C & E Loss (ft)        *       0.00  *       0.18  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.15  *       1.15  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.85  *       7.85  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     810.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     810.03  * E.G. Elev (ft)         *     810.49  *     810.42  *
* Q Total (cfs)          *   47000.00  * W.S. Elev (ft)         *     809.15  *     809.07  *
* Q Bridge (cfs)         *   45198.59  * Crit W.S. (ft)         *     781.77  *     781.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      47.35  *      47.27  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.03  *       7.07  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6681.53  *    6645.79  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  164639.90  *  164182.00  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *      14.37  *      14.30  *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *    1409.96  *    1409.86  *
* Delta EG (ft)          *       0.40  * Conv. Total (cfs)      *   677114.1  *   673573.3  *
```

```
* Delta WS (ft)          *       0.41  * Top Width (ft)         *    1805.62  *    1804.82  *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *       0.07  *       0.01  *
* BR Open Vel (ft/s)     *       7.87  * C & E Loss (ft)        *       0.00  *       0.24  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.43  *       1.43  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      10.03  *      10.13  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. US. (ft)          *     796.93  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     796.68  * E.G. Elev (ft)         *     796.92  *     796.91  *
* Q Total (cfs)          *   20700.00  * W.S. Elev (ft)         *     796.61  *     796.60  *
* Q Bridge (cfs)         *   20700.00  * Crit W.S. (ft)         *     774.53  *     774.53  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      34.81  *      34.80  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.60  *       3.60  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5743.47  *    5743.47  *
* Weir Submerg           *             * Froude # Chl           *       0.13  *       0.13  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   81303.33  *   81237.42  *
* Min El Weir Flow (ft)  *     806.51  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     796.34  * W.P. Total (ft)        *     942.58  *     942.58  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *   710384.8  *   710384.8  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    5743.47  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *       3.60  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.32  *       0.32  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.16  *       1.16  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 20.392

INPUT
Description: Downstream of MOPAC98.  XS Copied from U/S side.
Station Elevation Data    num=     217
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************************
       0   857.44   11.81  856.04   21.87  854.77   33.66  853.43    41.7  852.54
    56.1    849.8   70.04  848.55   72.44  848.44   96.17  847.03  102.37  847.27
  102.43   847.27   115.8  847.63  125.71  846.26   133.8  845.47  147.77  843.09
  169.47   842.97  170.48  842.92  170.95  842.94  178.13  842.22  190.04  841.21
  192.32   840.89  195.66   840.4  205.84  838.89  218.53  837.91  231.71  836.74
  233.59   836.53  235.17   836.5  235.69   836.5  237.08  836.44   238.9   836.4
  257.91   836.46  261.84  836.13  274.73  836.43  282.81  836.16  295.49  835.58
     305   835.39  308.83  835.28  317.44  835.64  328.58  835.32  343.93  834.27
  366.76   833.34  373.05  833.09  388.47  832.43  403.18  832.02  415.57  831.85
  423.54   832.28  428.23  832.14   429.6  832.01   430.9  832.01  432.31  832.03
  433.83   832.06  458.59  832.48  464.04  831.73  505.46  826.21  512.76  825.37
  516.87   825.33  522.49  825.38  525.93  825.38  536.89  825.16  558.47  823.73
  562.21   823.11  573.14  822.01   597.7  817.07  598.52  817.02  599.02  817.02
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  611.24  817.19  614.99  819.07  623.39  823.92  625.24  823.73  628.88   823.9
  632.37  824.13  634.31  824.55  647.35  823.97  647.54  823.91  647.73  823.89
  648.52  823.89  657.43  824.49  660.44  821.64  665.57  814.62  676.56  801.54
  678.81  801.07  695.38  798.87  695.68  798.83  696.58  798.71  696.86  798.66
  697.24  798.73  715.35  803.01  736.96   798.4  739.68  798.37  740.64  798.44
  743.18  799.03  746.72  800.05  757.65  800.08  776.59  798.65  777.91  800.76
  782.31  797.63  798.37  795.84  816.45  791.74  816.61   791.7   817.3  791.47
  838.84  783.59  843.28  781.78  855.58  777.92  869.59  776.78  871.14  776.37
   872.8  776.03  889.34  776.44  894.76  774.09  906.92   768.8  908.58  768.47
  909.68  768.05  910.78  767.63  913.56  766.56  914.28   766.3  923.01  763.13
  925.63  762.19  926.24  763.64  927.74  762.19     960   761.8  991.84  762.19
  996.45  762.19  997.73  762.19 1004.16  764.48 1016.28   768.9 1017.75  769.39
 1020.13  770.54 1030.25  774.72 1040.96  779.07 1044.48  778.93 1045.35  778.98
 1046.68  777.22 1049.82  778.71 1059.68  779.26 1061.28  779.22 1069.38   782.8
 1076.64  784.85 1076.99  784.99 1086.56  788.76 1096.19   792.6 1100.63  800.24
    1128     805    1135     808    1160     808 1167.82  805.42 1195.26   792.9
 1246.16  790.91 1342.27  781.07 1344.46     781 1351.76   781.1 1429.93  780.86
  1433.2  780.87 1443.24  781.09 1492.72  782.29 1509.92  782.74 1546.94  783.83
 1554.26  783.91 1559.98  784.07 1576.04  784.51 1606.78  794.73 1621.97  799.94
    1648  800.78 1650.63  800.84 1654.16  800.78 1677.92  800.02 1699.01  800.42
  1715.2  800.49 1758.35  800.27 1767.93  800.33 1777.34  800.56 1832.33  799.85
 1842.29  799.78 1844.09  799.79 1931.59  800.17 1934.47   800.1 1984.39   799.1
 1989.16  799.16 1997.27  798.96 2042.72  797.28 2049.48  796.73 2067.58  797.37
 2093.99  798.76 2104.17  799.27  2135.2  799.45  2159.4  800.16 2185.34  800.41
 2196.12  800.72 2217.69  801.24  2237.6  801.32 2274.98  801.08 2289.39  801.43
 2302.75  801.44    2312  801.35 2321.86  801.47 2386.48     802 2394.69  802.22
 2414.61   802.6  2468.1  803.93  2482.7  804.26 2485.45  804.35 2487.88  804.47
 2537.95   805.7 2546.72  806.12 2581.76  809.77 2584.68  810.06 2622.03  811.86
 2666.35  826.74 2666.47  826.76 2666.54  826.78 2692.22  833.35 2726.47  838.89
 2731.37  839.77 2737.94  840.91 2754.27  843.94  2764.8  845.75 2783.38  851.43
 2789.84  853.64 2799.54  855.33

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0      .1  558.47     .14  889.34    .038 1040.96    .125 1758.35     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        889.34 1040.96              331     474     587              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  777.89     804       F
    1135 2799.54     812       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    1700    1750     810    1800    1850     810

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  783.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.10  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  782.98  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  768.04  * Flow Area (sq ft)      *  251.90  * 2562.47  *  101.15  *
* E.G. Slope (ft/ft)     *0.000107  * Area (sq ft)           *  251.90  * 2562.47  *  393.52  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)              *   81.39  * 6616.27  *   27.35  *
* Top Width (ft)         *  424.16  * Top Width (ft)         *   49.00  *  151.62  *  223.53  *
* Vel Total (ft/s)       *    2.31  * Avg. Vel. (ft/s)       *    0.32  *    2.58  *    0.27  *
* Max Chl Dpth (ft)      *   21.18  * Hydr. Depth (ft)       *    5.14  *   16.90  *    3.48  *
* Conv. Total (cfs)      *649505.8  * Conv. (cfs)             *  7860.4  *639004.3  *  2641.0  *
* Length Wtd. (ft)       *  469.67  * Wetted Per. (ft)       *   49.97  *  159.11  *   31.07  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.03  *    0.11  *    0.02  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *    0.01  *    0.28  *    0.01  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  728.47  * 5898.71  *  680.93  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  123.62  *  439.33  *  137.55  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  787.89  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  787.70  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  770.61  * Flow Area (sq ft)      *  512.84  * 3277.98  *  273.63  *
* E.G. Slope (ft/ft)     *0.000149  * Area (sq ft)           *  512.84  * 3277.98  * 1835.72  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             *  267.18  *11752.01  *  130.81  *
* Top Width (ft)         *  564.38  * Top Width (ft)         *   61.73  *  151.62  *  351.02  *
* Vel Total (ft/s)       *    2.99  * Avg. Vel. (ft/s)       *    0.52  *    3.59  *    0.48  *
* Max Chl Dpth (ft)      *   25.90  * Hydr. Depth (ft)       *    8.31  *   21.62  *    6.38  *
* Conv. Total (cfs)      *995897.1  * Conv. (cfs)            * 21900.1  *963275.0  * 10722.0  *
* Length Wtd. (ft)       *  466.02  * Wetted Per. (ft)       *   63.55  *  159.11  *   45.72  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.07  *    0.19  *    0.06  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.04  *    0.69  *    0.03  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1361.84  * 7824.55  * 1374.92  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  174.95  *  479.07  *  197.44  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  791.23  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  791.05  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  771.16  * Flow Area (sq ft)      *  735.37  * 3786.72  *  431.81  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           *  735.37  * 3786.72  * 3099.81  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             *  382.34  *12903.60  *  214.06  *
* Top Width (ft)         *  627.15  * Top Width (ft)         *   70.91  *  151.62  *  404.63  *
* Vel Total (ft/s)       *    2.73  * Avg. Vel. (ft/s)       *    0.52  *    3.41  *    0.50  *
* Max Chl Dpth (ft)      *   29.25  * Hydr. Depth (ft)       *   10.37  *   24.98  *    8.41  *
* Conv. Total (cfs)      *1281743.0  * Conv. (cfs)            * 36301.1  *1225118.0  * 20323.4  *
* Length Wtd. (ft)       *  463.76  * Wetted Per. (ft)       *   73.31  *  159.11  *   54.81  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.07  *    0.16  *    0.05  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.04  *    0.56  *    0.03  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1928.51  * 9384.35  * 2091.73  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  221.37  *  507.01  *  288.33  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  795.12  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  794.86  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  773.43  * Flow Area (sq ft)      * 1033.11  * 4363.01  *  640.22  *
* E.G. Slope (ft/ft)     *0.000144  * Area (sq ft)           * 1033.11  * 4363.01  * 4812.73  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             *  671.25  *18594.29  *  434.46  *
* Top Width (ft)         *  710.96  * Top Width (ft)         *   86.63  *  151.62  *  472.71  *
* Vel Total (ft/s)       *    3.26  * Avg. Vel. (ft/s)       *    0.65  *    4.26  *    0.68  *
* Max Chl Dpth (ft)      *   33.06  * Hydr. Depth (ft)       *   11.93  *   28.78  *   11.32  *
* Conv. Total (cfs)      *1643628.0  * Conv. (cfs)            * 56004.6  *1551375.0  * 36248.2  *
* Length Wtd. (ft)       *  461.63  * Wetted Per. (ft)       *   89.50  *  159.11  *   61.59  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.10  *    0.25  *    0.09  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.07  *    1.05  *    0.06  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 2792.22  *11015.86  * 3166.23  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  338.62  *  529.86  *  385.24  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  799.91  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
```

```
* W.S. Elev (ft)         *  799.53  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  775.93  * Flow Area (sq ft)      * 1504.10  * 5072.39  *  911.11  *
* E.G. Slope (ft/ft)     *0.000167  * Area (sq ft)           * 1523.70  * 5072.39  * 7273.11  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 1154.99  *25748.29  *  796.71  *
* Top Width (ft)         *  971.85  * Top Width (ft)         *  145.53  *  151.62  *  674.70  *
* Vel Total (ft/s)       *    3.70  * Avg. Vel. (ft/s)       *    0.77  *    5.08  *    0.87  *
* Max Chl Dpth (ft)      *   37.73  * Hydr. Depth (ft)       *   13.71  *   33.45  *   15.37  *
* Conv. Total (cfs)      *2145319.0  * Conv. (cfs)           * 89452.4  *1994162.0  * 61703.9  *
* Length Wtd. (ft)       *  458.74  * Wetted Per. (ft)       *  113.40  *  159.11  *   67.00  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.14  *    0.33  *    0.14  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.11  *    1.68  *    0.12  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 4807.22  *13534.83  * 5586.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  662.86  *  557.87  *  788.41  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  803.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  802.79  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  777.46  * Flow Area (sq ft)      * 1865.59  * 5565.64  * 1123.75  *
* E.G. Slope (ft/ft)     *0.000173  * Area (sq ft)           * 2140.31  * 5565.64  *10560.12  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 1662.65  *30597.36  *  999.99  *
* Top Width (ft)         * 1586.35  * Top Width (ft)         *  211.84  *  151.62  * 1222.89  *
* Vel Total (ft/s)       *    3.89  * Avg. Vel. (ft/s)       *    0.89  *    5.50  *    0.89  *
* Max Chl Dpth (ft)      *   40.99  * Hydr. Depth (ft)       *   16.74  *   36.71  *   15.12  *
* Conv. Total (cfs)      *2530291.0  * Conv. (cfs)           *126487.9  *2327728.0  * 76075.1  *
* Length Wtd. (ft)       *  456.92  * Wetted Per. (ft)       *  115.55  *  159.11  *   82.69  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.17  *    0.38  *    0.15  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    0.16  *    2.07  *    0.13  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 6964.09  *15043.35  * 8157.10  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  893.12  *  564.85  * 1171.95  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  806.14  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  805.64  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  778.95  * Flow Area (sq ft)      * 2753.44  * 5998.13  * 1358.43  *
* E.G. Slope (ft/ft)     *0.000184  * Area (sq ft)           * 2753.44  * 5998.13  *14241.90  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 2103.58  *35727.22  * 1269.21  *
* Top Width (ft)         * 1724.74  * Top Width (ft)         *  216.23  *  151.62  * 1356.89  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    0.76  *    5.96  *    0.93  *
* Max Chl Dpth (ft)      *   43.84  * Hydr. Depth (ft)       *   12.73  *   39.56  *   15.34  *
* Conv. Total (cfs)      *2885877.0  * Conv. (cfs)           *155259.8  *2636940.0  * 93677.2  *
* Length Wtd. (ft)       *  455.83  * Wetted Per. (ft)       *  224.85  *  159.11  *   97.22  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.14  *    0.43  *    0.16  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    0.11  *    2.57  *    0.15  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 8907.86  *16030.97  *10603.22  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1055.58  *  565.75  * 1535.04  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  810.18  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  809.62  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  780.70  * Flow Area (sq ft)      * 3620.09  * 6601.18  * 1725.97  *
* E.G. Slope (ft/ft)     *0.000184  * Area (sq ft)           * 3620.09  * 6601.18  *19815.44  *
```

```
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 3269.08  *41913.09  * 1817.82  *
* Top Width (ft)         * 1810.52  * Top Width (ft)         *  219.57  *  151.62  * 1439.34  *
* Vel Total (ft/s)       *    3.93  * Avg. Vel. (ft/s)       *    0.90  *    6.35  *    1.05  *
* Max Chl Dpth (ft)      *   47.82  * Hydr. Depth (ft)       *   16.49  *   43.54  *   18.35  *
* Conv. Total (cfs)      *3468892.0  * Conv. (cfs)            *241278.5  *3093447.0  *134166.7  *
* Length Wtd. (ft)       *  455.72  * Wetted Per. (ft)       *  230.05  *  159.11  *  103.21  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.18  *    0.48  *    0.19  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.16  *    3.02  *    0.20  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *13022.50  *17545.53  *15173.58  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1312.99  *  568.09  * 1906.38  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  796.89  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  796.64  * Reach Len. (ft)        *  331.00  *  474.00  *  587.00  *
* Crit W.S. (ft)         *  773.77  * Flow Area (sq ft)      * 1195.78  * 4632.94  *  741.80  *
* E.G. Slope (ft/ft)     *0.000129  * Area (sq ft)           * 1195.78  * 4632.94  * 5663.33  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             *  746.76  *19439.34  *  513.90  *
* Top Width (ft)         *  732.57  * Top Width (ft)         *   98.11  *  151.62  *  482.84  *
* Vel Total (ft/s)       *    3.15  * Avg. Vel. (ft/s)       *    0.62  *    4.20  *    0.69  *
* Max Chl Dpth (ft)      *   34.84  * Hydr. Depth (ft)       *   12.19  *   30.56  *   12.88  *
* Conv. Total (cfs)      *1825817.0  * Conv. (cfs)            * 65867.4  *1714622.0  * 45327.8  *
* Length Wtd. (ft)       *  460.56  * Wetted Per. (ft)       *  101.14  *  159.11  *   63.65  *
* Min Ch El (ft)         *  761.80  * Shear (lb/sq ft)       *    0.09  *    0.23  *    0.09  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.06  *    0.98  *    0.06  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 3378.29  *11869.59  * 3826.59  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  428.29  *  540.24  *  455.47  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 20.302

INPUT
Description: Ineffective area due to high ground U/S.
Station Elevation Data    num=     209
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  857.67    2.47  857.14    4.28  856.75    7.77     856   18.56  854.67
   28.61   853.3   55.33  851.22   59.86   850.3   67.86  849.04   69.49  849.12
   74.83  848.96   94.04  847.47  108.48  845.76  110.59  845.54  114.12  845.34
  132.73  844.12  134.58  844.11  140.22  843.61  167.05  840.75  167.12  840.74
  170.78  840.74  184.76  840.63   194.5  840.08  200.29  839.53  215.44  837.76
  229.77  836.33  243.09   835.7  268.89  835.05  281.25  834.87  282.78  834.85
  298.54  834.18  301.97     834  312.52  832.85  316.83  832.61  325.59  832.72
  327.11  832.46  335.39  831.58  358.21   828.7     373  826.39  380.57  825.45
  397.38  821.79     405  820.26  414.94  818.14  415.14   818.1  435.93  813.89
  440.71     813  453.13  807.49  457.44  805.75  457.74  805.85  474.52  811.37
   479.2  811.43  479.61  811.43  479.87  811.43  490.38  811.39  499.87  810.79
  500.85  811.45  520.08   813.3  523.56  813.32  526.83  813.48  545.09  813.23
   557.9  813.26  569.17  812.97   598.5  813.16  605.77  813.07  609.66  812.94
  623.75  806.58  630.18  805.77  631.01  805.88   641.2  806.86  644.48  806.86
  646.32  806.86  661.21  804.23  672.77  807.84   679.9  807.94   688.4  807.36
  691.77  807.68     703  806.99  713.82  806.97  719.66  804.99  733.82  799.04
  735.68  797.79  738.54  797.83  759.41  793.47  764.42   793.3  787.54  790.95
  798.23  789.85  802.32  789.67  809.63  788.91  816.22  788.07  834.95  786.37
  848.91  784.66  863.32  782.88  873.41  782.63  883.63  781.94  909.54  780.66
  920.13  779.85  924.32  779.83  935.22  779.46  968.16  777.39  978.76  776.65
  988.15  775.49  1008.8  773.84 1014.59  773.38    1035     772    1045     764
    1075   762.2    1105     764    1115     772 1144.56  798.89 1159.35  799.16
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 1173.12  799.19 1185.75  799.12  1186.3  799.11 1217.34  798.52 1218.36  798.52
 1246.21  798.28 1252.22  798.07 1262.17  798.05 1276.54  798.04 1298.09  798.18
 1302.12  798.12  1326.5  797.86 1331.83  797.76  1343.9  797.61 1371.89  796.96
 1379.05  796.46 1398.63  796.55 1403.36   796.4 1408.58  796.13 1448.97  794.14
 1461.81  793.95 1470.52  793.45 1472.24  793.33 1474.05  793.28  1482.9  792.98
 1523.23  791.53    1537  790.65 1542.56  790.32 1544.36  790.34  1562.5  790.35
 1574.66  790.22 1581.64  789.78 1587.62  789.55 1605.38  788.68 1614.13  788.19
 1639.47  787.08  1642.5  786.94 1672.67  786.01 1688.12  785.41  1709.1  784.71
 1719.61  784.33 1726.34   784.1 1737.32  784.03 1753.14  783.98  1798.1  783.16
 1800.92  783.08  1832.4  783.28 1846.29  782.66 1866.67  781.75 1882.77  780.72
 1918.63  778.49 1933.69  779.76 1949.21  781.61 1968.46  782.95 1981.99  784.15
 1986.15  784.39 1997.31  784.75 2027.77   784.9 2029.73  784.91  2076.1  786.16
 2076.88  786.24 2078.23  786.43 2090.14  788.17 2121.24  792.56 2123.83  792.87
 2126.03  793.22 2144.79  794.09 2153.74  794.22 2157.94  794.27 2162.66  794.24
 2194.62   794.8 2206.03  795.36  2217.8  796.21    2222  796.52 2229.67  796.77
 2244.68  797.32 2321.19  800.05 2357.25  800.62 2376.22  801.05 2380.86  800.93
 2409.46  802.18 2437.98  803.23 2449.93  804.19 2474.67  805.43 2484.74   805.5
 2504.42  808.81 2509.65  809.86 2512.55  811.09 2527.52  816.26 2573.01  817.86
  2574.4  817.99 2576.66  818.64 2600.69  832.61  2613.7  838.78 2625.37  844.03
 2631.64  845.56 2659.12  851.64  2671.6  855.21 2675.86  857.17

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  435.93     .14    1035    .038    1115     .06 2090.14     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1035    1115           430.84  562.26  880.44             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1150 2675.86     812       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    2200    2250     810    2300    2350     810

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  782.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  782.73  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)         *  770.20  * Flow Area (sq ft)      *  802.66  * 1472.30  *   63.27  *
* E.G. Slope (ft/ft)     *0.000267  * Area (sq ft)           *  802.66  * 1472.30  *  305.04  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  398.14  * 6262.69  *   64.17  *
* Top Width (ft)         *  377.90  * Top Width (ft)         *  165.57  *   80.00  *  132.32  *
* Vel Total (ft/s)       *    2.88  * Avg. Vel. (ft/s)       *    0.50  *    4.25  *    1.01  *
* Max Chl Dpth (ft)      *   20.53  * Hydr. Depth (ft)       *    4.85  *   18.40  *    5.36  *
* Conv. Total (cfs)      *411540.1  * Conv. (cfs)            * 24364.4  *383248.5  *  3927.2  *
* Length Wtd. (ft)       *  572.61  * Wetted Per. (ft)       *  165.96  *   85.72  *   15.94  *
* Min Ch El (ft)         *  762.20  * Shear (lb/sq ft)       *    0.08  *    0.29  *    0.07  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.04  *    1.22  *    0.07  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  724.46  * 5876.75  *  676.22  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  122.81  *  438.07  *  135.15  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  787.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  787.31  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)         *  773.35  * Flow Area (sq ft)      * 1669.64  * 1838.80  *  128.83  *
* E.G. Slope (ft/ft)     *0.000365  * Area (sq ft)           * 1669.64  * 1838.80  * 1798.47  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 1344.95  *10611.28  *  193.77  *
* Top Width (ft)         *  757.27  * Top Width (ft)         *  210.41  *   80.00  *  466.86  *
* Vel Total (ft/s)       *    3.34  * Avg. Vel. (ft/s)       *    0.81  *    5.77  *    1.50  *
* Max Chl Dpth (ft)      *   25.11  * Hydr. Depth (ft)       *    7.94  *   22.98  *    7.65  *
* Conv. Total (cfs)      *635602.9  * Conv. (cfs)            * 70358.5  *555108.0  * 10136.5  *
* Length Wtd. (ft)       *  572.27  * Wetted Per. (ft)       *  211.05  *   85.72  *   22.75  *
* Min Ch El (ft)         *  762.20  * Shear (lb/sq ft)       *    0.18  *    0.49  *    0.13  *
* Alpha                  *    2.62  * Stream Power (lb/ft s) *    0.15  *    2.82  *    0.19  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 1353.55  * 7796.71  * 1350.43  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  173.92  *  477.81  *  191.93  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  791.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  790.76  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)         *  774.05  * Flow Area (sq ft)      * 2455.42  * 2114.91  *  193.47  *
* E.G. Slope (ft/ft)     *0.000259  * Area (sq ft)           * 2455.42  * 2114.91  * 3595.65  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 1941.67  *11277.84  *  280.49  *
* Top Width (ft)         *  919.49  * Top Width (ft)         *  245.63  *   80.00  *  593.86  *
* Vel Total (ft/s)       *    2.83  * Avg. Vel. (ft/s)       *    0.79  *    5.33  *    1.45  *
* Max Chl Dpth (ft)      *   28.56  * Hydr. Depth (ft)       *   10.00  *   26.44  *    9.38  *
* Conv. Total (cfs)      *838974.9  * Conv. (cfs)            *120667.8  *700875.9  * 17431.2  *
* Length Wtd. (ft)       *  573.25  * Wetted Per. (ft)       *  246.45  *   85.72  *   27.88  *
* Min Ch El (ft)         *  762.20  * Shear (lb/sq ft)       *    0.16  *    0.40  *    0.11  *
* Alpha                  *    2.97  * Stream Power (lb/ft s) *    0.13  *    2.13  *    0.16  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 1916.39  * 9352.24  * 2046.62  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  220.17  *  505.75  *  281.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  795.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  794.47  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)         *  776.92  * Flow Area (sq ft)      * 3435.21  * 2411.65  *  277.53  *
* E.G. Slope (ft/ft)     *0.000324  * Area (sq ft)           * 3435.21  * 2411.65  * 6029.59  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 3481.17  *15710.93  *  507.91  *
* Top Width (ft)         * 1118.65  * Top Width (ft)         *  280.38  *   80.00  *  758.27  *
* Vel Total (ft/s)       *    3.22  * Avg. Vel. (ft/s)       *    1.01  *    6.51  *    1.83  *
* Max Chl Dpth (ft)      *   32.27  * Hydr. Depth (ft)       *   12.25  *   30.15  *   11.24  *
* Conv. Total (cfs)      *1093815.0  * Conv. (cfs)            *193286.8  *872327.4  * 28200.8  *
* Length Wtd. (ft)       *  573.68  * Wetted Per. (ft)       *  281.44  *   85.72  *   33.39  *
* Min Ch El (ft)         *  762.20  * Shear (lb/sq ft)       *    0.25  *    0.57  *    0.17  *
* Alpha                  *    3.30  * Stream Power (lb/ft s) *    0.25  *    3.71  *    0.31  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 2775.24  *10979.00  * 3093.18  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  337.23  *  528.60  *  376.94  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  799.11  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)         *  780.37  * Flow Area (sq ft)      * 4787.26  * 2782.44  *  404.71  *
* E.G. Slope (ft/ft)     *0.000355  * Area (sq ft)           * 4787.26  * 2782.44  *10110.79  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 6026.54  *20861.54  *  811.92  *
* Top Width (ft)         * 1480.89  * Top Width (ft)         *  301.34  *   80.00  * 1099.55  *
* Vel Total (ft/s)       *    3.47  * Avg. Vel. (ft/s)       *    1.26  *    7.50  *    2.01  *
* Max Chl Dpth (ft)      *   36.91  * Hydr. Depth (ft)       *   15.89  *   34.78  *   11.56  *
* Conv. Total (cfs)      *1470051.0  * Conv. (cfs)            *319831.2  *1107131.0  * 43088.9  *
* Length Wtd. (ft)       *  573.14  * Wetted Per. (ft)       *  303.14  *   85.72  *   45.40  *
* Min Ch El (ft)         *  762.20  * Shear (lb/sq ft)       *    0.35  *    0.72  *    0.20  *
* Alpha                  *    3.55  * Stream Power (lb/ft s) *    0.44  *    5.39  *    0.40  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 4783.25  *13492.10  * 5469.40  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  661.16  *  556.61  *  776.46  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  803.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.71  * Wt. n-Val.              *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  802.38  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)          *  782.37  * Flow Area (sq ft)      * 5785.79  * 3044.16  *  519.21  *
* E.G. Slope (ft/ft)      *0.000348  * Area (sq ft)           * 5785.79  * 3044.16  *13894.57  *
* Q Total (cfs)           *33260.00  * Flow (cfs)             * 8037.40  *24004.39  * 1218.21  *
* Top Width (ft)          * 1588.93  * Top Width (ft)         *  309.12  *   80.00  * 1199.81  *
* Vel Total (ft/s)        *    3.56  * Avg. Vel. (ft/s)       *    1.39  *    7.89  *    2.35  *
* Max Chl Dpth (ft)       *   40.18  * Hydr. Depth (ft)       *   18.72  *   38.05  *   14.83  *
* Conv. Total (cfs)       *1781962.0  * Conv. (cfs)           *430617.6  *1286077.0  * 65267.7  *
* Length Wtd. (ft)        *  573.54  * Wetted Per. (ft)       *  311.58  *   85.72  *   45.40  *
* Min Ch El (ft)          *  762.20  * Shear (lb/sq ft)       *    0.40  *    0.77  *    0.25  *
* Alpha                   *    3.60  * Stream Power (lb/ft s) *    0.56  *    6.09  *    0.58  *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)   * 6933.98  *14996.50  * 7992.33  *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)         *  891.14  *  563.59  * 1155.63  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  806.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.77  * Wt. n-Val.              *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  805.24  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)          *  784.37  * Flow Area (sq ft)      * 6683.52  * 3272.81  *  619.24  *
* E.G. Slope (ft/ft)      *0.000354  * Area (sq ft)           * 6683.52  * 3272.81  *17409.27  *
* Q Total (cfs)           *39100.00  * Flow (cfs)             *10136.02  *27315.97  * 1648.00  *
* Top Width (ft)          * 1660.75  * Top Width (ft)         *  324.97  *   80.00  * 1255.78  *
* Vel Total (ft/s)        *    3.70  * Avg. Vel. (ft/s)       *    1.52  *    8.35  *    2.66  *
* Max Chl Dpth (ft)       *   43.04  * Hydr. Depth (ft)       *   20.57  *   40.91  *   17.69  *
* Conv. Total (cfs)       *2077064.0  * Conv. (cfs)           *538443.9  *1451075.0  * 87545.0  *
* Length Wtd. (ft)        *  573.86  * Wetted Per. (ft)       *  328.24  *   85.72  *   45.40  *
* Min Ch El (ft)          *  762.20  * Shear (lb/sq ft)       *    0.45  *    0.84  *    0.30  *
* Alpha                   *    3.63  * Stream Power (lb/ft s) *    0.68  *    7.05  *    0.80  *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)   * 8872.00  *15980.53  *10389.96  *
* C & E Loss (ft)         *    0.10  * Cum SA (acres)         * 1053.53  *  564.49  * 1517.44  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  810.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.91  * Wt. n-Val.              *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  809.12  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)          *  786.37  * Flow Area (sq ft)      * 8180.03  * 3583.51  *  755.17  *
* E.G. Slope (ft/ft)      *0.000373  * Area (sq ft)           * 8180.03  * 3583.51  *22376.79  *
* Q Total (cfs)           *47000.00  * Flow (cfs)             *12040.78  *32605.13  * 2354.10  *
* Top Width (ft)          * 1806.05  * Top Width (ft)         *  435.09  *   80.00  * 1290.96  *
* Vel Total (ft/s)        *    3.75  * Avg. Vel. (ft/s)       *    1.47  *    9.10  *    3.12  *
* Max Chl Dpth (ft)       *   46.92  * Hydr. Depth (ft)       *   18.80  *   44.79  *   21.58  *
* Conv. Total (cfs)       *2433032.0  * Conv. (cfs)           *623310.6  *1687858.0  *121863.6  *
* Length Wtd. (ft)        *  575.99  * Wetted Per. (ft)       *  441.12  *   85.72  *   45.40  *
* Min Ch El (ft)          *  762.20  * Shear (lb/sq ft)       *    0.43  *    0.97  *    0.39  *
* Alpha                   *    4.15  * Stream Power (lb/ft s) *    0.64  *    8.86  *    1.21  *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)   *12977.66  *17490.12  *14889.29  *
* C & E Loss (ft)         *    0.13  * Cum SA (acres)         * 1310.51  *  566.83  * 1887.98  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  796.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.48  * Wt. n-Val.              *   0.140  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  796.30  * Reach Len. (ft)        *  430.84  *  562.26  *  880.44  *
* Crit W.S. (ft)          *  777.36  * Flow Area (sq ft)      * 3956.95  * 2558.22  *  324.64  *
* E.G. Slope (ft/ft)      *0.000280  * Area (sq ft)           * 3956.95  * 2558.22  * 7493.47  *
* Q Total (cfs)           *20700.00  * Flow (cfs)             * 4009.94  *16108.35  *  581.71  *
```

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* Top Width (ft)          * 1190.63  * Top Width (ft)          *  289.15  *   80.00  *  821.48  *
* Vel Total (ft/s)        *    3.03  * Avg. Vel. (ft/s)        *    1.01  *    6.30  *    1.79  *
* Max Chl Dpth (ft)       *   34.10  * Hydr. Depth (ft)        *   13.68  *   31.98  *   12.15  *
* Conv. Total (cfs)       *1236817.0  * Conv. (cfs)            *239592.4  *962467.7  * 34756.7  *
* Length Wtd. (ft)        *  573.62  * Wetted Per. (ft)        *  290.40  *   85.72  *   36.12  *
* Min Ch El (ft)          *  762.20  * Shear (lb/sq ft)        *    0.24  *    0.52  *    0.16  *
* Alpha                   *    3.40  * Stream Power (lb/ft s) *    0.24  *    3.29  *    0.28  *
* Frctn Loss (ft)         *    0.12  * Cum Volume (acre-ft)    * 3358.71  *11830.46  * 3737.94  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)          *  426.82  *  538.98  *  446.69  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 20.195

INPUT
Description: Ineffective areas - behind RR on Left and in tributary floodplain
             on Right.
Station Elevation Data    num=     276
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   851.41     2.31   851.08     5.11   851.06     9.23   851.05    11.69   851.01
   25.75      851    31.17   851.01    39.73   851.06    56.82   851.32    61.25   851.29
   74.43    851.1    95.63   848.29   104.04   846.78   107.08   846.45   108.43   846.29
  115.99   845.22    142.5   841.98   155.26   840.71   159.98   840.51   174.67   841.16
  191.34   840.52   196.15   840.64   197.33   840.64   205.18   840.18   215.47   839.51
  228.22   838.65   233.48   838.34   247.91   837.01   260.44    835.7   270.27    834.5
  284.93   832.89   288.92   832.54   290.84   832.37   308.13   830.91    331.7   827.26
  353.67   822.22   365.46   817.07   380.51   812.66   381.62   812.26   383.76   811.22
  406.06    799.3   407.89   798.43   411.09   796.39   425.74   788.07   432.38   785.98
  442.38   781.99   445.35    782.2   465.13   787.44   483.06   791.51   493.41   796.93
   508.5   804.73    528.3   799.39   541.88    798.2    556.7   791.31   586.97   782.22
  602.59   778.41   617.48   778.61   643.97   778.94   666.45   787.74   671.22   791.47
  682.02   789.06   695.79   787.38   708.73   784.96   714.67   784.46   725.74   783.51
  736.14   783.26   755.32   781.28   761.44    780.8   772.85   780.54   782.64    780.4
  785.84   780.53   794.44   779.87   809.59   778.61    813.3   778.28   815.65   778.15
  854.34   778.05   854.67   778.04   855.09   778.03   914.64   776.93   924.08   772.52
     935      771      945      763      975    761.7     1005      763     1015      769
 1028.15   771.83  1032.74   771.57  1045.28   770.91  1068.28   772.03  1087.19   773.52
 1091.91   774.04  1096.44   774.53   1113.9   777.62  1117.75   778.28  1118.22   778.32
 1122.26   778.82   1128.9   779.65  1145.14   781.58  1147.22   781.81  1155.71   781.53
 1175.16   783.93  1188.08   785.05  1208.37    786.2  1219.87   787.24  1245.68   789.21
 1247.73   789.37  1265.65   790.44  1271.55   790.57  1284.19   791.01  1295.97   791.45
 1299.75   791.63  1301.78   791.71  1303.39   791.79  1308.16   791.99  1322.61   792.69
 1344.83    794.6  1358.21   797.85  1367.29   800.08  1389.28   798.54  1398.02    797.9
  1408.9    796.3  1424.94    792.4   1434.6   790.09  1449.32   790.23  1463.45   790.13
 1469.93   790.85  1473.25   791.03   1474.2   790.95   1513.8   789.97  1545.55   789.85
  1571.6   789.74  1583.12   789.75  1617.17   789.13  1631.66   788.91  1635.06   788.73
 1648.57   788.44  1660.24   788.15  1665.16    788.2  1690.24   788.23  1691.76   788.22
 1692.19   788.22  1694.72   788.24  1713.78   788.24  1725.53   787.77  1733.81    787.1
 1747.53   787.33  1755.24   787.32  1771.99   786.93  1777.63    786.8  1792.26   785.68
 1796.02   785.53  1810.77    785.3  1811.68   785.41  1813.13   785.58  1825.37   786.92
 1828.14   787.26  1838.59    786.6  1841.17    786.4  1842.11   786.37  1856.22   786.45
 1867.97    786.6  1874.69   786.67  1891.79   787.33   1893.4   787.37  1894.28   787.51
 1914.01   788.01  1917.61   788.03  1930.69   788.14  1936.73   788.32  1942.28   788.88
 1945.29   788.68  1959.37   787.55  1966.93   787.66  1976.06   788.17  1981.44    788.4
 1988.95      789  1999.44   789.42  2005.61   789.74   2013.2   789.58  2026.68    789.6
 2044.89    789.5  2050.54   789.94  2061.01   790.31  2069.73   790.07  2070.98   789.93
 2072.37   789.82  2082.55    789.3  2082.85   789.28  2082.91   789.28  2083.06   789.28
 2101.89   790.39  2116.55   791.27   2128.1      792  2132.19   792.45  2144.38    793.4
 2150.43   793.25   2153.4   793.58  2169.56   795.57  2173.51   795.98   2177.2   795.89
 2186.07   795.54  2191.74    795.8  2229.85   797.57  2230.61   797.57  2232.21   797.71
 2254.31   798.49  2286.08   798.26   2294.5   798.28   2303.4   798.34  2343.95   798.62
 2354.05   797.77  2382.59   797.86  2386.35   797.96  2401.19   797.98  2415.73   797.62
 2431.37   797.59  2439.39   797.41   2440.9   797.34  2441.61   797.24  2443.92   796.77
 2461.67   794.49  2472.27   792.66  2475.05   792.56  2496.33   792.14  2497.56   792.01
  2510.6      791  2515.34   790.18  2531.64   787.51  2537.07   786.79  2545.03    785.8
 2557.21   785.35  2562.87   785.23  2585.77   784.76  2591.74   784.83  2592.79   784.84
 2595.26   785.05  2618.51   785.87  2622.93   786.73  2631.76   789.45  2638.54   787.85
 2644.05   789.51  2656.27   792.46  2658.74   792.55  2659.33    792.6  2661.21   792.84
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 2672.51  793.93 2678.84  794.93 2685.59  796.86 2689.53  797.86 2694.98  799.31
 2697.84  799.83 2726.64  801.65 2742.95  801.26 2753.07  806.92 2755.68  808.64
  2758.8  809.47 2768.45  811.83 2771.28  812.95 2788.81   821.3 2793.66  823.31
 2798.25   825.6  2807.4  830.38 2826.76  840.27 2833.83  843.95    2843  848.26
 2865.43  855.21 2865.56  855.25 2865.66  855.29 2894.46  867.56 2895.44  867.93
 2896.69  868.07  2912.2  870.14  2922.9  871.32 2945.77  873.37 2960.73  874.42
 2961.79  874.49

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0      .1  308.13     .14     935    .038    1015    .125 1301.78      .1
  2303.4     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           935    1015           603.01  574.15  520.09             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  732.65  813.29       F
 1198.89 2961.79  813.65       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    2250    2300     810    2350    2400     810

CROSS SECTION OUTPUT  Profile #2-yr
************************************************************************************************
* E.G. Elev (ft)         *  782.84  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  782.66  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  769.35  * Flow Area (sq ft)      *  851.13  * 1541.58  * 1101.49  *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           * 1072.90  * 1541.58  * 1101.49  *
* Q Total (cfs)          * 6725.00  * Flow (cfs)             *  331.16  * 5719.23  *  674.61  *
* Top Width (ft)         *  497.19  * Top Width (ft)         *  267.34  *   80.00  *  149.85  *
* Vel Total (ft/s)       *    1.92  * Avg. Vel. (ft/s)       *    0.39  *    3.71  *    0.61  *
* Max Chl Dpth (ft)      *   20.96  * Hydr. Depth (ft)       *    4.41  *   19.27  *    7.35  *
* Conv. Total (cfs)      *491121.7  * Conv. (cfs)            * 24184.3  *417671.3  * 49266.1  *
* Length Wtd. (ft)       *  570.28  * Wetted Per. (ft)       *  194.31  *   84.52  *  150.92  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.05  *    0.21  *    0.09  *
* Alpha                  *    3.17  * Stream Power (lb/ft s) *    0.02  *    0.79  *    0.05  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *  715.18  * 5857.30  *  662.01  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  120.67  *  437.04  *  132.30  *
************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
************************************************************************************************
* E.G. Elev (ft)         *  787.54  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  787.26  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  772.63  * Flow Area (sq ft)      * 1778.98  * 1910.00  * 1888.92  *
* E.G. Slope (ft/ft)     *0.000241  * Area (sq ft)           * 2564.68  * 1910.00  * 2176.49  *
* Q Total (cfs)          *12150.00  * Flow (cfs)             * 1243.16  * 9266.97  * 1639.87  *
* Top Width (ft)         *  890.13  * Top Width (ft)         *  369.79  *   80.00  *  440.34  *
* Vel Total (ft/s)       *    2.18  * Avg. Vel. (ft/s)       *    0.70  *    4.85  *    0.87  *
* Max Chl Dpth (ft)      *   25.56  * Hydr. Depth (ft)       *    8.79  *   23.87  *   10.27  *
* Conv. Total (cfs)      *782676.9  * Conv. (cfs)            * 80081.8  *596958.3  *105636.9  *
* Length Wtd. (ft)       *  570.02  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.13  *    0.34  *    0.15  *
* Alpha                  *    3.82  * Stream Power (lb/ft s) *    0.09  *    1.65  *    0.13  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 1332.61  * 7772.52  * 1310.26  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  171.05  *  476.78  *  182.76  *
************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
************************************************************************************************
* E.G. Elev (ft)         *  790.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  790.76  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
```

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* Crit W.S. (ft)         *  773.34  * Flow Area (sq ft)      * 2486.26  * 2189.63  * 2531.68  *
* E.G. Slope (ft/ft)     *0.000162  * Area (sq ft)           * 3971.75  * 2189.63  * 4740.83  *
* Q Total (cfs)          *13500.00  * Flow (cfs)             * 1779.05  * 9532.34  * 2188.61  *
* Top Width (ft)         * 1573.61  * Top Width (ft)         *  431.10  *   80.00  * 1062.51  *
* Vel Total (ft/s)       *    1.87  * Avg. Vel. (ft/s)       *    0.72  *    4.35  *    0.86  *
* Max Chl Dpth (ft)      *   29.06  * Hydr. Depth (ft)       *   12.29  *   27.37  *   13.77  *
* Conv. Total (cfs)      *1061631.0  * Conv. (cfs)           *139903.4  *749616.9  *172111.0  *
* Length Wtd. (ft)       *  569.77  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.12  *    0.26  *    0.14  *
* Alpha                  *    3.87  * Stream Power (lb/ft s) *    0.09  *    1.14  *    0.12  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 1884.60  * 9324.46  * 1962.37  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  216.82  *  504.72  *  264.87  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  794.78  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  794.50  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  776.03  * Flow Area (sq ft)      * 3242.96  * 2488.79  * 3219.35  *
* E.G. Slope (ft/ft)     *0.000197  * Area (sq ft)           * 5647.02  * 2488.79  * 9194.47  *
* Q Total (cfs)          *19700.00  * Flow (cfs)             * 3059.51  *13032.72  * 3607.77  *
* Top Width (ft)         * 1827.16  * Top Width (ft)         *  459.50  *   80.00  * 1287.66  *
* Vel Total (ft/s)       *    2.20  * Avg. Vel. (ft/s)       *    0.94  *    5.24  *    1.12  *
* Max Chl Dpth (ft)      *   32.80  * Hydr. Depth (ft)       *   16.03  *   31.11  *   17.51  *
* Conv. Total (cfs)      *1402710.0  * Conv. (cfs)           *217847.9  *927976.4  *256886.0  *
* Length Wtd. (ft)       *  569.59  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.20  *    0.36  *    0.21  *
* Alpha                  *    3.82  * Stream Power (lb/ft s) *    0.18  *    1.90  *    0.24  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 2730.33  *10947.37  * 2939.32  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  333.57  *  527.57  *  356.27  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  799.52  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  799.16  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  779.28  * Flow Area (sq ft)      * 4187.21  * 2862.10  * 4077.45  *
* E.G. Slope (ft/ft)     *0.000216  * Area (sq ft)           * 7858.36  * 2862.10  *15753.37  *
* Q Total (cfs)          *27700.00  * Flow (cfs)             * 4899.08  *17206.36  * 5594.56  *
* Top Width (ft)         * 2138.12  * Top Width (ft)         *  495.50  *   80.00  * 1562.62  *
* Vel Total (ft/s)       *    2.49  * Avg. Vel. (ft/s)       *    1.17  *    6.01  *    1.37  *
* Max Chl Dpth (ft)      *   37.46  * Hydr. Depth (ft)       *   20.69  *   35.78  *   22.17  *
* Conv. Total (cfs)      *1885770.0  * Conv. (cfs)           *333521.5  *1171381.0  *380868.1  *
* Length Wtd. (ft)       *  569.21  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.28  *    0.46  *    0.30  *
* Alpha                  *    3.72  * Stream Power (lb/ft s) *    0.32  *    2.74  *    0.41  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 4720.71  *13455.67  * 5208.01  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  657.22  *  555.58  *  749.55  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  802.83  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  802.44  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  781.18  * Flow Area (sq ft)      * 4850.68  * 3124.41  * 4680.40  *
* E.G. Slope (ft/ft)     *0.000216  * Area (sq ft)           * 9529.06  * 3124.41  *21000.79  *
* Q Total (cfs)          *33260.00  * Flow (cfs)             * 6268.66  *19941.41  * 7049.93  *
* Top Width (ft)         * 2231.98  * Top Width (ft)         *  521.91  *   80.00  * 1630.06  *
* Vel Total (ft/s)       *    2.63  * Avg. Vel. (ft/s)       *    1.29  *    6.38  *    1.51  *
* Max Chl Dpth (ft)      *   40.74  * Hydr. Depth (ft)       *   23.97  *   39.06  *   25.45  *
* Conv. Total (cfs)      *2261186.0  * Conv. (cfs)           *426175.5  *1355720.0  *479290.5  *
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* Length Wtd. (ft)       *  568.95  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.32  *    0.50  *    0.34  *
* Alpha                  *    3.65  * Stream Power (lb/ft s) *    0.42  *    3.19  *    0.51  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 6858.24  *14956.69  * 7639.68  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  887.03  *  562.56  * 1127.03  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  805.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  805.31  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  782.96  * Flow Area (sq ft)      * 5430.76  * 3353.75  * 5207.56  *
* E.G. Slope (ft/ft)     *0.000224  * Area (sq ft)           *11055.15  * 3353.75  *25681.04  *
* Q Total (cfs)          *39100.00  * Flow (cfs)             * 7699.20  *22831.51  * 8569.29  *
* Top Width (ft)         * 2255.37  * Top Width (ft)         *  540.18  *   80.00  * 1635.19  *
* Vel Total (ft/s)       *    2.79  * Avg. Vel. (ft/s)       *    1.42  *    6.81  *    1.65  *
* Max Chl Dpth (ft)      *   43.61  * Hydr. Depth (ft)       *   26.84  *   41.92  *   28.32  *
* Conv. Total (cfs)      *2612657.0  * Conv. (cfs)            *514459.5  *1525598.0  *572599.1  *
* Length Wtd. (ft)       *  568.77  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.37  *    0.55  *    0.39  *
* Alpha                  *    3.59  * Stream Power (lb/ft s) *    0.53  *    3.78  *    0.65  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 8784.28  *15937.77  * 9954.48  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1049.25  *  563.46  * 1488.22  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  809.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  809.25  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  784.80  * Flow Area (sq ft)      * 6228.74  * 3669.23  * 5932.74  *
* E.G. Slope (ft/ft)     *0.000225  * Area (sq ft)           *13199.93  * 3669.23  *32143.07  *
* Q Total (cfs)          *47000.00  * Flow (cfs)             * 9707.22  *26608.86  *10683.91  *
* Top Width (ft)         * 2270.54  * Top Width (ft)         *  547.56  *   80.00  * 1642.98  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.56  *    7.25  *    1.80  *
* Max Chl Dpth (ft)      *   47.55  * Hydr. Depth (ft)       *   30.78  *   45.87  *   32.26  *
* Conv. Total (cfs)      *3130302.0  * Conv. (cfs)            *646522.1  *1772208.0  *711571.9  *
* Length Wtd. (ft)       *  568.56  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.43  *    0.61  *    0.45  *
* Alpha                  *    3.52  * Stream Power (lb/ft s) *    0.67  *    4.43  *    0.81  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *12871.93  *17443.31  *14338.31  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         * 1305.65  *  565.80  * 1858.33  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  796.60  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.140  *   0.038  *   0.125  *
* W.S. Elev (ft)         *  796.33  * Reach Len. (ft)        *  603.01  *  574.15  *  520.09  *
* Crit W.S. (ft)         *  776.43  * Flow Area (sq ft)      * 3614.74  * 2635.77  * 3557.21  *
* E.G. Slope (ft/ft)     *0.000170  * Area (sq ft)           * 6501.07  * 2635.77  *11623.92  *
* Q Total (cfs)          *20700.00  * Flow (cfs)             * 3408.09  *13331.19  * 3960.72  *
* Top Width (ft)         * 1918.20  * Top Width (ft)         *  470.19  *   80.00  * 1368.00  *
* Vel Total (ft/s)       *    2.11  * Avg. Vel. (ft/s)       *    0.94  *    5.06  *    1.11  *
* Max Chl Dpth (ft)      *   34.63  * Hydr. Depth (ft)       *   17.86  *   32.95  *   19.34  *
* Conv. Total (cfs)      *1585518.0  * Conv. (cfs)            *261042.5  *1021103.0  *303371.9  *
* Length Wtd. (ft)       *  569.53  * Wetted Per. (ft)       *  203.67  *   84.52  *  185.11  *
* Min Ch El (ft)         *  761.70  * Shear (lb/sq ft)       *    0.19  *    0.33  *    0.20  *
* Alpha                  *    3.78  * Stream Power (lb/ft s) *    0.18  *    1.68  *    0.23  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 3306.99  *11796.94  * 3544.74  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  423.06  *  537.94  *  424.56  *
**********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 20.087

INPUT
Description: Indian Creek tributary blocked out in LOB. Ineffective flow from Bannister Rd embankment D/S

Station Elevation Data num= 232

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	852.94	3.7	853.07	36.17	849.85	48.77	847.74	55.07	847.61
58.83	847.17	69.71	846.26	72.27	846.1	73.79	845.84	86.89	844.45
103.99	843.21	109.23	842.7	109.25	842.7	112.64	842.34	127.19	840.22
136.25	839.28	148.54	837.7	153.06	837.49	164.27	835.97	172.86	834.71
179.71	834.16	206.62	832.17	221.72	831.04	223.39	830.9	224.18	830.82
232.78	829.86	245.67	828.41	247.54	827.98	261.83	824.36	292.05	816.51
304.6	812.98	317.08	807.8	325.05	802.2	343.15	797.5	347.26	797.99
352.91	793.11	366.36	788.89	370.63	790.5	373.64	787.91	390.32	785.04
390.54	785.08	402.9	783.69	405.15	782.45	411.93	779	415.66	779.38
422.13	778.2	437.44	770.52	438.83	771.56	451.5	773.42	451.69	773.47
451.7	773.47	451.79	773.45	461.15	773.61	465.54	780.01	476.96	779.24
482.35	779.16	492.41	778.18	492.88	778.12	509.75	766.73	509.78	766.71
509.81	766.72	509.84	766.71	510.13	766.64	529.19	762.5	531.51	762.58
562.22	762.2	579.75	764.77	659.59	765.24	669.79	765.48	671.77	765.93
679.28	768.84	688.66	772.31	689.69	772.72	690.14	772.71	692.85	772.75
701.07	771.49	707.44	770.74	715.68	774.08	717.83	776.92	726.26	776.94
736.24	779.02	748.59	779.8	772.51	780.02	782.78	780.16	789.71	780.3
804.43	780.63	809.02	780.49	813.76	780.51	830.15	780.51	848.92	779.71
853.65	779.56	861.22	779.42	874.54	779.31	889.46	778.98	905.21	778.24
914.79	778.55	923.66	778.52	929.84	778.43	942.33	777.96	954.03	777.97
972.31	777.32	976.82	777.06	979.17	777	983.19	777.04	1008.73	776.98
1021.73	776.57	1039.52	776.44	1050.17	777.41	1057.27	777.47	1060.17	777.6
1068.88	777.73	1074.2	777.96	1085.94	778.55	1091.95	778.35	1110	770
1120	762	1150	761.1	1180	762	1190	768	1238.18	768
1242.43	770.08	1247.82	772.38	1257.93	776.69	1265.18	778.61	1286.37	778.38
1303.17	778.58	1309.69	778.41	1331.48	779.04	1334.97	779.11	1340.84	779.23
1342.06	779.34	1360.82	780.33	1380.43	786.46	1399.17	793.52	1408.75	794.73
1423.94	794.26	1439.45	795.04	1453.59	795.64	1463.69	795.55	1471.02	795.41
1474.97	795.88	1488.57	796.68	1502.2	796.64	1520.57	796.97	1525.82	796.91
1549.12	796.72	1566.2	796.74	1584.13	796.83	1585.12	796.8	1586.37	796.86
1587.48	796.88	1615.61	797.57	1624.12	797.82	1632.4	797.65	1670.37	797.73
1687.12	797.9	1736.57	798.19	1754.38	798.28	1793.38	798.23	1811.5	798.18
1860.36	798.34	1884.37	798.49	1931.24	797.7	1950.78	797.24	1956.71	797.16
1960.95	797.21	1978.51	797.29	1986.88	797.52	2000.66	798.3	2011.56	798.28
2040.27	798.46	2048.5	798.46	2056.78	798.56	2077.66	798.91	2091.53	798.94
2106.31	799.14	2131.81	799.45	2136.06	799.5	2151.98	799.5	2171.04	799.48
2177.78	799.53	2201.68	799.36	2263.4	799.99	2272.22	799.94	2311.68	800.22
2316.51	800.26	2318.4	800.28	2362.03	801.51	2364.95	801.56	2407.83	801.61
2450.77	801.59	2452.5	801.59	2453.28	801.58	2472.34	801.16	2511.38	801.16
2511.81	801.16	2514.16	801.15	2542.71	801.05	2550.49	801.27	2563.96	801.69
2574.5	801.74	2595.68	801.84	2610.91	801.9	2623.24	801.82	2636.05	801.45
2644.63	802.15	2656.51	803.85	2660.14	804.66	2682.24	804.64	2702.18	806.38
2711.19	805.24	2719.51	806.36	2727.13	807.08	2755.76	811.71	2757.25	812.36
2760.77	813.78	2788.75	825.71	2802.77	833.85	2806.4	835.55	2813.85	839.09
2829.11	845.49	2835.37	847.26	2842.85	849.83	2855.78	853.73	2861.59	856.15
2871.08	861.58	2883.89	868.3	2893.98	871.1	2905.85	875.01	2909.95	875.32
2925.91	875.3	2929.16	875.07						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.105	748.59	.06	929.84	.105	1110	.038	1190	.105
1549.12	.05	2719.51	.125						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1110	1190	402.75	436.5	465	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	893.62	810.65	F
1409.81	2929.16	810.82	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	782.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.097	0.038	0.105
W.S. Elev (ft)	782.00	Reach Len. (ft)	402.75	436.50	465.00
Crit W.S. (ft)	772.03	Flow Area (sq ft)	1013.53	1556.78	1197.01
E.G. Slope (ft/ft)	0.000625	Area (sq ft)	5430.74	1556.78	1197.01
Q Total (cfs)	13200.00	Flow (cfs)	1082.20	10612.58	1505.22
Top Width (ft)	960.11	Top Width (ft)	703.96	80.00	176.15
Vel Total (ft/s)	3.50	Avg. Vel. (ft/s)	1.07	6.82	1.26
Max Chl Dpth (ft)	20.90	Hydr. Depth (ft)	4.68	19.46	6.80
Conv. Total (cfs)	528188.9	Conv. (cfs)	43303.6	424655.0	60230.2
Length Wtd. (ft)	436.36	Wetted Per. (ft)	218.34	84.50	178.54
Min Ch El (ft)	761.10	Shear (lb/sq ft)	0.18	0.72	0.26
Alpha	3.07	Stream Power (lb/ft s)	0.19	4.90	0.33
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	670.17	5836.88	648.29
C & E Loss (ft)	0.05	Cum SA (acres)	113.94	435.98	130.35

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	787.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.095	0.038	0.105
W.S. Elev (ft)	786.75	Reach Len. (ft)	402.75	436.50	465.00
Crit W.S. (ft)	774.80	Flow Area (sq ft)	2041.09	1936.69	2069.59
E.G. Slope (ft/ft)	0.000515	Area (sq ft)	8824.09	1936.69	2069.59
Q Total (cfs)	20300.00	Flow (cfs)	3209.05	13872.27	3218.68
Top Width (ft)	1000.79	Top Width (ft)	729.60	80.00	191.19
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	1.57	7.16	1.56
Max Chl Dpth (ft)	25.65	Hydr. Depth (ft)	9.43	24.21	10.82
Conv. Total (cfs)	894211.8	Conv. (cfs)	141358.3	611071.1	141782.4
Length Wtd. (ft)	435.56	Wetted Per. (ft)	218.34	84.50	194.31
Min Ch El (ft)	761.10	Shear (lb/sq ft)	0.30	0.74	0.34
Alpha	3.18	Stream Power (lb/ft s)	0.47	5.28	0.53
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	1253.78	7747.17	1284.91
C & E Loss (ft)	0.01	Cum SA (acres)	163.44	475.72	178.99

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	790.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.095	0.038	0.105
W.S. Elev (ft)	790.21	Reach Len. (ft)	402.75	436.50	465.00
Crit W.S. (ft)	776.83	Flow Area (sq ft)	2790.18	2213.65	2747.38
E.G. Slope (ft/ft)	0.000463	Area (sq ft)	11377.51	2213.65	2747.38
Q Total (cfs)	26320.00	Flow (cfs)	5149.79	16435.02	4735.19
Top Width (ft)	1027.11	Top Width (ft)	746.73	80.00	200.38
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)	1.85	7.42	1.72
Max Chl Dpth (ft)	29.11	Hydr. Depth (ft)	12.89	27.67	13.71
Conv. Total (cfs)	1222793.0	Conv. (cfs)	239252.6	763549.9	219990.8
Length Wtd. (ft)	435.15	Wetted Per. (ft)	218.34	84.50	204.13
Min Ch El (ft)	761.10	Shear (lb/sq ft)	0.37	0.76	0.39
Alpha	3.09	Stream Power (lb/ft s)	0.68	5.63	0.67
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	1778.36	9295.44	1917.67
C & E Loss (ft)	0.00	Cum SA (acres)	208.67	503.66	257.33

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	794.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.094	0.038	0.105
W.S. Elev (ft)	794.00	Reach Len. (ft)	402.75	436.50	465.00
Crit W.S. (ft)	781.39	Flow Area (sq ft)	3611.25	2517.21	3527.45
E.G. Slope (ft/ft)	0.000432	Area (sq ft)	14237.21	2517.21	3527.45
Q Total (cfs)	34000.00	Flow (cfs)	7674.03	19671.81	6654.16

```
* Top Width (ft)         * 1051.12  * Top Width (ft)         *  758.12  *   80.00  *  212.99  *
* Vel Total (ft/s)       *    3.52  * Avg. Vel. (ft/s)       *    2.13  *    7.81  *    1.89  *
* Max Chl Dpth (ft)      *   32.90  * Hydr. Depth (ft)       *   16.69  *   31.47  *   16.56  *
* Conv. Total (cfs)      *1634899.0  * Conv. (cfs)           *369007.6  *945924.4  *319967.1  *
* Length Wtd. (ft)       *  434.81  * Wetted Per. (ft)       *  218.34  *   84.50  *  217.37  *
* Min Ch El (ft)         *  761.10  * Shear (lb/sq ft)       *    0.45  *    0.80  *    0.44  *
* Alpha                  *    2.99  * Stream Power (lb/ft s) *    0.95  *    6.29  *    0.83  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 2592.70  *10914.38  * 2863.37  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  325.14  *  526.51  *  347.31  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.094  *   0.038  *   0.105  *
* W.S. Elev (ft)         *  798.73  * Reach Len. (ft)        *  402.75  *  436.50  *  465.00  *
* Crit W.S. (ft)         *  783.41  * Flow Area (sq ft)      * 4633.60  * 2895.19  * 4563.16  *
* E.G. Slope (ft/ft)     *0.000396  * Area (sq ft)           *17838.73  * 2895.19  * 5380.58  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *11154.78  *23766.79  * 9578.43  *
* Top Width (ft)         * 1728.35  * Top Width (ft)         *  771.58  *   80.00  *  876.77  *
* Vel Total (ft/s)       *    3.68  * Avg. Vel. (ft/s)       *    2.41  *    8.21  *    2.10  *
* Max Chl Dpth (ft)      *   37.63  * Hydr. Depth (ft)       *   21.41  *   36.19  *   20.76  *
* Conv. Total (cfs)      *2236194.0  * Conv. (cfs)           *560544.8  *1194318.0  *481330.8  *
* Length Wtd. (ft)       *  434.61  * Wetted Per. (ft)       *  218.34  *   84.50  *  224.24  *
* Min Ch El (ft)         *  761.10  * Shear (lb/sq ft)       *    0.52  *    0.85  *    0.50  *
* Alpha                  *    2.83  * Stream Power (lb/ft s) *    1.26  *    6.95  *    1.06  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 4542.84  *13417.73  * 5081.85  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  648.45  *  554.53  *  734.99  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.094  *   0.038  *   0.105  *
* W.S. Elev (ft)         *  801.99  * Reach Len. (ft)        *  402.75  *  436.50  *  465.00  *
* Crit W.S. (ft)         *  784.91  * Flow Area (sq ft)      * 5339.79  * 3156.29  * 5280.55  *
* E.G. Slope (ft/ft)     *0.000394  * Area (sq ft)           *20377.41  * 3156.29  * 9041.83  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *14115.88  *27383.94  *12190.19  *
* Top Width (ft)         * 2316.83  * Top Width (ft)         *  784.15  *   80.00  * 1452.68  *
* Vel Total (ft/s)       *    3.90  * Avg. Vel. (ft/s)       *    2.64  *    8.68  *    2.31  *
* Max Chl Dpth (ft)      *   40.89  * Hydr. Depth (ft)       *   24.68  *   39.45  *   24.02  *
* Conv. Total (cfs)      *2704056.0  * Conv. (cfs)           *710935.3  *1379171.0  *613949.3  *
* Length Wtd. (ft)       *  434.52  * Wetted Per. (ft)       *  218.34  *   84.50  *  224.24  *
* Min Ch El (ft)         *  761.10  * Shear (lb/sq ft)       *    0.60  *    0.92  *    0.58  *
* Alpha                  *    2.73  * Stream Power (lb/ft s) *    1.59  *    7.98  *    1.34  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 6651.24  *14915.30  * 7460.33  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  877.99  *  561.50  * 1108.62  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  805.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.094  *   0.038  *   0.105  *
* W.S. Elev (ft)         *  804.87  * Reach Len. (ft)        *  402.75  *  436.50  *  465.00  *
* Crit W.S. (ft)         *  786.12  * Flow Area (sq ft)      * 5961.98  * 3386.32  * 5912.60  *
* E.G. Slope (ft/ft)     *0.000388  * Area (sq ft)           *22639.46  * 3386.32  *13253.83  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *16845.16  *30551.33  *14603.51  *
* Top Width (ft)         * 2363.58  * Top Width (ft)         *  788.75  *   80.00  * 1494.84  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    2.83  *    9.02  *    2.47  *
* Max Chl Dpth (ft)      *   43.77  * Hydr. Depth (ft)       *   27.55  *   42.33  *   26.90  *
* Conv. Total (cfs)      *3147017.0  * Conv. (cfs)           *855032.3  *1550735.0  *741249.6  *
* Length Wtd. (ft)       *  434.45  * Wetted Per. (ft)       *  218.34  *   84.50  *  224.24  *
* Min Ch El (ft)         *  761.10  * Shear (lb/sq ft)       *    0.66  *    0.97  *    0.64  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *    1.87  *    8.76  *    1.58  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 8551.06  *15893.35  * 9722.05  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1040.05  *  562.40  * 1469.54  *
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	809.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.094	0.038	0.105
W.S. Elev (ft)	808.79	Reach Len. (ft)	402.75	436.50	465.00
Crit W.S. (ft)	787.82	Flow Area (sq ft)	6811.17	3700.29	6775.25
E.G. Slope (ft/ft)	0.000387	Area (sq ft)	25746.38	3700.29	19251.93
Q Total (cfs)	74720.00	Flow (cfs)	21030.42	35382.59	18306.99
Top Width (ft)	2423.02	Top Width (ft)	795.31	80.00	1547.71
Vel Total (ft/s)	4.32	Avg. Vel. (ft/s)	3.09	9.56	2.70
Max Chl Dpth (ft)	47.69	Hydr. Depth (ft)	31.48	46.25	30.82
Conv. Total (cfs)	3796324.0	Conv. (cfs)	1068500.0	1797695.0	930129.6
Length Wtd. (ft)	434.38	Wetted Per. (ft)	218.34	84.50	224.24
Min Ch El (ft)	761.10	Shear (lb/sq ft)	0.75	1.06	0.73
Alpha	2.56	Stream Power (lb/ft s)	2.33	10.13	1.97
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	12602.36	17394.74	14031.50
C & E Loss (ft)	0.02	Cum SA (acres)	1296.35	564.74	1839.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	796.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.094	0.038	0.105
W.S. Elev (ft)	795.81	Reach Len. (ft)	402.75	436.50	465.00
Crit W.S. (ft)	782.23	Flow Area (sq ft)	4001.88	2661.63	3921.43
E.G. Slope (ft/ft)	0.000422	Area (sq ft)	15607.73	2661.63	3970.01
Q Total (cfs)	38000.00	Flow (cfs)	9003.25	21318.53	7678.22
Top Width (ft)	1124.58	Top Width (ft)	760.21	80.00	284.36
Vel Total (ft/s)	3.59	Avg. Vel. (ft/s)	2.25	8.01	1.96
Max Chl Dpth (ft)	34.71	Hydr. Depth (ft)	18.49	33.27	17.84
Conv. Total (cfs)	1850393.0	Conv. (cfs)	438409.5	1038096.0	373887.4
Length Wtd. (ft)	434.69	Wetted Per. (ft)	218.34	84.50	224.24
Min Ch El (ft)	761.10	Shear (lb/sq ft)	0.48	0.83	0.46
Alpha	2.95	Stream Power (lb/ft s)	1.09	6.64	0.90
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	3153.97	11762.03	3451.64
C & E Loss (ft)	0.01	Cum SA (acres)	414.55	536.89	414.69

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 20.004

INPUT
Description: U/S of Bannister Rd. Dodson XS 21.603
Station Elevation Data num= 284

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	810.29	6.74	810.45	8.79	810.5	11.88	810.56	56.28	811.79
58.32	811.83	91.52	812.75	92.23	812.78	126.58	813.73	126.78	813.74
127.15	813.75	139.59	814.09	159.24	814.63	169.53	814.91	171.02	814.95
200.45	815.88	201.31	815.91	211.18	816.22	212.14	816.25	214.12	816.31
243.42	817.23	245.66	817.3	272.62	818.16	275.34	818.24	293.18	818.8
295.54	818.88	297.95	818.95	321.15	819.68	323.85	819.77	347.38	820.51
350.39	820.6	355.3	820.76	374.63	821.32	378.92	821.45	397.2	821.98
401.73	822.12	419.35	822.64	425.63	822.83	445.18	823.4	450.03	823.54
466.93	824.03	473.31	824.22	478.43	824.38	494.33	824.84	499.99	825.01
514.49	825.43	520.45	825.62	528.53	825.85	535.27	826.05	543.15	826.29
558.28	826.72	566.26	826.97	576	827.28	587.52	827.61	595.12	827.8
601.91	828	614.93	828.33	620.45	828.48	634.8	828.84	653.72	829.3
654.24	829.32	654.33	829.32	657.97	829.41	673.54	829.47	674.94	829.47
698.81	829.57	702.89	829.59	706.98	829.61	721.04	829.67	725.57	829.7
738.41	829.75	745.14	829.87	762.86	829.96	763.58	829.98	772.94	829.19
777.98	827.79	779.16	826.84	779.85	826.5	779.93	826.47	779.97	826.45
789.01	821.39	801.41	815.49	803.27	814.53	821.71	805.78	825.38	803.73

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  828.02  802.48  829.95  801.76  831.63  801.82  839.92  801.81  847.38  802.76
  849.81  803.01  853.57  803.01  855.05  803.01   858.3  802.55  864.89  801.48
  871.12  800.87  873.06  800.62  881.18  804.47  884.07  805.37   886.4  806.45
  905.81  815.63  923.61  824.03  929.36  826.29  933.92  828.44  935.49  829.42
  939.06  829.81  985.26  829.12  997.28  828.72 1001.62  828.65  1033.3  827.95
 1046.54  827.76 1068.42  827.27 1073.56  826.99 1091.02  826.04 1113.81  825.54
 1118.93  826.13 1119.03  826.08 1126.88  822.52 1127.75  822.36 1135.78  819.76
 1160.05  811.39 1175.66  806.01 1178.66  804.93 1179.88  804.51  1186.2  802.39
 1216.67  792.39 1219.69   791.4 1231.63  786.89 1241.77  783.11 1268.77  774.96
 1269.46  774.71 1271.41  774.15 1275.33  774.14  1297.8  774.31 1303.84  774.57
 1312.17  774.92 1319.63  775.46 1323.28   773.6 1333.63  768.32 1348.18  762.09
    1352  760.79    1377  759.79    1402  760.79 1406.48  762.09 1414.64  765.13
 1418.75  766.68 1424.69  768.88 1433.58  773.02 1440.31  773.87 1444.71  775.05
 1448.23  775.06 1448.68  775.06 1456.45  774.92 1475.79  774.94 1487.49  775.07
 1491.44  776.46 1498.47  778.91 1511.87  783.57 1518.95  786.16 1526.12  788.94
 1546.23  796.76 1550.59  798.37 1555.26   799.8 1559.59  801.14 1583.16  808.31
 1593.52  811.46 1594.23  811.88 1598.22  813.69 1601.15  813.86 1607.78  813.73
 1610.14  813.68 1629.83  813.28 1635.81  813.25 1668.45  812.54 1670.32  812.48
  1671.9   812.4 1673.72  812.27 1715.75  810.84 1716.86  810.83  1753.1   809.6
 1753.74  809.54 1754.06  809.54 1754.81  809.55 1779.02  808.73 1779.58  808.71
 1796.33  808.71  1821.6  808.35  1824.3  808.34 1858.19  807.89 1894.07  807.89
 1898.36  807.87 1940.75  807.86 1960.36  807.71 1974.66  807.69 1982.09  807.72
  2012.7  807.94 2026.64  808.01 2051.61  808.18  2056.6   808.2  2080.8  808.37
 2085.84  808.41 2096.07  808.57 2104.71  808.63 2114.94  808.78  2127.5  808.88
 2139.68  809.06 2171.77  809.78 2217.75  810.64 2256.09  811.47 2276.59  811.85
 2282.79  811.98 2294.66  812.16 2302.27  812.45  2308.1  812.67 2326.44  813.37
  2328.3  813.43 2340.04  813.89 2354.98  814.39  2362.8  814.66 2365.68  814.78
 2389.03  815.74 2412.49   816.7  2414.4  816.79 2436.57   817.7  2450.2  818.26
 2453.04  818.39 2473.03  819.39 2492.82  820.37 2494.33  820.44 2507.49   821.1
 2549.54  823.58 2552.18  823.74 2566.36  824.58 2567.16  824.62 2568.04  824.68
 2597.51  826.79 2598.32  826.84 2614.15  827.97    2615  827.73 2621.19  824.83
 2628.75   821.4 2640.43  816.02  2641.5  815.53 2641.58  815.49 2642.08  815.26
 2643.39  814.65 2649.94  811.65 2657.06  808.43 2664.18  805.68 2666.08  804.83
 2667.64  804.36 2679.45  806.05 2682.86  806.52 2684.08  806.54 2708.95  806.97
 2720.38  806.78 2732.15  806.55 2744.09  805.55 2744.28  805.53 2745.05  805.78
 2763.47  811.13 2768.32  813.26 2774.17  815.82 2786.12  820.91 2792.28  823.42
 2799.52  826.44 2817.21   833.6 2819.15  835.13  2825.1  841.36 2825.59  841.41
 2831.64  840.62 2857.25  842.29 2872.47  842.38 2927.92  844.33 2935.44  844.84
 2968.98  847.88 2978.68  848.55 3025.19  851.18 3031.84  851.71 3062.79  856.46
 3066.42  856.81  3068.8  856.98 3084.43   857.2 3095.83  858.15

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .06 1319.63    .038 1444.71     .06  2825.1    .105

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1319.63 1444.71            96.61   96.29   80.76             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1000     815       F
    2400 3095.83     815       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  782.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.43  * Wt. n-Val.             *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  781.86  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)          *  771.08  * Flow Area (sq ft)      *  454.07  * 2114.59  *  360.75  *
* E.G. Slope (ft/ft)      *0.000493  * Area (sq ft)           *  454.07  * 2114.59  *  360.75  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *  830.31  *11737.31  *  632.38  *
* Top Width (ft)          *  261.06  * Top Width (ft)         *   73.73  *  125.08  *   62.25  *
* Vel Total (ft/s)        *    4.51  * Avg. Vel. (ft/s)       *    1.83  *    5.55  *    1.75  *
* Max Chl Dpth (ft)       *   22.07  * Hydr. Depth (ft)       *    6.16  *   16.91  *    5.80  *
* Conv. Total (cfs)       *594355.8  * Conv. (cfs)            * 37386.3  *528495.5  * 28474.0  *
* Length Wtd. (ft)        *    4.00  * Wetted Per. (ft)       *   74.90  *  130.86  *   63.40  *
* Min Ch El (ft)          *  759.79  * Shear (lb/sq ft)       *    0.19  *    0.50  *    0.18  *
* Alpha                   *    1.37  * Stream Power (lb/ft s) *    0.34  *    2.76  *    0.31  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *  642.96  * 5818.49  *  639.97  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  110.35  *  434.95  *  129.08  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
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*****************************************************************************************
* E.G. Elev (ft)          *  787.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.51  * Wt. n-Val.              *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  786.57  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)          *  774.14  * Flow Area (sq ft)      *  833.89  * 2703.13  *  684.85  *
* E.G. Slope (ft/ft)      *0.000447  * Area (sq ft)           *  833.89  * 2703.13  *  684.85  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 1938.94  *16825.22  * 1535.84  *
* Top Width (ft)          *  287.51  * Top Width (ft)         *   87.14  *  125.08  *   75.29  *
* Vel Total (ft/s)        *    4.81  * Avg. Vel. (ft/s)       *    2.33  *    6.22  *    2.24  *
* Max Chl Dpth (ft)       *   26.78  * Hydr. Depth (ft)       *    9.57  *   21.61  *    9.10  *
* Conv. Total (cfs)       *960089.5  * Conv. (cfs)            * 91702.0  *795749.8  * 72637.8  *
* Length Wtd. (ft)        *    4.00  * Wetted Per. (ft)       *   89.12  *  130.86  *   77.27  *
* Min Ch El (ft)          *  759.79  * Shear (lb/sq ft)       *    0.26  *    0.58  *    0.25  *
* Alpha                   *    1.43  * Stream Power (lb/ft s) *    0.61  *    3.59  *    0.55  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   * 1209.14  * 7723.92  * 1270.21  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  159.66  *  474.69  *  177.57  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  790.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.57  * Wt. n-Val.              *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  790.00  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)          *  776.80  * Flow Area (sq ft)      * 1148.19  * 3131.89  *  958.10  *
* E.G. Slope (ft/ft)      *0.000422  * Area (sq ft)           * 1148.19  * 3131.89  *  958.10  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             * 2997.84  *20903.50  * 2418.66  *
* Top Width (ft)          *  305.43  * Top Width (ft)         *   96.22  *  125.08  *   84.13  *
* Vel Total (ft/s)        *    5.02  * Avg. Vel. (ft/s)       *    2.61  *    6.67  *    2.52  *
* Max Chl Dpth (ft)       *   30.21  * Hydr. Depth (ft)       *   11.93  *   25.04  *   11.39  *
* Conv. Total (cfs)       *1280591.0  * Conv. (cfs)           *145859.0  *1017053.0  *117678.9  *
* Length Wtd. (ft)        *    4.00  * Wetted Per. (ft)       *   98.83  *  130.86  *   86.74  *
* Min Ch El (ft)          *  759.79  * Shear (lb/sq ft)       *    0.31  *    0.63  *    0.29  *
* Alpha                   *    1.46  * Stream Power (lb/ft s) *    0.80  *    4.21  *    0.74  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   * 1720.45  * 9268.66  * 1897.89  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  204.77  *  502.64  *  255.81  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)          *  794.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.65  * Wt. n-Val.              *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  793.74  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)          *  778.74  * Flow Area (sq ft)      * 1528.30  * 3600.42  * 1291.27  *
* E.G. Slope (ft/ft)      *0.000409  * Area (sq ft)           * 1528.30  * 3600.42  * 1291.27  *
* Q Total (cfs)           *34000.00  * Flow (cfs)             * 4415.95  *25952.88  * 3631.17  *
* Top Width (ft)          *  325.92  * Top Width (ft)         *  107.08  *  125.08  *   93.76  *
* Vel Total (ft/s)        *    5.30  * Avg. Vel. (ft/s)       *    2.89  *    7.21  *    2.81  *
* Max Chl Dpth (ft)       *   33.95  * Hydr. Depth (ft)       *   14.27  *   28.78  *   13.77  *
* Conv. Total (cfs)       *1680924.0  * Conv. (cfs)           *218320.0  *1283083.0  *179521.0  *
* Length Wtd. (ft)        *    4.00  * Wetted Per. (ft)       *  110.32  *  130.86  *   97.08  *
* Min Ch El (ft)          *  759.79  * Shear (lb/sq ft)       *    0.35  *    0.70  *    0.34  *
* Alpha                   *    1.48  * Stream Power (lb/ft s) *    1.02  *    5.07  *    0.96  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   * 2519.81  *10883.73  * 2837.65  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  321.14  *  525.49  *  345.67  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  799.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.73  * Wt. n-Val.              *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)          *  798.41  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)          *  780.93  * Flow Area (sq ft)      * 2061.60  * 4184.55  * 1757.36  *
* E.G. Slope (ft/ft)      *0.000390  * Area (sq ft)           * 2061.60  * 4184.55  * 1757.36  *
* Q Total (cfs)           *44500.00  * Flow (cfs)             * 6519.38  *32538.08  * 5442.55  *
* Top Width (ft)          *  352.41  * Top Width (ft)         *  121.31  *  125.08  *  106.02  *
* Vel Total (ft/s)        *    5.56  * Avg. Vel. (ft/s)       *    3.16  *    7.78  *    3.10  *
* Max Chl Dpth (ft)       *   38.62  * Hydr. Depth (ft)       *   16.99  *   33.46  *   16.58  *
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* Conv. Total (cfs)      *2254492.0  * Conv. (cfs)            *330289.4  *1648468.0  *275734.3  *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)        *  125.29  *  130.86  *  110.20  *
* Min Ch El (ft)         *  759.79  * Shear (lb/sq ft)        *    0.40  *    0.78  *    0.39  *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    1.27  *    6.05  *    1.20  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 4450.85  *13382.26  * 5043.75  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  644.32  *  553.50  *  729.74  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  802.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.              *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  801.62  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)         *  782.54  * Flow Area (sq ft)      * 2467.01  * 4586.36  * 2114.73  *
* E.G. Slope (ft/ft)     *0.000397  * Area (sq ft)           * 2472.65  * 4586.36  * 2114.73  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 8417.52  *38253.02  * 7019.46  *
* Top Width (ft)         *  383.83  * Top Width (ft)         *  142.28  *  125.08  *  116.47  *
* Vel Total (ft/s)       *    5.86  * Avg. Vel. (ft/s)        *    3.41  *    8.34  *    3.32  *
* Max Chl Dpth (ft)      *   41.83  * Hydr. Depth (ft)       *   18.82  *   36.67  *   18.16  *
* Conv. Total (cfs)      *2695711.0  * Conv. (cfs)            *422633.4  *1920639.0  *352438.9  *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)        *  135.60  *  130.86  *  121.14  *
* Min Ch El (ft)         *  759.79  * Shear (lb/sq ft)        *    0.45  *    0.87  *    0.43  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    1.54  *    7.24  *    1.44  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 6545.60  *14876.51  * 7400.78  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  873.71  *  560.48  * 1100.25  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  805.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.              *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  804.47  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)         *  784.04  * Flow Area (sq ft)      * 2852.00  * 4942.06  * 2459.24  *
* E.G. Slope (ft/ft)     *0.000395  * Area (sq ft)           * 2979.91  * 4942.06  * 2459.30  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *10242.34  *43208.47  * 8549.19  *
* Top Width (ft)         *  448.76  * Top Width (ft)         *  196.74  *  125.08  *  126.94  *
* Vel Total (ft/s)       *    6.05  * Avg. Vel. (ft/s)        *    3.59  *    8.74  *    3.48  *
* Max Chl Dpth (ft)      *   44.68  * Hydr. Depth (ft)       *   20.43  *   39.51  *   19.55  *
* Conv. Total (cfs)      *3121292.0  * Conv. (cfs)            *515634.6  *2175262.0  *430395.5  *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)        *  144.59  *  130.86  *  130.91  *
* Min Ch El (ft)         *  759.79  * Shear (lb/sq ft)        *    0.49  *    0.93  *    0.46  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    1.74  *    8.13  *    1.61  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 8432.62  *15851.62  * 9638.18  *
* C & E Loss (ft)        *          * Cum SA (acres)         * 1035.49  *  561.37  * 1460.88  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  809.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.              *   0.060  *   0.038  *   0.060  *
* W.S. Elev (ft)         *  808.36  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)         *  786.00  * Flow Area (sq ft)      * 3416.72  * 5428.60  * 3077.81  *
* E.G. Slope (ft/ft)     *0.000395  * Area (sq ft)           * 3800.91  * 5428.60  * 3263.78  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *13140.46  *50550.71  *11028.83  *
* Top Width (ft)         *  843.43  * Top Width (ft)         *  224.94  *  125.08  *  493.40  *
* Vel Total (ft/s)       *    6.27  * Avg. Vel. (ft/s)        *    3.85  *    9.31  *    3.58  *
* Max Chl Dpth (ft)      *   48.57  * Hydr. Depth (ft)       *   22.66  *   43.40  *    7.76  *
* Conv. Total (cfs)      *3760006.0  * Conv. (cfs)            *661244.6  *2543776.0  *554984.6  *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)        *  156.40  *  130.86  *  402.39  *
* Min Ch El (ft)         *  759.79  * Shear (lb/sq ft)        *    0.54  *    1.02  *    0.19  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    2.07  *    9.52  *    0.68  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *12465.77  *17349.00  *13911.32  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1291.64  *  563.72  * 1828.39  *
**********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	796.21	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.68	Wt. n-Val.	0.060	0.038	0.060	
W.S. Elev (ft)	795.53	Reach Len. (ft)	4.00	4.00	4.00	
Crit W.S. (ft)	779.61	Flow Area (sq ft)	1724.19	3823.58	1462.64	
E.G. Slope (ft/ft)	0.000404	Area (sq ft)	1724.19	3823.58	1462.64	
Q Total (cfs)	38000.00	Flow (cfs)	5188.25	28513.74	4298.01	
Top Width (ft)	335.94	Top Width (ft)	112.52	125.08	98.35	
Vel Total (ft/s)	5.42	Avg. Vel. (ft/s)	3.01	7.46	2.94	
Max Chl Dpth (ft)	35.74	Hydr. Depth (ft)	15.32	30.57	14.87	
Conv. Total (cfs)	1890218.0	Conv. (cfs)	258077.0	1418347.0	213793.9	
Length Wtd. (ft)	4.00	Wetted Per. (ft)	116.04	130.86	102.00	
Min Ch El (ft)	759.79	Shear (lb/sq ft)	0.37	0.74	0.36	
Alpha	1.50	Stream Power (lb/ft s)	1.13	5.50	1.06	
Frctn Loss (ft)		Cum Volume (acre-ft)	3073.84	11729.54	3422.65	
C & E Loss (ft)		Cum SA (acres)	410.51	535.86	412.65	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 19.995

INPUT
Description: Bannister Road.
Distance from Upstream XS = 4
Deck/Roadway Width = 85
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 20

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
650	829.2	800	743	832	820	767	832.5	825
943	832.7	825	981	832	800	1118	828.8	800
1165	830	800	1165	830	822.5	1353	823.1	815.6
1580	816.2	808.7	1580	816.2	800	1601	815.6	800
1780	810	800	1850	809	800	1975	808.5	800
2150	809	800	2600	809	800	2605	827.3	819.8
2830	841.8	834.3	2860	842.3	835			

Upstream Bridge Cross Section Data
Station Elevation Data num= 284

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	810.29	6.74	810.45	8.79	810.5	11.88	810.56	56.28	811.79
58.32	811.83	91.52	812.75	92.23	812.78	126.58	813.73	126.78	813.74
127.15	813.75	139.59	814.09	159.24	814.63	169.53	814.91	171.02	814.95
200.45	815.88	201.31	815.91	211.18	816.22	212.14	816.25	214.12	816.31
243.42	817.23	245.66	817.3	272.62	818.16	275.34	818.24	293.18	818.8
295.54	818.88	297.95	818.95	321.15	819.68	323.85	819.77	347.38	820.51
350.39	820.6	355.3	820.76	374.63	821.32	378.92	821.45	397.2	821.98
401.73	822.12	419.35	822.64	425.63	822.83	445.18	823.4	450.03	823.54
466.93	824.03	473.31	824.22	478.43	824.38	494.33	824.84	499.99	825.01
514.49	825.43	520.45	825.62	528.53	825.85	535.27	826.05	543.15	826.29
558.28	826.72	566.26	826.97	576	827.28	587.52	827.61	595.12	827.8
601.91	828	614.93	828.33	620.45	828.48	634.8	828.84	653.72	829.3
654.24	829.32	654.33	829.32	657.97	829.41	673.54	829.47	674.94	829.47
698.81	829.57	702.89	829.59	706.98	829.61	721.04	829.67	725.57	829.7
738.41	829.75	745.14	829.87	762.86	829.96	763.58	829.98	772.94	829.19
777.98	827.79	779.16	826.84	779.85	826.5	779.93	826.47	779.97	826.45
789.01	821.39	801.41	815.49	803.27	814.53	821.71	805.78	825.38	803.73
828.02	802.48	829.95	801.76	831.63	801.82	839.92	801.81	847.38	802.76
849.81	803.01	853.57	803.01	855.05	803.01	858.3	802.55	864.89	801.48
871.12	800.87	873.06	800.62	881.18	804.47	884.07	805.37	886.4	806.45
905.81	815.63	923.61	824.03	929.36	826.29	933.92	828.44	935.49	829.42
939.06	829.81	985.26	829.12	997.28	828.72	1001.62	828.65	1033.3	827.95
1046.54	827.76	1068.42	827.27	1073.56	826.99	1091.02	826.04	1113.81	825.54

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 1118.93  826.13 1119.03  826.08 1126.88  822.52 1127.75  822.36 1135.78  819.76
 1160.05  811.39 1175.66  806.01 1178.66  804.93 1179.88  804.51  1186.2  802.39
 1216.67  792.39 1219.69   791.4 1231.63  786.89 1241.77  783.11 1268.77  774.96
 1269.46  774.71 1271.41  774.15 1275.33  774.14  1297.8  774.31 1303.84  774.57
 1312.17  774.92 1319.63  775.46 1323.28   773.6 1333.63  768.32 1348.18  762.09
    1352  760.79    1377  759.79    1402  760.79 1406.48  762.09 1414.64  765.13
 1418.75  766.68 1424.69  768.88 1433.58  773.02 1440.31  773.87 1444.71  775.05
 1448.23  775.06 1448.68  775.06 1456.45  774.92 1475.79  774.94 1487.49  775.07
 1491.44  776.46 1498.47  778.91 1511.87  783.57 1518.95  786.16 1526.12  788.94
 1546.23  796.76 1550.59  798.37 1555.26   799.8 1559.59  801.14 1583.16  808.31
 1593.52  811.46 1594.23  811.88 1598.22  813.69 1601.15  813.86 1607.78  813.73
 1610.14  813.68 1629.83  813.28 1635.81  813.25 1668.45  812.54 1670.32  812.48
  1671.9   812.4 1673.72  812.27 1715.75  810.84 1716.86  810.83  1753.1   809.6
 1753.74  809.54 1754.06  809.54 1754.81  809.55 1779.02  808.73 1779.58  808.71
 1796.33  808.71  1821.6  808.35  1824.3  808.34 1858.19  807.89 1894.07  807.89
 1898.36  807.87 1940.75  807.86 1960.36  807.71 1974.66  807.69 1982.09  807.72
  2012.7  807.94 2026.64  808.01 2051.61  808.18  2056.6   808.2  2080.8  808.37
 2085.84  808.41 2096.07  808.57 2104.71  808.63 2114.94  808.78  2127.5  808.88
 2139.68  809.06 2171.77  809.78 2217.75  810.64 2256.09  811.47 2276.59  811.85
 2282.79  811.98 2294.66  812.16 2302.27  812.45  2308.1  812.67 2326.44  813.37
  2328.3  813.43 2340.04  813.89 2354.98  814.39  2362.8  814.66 2365.68  814.78
 2389.03  815.74 2412.49   816.7  2414.4  816.79 2436.57   817.7  2450.2  818.26
 2453.04  818.39 2473.03  819.39 2492.82  820.37 2494.33  820.44 2507.49   821.1
 2549.54  823.58 2552.18  823.74 2566.36  824.58 2567.16  824.62 2568.04  824.68
 2597.51  826.79 2598.32  826.84 2614.15  827.97    2615  827.73 2621.19  824.83
 2628.75   821.4 2640.43  816.02  2641.5  815.53 2641.58  815.49 2642.08  815.26
 2643.39  814.65 2649.94  811.65 2657.06  808.43 2664.18  805.68 2666.08  804.83
 2667.64  804.36 2679.45  806.05 2682.86  806.52 2684.08  806.54 2708.95  806.97
 2720.38  806.78 2732.15  806.55 2744.09  805.55 2744.28  805.53 2745.05  805.78
 2763.47  811.13 2768.32  813.26 2774.17  815.82 2786.12  820.91 2792.28  823.42
 2799.52  826.44 2817.21   833.6 2819.15  835.13  2825.1  841.36 2825.59  841.41
 2831.64  840.62 2857.25  842.29 2872.47  842.38 2927.92  844.33 2935.44  844.84
 2968.98  847.88 2978.68  848.55 3025.19  851.18 3031.84  851.71 3062.79  856.46
 3066.42  856.81  3068.8  856.98 3084.43   857.2 3095.83  858.15

Manning's n Values         num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*****************************************************************
       0     .06 1319.63    .038 1444.71     .06  2825.1    .105

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1319.63 1444.71            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1000     815        F
    2400 3095.83     815        F

Downstream  Deck/Roadway Coordinates
    num=      20
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
     650   829.2     800     743     832     820     767   832.5     825
     943   832.7     825     981     832     800    1118   828.8     800
    1165     830     800    1165     830   822.5    1353   823.1   815.6
    1580   816.2   808.7    1580   816.2     800    1601   815.6     800
    1780     810     800    1850     809     800    1975   808.5     800
    2150     809     800    2600     809     800    2605   827.3   819.8
    2830   841.8   834.3    2860   842.3     835

Downstream Bridge Cross Section Data
Station Elevation Data    num=     294
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  809.64   29.44  810.34   33.14  810.44   34.85  810.56   53.63  811.24
   72.66  811.92   75.77  812.08    79.5  812.27   91.33   812.6   96.58  812.75
  101.93   812.9  109.82  813.12  112.07  813.18  115.77  813.28  117.65  813.28
  118.16  813.27  124.46  813.23  128.25  813.21  129.92   813.2  131.45  813.19
  131.78  813.19  136.73  813.37  138.15  813.38  147.05  813.65  150.87  813.79
  159.73  814.07  163.59  814.21  181.13  814.76  188.92  815.04  200.83  815.41
  209.15  815.65  220.87  816.02  222.93  816.08  230.44  816.29  241.98  816.65
  253.32     817  261.12  817.23  270.94  817.53  277.62  817.72  287.29  818.03
  294.16  818.22  301.48  818.48   313.5  818.89  330.85  819.51   339.6   819.8
  352.06  820.24  361.19  820.55  373.22  820.98  383.33  821.34  398.31  821.85
   408.3   822.2  419.15  822.57  436.17  823.17  447.52  823.55   455.3   823.8
  463.88   824.1  475.99  824.48  484.24  824.77  496.84  825.16  505.06  825.33
  513.11   825.5  513.44  825.51  533.44  826.08  540.73  826.22   548.9  826.46
```

```
  553.27  826.54  557.39  826.61  575.67  827.16  582.55  827.29  602.49   827.9
  609.26  828.04  639.06  828.67  640.97  828.71  660.27  829.12  684.97  829.13
  687.65  829.16  709.16  829.18  729.19  829.21  735.61  829.27  740.04  829.44
  747.03  829.47  761.81  829.53  771.25  829.85  771.29  829.86  776.86  829.71
  781.91  827.43  783.06  827.06  785.37  826.33  807.63  816.39  807.91  816.28
  814.02  813.53  824.41  808.76  824.75  808.61  824.93  809.07  832.61  805.93
  834.26  804.66  845.37  802.14   852.3  802.45  854.07   802.5  858.67  802.49
  859.31  802.49  860.62  802.41  869.82  801.82  877.05   802.2  879.23   802.4
  881.16  803.33  898.22  811.58  898.51  811.72  898.89   811.9  904.43  814.58
  922.29  823.15  933.97  828.74  935.62  829.15   937.3  829.26  942.25  829.54
  964.57  829.21  977.71  828.73   983.1  828.82 1005.47  828.48 1014.94  828.26
 1025.32  828.01 1038.76  827.89 1057.69   827.3 1071.86  826.85 1078.75  826.37
  1090.4  825.98  1107.7  825.84 1108.61   825.8 1114.54  825.21 1127.69  822.34
 1149.16  814.22 1151.93  813.16  1161.5  809.58 1176.97  803.68 1194.79  797.11
 1199.85  795.31 1220.36  787.46 1226.76  785.01 1226.95  784.94 1226.99  784.92
    1227  784.92 1228.26   784.6 1234.78  782.88 1260.81     776 1265.98  775.88
 1282.55  775.34 1289.31   775.3 1303.31  775.55  1310.5  774.08    1338  761.37
    1340  760.55    1371  759.55    1401  760.55 1403.33  761.37 1404.38  761.78
 1416.48  766.53 1427.41  772.11 1428.21   772.5 1428.94  772.64 1440.63  774.76
 1445.85  774.93 1448.61  775.05 1454.57  775.32 1468.94  775.97 1483.94  776.45
 1485.93  777.22 1489.22  778.42 1503.79  784.01 1515.62  788.49  1530.2   794.1
 1534.73  795.77 1540.69  797.69 1566.82   806.1 1573.72  808.09 1575.35  808.48
 1584.11  810.93 1586.58  811.29 1589.18   811.4 1591.85  811.53 1598.04   811.1
 1608.07  811.54 1630.15  811.61 1649.33  811.28 1659.24  810.24 1666.27   810.2
 1673.58  809.62 1701.91  809.11 1710.14  808.91 1716.59  808.52 1722.07  809.07
 1741.59  808.68  1750.8   808.5 1755.01  808.29 1760.84   808.3  1802.2  808.94
  1803.6  808.94 1811.47  809.08 1841.42  808.45 1848.03  808.41 1893.79  807.79
 1896.55  807.77 1939.12   807.2 1951.08  807.12 1996.17  807.42 2003.09  807.46
 2028.28  807.63 2036.21  807.66 2041.65  807.69  2083.1  807.82 2094.81  808.03
 2107.68  808.08 2120.85  808.31 2152.78  809.34 2161.05  809.48 2169.97  809.77
 2177.61  809.91 2220.43  810.69 2260.56  811.55 2269.34  811.61 2273.31  811.75
 2301.87  812.82 2329.95  813.87 2334.55  814.03 2358.05  814.91 2362.14  815.08
 2378.91  815.78  2395.8  816.48 2399.72  816.65  2431.7  817.98 2433.66  818.07
 2446.15  818.65 2452.93  818.96 2471.75  819.83 2490.36   820.7 2493.19  820.83
  2521.6  822.15 2525.64  822.38 2552.54  824.22 2556.93  824.47 2586.03  826.45
 2589.47  826.65  2590.6  826.72 2601.23  822.05 2601.37  822.01 2601.68  821.87
 2618.96  814.59 2627.23  810.69 2630.53  809.14 2637.79  806.26 2639.39  805.63
 2641.74  805.83 2658.75  806.98 2669.65  807.09 2684.56   807.3 2699.74  807.14
 2707.02  807.04 2714.44  806.26 2716.13  806.07  2717.7  806.44  2722.5  807.75
    2737  811.64 2757.07  819.92 2759.74  821.02 2759.76  821.03  2759.8  821.04
 2760.01  821.13 2761.21  821.66 2789.24  833.71 2792.63   834.8 2795.37   836.4
 2802.47  839.98  2802.5  839.98 2802.57  839.98 2802.61  839.98 2802.99  839.99
 2804.55  840.03 2813.36  839.84 2834.75  841.38 2840.24  841.35 2842.87  841.41
 2877.56  843.65 2886.26  843.71 2892.72  843.93 2937.55  846.94 2941.17  847.26
 2994.69  850.97 2999.46  851.24 3032.14  853.82 3033.97   854.1 3039.17  854.59
  3045.9  855.17 3073.08  857.01  3083.1  857.66 3087.99  858.05

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .06 1303.31    .038 1440.63     .08 2586.03     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1303.31 1440.63           .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1000     815       F
    2400 3087.99     815       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=    1235    Downstream=    1235
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     760       3     820
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
       3     760       3     820

Pier Data
Pier Station     Upstream=    1315    Downstream=    1315
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     760       3     820
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     760       3     820

Pier Data
Pier Station     Upstream=    1430    Downstream=    1430
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     760       3     818
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     760       3     818

Pier Data
Pier Station     Upstream=    1510    Downstream=    1510
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     760       3     815
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     760       3     815

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     782.29  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     781.86  * E.G. Elev (ft)         *     782.28  *     781.65  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     781.84  *     781.19  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     771.05  *     770.09  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      22.05  *      21.64  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.60  *       4.78  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2872.08  *    2758.91  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   24075.65  *   23922.68  *
* Min El Weir Flow (ft)  *     808.51  * Hydr Depth (ft)        *      11.27  *      11.07  *
* Min El Prs (ft)        *     833.45  * W.P. Total (ft)        *     297.12  *     291.48  *
* Delta EG (ft)          *       0.66  * Conv. Total (cfs)      *   533442.4  *   504065.3  *
* Delta WS (ft)          *       0.67  * Top Width (ft)         *     254.93  *     249.26  *
* BR Open Area (sq ft)   *   18684.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.78  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.37  *       0.41  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.70  *       1.94  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	787.08	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	786.57	E.G. Elev (ft)	787.06	786.55
Q Total (cfs)	20300.00	W.S. Elev (ft)	786.55	786.03
Q Bridge (cfs)	20300.00	Crit W.S. (ft)	774.11	772.86
Q Weir (cfs)		Max Chl Dpth (ft)	26.76	26.48
Weir Sta Lft (ft)		Vel Total (ft/s)	4.92	5.04
Weir Sta Rgt (ft)		Flow Area (sq ft)	4122.70	4028.87
Weir Submerg		Froude # Chl	0.24	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	41882.12	41666.73
Min El Weir Flow (ft)	808.51	Hydr Depth (ft)	14.97	14.63
Min El Prs (ft)	833.45	W.P. Total (ft)	346.77	345.03
Delta EG (ft)	0.53	Conv. Total (cfs)	833652.6	774829.1
Delta WS (ft)	0.56	Top Width (ft)	275.41	275.39
BR Open Area (sq ft)	18684.87	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.04	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.44	0.50
Br Sel Method	Momentum	Power Total (lb/ft s)	2.17	2.52

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	790.57	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	790.00	E.G. Elev (ft)	790.54	790.08
Q Total (cfs)	26320.00	W.S. Elev (ft)	789.97	789.51
Q Bridge (cfs)	26320.00	Crit W.S. (ft)	776.82	775.19
Q Weir (cfs)		Max Chl Dpth (ft)	30.18	29.96
Weir Sta Lft (ft)		Vel Total (ft/s)	5.16	5.25
Weir Sta Rgt (ft)		Flow Area (sq ft)	5096.12	5012.96
Weir Submerg		Froude # Chl	0.23	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	58898.70	58629.20
Min El Weir Flow (ft)	808.51	Hydr Depth (ft)	17.37	17.21
Min El Prs (ft)	833.45	W.P. Total (ft)	393.32	388.99
Delta EG (ft)	0.48	Conv. Total (cfs)	1085264.0	1000422.0
Delta WS (ft)	0.52	Top Width (ft)	293.30	291.26
BR Open Area (sq ft)	18684.87	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.25	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.48	0.56
Br Sel Method	Momentum	Power Total (lb/ft s)	2.46	2.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	794.39	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	793.74	E.G. Elev (ft)	794.35	793.93
Q Total (cfs)	34000.00	W.S. Elev (ft)	793.71	793.30
Q Bridge (cfs)	34000.00	Crit W.S. (ft)	778.81	777.97
Q Weir (cfs)		Max Chl Dpth (ft)	33.92	33.75
Weir Sta Lft (ft)		Vel Total (ft/s)	5.46	5.52
Weir Sta Rgt (ft)		Flow Area (sq ft)	6231.60	6154.54
Weir Submerg		Froude # Chl	0.24	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	81820.71	81471.20
Min El Weir Flow (ft)	808.51	Hydr Depth (ft)	19.86	19.79
Min El Prs (ft)	833.45	W.P. Total (ft)	445.06	440.48
Delta EG (ft)	0.45	Conv. Total (cfs)	1387004.0	1268729.0
Delta WS (ft)	0.49	Top Width (ft)	313.77	311.02
BR Open Area (sq ft)	18684.87	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.52	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.53	0.63
Br Sel Method	Momentum	Power Total (lb/ft s)	2.87	3.46

```
*******************************************************************************************
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     799.14  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     798.41  * E.G. Elev (ft)         *     799.10  *     798.71  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     798.39  *     798.02  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     781.05  *     780.41  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.60  *      38.47  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.74  *       5.79  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7759.13  *    7684.20  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  116936.50  *  116493.10  *
* Min El Weir Flow (ft)  *     808.51  * Hydr Depth (ft)        *      22.80  *      22.77  *
* Min El Prs (ft)        *     833.45  * W.P. Total (ft)        *     510.53  *     506.30  *
* Delta EG (ft)          *       0.40  * Conv. Total (cfs)      *  1801037.0  *  1634361.0  *
* Delta WS (ft)          *       0.46  * Top Width (ft)         *     340.25  *     337.41  *
* BR Open Area (sq ft)   *   18684.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.79  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.58  *       0.70  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       3.32  *       4.07  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*******************************************************************************************
* E.G. US. (ft)          *     802.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     801.62  * E.G. Elev (ft)         *     802.40  *     802.02  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     801.60  *     801.26  *
* Q Bridge (cfs)         *   53690.00  * Crit W.S. (ft)         *     782.84  *     782.26  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.81  *      41.71  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.04  *       6.10  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8883.11  *    8807.48  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  146089.50  *  145567.00  *
* Min El Weir Flow (ft)  *     808.51  * Hydr Depth (ft)        *      24.64  *      24.72  *
* Min El Prs (ft)        *     833.45  * W.P. Total (ft)        *     557.41  *     552.14  *
* Delta EG (ft)          *       0.38  * Conv. Total (cfs)      *  2108819.0  *  1905046.0  *
* Delta WS (ft)          *       0.45  * Top Width (ft)         *     371.40  *     356.26  *
* BR Open Area (sq ft)   *   18684.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.10  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.64  *       0.79  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       3.90  *       4.82  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*******************************************************************************************
* E.G. US. (ft)          *     805.35  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     804.47  * E.G. Elev (ft)         *     805.30  *     804.94  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     804.44  *     804.13  *
* Q Bridge (cfs)         *   62000.00  * Crit W.S. (ft)         *     784.23  *     783.79  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      44.65  *      44.58  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.24  *       6.29  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9934.98  *    9854.71  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  175107.40  *  174504.80  *
* Min El Weir Flow (ft)  *     808.51  * Hydr Depth (ft)        *      26.26  *      26.42  *
* Min El Prs (ft)        *     833.45  * W.P. Total (ft)        *     598.97  *     592.76  *
* Delta EG (ft)          *       0.36  * Conv. Total (cfs)      *  2398713.0  *  2158815.0  *
* Delta WS (ft)          *       0.44  * Top Width (ft)         *     436.23  *     419.18  *
* BR Open Area (sq ft)   *   18684.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.29  * C & E Loss (ft)        *             *             *
```

```
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.69  *       0.86  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       4.32  *       5.39  *
*********************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     809.34  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     808.36  * E.G. Elev (ft)         *     809.33  *     809.24  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     808.38  *     808.37  *
* Q Bridge (cfs)         *   74720.00  * Crit W.S. (ft)         *     786.16  *     785.87  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      48.59  *      48.82  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.51  *       6.50  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11470.46  *   11487.89  *
* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  220791.60  *  222976.00  *
* Min El Weir Flow (ft)  *     808.51  * Hydr Depth (ft)        *      28.73  *      28.87  *
* Min El Prs (ft)        *     833.45  * W.P. Total (ft)        *     652.42  *     653.02  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *  2827815.0  *  2557263.0  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *     570.27  *     555.21  *
* BR Open Area (sq ft)   *   18684.87  * Frctn Loss (ft)        *       0.07  *       0.00  *
* BR Open Vel (ft/s)     *       6.51  * C & E Loss (ft)        *       0.03  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.77  *       0.94  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.99  *       6.10  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     796.21  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     795.53  * E.G. Elev (ft)         *     796.17  *     795.76  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     795.50  *     795.11  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     779.72  *     778.98  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.71  *      35.56  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.59  *       5.65  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6801.72  *    6725.80  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   94421.98  *   94038.92  *
* Min El Weir Flow (ft)  *     808.51  * Hydr Depth (ft)        *      21.01  *      20.98  *
* Min El Prs (ft)        *     833.45  * W.P. Total (ft)        *     470.04  *     465.16  *
* Delta EG (ft)          *       0.43  * Conv. Total (cfs)      *  1540643.0  *  1404756.0  *
* Delta WS (ft)          *       0.47  * Top Width (ft)         *     323.81  *     320.56  *
* BR Open Area (sq ft)   *   18684.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.65  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.55  *       0.66  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       3.07  *       3.73  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.986
```

INPUT
Description: D/S of Bannister Rd. Dodson XS 21.58
Station Elevation Data num= 294

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	809.64	29.44	810.34	33.14	810.44	34.85	810.56	53.63	811.24
72.66	811.92	75.77	812.08	79.5	812.27	91.33	812.6	96.58	812.75
101.93	812.9	109.82	813.12	112.07	813.18	115.77	813.28	117.65	813.28
118.16	813.27	124.46	813.23	128.25	813.21	129.92	813.2	131.45	813.19
131.78	813.19	136.73	813.37	138.15	813.38	147.05	813.65	150.87	813.79
159.73	814.07	163.59	814.21	181.13	814.76	188.92	815.04	200.83	815.41
209.15	815.65	220.87	816.02	222.93	816.08	230.44	816.29	241.98	816.65
253.32	817	261.12	817.23	270.94	817.53	277.62	817.72	287.29	818.03
294.16	818.22	301.48	818.48	313.5	818.89	330.85	819.51	339.6	819.8
352.06	820.24	361.19	820.55	373.22	820.98	383.33	821.34	398.31	821.85
408.3	822.2	419.15	822.57	436.17	823.17	447.52	823.55	455.3	823.8
463.88	824.1	475.99	824.48	484.24	824.77	496.84	825.16	505.06	825.33
513.11	825.5	513.44	825.51	533.44	826.08	540.73	826.22	548.9	826.46
553.27	826.54	557.39	826.61	575.67	827.16	582.55	827.29	602.49	827.9
609.26	828.04	639.06	828.67	640.97	828.71	660.27	829.12	684.97	829.13
687.65	829.16	709.16	829.18	729.19	829.21	735.61	829.27	740.04	829.44
747.03	829.47	761.81	829.53	771.25	829.85	771.29	829.86	776.86	829.71
781.91	827.43	783.06	827.06	785.37	826.33	807.63	816.39	807.91	816.28
814.02	813.53	824.41	808.76	824.75	808.61	824.93	809.07	832.61	805.93
834.26	804.66	845.37	802.14	852.3	802.45	854.07	802.5	858.67	802.49
859.31	802.49	860.62	802.41	869.82	801.82	877.05	802.2	879.23	802.4
881.16	803.33	898.22	811.58	898.51	811.72	898.89	811.9	904.43	814.58
922.29	823.15	933.97	828.74	935.62	829.15	937.3	829.26	942.25	829.54
964.57	829.21	977.71	828.73	983.1	828.82	1005.47	828.48	1014.94	828.26
1025.32	828.01	1038.76	827.89	1057.69	827.3	1071.86	826.85	1078.75	826.37
1090.4	825.98	1107.7	825.84	1108.61	825.8	1114.54	825.21	1127.69	822.34
1149.16	814.22	1151.93	813.16	1161.5	809.58	1176.97	803.68	1194.79	797.11
1199.85	795.31	1220.36	787.46	1226.76	785.01	1226.95	784.94	1226.99	784.92
1227	784.92	1228.26	784.6	1234.78	782.88	1260.81	776	1265.98	775.88
1282.55	775.34	1289.31	775.3	1303.31	775.55	1310.5	774.08	1338	761.37
1340	760.55	1371	759.55	1401	760.55	1403.33	761.37	1404.38	761.78
1416.48	766.53	1427.41	772.11	1428.21	772.5	1428.94	772.64	1440.63	774.76
1445.85	774.93	1448.61	775.05	1454.57	775.32	1468.94	775.97	1483.94	776.45
1485.93	777.22	1489.22	778.42	1503.79	784.01	1515.62	788.49	1530.2	794.1
1534.73	795.77	1540.69	797.69	1566.82	806.1	1573.72	808.09	1575.35	808.48
1584.11	810.93	1586.58	811.29	1589.18	811.4	1591.85	811.53	1598.04	811.1
1608.07	811.54	1630.15	811.61	1649.33	811.28	1659.24	810.24	1666.27	810.2
1673.58	809.62	1701.91	809.11	1710.14	808.91	1716.59	808.52	1722.07	809.07
1741.59	808.68	1750.8	808.5	1755.01	808.29	1760.84	808.3	1802.2	808.94
1803.6	808.94	1811.47	809.08	1841.42	808.45	1848.03	808.41	1893.79	807.79
1896.55	807.77	1939.12	807.2	1951.08	807.12	1996.17	807.42	2003.09	807.46
2028.28	807.63	2036.21	807.66	2041.65	807.69	2083.1	807.82	2094.81	808.03
2107.68	808.08	2120.85	808.31	2152.78	809.34	2161.05	809.48	2169.97	809.77
2177.61	809.91	2220.43	810.69	2260.56	811.55	2269.34	811.61	2273.31	811.75
2301.87	812.82	2329.95	813.87	2334.55	814.03	2358.05	814.91	2362.14	815.08
2378.91	815.78	2395.8	816.48	2399.72	816.65	2431.7	817.98	2433.66	818.07
2446.15	818.65	2452.93	818.96	2471.75	819.83	2490.36	820.7	2493.19	820.83
2521.6	822.15	2525.64	822.38	2552.54	824.22	2556.93	824.47	2586.03	826.45
2589.47	826.65	2590.6	826.72	2601.23	822.05	2601.37	822.01	2601.68	821.87
2618.96	814.59	2627.23	810.69	2630.53	809.14	2637.79	806.26	2639.39	805.63
2641.74	805.83	2658.75	806.98	2669.65	807.09	2684.56	807.3	2699.74	807.14
2707.02	807.04	2714.44	806.26	2716.13	806.07	2717.7	806.44	2722.5	807.75
2737	811.64	2757.07	819.92	2759.74	821.02	2759.76	821.03	2759.8	821.04
2760.01	821.13	2761.21	821.66	2789.24	833.71	2792.63	834.8	2795.37	836.4
2802.47	839.98	2802.5	839.98	2802.57	839.98	2802.61	839.98	2802.99	839.99
2804.55	840.03	2813.36	839.84	2834.75	841.38	2840.24	841.35	2842.87	841.41
2877.56	843.65	2886.26	843.71	2892.72	843.93	2937.55	846.94	2941.17	847.26
2994.69	850.97	2999.46	851.24	3032.14	853.82	3033.97	854.1	3039.17	854.59
3045.9	855.17	3073.08	857.01	3083.1	857.66	3087.99	858.05		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1303.31	.038	1440.63	.08	2586.03	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1303.31	1440.63	669.73	773.55	388.15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1000	815	F
2400	3087.99	815	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	781.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.060	0.038	0.080
W.S. Elev (ft)	781.19	Reach Len. (ft)	669.73	773.55	388.15
Crit W.S. (ft)	770.09	Flow Area (sq ft)	290.90	2250.58	270.12
E.G. Slope (ft/ft)	0.000507	Area (sq ft)	290.90	2250.58	270.12
Q Total (cfs)	13200.00	Flow (cfs)	450.58	12429.69	319.74
Top Width (ft)	255.26	Top Width (ft)	62.13	137.32	55.81
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)	1.55	5.52	1.18
Max Chl Dpth (ft)	21.64	Hydr. Depth (ft)	4.68	16.39	4.84
Conv. Total (cfs)	586361.2	Conv. (cfs)	20015.3	552142.8	14203.1
Length Wtd. (ft)	760.13	Wetted Per. (ft)	62.82	143.21	56.71
Min Ch El (ft)	759.55	Shear (lb/sq ft)	0.15	0.50	0.15
Alpha	1.31	Stream Power (lb/ft s)	0.23	2.75	0.18
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	642.17	5813.75	639.28
C & E Loss (ft)	0.04	Cum SA (acres)	110.20	434.67	128.95

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	786.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.060	0.038	0.080
W.S. Elev (ft)	786.01	Reach Len. (ft)	669.73	773.55	388.15
Crit W.S. (ft)	772.99	Flow Area (sq ft)	633.81	2912.59	569.52
E.G. Slope (ft/ft)	0.000453	Area (sq ft)	633.81	2912.59	569.52
Q Total (cfs)	20300.00	Flow (cfs)	1322.37	18068.50	909.13
Top Width (ft)	284.92	Top Width (ft)	79.16	137.32	68.44
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)	2.09	6.20	1.60
Max Chl Dpth (ft)	26.46	Hydr. Depth (ft)	8.01	21.21	8.32
Conv. Total (cfs)	953386.1	Conv. (cfs)	62104.8	848584.3	42697.0
Length Wtd. (ft)	748.85	Wetted Per. (ft)	80.53	143.21	70.23
Min Ch El (ft)	759.55	Shear (lb/sq ft)	0.22	0.58	0.23
Alpha	1.42	Stream Power (lb/ft s)	0.46	3.57	0.37
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	1207.57	7717.84	1268.84
C & E Loss (ft)	0.06	Cum SA (acres)	159.49	474.41	177.41

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	790.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.060	0.038	0.080
W.S. Elev (ft)	789.48	Reach Len. (ft)	669.73	773.55	388.15
Crit W.S. (ft)	775.24	Flow Area (sq ft)	924.15	3388.96	822.82
E.G. Slope (ft/ft)	0.000428	Area (sq ft)	924.15	3388.96	822.82
Q Total (cfs)	26320.00	Flow (cfs)	2232.43	22592.43	1495.14
Top Width (ft)	303.11	Top Width (ft)	88.23	137.32	77.56
Vel Total (ft/s)	5.12	Avg. Vel. (ft/s)	2.42	6.67	1.82
Max Chl Dpth (ft)	29.93	Hydr. Depth (ft)	10.47	24.68	10.61
Conv. Total (cfs)	1272516.0	Conv. (cfs)	107933.3	1092296.0	72286.6
Length Wtd. (ft)	742.85	Wetted Per. (ft)	90.24	143.21	79.99
Min Ch El (ft)	759.55	Shear (lb/sq ft)	0.27	0.63	0.27
Alpha	1.48	Stream Power (lb/ft s)	0.66	4.21	0.50
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	1718.25	9261.61	1895.96
C & E Loss (ft)	0.08	Cum SA (acres)	204.58	502.36	255.64

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	793.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.	0.060	0.038	0.080
W.S. Elev (ft)	793.25	Reach Len. (ft)	669.73	773.55	388.15
Crit W.S. (ft)	777.83	Flow Area (sq ft)	1275.81	3907.33	1134.12
E.G. Slope (ft/ft)	0.000415	Area (sq ft)	1275.81	3907.33	1134.12
Q Total (cfs)	34000.00	Flow (cfs)	3493.70	28192.44	2313.86
Top Width (ft)	322.78	Top Width (ft)	98.09	137.32	87.37

```
* Vel Total (ft/s)       *    5.38  * Avg. Vel. (ft/s)       *    2.74  *    7.22  *    2.04  *
* Max Chl Dpth (ft)      *   33.70  * Hydr. Depth (ft)       *   13.01  *   28.45  *   12.98  *
* Conv. Total (cfs)      *1669965.0  * Conv. (cfs)           *171599.0  *1384718.0  *113648.9  *
* Length Wtd. (ft)       *  737.61  * Wetted Per. (ft)       *  100.80  *  143.21  *   90.50  *
* Min Ch El (ft)         *  759.55  * Shear (lb/sq ft)       *    0.33  *    0.71  *    0.32  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.90  *    5.09  *    0.66  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 2516.84  *10875.62  * 2835.03  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  320.93  *  525.20  *  345.48  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  798.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *   0.060  *   0.038  *   0.080  *
* W.S. Elev (ft)         *  797.96  * Reach Len. (ft)        *  669.73  *  773.55  *  388.15  *
* Crit W.S. (ft)         *  780.18  * Flow Area (sq ft)      * 1766.52  * 4552.95  * 1575.41  *
* E.G. Slope (ft/ft)     *0.000396  * Area (sq ft)           * 1766.52  * 4552.95  * 1575.41  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 5399.45  *35554.14  * 3546.41  *
* Top Width (ft)         *  349.02  * Top Width (ft)         *  110.81  *  137.32  *  100.89  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    3.06  *    7.81  *    2.25  *
* Max Chl Dpth (ft)      *   38.41  * Hydr. Depth (ft)       *   15.94  *   33.16  *   15.62  *
* Conv. Total (cfs)      *2236247.0  * Conv. (cfs)           *271337.1  *1786693.0  *178216.7  *
* Length Wtd. (ft)       *  725.64  * Wetted Per. (ft)       *  114.37  *  143.21  *  104.81  *
* Min Ch El (ft)         *  759.55  * Shear (lb/sq ft)       *    0.38  *    0.79  *    0.37  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *    1.17  *    6.14  *    0.84  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 4446.78  *13372.82  * 5040.15  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  644.07  *  553.22  *  729.52  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  802.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *   0.060  *   0.038  *   0.080  *
* W.S. Elev (ft)         *  801.18  * Reach Len. (ft)        *  669.73  *  773.55  *  388.15  *
* Crit W.S. (ft)         *  781.96  * Flow Area (sq ft)      * 2137.50  * 4995.23  * 1916.46  *
* E.G. Slope (ft/ft)     *0.000404  * Area (sq ft)           * 2137.50  * 4995.23  * 1916.46  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 7113.20  *41917.13  * 4659.67  *
* Top Width (ft)         *  367.76  * Top Width (ft)         *  119.55  *  137.32  *  110.89  *
* Vel Total (ft/s)       *    5.93  * Avg. Vel. (ft/s)       *    3.33  *    8.39  *    2.43  *
* Max Chl Dpth (ft)      *   41.63  * Hydr. Depth (ft)       *   17.88  *   36.38  *   17.28  *
* Conv. Total (cfs)      *2670893.0  * Conv. (cfs)           *353857.2  *2085234.0  *231802.6  *
* Length Wtd. (ft)       *  719.76  * Wetted Per. (ft)       *  123.68  *  143.21  *  115.33  *
* Min Ch El (ft)         *  759.55  * Shear (lb/sq ft)       *    0.44  *    0.88  *    0.42  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *    1.45  *    7.38  *    1.02  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 6540.70  *14866.17  * 7396.43  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *  873.43  *  560.20  * 1100.00  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  804.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *   0.060  *   0.038  *   0.080  *
* W.S. Elev (ft)         *  804.03  * Reach Len. (ft)        *  669.73  *  773.55  *  388.15  *
* Crit W.S. (ft)         *  783.41  * Flow Area (sq ft)      * 2490.03  * 5387.46  * 2245.88  *
* E.G. Slope (ft/ft)     *0.000403  * Area (sq ft)           * 2561.68  * 5387.46  * 2245.88  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 8774.84  *47471.00  * 5754.16  *
* Top Width (ft)         *  429.94  * Top Width (ft)         *  172.85  *  137.32  *  119.77  *
* Vel Total (ft/s)       *    6.12  * Avg. Vel. (ft/s)       *    3.52  *    8.81  *    2.56  *
* Max Chl Dpth (ft)      *   44.48  * Hydr. Depth (ft)       *   19.57  *   39.23  *   18.75  *
```

```
* Conv. Total (cfs)      *3089101.0  * Conv. (cfs)            *437199.5  *2365206.0  *286696.4  *
* Length Wtd. (ft)       *  713.74  * Wetted Per. (ft)       *  131.90  *  143.21  *  124.65  *
* Min Ch El (ft)         *  759.55  * Shear (lb/sq ft)       *    0.47  *    0.95  *    0.45  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *    1.67  *    8.34  *    1.16  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   * 8426.71  *15840.48  * 9633.10  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         * 1035.09  *  561.09  * 1460.62  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  809.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.06  * Wt. n-Val.             *   0.060  *   0.038  *   0.080  *
* W.S. Elev (ft)         *  808.16  * Reach Len. (ft)        *  669.73  *  773.55  *  388.15  *
* Crit W.S. (ft)         *  785.51  * Flow Area (sq ft)      * 3036.92  * 5953.52  * 2900.74  *
* E.G. Slope (ft/ft)     *0.000397  * Area (sq ft)           * 3335.37  * 5953.52  * 3015.65  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *11471.55  *55686.80  * 7561.65  *
* Top Width (ft)         *  808.86  * Top Width (ft)         *  202.04  *  137.32  *  469.50  *
* Vel Total (ft/s)       *    6.28  * Avg. Vel. (ft/s)       *    3.78  *    9.35  *    2.61  *
* Max Chl Dpth (ft)      *   48.61  * Hydr. Depth (ft)       *   21.99  *   43.36  *    7.66  *
* Conv. Total (cfs)      *3748606.0  * Conv. (cfs)            *575512.8  *2793735.0  *379358.4  *
* Length Wtd. (ft)       *  704.77  * Wetted Per. (ft)       *  143.47  *  143.21  *  384.01  *
* Min Ch El (ft)         *  759.55  * Shear (lb/sq ft)       *    0.53  *    1.03  *    0.19  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    1.98  *    9.65  *    0.49  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *12458.10  *17336.71  *13904.73  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         * 1291.17  *  563.44  * 1827.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  795.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.060  *   0.038  *   0.080  *
* W.S. Elev (ft)         *  795.06  * Reach Len. (ft)        *  669.73  *  773.55  *  388.15  *
* Crit W.S. (ft)         *  778.77  * Flow Area (sq ft)      * 1456.72  * 4154.66  * 1295.76  *
* E.G. Slope (ft/ft)     *0.000409  * Area (sq ft)           * 1456.72  * 4154.66  * 1295.76  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 4192.72  *31039.05  * 2768.23  *
* Top Width (ft)         *  332.28  * Top Width (ft)         *  102.79  *  137.32  *   92.16  *
* Vel Total (ft/s)       *    5.50  * Avg. Vel. (ft/s)       *    2.88  *    7.47  *    2.14  *
* Max Chl Dpth (ft)      *   35.51  * Hydr. Depth (ft)       *   14.17  *   30.26  *   14.06  *
* Conv. Total (cfs)      *1877858.0  * Conv. (cfs)            *207193.0  *1533866.0  *136798.6  *
* Length Wtd. (ft)       *  735.41  * Wetted Per. (ft)       *  105.84  *  143.21  *   95.62  *
* Min Ch El (ft)         *  759.55  * Shear (lb/sq ft)       *    0.35  *    0.74  *    0.35  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    1.01  *    5.54  *    0.74  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 3070.46  *11720.92  * 3419.67  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  410.28  *  535.58  *  412.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.840

INPUT
Description:
Station Elevation Data    num=     235
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
```

```
       0  796.27   18.57  796.21   26.75  796.45  229.95  798.58  254.24  798.35
  268.99  798.07   269.8  798.65  276.81  798.64  277.43  798.64  304.27  798.54
  310.11  797.85  330.42  797.97  343.43  797.77  361.18  797.87  379.56  797.68
  383.53   797.2  389.85  796.73  393.89  796.59   418.5   796.1  429.13  796.53
  450.09  797.41  488.29  798.08   501.6  798.41  506.63  798.36  520.52  798.35
   559.9   798.7  591.51  798.55  599.79  798.53   607.7  798.45  609.92  798.48
  622.83  798.65  659.35  798.68  705.39  798.52  757.36  798.28  786.85   797.6
  872.26  796.36  934.03  795.04  939.49  794.86  940.49  794.83  941.03  794.87
  957.67  797.24  962.78  797.44  970.35  797.64  975.94  797.82  996.44  797.81
 1003.01  797.76 1006.97  797.99 1023.76  798.76 1026.27  798.88 1026.81  798.87
 1033.44  798.86 1049.76  798.84 1080.61  798.61 1085.74  798.44 1091.45  798.26
 1091.96  798.26 1099.74  798.76 1102.08  798.76 1105.16  798.76 1109.04  798.05
 1113.25  797.24 1120.04  795.62 1135.12  788.48 1136.02  788.26 1137.47   787.1
 1144.47  783.25 1153.83  786.78 1154.55  787.12 1155.54  787.32 1167.67  789.15
 1177.75  789.29 1183.76  789.94 1197.59  790.34 1201.49  790.33 1213.77  790.64
 1216.53  790.65 1224.08   790.6 1248.99  790.35  1260.6  790.33 1266.99  790.26
 1300.52  789.53 1308.88  789.47 1314.66  789.39 1342.41  789.53 1358.39  789.93
 1367.83  787.68 1380.59  785.48 1386.55  782.97 1397.02   780.4 1408.26  777.55
 1417.13     777  1426.3  776.76  1428.4  777.08 1437.08  778.55 1450.88  781.72
 1453.98  782.43 1456.39  782.91 1472.67  786.57 1484.84  786.78 1492.39   786.9
 1494.64  787.04 1507.15  787.82 1513.52  789.34 1537.89  795.09 1546.87  799.81
 1559.15  806.82 1562.74  809.05 1567.82  809.45 1569.99  809.63 1572.64  809.87
 1589.81  801.05 1604.68  793.45 1624.17  788.65 1628.42  787.57 1630.56  787.44
 1643.99  786.59 1654.84   785.9 1669.57  782.04 1676.65  780.18 1689.43   778.3
 1692.52  777.86 1695.09  777.78 1705.71  777.49 1716.85  777.19 1724.36  777.01
 1731.59  777.03  1742.7     777  1756.5  777.12 1764.31  777.17 1774.06  777.15
  1779.2  777.27 1781.38  777.29 1783.99  777.25 1804.58  777.39 1806.15  777.44
  1808.4   777.4 1841.74  776.83 1857.19  776.55 1857.95  776.56 1858.95  776.53
 1874.45   776.3 1893.52   775.9 1915.84  775.84 1927.24  775.84 1954.89  776.18
 1964.44  776.29 1996.55  775.59 2000.84  775.49 2003.96  775.26 2018.33  774.49
 2021.23  774.29 2022.75  774.19 2048.08  772.41 2051.58  770.04 2058.44   765.4
 2073.64     760    2080   758.8    2110   757.8    2140   758.8 2145.03  759.58
 2171.63  777.01 2171.76  777.11 2171.85  777.11 2172.21  777.46 2182.22  786.96
 2193.65   790.8 2196.49  791.46 2199.56  792.18 2217.49  794.97 2223.41  795.41
 2250.37  796.59 2282.79  797.03 2316.27  796.74 2326.44  796.57 2346.75  796.59
 2372.79  796.46 2385.39  796.78 2401.21  797.21 2401.64  797.22 2411.78  797.19
 2423.81  796.63 2435.89  796.65 2448.02  796.31 2461.65   796.4 2489.92   797.4
 2500.99  797.94 2508.37  798.15 2516.06  798.25 2559.03  799.38  2573.5  799.64
 2575.27  799.65  2578.9  799.74 2639.58  800.78 2672.57  801.85 2698.44  802.54
 2743.18  803.65  2771.2  804.91 2795.18  806.11 2809.83  806.86 2819.03  805.84
 2828.49  805.27 2837.89  806.64 2852.26   808.3 2855.65  808.18 2861.96  807.99
 2867.27   808.1 2876.66  808.23 2878.18     808 2880.21  808.01 2896.19  807.02
  2899.3  808.53 2900.78  809.33 2902.42  809.88 2911.44  813.28 2918.87     815
 2922.61  816.28 2937.46  820.54 2946.45  824.83 2958.78  832.43 2964.51  836.74
 2970.66  839.65 2979.24   844.1 2980.97  845.12 2982.15   845.7 2996.48  853.01
  3001.7  855.67 3014.24  861.53 3017.73  861.32 3019.34  861.15  3047.5  858.77
  3061.8  862.48  3062.7  862.53 3081.97  863.47 3086.33  863.27 3087.78  863.42

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .055 2048.08    .038 2182.22    .105 2401.21     .06 2896.19    .105

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2048.08 2182.22           648.35   616.3   541.7             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 1827.09   797.1       F
Left Levee      Station= 1572.64      Elevation=     810
Blocked Obstructions     num=       1
   Sta L   Sta R     Elev
************************
       0     350     815

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  781.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.055  *   0.038  *          *
* W.S. Elev (ft)         *  780.96  * Reach Len. (ft)        *  648.35  *  616.30  *  541.70  *
* Crit W.S. (ft)         *  768.04  * Flow Area (sq ft)      * 1162.16  * 2354.23  *          *
* E.G. Slope (ft/ft)     *0.000350  * Area (sq ft)           * 1694.85  * 2354.23  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1776.28  *11423.72  *          *
* Top Width (ft)         *  502.22  * Top Width (ft)         *  374.40  *  127.82  *          *
* Vel Total (ft/s)       *    3.75  * Avg. Vel. (ft/s)       *    1.53  *    4.85  *          *
* Max Chl Dpth (ft)      *   23.16  * Hydr. Depth (ft)       *    5.26  *   18.42  *          *
* Conv. Total (cfs)      *705335.3  * Conv. (cfs)            * 94914.7  *610420.6  *          *
```

```
* Length Wtd. (ft)       *  618.35  * Wetted Per. (ft)       *  221.11  *  137.88  *          *
* Min Ch El (ft)         *  757.80  * Shear (lb/sq ft)       *    0.11  *    0.37  *          *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.18  *    1.81  *          *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *  626.90  * 5772.86  *  638.08  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  106.85  *  432.32  *  128.70  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  786.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.              *   0.055  *   0.038  *          *
* W.S. Elev (ft)         *  785.88  * Reach Len. (ft)        *  648.35  *  616.30  *  541.70  *
* Crit W.S. (ft)         *  770.84  * Flow Area (sq ft)      * 2250.36  * 2996.40  *          *
* E.G. Slope (ft/ft)     *0.000302  * Area (sq ft)           * 3584.69  * 2996.40  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 4963.57  *15336.43  *          *
* Top Width (ft)         *  526.19  * Top Width (ft)         *  393.18  *  133.01  *          *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    2.21  *    5.12  *          *
* Max Chl Dpth (ft)      *   28.08  * Hydr. Depth (ft)       *   10.18  *   22.53  *          *
* Conv. Total (cfs)      *1167732.0  * Conv. (cfs)           *285523.3  *882208.6  *          *
* Length Wtd. (ft)       *  619.85  * Wetted Per. (ft)       *  221.11  *  145.03  *          *
* Min Ch El (ft)         *  757.80  * Shear (lb/sq ft)       *    0.19  *    0.39  *          *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.42  *    2.00  *          *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 1175.14  * 7665.37  * 1266.30  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  155.86  *  472.01  *  177.11  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  789.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.              *   0.055  *   0.038  *   0.105  *
* W.S. Elev (ft)         *  789.41  * Reach Len. (ft)        *  648.35  *  616.30  *  541.70  *
* Crit W.S. (ft)         *  772.90  * Flow Area (sq ft)      * 3029.36  * 3468.64  *    8.93  *
* E.G. Slope (ft/ft)     *0.000275  * Area (sq ft)           * 5048.13  * 3468.64  *    8.93  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 7773.45  *18544.23  *    2.32  *
* Top Width (ft)         *  568.42  * Top Width (ft)         *  426.99  *  134.14  *    7.29  *
* Vel Total (ft/s)       *    4.04  * Avg. Vel. (ft/s)       *    2.57  *    5.35  *    0.26  *
* Max Chl Dpth (ft)      *   31.61  * Hydr. Depth (ft)       *   13.71  *   25.86  *    1.22  *
* Conv. Total (cfs)      *1586636.0  * Conv. (cfs)           *468603.3  *1117894.0  *   139.6  *
* Length Wtd. (ft)       *  620.41  * Wetted Per. (ft)       *  221.11  *  146.59  *    7.69  *
* Min Ch El (ft)         *  757.80  * Shear (lb/sq ft)       *    0.24  *    0.41  *    0.02  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    0.60  *    2.17  *    0.01  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 1672.34  * 9200.72  * 1892.25  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  200.62  *  499.95  *  255.26  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  793.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.              *   0.055  *   0.038  *   0.105  *
* W.S. Elev (ft)         *  793.23  * Reach Len. (ft)        *  648.35  *  616.30  *  541.70  *
* Crit W.S. (ft)         *  775.49  * Flow Area (sq ft)      * 3874.10  * 3981.39  *   63.60  *
* E.G. Slope (ft/ft)     *0.000259  * Area (sq ft)           * 6709.98  * 3981.39  *   63.60  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *11353.47  *22619.54  *   27.00  *
* Top Width (ft)         *  600.76  * Top Width (ft)         *  442.51  *  134.14  *   24.10  *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *    2.93  *    5.68  *    0.42  *
* Max Chl Dpth (ft)      *   35.43  * Hydr. Depth (ft)       *   17.53  *   29.68  *    2.64  *
* Conv. Total (cfs)      *2114406.0  * Conv. (cfs)           *706054.2  *1406673.0  *  1678.8  *
* Length Wtd. (ft)       *  620.78  * Wetted Per. (ft)       *  221.11  *  146.59  *   24.97  *
* Min Ch El (ft)         *  757.80  * Shear (lb/sq ft)       *    0.28  *    0.44  *    0.04  *
* Alpha                  *    1.32  * Stream Power (lb/ft s) *    0.83  *    2.49  *    0.02  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 2455.45  *10805.57  * 2829.70  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  316.77  *  522.79  *  344.98  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	798.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.055	0.038	0.095
W.S. Elev (ft)	798.17	Reach Len. (ft)	648.35	616.30	541.70
Crit W.S. (ft)	779.61	Flow Area (sq ft)	8921.57	4643.89	651.69
E.G. Slope (ft/ft)	0.000154	Area (sq ft)	8921.57	4643.89	651.69
Q Total (cfs)	44500.00	Flow (cfs)	21730.79	22561.24	207.97
Top Width (ft)	914.53	Top Width (ft)	452.64	134.14	327.75
Vel Total (ft/s)	3.13	Avg. Vel. (ft/s)	2.44	4.86	0.32
Max Chl Dpth (ft)	40.37	Hydr. Depth (ft)	19.71	34.62	1.99
Conv. Total (cfs)	3585928.0	Conv. (cfs)	1751125.0	1818044.0	16758.8
Length Wtd. (ft)	622.89	Wetted Per. (ft)	455.59	146.59	328.86
Min Ch El (ft)	757.80	Shear (lb/sq ft)	0.19	0.30	0.02
Alpha	1.52	Stream Power (lb/ft s)	0.46	1.48	0.01
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	4364.62	13291.16	5030.23
C & E Loss (ft)	0.08	Cum SA (acres)	639.74	550.81	727.61

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	801.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.055	0.038	0.087
W.S. Elev (ft)	801.47	Reach Len. (ft)	648.35	616.30	541.70
Crit W.S. (ft)	781.15	Flow Area (sq ft)	10423.34	5085.79	1983.44
E.G. Slope (ft/ft)	0.000145	Area (sq ft)	10423.34	5085.79	1983.44
Q Total (cfs)	53690.00	Flow (cfs)	27071.91	25500.80	1117.28
Top Width (ft)	1071.71	Top Width (ft)	459.08	134.14	478.49
Vel Total (ft/s)	3.07	Avg. Vel. (ft/s)	2.60	5.01	0.56
Max Chl Dpth (ft)	43.67	Hydr. Depth (ft)	22.70	37.91	4.15
Conv. Total (cfs)	4453887.0	Conv. (cfs)	2245767.0	2115435.0	92684.9
Length Wtd. (ft)	622.36	Wetted Per. (ft)	462.83	146.59	479.64
Min Ch El (ft)	757.80	Shear (lb/sq ft)	0.20	0.31	0.04
Alpha	1.63	Stream Power (lb/ft s)	0.53	1.58	0.02
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	6444.14	14776.66	7379.06
C & E Loss (ft)	0.10	Cum SA (acres)	868.98	557.79	1097.38

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	804.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.055	0.038	0.082
W.S. Elev (ft)	804.38	Reach Len. (ft)	648.35	616.30	541.70
Crit W.S. (ft)	782.34	Flow Area (sq ft)	11772.03	5477.45	3533.22
E.G. Slope (ft/ft)	0.000135	Area (sq ft)	11772.03	5477.45	3533.22
Q Total (cfs)	62000.00	Flow (cfs)	31621.65	27772.49	2605.87
Top Width (ft)	1176.21	Top Width (ft)	464.76	134.14	577.30
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	2.69	5.07	0.74
Max Chl Dpth (ft)	46.58	Hydr. Depth (ft)	25.33	40.83	6.12
Conv. Total (cfs)	5344113.0	Conv. (cfs)	2725640.0	2393860.0	224613.8
Length Wtd. (ft)	621.45	Wetted Per. (ft)	469.22	146.59	578.50
Min Ch El (ft)	757.80	Shear (lb/sq ft)	0.21	0.31	0.05
Alpha	1.71	Stream Power (lb/ft s)	0.57	1.59	0.04
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	8316.52	15744.01	9607.35
C & E Loss (ft)	0.12	Cum SA (acres)	1030.19	558.68	1457.51

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	808.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.055	0.038	0.079
W.S. Elev (ft)	808.59	Reach Len. (ft)	648.35	616.30	541.70
Crit W.S. (ft)	783.93	Flow Area (sq ft)	13745.50	6042.06	6237.52
E.G. Slope (ft/ft)	0.000120	Area (sq ft)	13745.50	6042.06	6237.52
Q Total (cfs)	74720.00	Flow (cfs)	38121.86	30850.49	5747.66
Top Width (ft)	1324.30	Top Width (ft)	472.96	134.14	717.20
Vel Total (ft/s)	2.87	Avg. Vel. (ft/s)	2.77	5.11	0.92
Max Chl Dpth (ft)	50.79	Hydr. Depth (ft)	29.06	45.04	8.70
Conv. Total (cfs)	6827860.0	Conv. (cfs)	3483548.0	2819095.0	525217.0
Length Wtd. (ft)	620.98	Wetted Per. (ft)	478.43	146.59	719.14
Min Ch El (ft)	757.80	Shear (lb/sq ft)	0.21	0.31	0.06
Alpha	1.79	Stream Power (lb/ft s)	0.60	1.57	0.06
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	12326.79	17230.20	13863.50
C & E Loss (ft)	0.15	Cum SA (acres)	1285.98	561.03	1822.57

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	795.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.055	0.038	0.105
W.S. Elev (ft)	795.05	Reach Len. (ft)	648.35	616.30	541.70
Crit W.S. (ft)	778.30	Flow Area (sq ft)	4276.58	4225.70	118.18
E.G. Slope (ft/ft)	0.000253	Area (sq ft)	7519.96	4225.70	118.18
Q Total (cfs)	38000.00	Flow (cfs)	13238.81	24703.92	57.28
Top Width (ft)	617.07	Top Width (ft)	446.54	134.14	36.39
Vel Total (ft/s)	4.41	Avg. Vel. (ft/s)	3.10	5.85	0.48
Max Chl Dpth (ft)	37.25	Hydr. Depth (ft)	19.35	31.50	3.25
Conv. Total (cfs)	2389555.0	Conv. (cfs)	832496.1	1553457.0	3601.6
Length Wtd. (ft)	620.89	Wetted Per. (ft)	221.11	146.59	37.40
Min Ch El (ft)	757.80	Shear (lb/sq ft)	0.31	0.46	0.05
Alpha	1.32	Stream Power (lb/ft s)	0.95	2.66	0.02
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	3001.46	11646.51	3413.37
C & E Loss (ft)	0.05	Cum SA (acres)	406.06	533.17	411.87

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 19.723

INPUT
Description: U/S of Old 95th St Bridge. Copied from 19.703. Stop Log Gap across road on left.
Station Elevation Data num= 221

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	797.94	3.27	798.1	5.67	798.13	11.67	798.14	73.54	797.73
91.69	797.84	107.57	798.08	223.93	797.41	231.65	797.95	261.94	798.01
267.97	797.64	282.98	797.5	287.23	797.45	293.35	797.49	310.6	797.38
313.11	797.36	313.26	797.36	325.23	797.31	325.26	797.31	325.58	797.31
334.24	797.34	348.56	797.48	385.05	797.59	403.11	797.65	405.51	797.7
437.64	797.86	474.89	797.66	480.69	797.67	481.97	797.67	482.38	797.67
482.75	797.67	535.21	797.48	551.58	797.43	567.32	797.27	629.8	796.86
654.91	796.29	669.84	796.18	679	795.08	682.78	794.95	683.97	794.88
686.3	795.37	693.23	796.08	698.21	795.92	700.51	795.85	702.29	795.9
705.48	795.52	711.8	794.65	717.28	795	720.29	795.33	722.91	795.34
734.92	796	739.42	796.1	752.7	796.46	754.4	796.29	756.93	796.29
758.7	796.29	759.7	796.29	761.47	796.4	766.86	795.51	772.03	796.41

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  772.61  796.36  774.72  796.37  776.18  796.35  784.16  796.27  793.96  796.02
  809.45  795.76  814.86  795.73  826.37  795.97  830.16  796.06     846  796.36
  853.49  795.72  855.76  795.52   866.7  795.32  866.74  795.32  866.78  795.32
  866.85  795.32  879.71  795.09  884.36  795.11  970.12  795.48  984.15  795.56
  987.61  795.57  994.78  795.58 1063.72  795.43 1108.67   795.3 1130.22  795.27
 1194.74  795.36 1300.16  796.15 1304.72  796.17 1306.17   796.2 1308.95  796.24
 1383.61  796.78 1405.09  797.04 1442.08   796.5 1444.52  796.56 1453.03  797.88
 1462.43  800.61 1470.19  802.41 1477.98   802.8 1481.82  803.05 1486.52  802.94
 1508.94  803.14 1509.77  803.14 1511.56  803.17 1515.39  803.11 1517.91  803.26
 1527.69  802.59  1539.3  801.97 1547.61   802.1 1548.94  801.99 1553.51  801.92
 1565.73  803.34  1574.5  803.88  1578.8  804.22 1583.14  804.47 1585.12  804.51
  1592.9  804.62 1593.53   804.7 1597.52  805.15 1605.96  804.99 1610.32  804.94
 1614.53  804.89 1615.17  804.87 1618.24   804.8 1620.25  804.77 1632.53  804.51
 1665.31  803.79 1683.38  803.78 1692.68  803.75 1701.08  803.75 1723.23  803.67
 1753.59  803.57 1771.71  803.62 1778.74  803.59 1809.22  803.69 1819.92  803.78
 1846.68  803.75 1859.83   802.8 1862.75  802.42 1883.37  800.72 1885.42  800.44
 1895.37  799.93 1902.56  797.43  1904.6  794.26 1906.47  793.15 1913.93  788.76
 1925.79  782.22 1929.42  780.26 1932.26  778.72 1944.39  775.23 1950.21  773.71
 1955.16  772.92 1955.31   772.9 1955.84  772.81 1968.77  771.21 1975.88  770.29
 1984.32  765.54 1987.95  763.15 2002.87  759.68 2003.96  759.36    2012  757.12
    2035  756.12    2060  757.12 2067.34  759.35 2067.44  759.37 2096.95  770.82
 2102.67  773.04 2104.24  773.89 2105.36  774.15 2136.73  775.55 2147.73  777.18
 2168.88  783.31 2176.54  784.54 2177.84  785.35 2177.89  785.38 2177.93  785.41
 2178.39  785.69 2195.71  798.72 2204.26  805.55 2204.41  805.55 2213.75  805.38
 2222.64  805.52 2241.84  804.27 2272.04  803.92 2294.51  804.46 2324.38  808.09
 2335.99  813.17 2339.47  813.12 2342.05  813.22 2361.02  816.25 2364.51  816.28
 2392.16  819.08 2393.57   819.1 2395.76  819.33 2420.95  820.97 2425.85  821.68
 2443.21  822.52  2450.9  823.34 2462.42  823.14 2477.16  826.15 2478.28  826.15
 2480.26  825.94 2489.04  825.59 2495.75  825.58 2503.78  824.35 2510.43  822.52
 2512.91  823.18 2520.85  825.49 2523.72  826.08 2526.99  826.76 2531.64  829.26
 2545.04  834.98 2556.98  843.25  2562.1  846.71 2573.58  855.44 2578.58  859.49
 2584.83  860.84 2596.13  863.01  2605.1  865.47 2616.49  868.45 2626.21  872.15
 2632.54  874.43

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0    .055 1846.68     .11 1975.88    .038 2104.24     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1975.88 2104.24              40      40      40             .1       .3
Left Levee      Station=    1600      Elevation=     809
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************
       0     270     815     900    1400     815

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  781.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  780.67  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  767.19  * Flow Area (sq ft)      *  308.40  * 2499.08  *  258.11  *
* E.G. Slope (ft/ft)     *0.000347  * Area (sq ft)           *  308.40  * 2499.08  *  258.11  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  265.80  *12782.40  *  151.80  *
* Top Width (ft)         *  231.08  * Top Width (ft)          *   47.21  *  128.36  *   55.51  *
* Vel Total (ft/s)       *    4.31  * Avg. Vel. (ft/s)       *    0.86  *    5.11  *    0.59  *
* Max Chl Dpth (ft)      *   24.55  * Hydr. Depth (ft)       *    6.53  *   19.47  *    4.65  *
* Conv. Total (cfs)      *708912.4  * Conv. (cfs)            * 14274.9  *686485.0  *  8152.6  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   48.62  *  134.22  *   56.19  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.14  *    0.40  *    0.10  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.12  *    2.06  *    0.06  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  612.00  * 5738.53  *  636.47  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  103.71  *  430.51  *  128.36  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  785.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  785.42  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
```

```
* Crit W.S. (ft)         *  770.03  * Flow Area (sq ft)      *  553.63  * 3109.46  *  565.50  *
* E.G. Slope (ft/ft)     *0.000376  * Area (sq ft)           *  553.63  * 3109.46  *  565.50  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  648.99  *19169.31  *  481.70  *
* Top Width (ft)         *  257.96  * Top Width (ft)         *   55.89  *  128.36  *   73.71  *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)       *    1.17  *    6.16  *    0.85  *
* Max Chl Dpth (ft)      *   29.30  * Hydr. Depth (ft)       *    9.91  *   24.22  *    7.67  *
* Conv. Total (cfs)      *1046396.0  * Conv. (cfs)           * 33453.0  *988113.3  * 24830.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   58.52  *  134.22  *   75.11  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.22  *    0.54  *    0.18  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.26  *    3.36  *    0.15  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1144.34  * 7622.18  * 1262.79  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  152.51  *  470.16  *  176.65  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  789.52  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  788.83  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  772.03  * Flow Area (sq ft)      *  754.90  * 3547.42  *  825.00  *
* E.G. Slope (ft/ft)     *0.000393  * Area (sq ft)           *  754.90  * 3547.42  *  825.00  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1031.03  *24409.19  *  879.77  *
* Top Width (ft)         *  268.76  * Top Width (ft)         *   62.07  *  128.36  *   78.33  *
* Vel Total (ft/s)       *    5.13  * Avg. Vel. (ft/s)       *    1.37  *    6.88  *    1.07  *
* Max Chl Dpth (ft)      *   32.71  * Hydr. Depth (ft)       *   12.16  *   27.64  *   10.53  *
* Conv. Total (cfs)      *1327148.0  * Conv. (cfs)           * 51988.3  *1230798.0  * 44361.3  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   65.58  *  134.22  *   80.85  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.28  *    0.65  *    0.25  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.39  *    4.47  *    0.27  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1629.15  * 9151.08  * 1887.07  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  196.98  *  498.09  *  254.73  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  793.36  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  792.52  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  774.31  * Flow Area (sq ft)      *  995.28  * 4020.63  * 1122.79  *
* E.G. Slope (ft/ft)     *0.000418  * Area (sq ft)           *  995.28  * 4020.63  * 1122.79  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1570.09  *30986.90  * 1443.01  *
* Top Width (ft)         *  279.92  * Top Width (ft)         *   68.34  *  128.36  *   83.23  *
* Vel Total (ft/s)       *    5.54  * Avg. Vel. (ft/s)       *    1.58  *    7.71  *    1.29  *
* Max Chl Dpth (ft)      *   36.40  * Hydr. Depth (ft)       *   14.56  *   31.32  *   13.49  *
* Conv. Total (cfs)      *1663885.0  * Conv. (cfs)           * 76836.5  *1516430.0  * 70617.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   72.85  *  134.22  *   86.99  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.36  *    0.78  *    0.34  *
* Alpha                  *    1.77  * Stream Power (lb/ft s) *    0.56  *    6.02  *    0.43  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 2398.10  *10748.96  * 2822.32  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  312.97  *  520.94  *  344.31  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  798.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  797.13  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  777.03  * Flow Area (sq ft)      * 1324.41  * 4613.15  * 1521.13  *
* E.G. Slope (ft/ft)     *0.000435  * Area (sq ft)           * 1324.41  * 4613.15  * 1521.13  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 2429.57  *39761.87  * 2308.56  *
* Top Width (ft)         *  290.85  * Top Width (ft)         *   73.13  *  128.36  *   89.36  *
```

```
* Vel Total (ft/s)       *    5.97  * Avg. Vel. (ft/s)       *    1.83  *    8.62  *    1.52  *
* Max Chl Dpth (ft)      *   41.01  * Hydr. Depth (ft)       *   18.11  *   35.94  *   17.02  *
* Conv. Total (cfs)      *2134128.0  * Conv. (cfs)            *116517.0  *1906897.0  *110713.9  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   79.69  *  134.22  *   94.67  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.45  *    0.93  *    0.44  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.83  *    8.04  *    0.66  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 4288.37  *13225.68  * 5016.72  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  635.83  *  548.95  *  725.02  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  801.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  800.20  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  779.15  * Flow Area (sq ft)      * 1561.03  * 5006.99  * 1801.49  *
* E.G. Slope (ft/ft)     *0.000474  * Area (sq ft)           * 1561.03  * 5006.99  * 1801.49  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 3010.17  *47592.28  * 3087.56  *
* Top Width (ft)         *  307.53  * Top Width (ft)         *   85.84  *  128.36  *   93.33  *
* Vel Total (ft/s)       *    6.41  * Avg. Vel. (ft/s)       *    1.93  *    9.51  *    1.71  *
* Max Chl Dpth (ft)      *   44.08  * Hydr. Depth (ft)       *   18.19  *   39.01  *   19.30  *
* Conv. Total (cfs)      *2465940.0  * Conv. (cfs)            *138254.8  *2185876.0  *141809.1  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   92.98  *  134.22  *   99.68  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.50  *    1.10  *    0.53  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    0.96  *   10.49  *    0.92  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 6354.95  *14705.26  * 7355.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  864.93  *  555.93  * 1093.82  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  804.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.44  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  802.91  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  780.87  * Flow Area (sq ft)      * 1838.95  * 5354.70  * 2058.90  *
* E.G. Slope (ft/ft)     *0.000502  * Area (sq ft)           * 1838.95  * 5354.70  * 2058.90  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3345.27  *54795.04  * 3859.69  *
* Top Width (ft)         *  342.68  * Top Width (ft)         *  117.60  *  128.36  *   96.72  *
* Vel Total (ft/s)       *    6.70  * Avg. Vel. (ft/s)       *    1.82  *   10.23  *    1.87  *
* Max Chl Dpth (ft)      *   46.79  * Hydr. Depth (ft)       *   15.64  *   41.72  *   21.29  *
* Conv. Total (cfs)      *2766141.0  * Conv. (cfs)            *149249.6  *2444691.0  *172200.9  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  124.87  *  134.22  *  104.02  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.46  *    1.25  *    0.62  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.84  *   12.80  *    1.16  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 8215.23  *15667.38  * 9572.58  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         * 1025.86  *  556.83  * 1453.32  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  808.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.68  * Wt. n-Val.             *   0.101  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  806.86  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  783.30  * Flow Area (sq ft)      * 3073.27  * 5861.13  * 2679.56  *
* E.G. Slope (ft/ft)     *0.000527  * Area (sq ft)           * 3073.27  * 5861.13  * 2679.56  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 5762.98  *65218.50  * 3738.52  *
* Top Width (ft)         *  714.24  * Top Width (ft)         *  375.88  *  128.36  *  210.00  *
* Vel Total (ft/s)       *    6.43  * Avg. Vel. (ft/s)       *    1.88  *   11.13  *    1.40  *
* Max Chl Dpth (ft)      *   50.74  * Hydr. Depth (ft)       *    8.18  *   45.66  *   12.76  *
* Conv. Total (cfs)      *3256117.0  * Conv. (cfs)            *251136.5  *2842065.0  *162915.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  384.95  *  134.22  *  218.42  *
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```
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.26  *    1.44  *    0.40  *
* Alpha                  *    2.62  * Stream Power (lb/ft s) *    0.49  *   15.97  *    0.56  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *12201.62  *17146.00  *13808.06  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1279.67  *  559.17  * 1816.80  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  795.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.              *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  794.27  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  775.37  * Flow Area (sq ft)      * 1117.73  * 4245.74  * 1270.79  *
* E.G. Slope (ft/ft)     *0.000428  * Area (sq ft)           * 1117.73  * 4245.74  * 1270.79  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 1871.35  *34371.02  * 1757.63  *
* Top Width (ft)         *  285.21  * Top Width (ft)         *   71.29  *  128.36  *   85.56  *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)       *    1.67  *    8.10  *    1.38  *
* Max Chl Dpth (ft)      *   38.15  * Hydr. Depth (ft)       *   15.68  *   33.08  *   14.85  *
* Conv. Total (cfs)      *1835885.0  * Conv. (cfs)            * 90410.0  *1660559.0  * 84915.9  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   76.28  *  134.22  *   89.90  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.39  *    0.85  *    0.38  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    0.66  *    6.85  *    0.52  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 2937.17  *11586.58  * 3404.73  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  402.21  *  531.31  *  411.12  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 19.719

INPUT
Description: Old 95th St Bridge
Distance from Upstream XS =       1
Deck/Roadway Width        =      38
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    1840  803.75  796.25    1900   803.8     790    1910   803.9     790
    1910   803.9   796.4    2065   806.5     799    2190  809.35  801.85
    2190  809.35     790    2205   809.7   802.2    2317     814     800
    2457     820     800

Upstream Bridge Cross Section Data
Station Elevation Data    num=     221
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  797.94    3.27   798.1    5.67  798.13   11.67  798.14   73.54  797.73
   91.69  797.84  107.57  798.08  223.93  797.41  231.65  797.95  261.94  798.01
  267.97  797.64  282.98   797.5  287.23  797.45  293.35  797.49   310.6  797.38
  313.11  797.36  313.26  797.36  325.23  797.31  325.26  797.31  325.58  797.31
  334.24  797.34  348.56  797.48  385.05  797.59  403.11  797.65  405.51   797.7
  437.64  797.86  474.89  797.66  480.69  797.67  481.97  797.67  482.38  797.67
  482.75  797.67  535.21  797.48  551.58  797.43  567.32  797.27   629.8  796.86
  654.91  796.29  669.84  796.18     679  795.08  682.78  794.95  683.97  794.88
   686.3  795.37  693.23  796.08  698.21  795.92  700.51  795.85  702.29   795.9
  705.48  795.52   711.8  794.65  717.28     795  720.29  795.33  722.91  795.34
  734.92     796  739.42   796.1   752.7  796.46   754.4  796.29  756.93  796.29
   758.7  796.29   759.7  796.29  761.47   796.4  766.86  795.51  772.03  796.41
  772.61  796.36  774.72  796.37  776.18  796.35  784.16  796.27  793.96  796.02
  809.45  795.76  814.86  795.73  826.37  795.97  830.16  796.06     846  796.36
  853.49  795.72  855.76  795.52   866.7  795.32  866.74  795.32  866.78  795.32
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  866.85  795.32  879.71  795.09  884.36  795.11  970.12  795.48  984.15  795.56
  987.61  795.57  994.78  795.58 1063.72  795.43 1108.67   795.3 1130.22  795.27
 1194.74  795.36 1300.16  796.15 1304.72  796.17 1306.17   796.2 1308.95  796.24
 1383.61  796.78 1405.09  797.04 1442.08   796.5 1444.52  796.56 1453.03  797.88
 1462.43  800.61 1470.19  802.41 1477.98   802.8 1481.82  803.05 1486.52  802.94
 1508.94  803.14 1509.77  803.14 1511.56  803.17 1515.39  803.11 1517.91  803.26
 1527.69  802.59  1539.3  801.97 1547.61   802.1 1548.94  801.99 1553.51  801.92
 1565.73  803.34  1574.5  803.88  1578.8  804.22 1583.14  804.47 1585.12  804.51
  1592.9  804.62 1593.53   804.7 1597.52  805.15 1605.96  804.99 1610.32  804.94
 1614.53  804.89 1615.17  804.87 1618.24   804.8 1620.25  804.77 1632.53  804.51
 1665.31  803.79 1683.38  803.78 1692.68  803.75 1701.08  803.75 1723.23  803.67
 1753.59  803.57 1771.71  803.62 1778.74  803.59 1809.22  803.69 1819.92  803.78
 1846.68  803.75 1859.83   802.8 1862.75  802.42 1883.37  800.72 1885.42  800.44
 1895.37  799.93 1902.56  797.43  1904.6  794.26 1906.47  793.15 1913.93  788.76
 1925.79  782.22 1929.42  780.26 1932.26  778.72 1944.39  775.23 1950.21  773.71
 1955.16  772.92 1955.31   772.9 1955.84  772.81 1968.77  771.21 1975.88  770.29
 1984.32  765.54 1987.95  763.15 2002.87  759.68 2003.96  759.36    2012  757.12
    2035  756.12    2060  757.12 2067.34  759.35 2067.44  759.37 2096.95  770.82
 2102.67  773.04 2104.24  773.89 2105.36  774.15 2136.73  775.55 2147.73  777.18
 2168.88  783.31 2176.54  784.54 2177.84  785.35 2177.89  785.38 2177.93  785.41
 2178.39  785.69 2195.71  798.72 2204.26  805.55 2204.41  805.55 2213.75  805.38
 2222.64  805.52 2241.84  804.27 2272.04  803.92 2294.51  804.46 2324.38  808.09
 2335.99  813.17 2339.47  813.12 2342.05  813.22 2361.02  816.25 2364.51  816.28
 2392.16  819.08 2393.57   819.1 2395.76  819.33 2420.95  820.97 2425.85  821.68
 2443.21  822.52  2450.9  823.34 2462.42  823.14 2477.16  826.15 2478.28  826.15
 2480.26  825.94 2489.04  825.59 2495.75  825.58 2503.78  824.35 2510.43  822.52
 2512.91  823.18 2520.85  825.49 2523.72  826.08 2526.99  826.76 2531.64  829.26
 2545.04  834.98 2556.98  843.25  2562.1  846.71 2573.58  855.44 2578.58  859.49
 2584.83  860.84 2596.13  863.01  2605.1  865.47 2616.49  868.45 2626.21  872.15
 2632.54  874.43

Manning's n Values        num=       4
     Sta   n Val      Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0    .055 1846.68     .11 1975.88    .038 2104.24     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1975.88 2104.24             .1       .3
Left Levee      Station=    1600      Elevation=     809
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
       0     270     815     900    1400     815

Downstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    1840  803.75  796.25    1900   803.8     790    1910   803.9     790
    1910   803.9   796.4    2065   806.5     799    2190  809.35  801.85
    2190  809.35     790    2205   809.7   802.2    2317     814     800
    2457     820     800

Downstream Bridge Cross Section Data
Station Elevation Data    num=     221
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  797.94    3.27   798.1    5.67  798.13   11.67  798.14   73.54  797.73
   91.69  797.84  107.57  798.08  223.93  797.41  231.65  797.95  261.94  798.01
  267.97  797.64  282.98   797.5  287.23  797.45  293.35  797.49   310.6  797.38
  313.11  797.36  313.26  797.36  325.23  797.31  325.26  797.31  325.58  797.31
  334.24  797.34  348.56  797.48  385.05  797.59  403.11  797.65  405.51   797.7
  437.64  797.86  474.89  797.66  480.69  797.67  481.97  797.67  482.38  797.67
  482.75  797.67  535.21  797.48  551.58  797.43  567.32  797.27   629.8  796.86
  654.91  796.29  669.84  796.18     679  795.08  682.78  794.95  683.97  794.88
   686.3  795.37  693.23  796.08  698.21  795.92  700.51  795.85  702.29   795.9
  705.48  795.52   711.8  794.65  717.28     795  720.29  795.33  722.91  795.34
  734.92     796  739.42   796.1   752.7  796.46   754.4  796.29  756.93  796.29
   758.7  796.29   759.7  796.29  761.47   796.4  766.86  795.51  772.03  796.41
  772.61  796.36  774.72  796.37  776.18  796.35  784.16  796.27  793.96  796.02
  809.45  795.76  814.86  795.73  826.37  795.97  830.16  796.06     846  796.36
  853.49  795.72  855.76  795.52   866.7  795.32  866.74  795.32  866.78  795.32
  866.85  795.32  879.71  795.09  884.36  795.11  970.12  795.48  984.15  795.56
  987.61  795.57  994.78  795.58 1063.72  795.43 1108.67   795.3 1130.22  795.27
 1194.74  795.36 1300.16  796.15 1304.72  796.17 1306.17   796.2 1308.95  796.24
 1383.61  796.78 1405.09  797.04 1442.08   796.5 1444.52  796.56 1453.03  797.88
```

```
 1462.43  800.61 1470.19  802.41 1477.98   802.8 1481.82  803.05 1486.52  802.94
 1508.94  803.14 1509.77  803.14 1511.56  803.17 1515.39  803.11 1517.91  803.26
 1527.69  802.59  1539.3  801.97 1547.61   802.1 1548.94  801.99 1553.51  801.92
 1565.73  803.34  1574.5  803.88  1578.8  804.22 1583.14  804.47 1585.12  804.51
  1592.9  804.62 1593.53   804.7 1597.52  805.15 1605.96  804.99 1610.32  804.94
 1614.53  804.89 1615.17  804.87 1618.24   804.8 1620.25  804.77 1632.53  804.51
 1665.31  803.79 1683.38  803.78 1692.68  803.75 1701.08  803.75 1723.23  803.67
 1753.59  803.57 1771.71  803.62 1778.74  803.59 1809.22  803.69 1819.92  803.78
 1846.68  803.75 1859.83   802.8 1862.75  802.42 1883.37  800.72 1885.42  800.44
 1895.37  799.93 1902.56  797.43  1904.6  794.26 1906.47  793.15 1913.93  788.76
 1925.79  782.22 1929.42  780.26 1932.26  778.72 1944.39  775.23 1950.21  773.71
 1955.16  772.92 1955.31   772.9 1955.84  772.81 1968.77  771.21 1975.88  770.29
 1984.32  765.54 1987.95  763.15 2002.87  759.68 2003.96  759.36    2012  757.12
    2035  756.12    2060  757.12 2067.34  759.35 2067.44  759.37 2096.95  770.82
 2102.67  773.04 2104.24  773.89 2105.36  774.15 2136.73  775.55 2147.73  777.18
 2168.88  783.31 2176.54  784.54 2177.84  785.35 2177.89  785.38 2177.93  785.41
 2178.39  785.69 2195.71  798.72 2204.26  805.55 2204.41  805.55 2213.75  805.38
 2222.64  805.52 2241.84  804.27 2272.04  803.92 2294.51  804.46 2324.38  808.09
 2335.99  813.17 2339.47  813.12 2342.05  813.22 2361.02  816.25 2364.51  816.28
 2392.16  819.08 2393.57   819.1 2395.76  819.33 2420.95  820.97 2425.85  821.68
 2443.21  822.52  2450.9  823.34 2462.42  823.14 2477.16  826.15 2478.28  826.15
 2480.26  825.94 2489.04  825.59 2495.75  825.58 2503.78  824.35 2510.43  822.52
 2512.91  823.18 2520.85  825.49 2523.72  826.08 2526.99  826.76 2531.64  829.26
 2545.04  834.98 2556.98  843.25  2562.1  846.71 2573.58  855.44 2578.58  859.49
 2584.83  860.84 2596.13  863.01  2605.1  865.47 2616.49  868.45 2626.21  872.15
 2632.54  874.43

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0    .055 1846.68     .11 1975.88    .038 2104.24     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1975.88 2104.24           .1        .3
Left Levee      Station=    1600      Elevation=     809
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0     270     815     900    1400     815

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=    1935    Downstream=    1935
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       8     750       8     781       4     781       4     802
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       8     750       8     782       4     782       4     802

Pier Data
Pier Station     Upstream=    2010    Downstream=    2010
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    5.67     750    5.67     802
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    5.67     750    5.67     802

Pier Data
Pier Station     Upstream=    2090    Downstream=    2090
Upstream     num=       2
    Width   Elev    Width   Elev
```

```
********************************
    5.67     750    5.67     804
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    5.67     750    5.67     804

Pier Data
Pier Station     Upstream=    2165    Downstream=    2165
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        8     750       8     785       4     785       4     805
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        8     750       8     785       4     785       4     805

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
       Yarnell                 KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     781.06  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     780.67  * E.G. Elev (ft)         *     781.03  *     781.00  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     780.58  *     780.55  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     767.58  *     767.58  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.46  *      24.43  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.67  *       4.68  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2823.67  *    2817.85  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   27794.95  *   27721.18  *
* Min El Weir Flow (ft)  *     803.58  * Hydr Depth (ft)        *      13.37  *      13.35  *
* Min El Prs (ft)        *     801.85  * W.P. Total (ft)        *     293.61  *     293.29  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *   486881.7  *   485820.6  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *     211.27  *     211.13  *
* BR Open Area (sq ft)   *    7339.32  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.68  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.44  *       0.44  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.06  *       2.07  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     785.98  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     785.42  * E.G. Elev (ft)         *     785.94  *     785.91  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     785.32  *     785.29  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     770.46  *     770.46  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.20  *      29.17  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.23  *       5.24  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3882.74  *    3871.20  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   45372.11  *   45243.47  *
* Min El Weir Flow (ft)  *     803.58  * Hydr Depth (ft)        *      16.30  *      16.25  *
* Min El Prs (ft)        *     801.85  * W.P. Total (ft)        *     356.95  *     356.57  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *   681548.6  *   679893.9  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *     238.28  *     238.17  *
* BR Open Area (sq ft)   *    7339.32  * Frctn Loss (ft)        *             *             *
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* BR Open Vel (ft/s)     *       5.24  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.60  *       0.60  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       3.15  *       3.17  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     789.52  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     788.83  * E.G. Elev (ft)         *     789.47  *     789.44  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     788.73  *     788.69  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     772.65  *     772.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.61  *      32.57  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.58  *       5.60  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4713.71  *    4701.11  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   61619.34  *   61440.57  *
* Min El Weir Flow (ft)  *     803.58  * Hydr Depth (ft)        *      18.92  *      18.88  *
* Min El Prs (ft)        *     801.85  * W.P. Total (ft)        *     397.04  *     396.64  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *   835115.6  *   833187.3  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *     249.10  *     248.99  *
* BR Open Area (sq ft)   *    7339.32  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.60  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.74  *       0.74  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       4.11  *       4.13  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     793.36  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     792.52  * E.G. Elev (ft)         *     793.31  *     793.28  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     792.41  *     792.37  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     775.08  *     775.08  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.29  *      36.25  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.02  *       6.03  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5650.16  *    5636.14  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   82960.52  *   82715.44  *
* Min El Weir Flow (ft)  *     803.58  * Hydr Depth (ft)        *      21.90  *      21.85  *
* Min El Prs (ft)        *     801.85  * W.P. Total (ft)        *     437.26  *     436.89  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *  1011261.0  *  1008976.0  *
* Delta WS (ft)          *       0.12  * Top Width (ft)         *     257.98  *     257.93  *
* BR Open Area (sq ft)   *    7339.32  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.03  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.91  *       0.91  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       5.49  *       5.52  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     798.17  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     797.13  * E.G. Elev (ft)         *     798.13  *     798.14  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     797.03  *     797.03  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     778.08  *     778.08  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.91  *      40.91  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.51  *       6.51  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6839.56  *    6835.56  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  115261.30  *  115204.60  *
* Min El Weir Flow (ft)  *     803.58  * Hydr Depth (ft)        *      30.08  *      30.06  *
* Min El Prs (ft)        *     801.85  * W.P. Total (ft)        *     515.73  *     515.73  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  1232737.0  *  1232377.0  *
* Delta WS (ft)          *       0.11  * Top Width (ft)         *     227.38  *     227.38  *
* BR Open Area (sq ft)   *    7339.32  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.51  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.08  *       1.08  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       7.02  *       7.02  *
*********************************************************************************************
```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	801.45	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	800.20	E.G. Elev (ft)	801.44	801.34
Q Total (cfs)	53690.00	W.S. Elev (ft)	800.08	799.99
Q Bridge (cfs)	53690.00	Crit W.S. (ft)	780.20	780.20
Q Weir (cfs)		Max Chl Dpth (ft)	43.96	43.87
Weir Sta Lft (ft)		Vel Total (ft/s)	7.38	7.39
Weir Sta Rgt (ft)		Flow Area (sq ft)	7279.74	7268.69
Weir Submerg		Froude # Chl	0.24	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	140709.70	139920.10
Min El Weir Flow (ft)	803.58	Hydr Depth (ft)	99.12	93.75
Min El Prs (ft)	801.85	W.P. Total (ft)	683.01	678.72
Delta EG (ft)	0.14	Conv. Total (cfs)	1052750.0	1055077.0
Delta WS (ft)	0.15	Top Width (ft)	73.44	77.54
BR Open Area (sq ft)	7339.32	Frctn Loss (ft)	0.10	0.00
BR Open Vel (ft/s)	7.39	C & E Loss (ft)	0.00	0.03
Coef of Q		Shear Total (lb/sq ft)	1.73	1.73
Br Sel Method	Energy only	Power Total (lb/ft s)	12.76	12.79

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	804.36	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	802.91	E.G. Elev (ft)	804.30	804.17
Q Total (cfs)	62000.00	W.S. Elev (ft)	802.37	802.23
Q Bridge (cfs)	62000.00	Crit W.S. (ft)	782.06	781.99
Q Weir (cfs)		Max Chl Dpth (ft)	46.25	46.11
Weir Sta Lft (ft)		Vel Total (ft/s)	8.44	8.45
Weir Sta Rgt (ft)		Flow Area (sq ft)	7343.32	7339.32
Weir Submerg		Froude # Chl	0.26	0.27
Weir Max Depth (ft)		Specif Force (cu ft)	163105.80	162000.70
Min El Weir Flow (ft)	803.58	Hydr Depth (ft)		
Min El Prs (ft)	801.85	W.P. Total (ft)	766.28	766.28
Delta EG (ft)	0.33	Conv. Total (cfs)	1026352.0	1026043.0
Delta WS (ft)	0.36	Top Width (ft)		
BR Open Area (sq ft)	7339.32	Frctn Loss (ft)	0.14	0.00
BR Open Vel (ft/s)	8.45	C & E Loss (ft)	0.00	0.14
Coef of Q		Shear Total (lb/sq ft)	2.18	2.18
Br Sel Method	Energy only	Power Total (lb/ft s)	18.43	18.44

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	808.54	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	806.86	E.G. Elev (ft)	808.45	808.22
Q Total (cfs)	74720.00	W.S. Elev (ft)	805.91	805.57
Q Bridge (cfs)	72846.19	Crit W.S. (ft)	784.46	784.45
Q Weir (cfs)		Max Chl Dpth (ft)	49.79	49.45
Weir Sta Lft (ft)		Vel Total (ft/s)	9.23	9.40
Weir Sta Rgt (ft)		Flow Area (sq ft)	8093.47	7946.11
Weir Submerg		Froude # Chl	0.27	0.28
Weir Max Depth (ft)		Specif Force (cu ft)	197479.60	195309.90
Min El Weir Flow (ft)	803.58	Hydr Depth (ft)	18.83	19.41
Min El Prs (ft)	801.85	W.P. Total (ft)	1196.91	1176.20
Delta EG (ft)	0.58	Conv. Total (cfs)	977863.1	991122.6
Delta WS (ft)	0.68	Top Width (ft)	429.79	409.42
BR Open Area (sq ft)	7339.32	Frctn Loss (ft)	0.22	0.00

```
* BR Open Vel (ft/s)     *       9.93  * C & E Loss (ft)        *       0.01  *       0.26  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.46  *       2.40  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      22.76  *      22.54  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     795.20  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     794.27  * E.G. Elev (ft)         *     795.15  *     795.15  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     794.17  *     794.17  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     776.30  *     776.30  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.05  *      38.05  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.22  *       6.23  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6106.52  *    6102.52  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   94563.72  *   94518.24  *
* Min El Weir Flow (ft)  *     803.58  * Hydr Depth (ft)        *      23.46  *      23.44  *
* Min El Prs (ft)        *     801.85  * W.P. Total (ft)        *     454.28  *     454.28  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1098817.0  *  1098416.0  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *     260.32  *     260.32  *
* BR Open Area (sq ft)   *    7339.32  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.23  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.00  *       1.00  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       6.25  *       6.25  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.715

INPUT
Description: D/S of Old 95th St Bridge.  Dodson XS 21.33.  Stop Log Gap across
             road on left.
Station Elevation Data    num=     221
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  797.94    3.27   798.1    5.67  798.13   11.67  798.14   73.54  797.73
   91.69  797.84  107.57  798.08  223.93  797.41  231.65  797.95  261.94  798.01
  267.97  797.64  282.98   797.5  287.23  797.45  293.35  797.49   310.6  797.38
  313.11  797.36  313.26  797.36  325.23  797.31  325.26  797.31  325.58  797.31
  334.24  797.34  348.56  797.48  385.05  797.59  403.11  797.65  405.51   797.7
  437.64  797.86  474.89  797.66  480.69  797.67  481.97  797.67  482.38  797.67
  482.75  797.67  535.21  797.48  551.58  797.43  567.32  797.27   629.8  796.86
  654.91  796.29  669.84  796.18     679  795.08  682.78  794.95  683.97  794.88
   686.3  795.37  693.23  796.08  698.21  795.92  700.51  795.85  702.29   795.9
  705.48  795.52   711.8  794.65  717.28     795  720.29  795.33  722.91  795.34
  734.92     796  739.42   796.1   752.7  796.46   754.4  796.29  756.93  796.29
   758.7  796.29   759.7  796.29  761.47   796.4  766.86  795.51  772.03  796.41
  772.61  796.36  774.72  796.37  776.18  796.35  784.16  796.27  793.96  796.02
  809.45  795.76  814.86  795.73  826.37  795.97  830.16  796.06     846  796.36
  853.49  795.72  855.76  795.52   866.7  795.32  866.74  795.32  866.78  795.32
  866.85  795.32  879.71  795.09  884.36  795.11  970.12  795.48  984.15  795.56
  987.61  795.57  994.78  795.58 1063.72  795.43 1108.67   795.3 1130.22  795.27
 1194.74  795.36 1300.16  796.15 1304.72  796.17 1306.17   796.2 1308.95  796.24
 1383.61  796.78 1405.09  797.04 1442.08   796.5 1444.52  796.56 1453.03  797.88
 1462.43  800.61 1470.19  802.41 1477.98   802.8 1481.82  803.05 1486.52  802.94
 1508.94  803.14 1509.77  803.14 1511.56  803.17 1515.39  803.11 1517.91  803.26
 1527.69  802.59  1539.3  801.97 1547.61   802.1 1548.94  801.99 1553.51  801.92
 1565.73  803.34  1574.5  803.88  1578.8  804.22 1583.14  804.47 1585.12  804.51
  1592.9  804.62 1593.53   804.7 1597.52  805.15 1605.96  804.99 1610.32  804.94
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 1614.53  804.89 1615.17  804.87 1618.24   804.8 1620.25  804.77 1632.53  804.51
 1665.31  803.79 1683.38  803.78 1692.68  803.75 1701.08  803.75 1723.23  803.67
 1753.59  803.57 1771.71  803.62 1778.74  803.59 1809.22  803.69 1819.92  803.78
 1846.68  803.75 1859.83   802.8 1862.75  802.42 1883.37  800.72 1885.42  800.44
 1895.37  799.93 1902.56  797.43  1904.6  794.26 1906.47  793.15 1913.93  788.76
 1925.79  782.22 1929.42  780.26 1932.26  778.72 1944.39  775.23 1950.21  773.71
 1955.16  772.92 1955.31   772.9 1955.84  772.81 1968.77  771.21 1975.88  770.29
 1984.32  765.54 1987.95  763.15 2002.87  759.68 2003.96  759.36    2012  757.12
    2035  756.12    2060  757.12 2067.34  759.35 2067.44  759.37 2096.95  770.82
 2102.67  773.04 2104.24  773.89 2105.36  774.15 2136.73  775.55 2147.73  777.18
 2168.88  783.31 2176.54  784.54 2177.84  785.35 2177.89  785.38 2177.93  785.41
 2178.39  785.69 2195.71  798.72 2204.26  805.55 2204.41  805.55 2213.75  805.38
 2222.64  805.52 2241.84  804.27 2272.04  803.92 2294.51  804.46 2324.38  808.09
 2335.99  813.17 2339.47  813.12 2342.05  813.22 2361.02  816.25 2364.51  816.28
 2392.16  819.08 2393.57   819.1 2395.76  819.33 2420.95  820.97 2425.85  821.68
 2443.21  822.52  2450.9  823.34 2462.42  823.14 2477.16  826.15 2478.28  826.15
 2480.26  825.94 2489.04  825.59 2495.75  825.58 2503.78  824.35 2510.43  822.52
 2512.91  823.18 2520.85  825.49 2523.72  826.08 2526.99  826.76 2531.64  829.26
 2545.04  834.98 2556.98  843.25  2562.1  846.71 2573.58  855.44 2578.58  859.49
 2584.83  860.84 2596.13  863.01  2605.1  865.47 2616.49  868.45 2626.21  872.15
 2632.54  874.43

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0    .055 1846.68     .11 1975.88    .038 2104.24     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1975.88 2104.24            545.9  708.56  753.39             .1       .3
Left Levee      Station=    1600      Elevation=     809
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0     270     815     900    1400     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  780.99  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.40  * Wt. n-Val.              *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)          *  780.59  * Reach Len. (ft)         *  545.90  *  708.56  *  753.39  *
* Crit W.S. (ft)          *  767.19  * Flow Area (sq ft)       *  305.05  * 2489.98  *  254.19  *
* E.G. Slope (ft/ft)      *0.000351  * Area (sq ft)            *  305.05  * 2489.98  *  254.19  *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *  263.25  *12787.37  *  149.38  *
* Top Width (ft)          *  230.71  * Top Width (ft)          *   47.08  *  128.36  *   55.27  *
* Vel Total (ft/s)        *    4.33  * Avg. Vel. (ft/s)        *    0.86  *    5.14  *    0.59  *
* Max Chl Dpth (ft)       *   24.47  * Hydr. Depth (ft)        *    6.48  *   19.40  *    4.60  *
* Conv. Total (cfs)       *704343.8  * Conv. (cfs)             * 14046.8  *682325.8  *  7971.1  *
* Length Wtd. (ft)        *  705.05  * Wetted Per. (ft)        *   48.47  *  134.22  *   55.94  *
* Min Ch El (ft)          *  756.12  * Shear (lb/sq ft)        *    0.14  *    0.41  *    0.10  *
* Alpha                   *    1.36  * Stream Power (lb/ft s) *    0.12  *    2.09  *    0.06  *
* Frctn Loss (ft)         *    0.27  * Cum Volume (acre-ft)    *  611.74  * 5736.43  *  636.24  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  103.67  *  430.40  *  128.30  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  785.89  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.56  * Wt. n-Val.              *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)          *  785.33  * Reach Len. (ft)         *  545.90  *  708.56  *  753.39  *
* Crit W.S. (ft)          *  770.03  * Flow Area (sq ft)       *  548.61  * 3097.91  *  558.87  *
* E.G. Slope (ft/ft)      *0.000381  * Area (sq ft)            *  548.61  * 3097.91  *  558.87  *
* Q Total (cfs)           *20300.00  * Flow (cfs)              *  644.87  *19178.93  *  476.20  *
* Top Width (ft)          *  257.66  * Top Width (ft)          *   55.73  *  128.36  *   73.57  *
* Vel Total (ft/s)        *    4.83  * Avg. Vel. (ft/s)        *    1.18  *    6.19  *    0.85  *
* Max Chl Dpth (ft)       *   29.21  * Hydr. Depth (ft)        *    9.84  *   24.13  *    7.60  *
* Conv. Total (cfs)       *1039402.0  * Conv. (cfs)             * 33018.7  *982000.8  * 24382.5  *
* Length Wtd. (ft)        *  702.41  * Wetted Per. (ft)        *   58.33  *  134.22  *   74.94  *
* Min Ch El (ft)          *  756.12  * Shear (lb/sq ft)        *    0.22  *    0.55  *    0.18  *
* Alpha                   *    1.56  * Stream Power (lb/ft s) *    0.26  *    3.40  *    0.15  *
* Frctn Loss (ft)         *    0.30  * Cum Volume (acre-ft)    * 1143.88  * 7619.56  * 1262.30  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  152.47  *  470.06  *  176.58  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	789.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.	0.110	0.038	0.130
W.S. Elev (ft)	788.73	Reach Len. (ft)	545.90	708.56	753.39
Crit W.S. (ft)	772.03	Flow Area (sq ft)	748.65	3534.49	817.11
E.G. Slope (ft/ft)	0.000399	Area (sq ft)	748.65	3534.49	817.11
Q Total (cfs)	26320.00	Flow (cfs)	1025.68	24421.58	872.74
Top Width (ft)	268.45	Top Width (ft)	61.90	128.36	78.19
Vel Total (ft/s)	5.16	Avg. Vel. (ft/s)	1.37	6.91	1.07
Max Chl Dpth (ft)	32.61	Hydr. Depth (ft)	12.09	27.54	10.45
Conv. Total (cfs)	1318423.0	Conv. (cfs)	51378.6	1223327.0	43717.2
Length Wtd. (ft)	701.09	Wetted Per. (ft)	65.38	134.22	80.69
Min Ch El (ft)	756.12	Shear (lb/sq ft)	0.28	0.66	0.25
Alpha	1.67	Stream Power (lb/ft s)	0.39	4.53	0.27
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	1628.52	9148.10	1886.35
C & E Loss (ft)	0.00	Cum SA (acres)	196.93	497.98	254.66

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	793.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.	0.110	0.038	0.130
W.S. Elev (ft)	792.40	Reach Len. (ft)	545.90	708.56	753.39
Crit W.S. (ft)	774.31	Flow Area (sq ft)	987.39	4005.80	1113.18
E.G. Slope (ft/ft)	0.000423	Area (sq ft)	987.39	4005.80	1113.18
Q Total (cfs)	34000.00	Flow (cfs)	1563.04	31002.84	1434.12
Top Width (ft)	279.57	Top Width (ft)	68.14	128.36	83.07
Vel Total (ft/s)	5.57	Avg. Vel. (ft/s)	1.58	7.74	1.29
Max Chl Dpth (ft)	36.28	Hydr. Depth (ft)	14.49	31.21	13.40
Conv. Total (cfs)	1652813.0	Conv. (cfs)	75982.8	1507114.0	69715.7
Length Wtd. (ft)	700.50	Wetted Per. (ft)	72.62	134.22	86.79
Min Ch El (ft)	756.12	Shear (lb/sq ft)	0.36	0.79	0.34
Alpha	1.77	Stream Power (lb/ft s)	0.57	6.10	0.44
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	2397.26	10745.59	2821.34
C & E Loss (ft)	0.01	Cum SA (acres)	312.91	520.83	344.24

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	798.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.	0.110	0.038	0.130
W.S. Elev (ft)	797.03	Reach Len. (ft)	545.90	708.56	753.39
Crit W.S. (ft)	777.03	Flow Area (sq ft)	1316.41	4599.09	1511.36
E.G. Slope (ft/ft)	0.000440	Area (sq ft)	1316.41	4599.09	1511.36
Q Total (cfs)	44500.00	Flow (cfs)	2421.11	39779.40	2299.49
Top Width (ft)	290.64	Top Width (ft)	73.06	128.36	89.22
Vel Total (ft/s)	5.99	Avg. Vel. (ft/s)	1.84	8.65	1.52
Max Chl Dpth (ft)	40.91	Hydr. Depth (ft)	18.02	35.83	16.94
Conv. Total (cfs)	2122365.0	Conv. (cfs)	115471.5	1897223.0	109671.0
Length Wtd. (ft)	698.28	Wetted Per. (ft)	79.56	134.22	94.48
Min Ch El (ft)	756.12	Shear (lb/sq ft)	0.45	0.94	0.44
Alpha	1.87	Stream Power (lb/ft s)	0.84	8.13	0.67
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	4287.27	13221.80	5015.40
C & E Loss (ft)	0.04	Cum SA (acres)	635.80	548.84	724.94

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	801.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.	0.110	0.038	0.130
W.S. Elev (ft)	800.05	Reach Len. (ft)	545.90	708.56	753.39
Crit W.S. (ft)	779.15	Flow Area (sq ft)	1548.48	4987.89	1787.62
E.G. Slope (ft/ft)	0.000480	Area (sq ft)	1548.48	4987.89	1787.62

```
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 3051.28  *47567.88  * 3070.84  *
* Top Width (ft)         *  304.44  * Top Width (ft)         *   82.94  *  128.36  *   93.14  *
* Vel Total (ft/s)       *    6.45  * Avg. Vel. (ft/s)       *    1.97  *    9.54  *    1.72  *
* Max Chl Dpth (ft)      *   43.93  * Hydr. Depth (ft)       *   18.67  *   38.86  *   19.19  *
* Conv. Total (cfs)      *2451545.0  * Conv. (cfs)            *139324.8  *2172002.0  *140218.0  *
* Length Wtd. (ft)       *  697.35  * Wetted Per. (ft)       *   90.08  *  134.22  *   99.44  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.51  *    1.11  *    0.54  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    1.01  *   10.61  *    0.92  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 6353.85  *14701.21  * 7353.97  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  864.92  *  555.93  * 1093.75  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  804.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.47  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  802.55  * Reach Len. (ft)        *  545.90  *  708.56  *  753.39  *
* Crit W.S. (ft)         *  780.87  * Flow Area (sq ft)      * 1797.43  * 5308.61  * 2024.25  *
* E.G. Slope (ft/ft)     *0.000518  * Area (sq ft)           * 1797.43  * 5308.61  * 2024.25  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3331.98  *54844.01  * 3824.01  *
* Top Width (ft)         *  338.78  * Top Width (ft)         *  114.15  *  128.36  *   96.27  *
* Vel Total (ft/s)       *    6.79  * Avg. Vel. (ft/s)       *    1.85  *   10.33  *    1.89  *
* Max Chl Dpth (ft)      *   46.43  * Hydr. Depth (ft)       *   15.75  *   41.36  *   21.03  *
* Conv. Total (cfs)      *2724139.0  * Conv. (cfs)            *146399.7  *2409721.0  *168018.3  *
* Length Wtd. (ft)       *  697.06  * Wetted Per. (ft)       *  121.40  *  134.22  *  103.44  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.48  *    1.28  *    0.63  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.89  *   13.21  *    1.20  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 8214.12  *15663.32  * 9570.97  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         * 1025.86  *  556.82  * 1453.32  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  807.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.78  * Wt. n-Val.             *   0.104  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  806.18  * Reach Len. (ft)        *  545.90  *  708.56  *  753.39  *
* Crit W.S. (ft)         *  783.30  * Flow Area (sq ft)      * 2818.41  * 5774.10  * 2539.07  *
* E.G. Slope (ft/ft)     *0.000564  * Area (sq ft)           * 2818.41  * 5774.10  * 2539.07  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 5317.28  *65805.36  * 3597.36  *
* Top Width (ft)         *  708.66  * Top Width (ft)         *  375.88  *  128.36  *  204.42  *
* Vel Total (ft/s)       *    6.71  * Avg. Vel. (ft/s)       *    1.89  *   11.40  *    1.42  *
* Max Chl Dpth (ft)      *   50.06  * Hydr. Depth (ft)       *    7.50  *   44.98  *   12.42  *
* Conv. Total (cfs)      *3147609.0  * Conv. (cfs)            *223992.4  *2772077.0  *151540.3  *
* Length Wtd. (ft)       *  682.70  * Wetted Per. (ft)       *  384.27  *  134.22  *  212.80  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.26  *    1.51  *    0.42  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    0.49  *   17.25  *    0.59  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *12199.89  *17141.91  *13806.43  *
* C & E Loss (ft)        *    0.33  * Cum SA (acres)         * 1279.32  *  559.13  * 1816.80  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  795.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.93  * Wt. n-Val.             *   0.110  *   0.038  *   0.130  *
* W.S. Elev (ft)         *  794.17  * Reach Len. (ft)        *  545.90  *  708.56  *  753.39  *
* Crit W.S. (ft)         *  775.37  * Flow Area (sq ft)      * 1110.53  * 4232.76  * 1262.15  *
* E.G. Slope (ft/ft)     *0.000433  * Area (sq ft)           * 1110.53  * 4232.76  * 1262.15  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 1864.64  *34385.79  * 1749.57  *
* Top Width (ft)         *  284.91  * Top Width (ft)         *   71.13  *  128.36  *   85.42  *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *    1.68  *    8.12  *    1.39  *
* Max Chl Dpth (ft)      *   38.05  * Hydr. Depth (ft)       *   15.61  *   32.98  *   14.78  *
* Conv. Total (cfs)      *1825754.0  * Conv. (cfs)            * 89588.7  *1652105.0  * 84060.1  *
* Length Wtd. (ft)       *  699.47  * Wetted Per. (ft)       *   76.09  *  134.22  *   89.74  *
* Min Ch El (ft)         *  756.12  * Shear (lb/sq ft)       *    0.39  *    0.85  *    0.38  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    0.66  *    6.93  *    0.53  *
```

```
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 2936.23  *11583.01  * 3403.63  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  402.15  *  531.21  *  411.04  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.581

INPUT
Description:
Station Elevation Data    num=     157
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  799.37    2.73  799.73    7.47  800.28     8.8  800.26   13.54  800.47
   23.86  799.98   36.61  800.22   62.14  801.02   78.71  801.61   95.92   801.6
  105.97  801.81  132.88  802.01  148.18  802.14  150.57  802.09  161.29  802.05
   173.3     802   183.2  801.87     185  801.86  188.57  801.78  215.72  800.92
  225.46  800.64  240.14  800.07  245.33   799.9   250.1  799.72  266.91  799.01
  281.22  798.46  285.45  798.71  287.14  798.67     308  797.87  311.99  797.78
  331.81  796.91  343.28  795.98  344.09  795.92  344.88  795.86  350.52  795.43
  356.08  795.65  361.86  795.73  366.46  795.63  369.67  795.73  376.38   795.7
  387.69  795.79  400.86  796.38  401.78  796.42  409.35  797.07  412.87  797.38
   413.1  797.39  413.94  797.39  431.88  797.51  440.24  797.38   440.7  797.37
   441.8  797.28  456.05     796  465.43  795.75  474.23  795.46  501.01  794.22
  508.16  793.89  520.51  798.02  520.64  798.07  520.89  798.06  521.49  798.02
  532.95  797.36  537.54  796.04  550.77  792.31  566.74  792.95  576.04  793.21
  595.87  793.47   618.5  793.77  635.29  793.84  652.45   793.9  672.56  793.87
  1143.8  792.66    1177  792.53 1198.89   792.7 1241.27  792.69 1277.59  792.51
    1279  792.51 1280.69  792.46 1312.65  791.13 1336.74  792.22 1352.43  792.94
 1355.43  796.82 1359.64   801.9 1361.72   804.4  1369.2  805.27 1370.57  805.45
 1371.73  805.45 1373.73  805.45 1378.43  805.45 1383.79  803.61 1398.66  798.47
 1407.46  795.76 1421.71  791.34  1436.5  790.31 1450.21  789.33 1467.08   782.5
 1467.16  782.47 1467.24  782.44 1480.39  778.39 1491.42  776.67 1497.57  775.89
 1517.68  774.58 1523.28  774.22 1528.28  773.16 1529.14  772.98 1542.23  770.24
 1553.64  762.33 1554.31  761.91 1561.66  758.17 1566.37  755.79 1566.82  755.56
    1596  755.05 1626.82   755.1 1628.01  755.91 1645.55  769.81 1646.42  769.88
 1656.19  770.71 1660.15  771.27 1665.07  772.04 1669.42  772.58 1673.58  773.11
 1684.61  774.28 1695.15  776.41 1701.86  777.93  1702.5  777.95 1704.42  778.03
 1711.46  778.43 1730.39  779.38 1730.85  779.41 1731.42  779.45 1733.78  779.58
 1770.85  781.61    1776  781.93 1826.63  785.22 1829.04  785.37 1829.28  785.47
  1842.4  791.37 1844.92   792.5 1844.99  792.51 1852.95  793.52 1858.23  793.66
 1860.09  793.71  1863.6  793.75 1864.85  793.76 1866.12  793.75 1869.61  793.71
 1871.67  793.66 1876.76  793.52 1883.51  795.07 1898.58  798.63 1909.88   802.1
 1943.54  815.13 1956.54  821.74 1960.34  822.17 1967.89  823.01 2001.93  839.84
 2019.48  848.85 2024.25  853.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0    .075 1542.23    .042 1645.55     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1542.23 1645.55           430.76  415.68  378.43            .1       .3
Left Levee      Station=    1375      Elevation=   805.5
Blocked Obstructions     num=       1
   Sta L   Sta R     Elev
************************
     650    1225     815

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  780.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  780.27  * Reach Len. (ft)        *  430.76  *  415.68  *  378.43  *
* Crit W.S. (ft)         *  765.59  * Flow Area (sq ft)      *  346.95  * 2280.82  *  449.30  *
* E.G. Slope (ft/ft)     *0.000435  * Area (sq ft)           *  346.95  * 2280.82  *  449.30  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  421.28  *12510.61  *  268.11  *
* Top Width (ft)         *  272.05  * Top Width (ft)         *   67.94  *  103.32  *  100.80  *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *    1.21  *    5.49  *    0.60  *
* Max Chl Dpth (ft)      *   25.22  * Hydr. Depth (ft)       *    5.11  *   22.08  *    4.46  *
* Conv. Total (cfs)      *632927.4  * Conv. (cfs)            * 20200.0  *599871.8  * 12855.6  *
```

```
* Length Wtd. (ft)       *  415.08  * Wetted Per. (ft)       *   68.87  *  112.53  *  101.51  *
* Min Ch El (ft)         *  755.05  * Shear (lb/sq ft)       *    0.14  *    0.55  *    0.12  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.17  *    3.02  *    0.07  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  607.65  * 5697.62  *  630.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  102.95  *  428.51  *  126.96  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  785.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  784.99  * Reach Len. (ft)        *  430.76  *  415.68  *  378.43  *
* Crit W.S. (ft)         *  768.67  * Flow Area (sq ft)      *  701.35  * 2768.57  * 1112.93  *
* E.G. Slope (ft/ft)     *0.000480  * Area (sq ft)           *  701.35  * 2768.57  * 1112.93  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1262.89  *18159.71  *  877.40  *
* Top Width (ft)         *  362.14  * Top Width (ft)         *   81.30  *  103.32  *  177.52  *
* Vel Total (ft/s)       *    4.43  * Avg. Vel. (ft/s)       *    1.80  *    6.56  *    0.79  *
* Max Chl Dpth (ft)      *   29.94  * Hydr. Depth (ft)       *    8.63  *   26.80  *    6.27  *
* Conv. Total (cfs)      *926227.9  * Conv. (cfs)            * 57622.0  *828573.0  * 40032.9  *
* Length Wtd. (ft)       *  414.42  * Wetted Per. (ft)       *   83.05  *  112.53  *  178.38  *
* Min Ch El (ft)         *  755.05  * Shear (lb/sq ft)       *    0.25  *    0.74  *    0.19  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    0.46  *    4.84  *    0.15  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 1136.05  * 7571.85  * 1247.84  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  151.61  *  468.17  *  174.41  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  789.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  788.43  * Reach Len. (ft)        *  430.76  *  415.68  *  378.43  *
* Crit W.S. (ft)         *  770.88  * Flow Area (sq ft)      *  995.33  * 3123.65  * 1752.82  *
* E.G. Slope (ft/ft)     *0.000489  * Area (sq ft)           *  995.33  * 3123.65  * 1752.82  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2128.85  *22393.89  * 1797.26  *
* Top Width (ft)         *  383.41  * Top Width (ft)         *   89.79  *  103.32  *  190.30  *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)       *    2.14  *    7.17  *    1.03  *
* Max Chl Dpth (ft)      *   33.38  * Hydr. Depth (ft)       *   11.09  *   30.23  *    9.21  *
* Conv. Total (cfs)      *1190782.0  * Conv. (cfs)            * 96314.6  *1013155.0  * 81312.5  *
* Length Wtd. (ft)       *  413.80  * Wetted Per. (ft)       *   92.21  *  112.53  *  191.83  *
* Min Ch El (ft)         *  755.05  * Shear (lb/sq ft)       *    0.33  *    0.85  *    0.28  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.70  *    6.07  *    0.29  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 1617.59  * 9093.95  * 1864.13  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  195.97  *  496.10  *  252.34  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  792.11  * Reach Len. (ft)        *  430.76  *  415.68  *  378.43  *
* Crit W.S. (ft)         *  773.45  * Flow Area (sq ft)      * 1384.68  * 3504.29  * 2469.01  *
* E.G. Slope (ft/ft)     *0.000512  * Area (sq ft)           * 1384.68  * 3504.29  * 2469.01  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 3071.92  *27769.18  * 3158.89  *
* Top Width (ft)         *  424.82  * Top Width (ft)         *  123.00  *  103.32  *  198.50  *
* Vel Total (ft/s)       *    4.62  * Avg. Vel. (ft/s)       *    2.22  *    7.92  *    1.28  *
* Max Chl Dpth (ft)      *   37.06  * Hydr. Depth (ft)       *   11.26  *   33.92  *   12.44  *
* Conv. Total (cfs)      *1502528.0  * Conv. (cfs)            *135754.4  *1227175.0  *139597.7  *
* Length Wtd. (ft)       *  413.06  * Wetted Per. (ft)       *  125.79  *  112.53  *  200.81  *
* Min Ch El (ft)         *  755.05  * Shear (lb/sq ft)       *    0.35  *    1.00  *    0.39  *
* Alpha                  *    2.43  * Stream Power (lb/ft s) *    0.78  *    7.89  *    0.50  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 2382.40  *10684.51  * 2790.37  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  311.71  *  518.95  *  341.80  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	797.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	796.79	Reach Len. (ft)	430.76	415.68	378.43
Crit W.S. (ft)	776.98	Flow Area (sq ft)	1996.15	3988.21	3530.65
E.G. Slope (ft/ft)	0.000509	Area (sq ft)	1996.15	3988.21	3530.65
Q Total (cfs)	44500.00	Flow (cfs)	5204.11	34333.16	4962.73
Top Width (ft)	486.70	Top Width (ft)	138.13	103.32	245.26
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)	2.61	8.61	1.41
Max Chl Dpth (ft)	41.74	Hydr. Depth (ft)	14.45	38.60	14.40
Conv. Total (cfs)	1973249.0	Conv. (cfs)	230764.3	1522424.0	220060.7
Length Wtd. (ft)	412.85	Wetted Per. (ft)	141.62	112.53	248.10
Min Ch El (ft)	755.05	Shear (lb/sq ft)	0.45	1.13	0.45
Alpha	2.66	Stream Power (lb/ft s)	1.17	9.69	0.64
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	4266.51	13151.96	4971.79
C & E Loss (ft)	0.01	Cum SA (acres)	634.48	546.96	722.05

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	800.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	799.88	Reach Len. (ft)	430.76	415.68	378.43
Crit W.S. (ft)	779.47	Flow Area (sq ft)	2437.68	4307.17	4307.18
E.G. Slope (ft/ft)	0.000529	Area (sq ft)	2437.68	4307.17	4307.18
Q Total (cfs)	53690.00	Flow (cfs)	7072.99	39792.61	6824.41
Top Width (ft)	508.07	Top Width (ft)	147.65	103.32	257.10
Vel Total (ft/s)	4.86	Avg. Vel. (ft/s)	2.90	9.24	1.58
Max Chl Dpth (ft)	44.83	Hydr. Depth (ft)	16.51	41.69	16.75
Conv. Total (cfs)	2335159.0	Conv. (cfs)	307628.0	1730715.0	296816.5
Length Wtd. (ft)	412.52	Wetted Per. (ft)	151.64	112.53	260.35
Min Ch El (ft)	755.05	Shear (lb/sq ft)	0.53	1.26	0.55
Alpha	2.74	Stream Power (lb/ft s)	1.54	11.67	0.87
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	6328.87	14625.61	7301.27
C & E Loss (ft)	0.01	Cum SA (acres)	863.48	554.04	1090.72

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	803.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	802.45	Reach Len. (ft)	430.76	415.68	378.43
Crit W.S. (ft)	781.56	Flow Area (sq ft)	2827.35	4573.14	4979.77
E.G. Slope (ft/ft)	0.000542	Area (sq ft)	2827.35	4573.14	4979.77
Q Total (cfs)	62000.00	Flow (cfs)	8864.97	44522.20	8612.83
Top Width (ft)	523.66	Top Width (ft)	155.10	103.32	265.25
Vel Total (ft/s)	5.01	Avg. Vel. (ft/s)	3.14	9.74	1.73
Max Chl Dpth (ft)	47.40	Hydr. Depth (ft)	18.23	44.26	18.77
Conv. Total (cfs)	2663246.0	Conv. (cfs)	380800.1	1912477.0	369969.1
Length Wtd. (ft)	412.28	Wetted Per. (ft)	159.52	112.53	268.89
Min Ch El (ft)	755.05	Shear (lb/sq ft)	0.60	1.38	0.63
Alpha	2.79	Stream Power (lb/ft s)	1.88	13.39	1.08
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	8185.14	15582.95	9510.40
C & E Loss (ft)	0.02	Cum SA (acres)	1024.17	554.94	1450.19

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	807.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	806.64	Reach Len. (ft)	430.76	415.68	378.43
Crit W.S. (ft)	784.38	Flow Area (sq ft)	11114.26	5006.02	6113.76
E.G. Slope (ft/ft)	0.000371	Area (sq ft)	11114.26	5006.02	6113.76
Q Total (cfs)	74720.00	Flow (cfs)	22117.26	42846.47	9756.27
Top Width (ft)	1346.62	Top Width (ft)	967.23	103.32	276.07
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	1.99	8.56	1.60

```
* Max Chl Dpth (ft)      *   51.59  * Hydr. Depth (ft)       *   11.49  *   48.45  *   22.15  *
* Conv. Total (cfs)      *3877773.0  * Conv. (cfs)           *1147828.0  *2223620.0  *506325.0  *
* Length Wtd. (ft)       *  414.84  * Wetted Per. (ft)       * 1013.68  *  112.53  *  280.50  *
* Min Ch El (ft)         *  755.05  * Shear (lb/sq ft)       *    0.25  *    1.03  *    0.51  *
* Alpha                  *    3.85  * Stream Power (lb/ft s) *    0.51  *    8.83  *    0.81  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *12112.59  *17054.24  *13731.60  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1270.91  *  557.24  * 1812.64  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  794.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.87  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.88  * Reach Len. (ft)        *  430.76  *  415.68  *  378.43  *
* Crit W.S. (ft)         *  774.73  * Flow Area (sq ft)      * 1608.08  * 3687.68  * 2835.27  *
* E.G. Slope (ft/ft)     *0.000522  * Area (sq ft)           * 1608.08  * 3687.68  * 2835.27  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 3858.44  *30527.72  * 3613.84  *
* Top Width (ft)         *  464.84  * Top Width (ft)         *  128.72  *  103.32  *  232.80  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    2.40  *    8.28  *    1.27  *
* Max Chl Dpth (ft)      *   38.83  * Hydr. Depth (ft)       *   12.49  *   35.69  *   12.18  *
* Conv. Total (cfs)      *1663097.0  * Conv. (cfs)           *168867.5  *1336068.0  *158162.3  *
* Length Wtd. (ft)       *  413.21  * Wetted Per. (ft)       *  131.78  *  112.53  *  235.31  *
* Min Ch El (ft)         *  755.05  * Shear (lb/sq ft)       *    0.40  *    1.07  *    0.39  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    0.95  *    8.84  *    0.50  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 2919.20  *11518.59  * 3368.19  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  400.90  *  529.32  *  408.29  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 19.502

INPUT
Description: close to Dodson XS 21.135.  IRS Federal Complex on LOB.
Station Elevation Data    num=     144
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  804.14    1.89  804.16    5.57  804.21    9.54  804.08   27.24  803.39
   33.38  803.15   34.41  803.11   35.24   803.1   67.11  802.45   86.27  802.21
  100.07  802.18  109.06  801.56  130.89  800.76  136.54  800.52   150.3  799.27
  155.12  799.06  178.73  797.82  188.65  797.35  192.45  797.25  198.88   797.4
  200.55  797.44  202.52  796.92  222.16  791.47  232.92  796.34  239.24  799.28
  249.84  799.65  250.03  799.66  250.08  799.66  250.11  799.66  255.01  799.28
  261.65  798.77   269.7  797.91  281.69  796.59   291.3  796.68  292.01  796.68
  292.83  796.61  321.16  794.67  325.57  794.79  327.09  794.29  329.78  794.87
  341.34  796.05  357.21  793.69  363.27  795.81  369.12  797.83  376.18  797.45
   379.5  797.25  388.63  797.21  389.68  797.21  392.68  796.52  409.32  792.85
  415.12  793.03  434.39  793.61     470  794.09  496.67  794.46  551.27  794.44
  735.28  793.89 1107.71  793.04 1153.69   792.7  1157.6  792.64 1161.03  792.64
 1166.59  792.39 1198.25  791.29 1245.88  791.84 1256.04  791.96  1258.4  794.57
 1265.49  802.39 1266.17  802.55  1278.9  805.59 1283.75  805.59 1283.76  805.59
 1286.78  805.59 1300.62  801.13  1311.3  797.71 1317.62  795.81 1333.29  791.12
 1346.64  790.39 1355.57  789.88 1358.85  788.85 1381.14  781.95  1395.8  777.05
 1397.32  776.52 1401.16  776.14 1415.43  774.77 1417.26   774.6  1424.8  774.21
 1428.33     774 1433.66   772.8 1438.49  771.73 1443.41  770.63 1448.42  769.47
 1460.22  766.69 1464.22  762.99 1467.94  759.85 1474.92  757.19  1479.1  755.56
    1498  754.43 1517.11   755.1 1519.49  755.92 1557.72  768.72 1565.89  769.34
 1573.78  769.95 1577.29  770.23 1582.77  770.64 1584.17  770.76 1585.47  770.81
 1608.61  773.57 1617.53  775.01 1622.03  775.07 1646.63  775.56 1669.11     776
    1694  777.84 1695.53  777.95 1695.97  778.01 1698.31  778.36 1722.66  781.51
 1739.02  784.84  1751.8  787.05 1759.19  790.07  1765.4  792.57 1770.84  793.09
 1774.27  793.39 1779.07  793.52 1781.41  793.58 1783.67   793.6 1786.19  793.63
 1788.06  793.61 1790.95  793.58 1793.79  793.51 1798.11  793.39 1803.34   794.8
 1832.55  803.06  1837.8  804.59 1874.71  819.89 1886.18  824.93 1895.51  829.72
 1925.71  844.68 1929.42   845.6 1941.72  852.88 1954.77  861.86 1958.93  865.29
 1974.58  869.37 1974.98  869.47 1975.22  869.53  1986.7  871.99
```

```
Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .075 1460.22    .042 1557.72     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1460.22 1557.72           417.54  414.45  407.23             .1       .3
Left Levee      Station=    1283      Elevation=   805.6
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     500    1100     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  780.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  780.06  * Reach Len. (ft)        *  417.54  *  414.45  *  407.23  *
* Crit W.S. (ft)         *  766.89  * Flow Area (sq ft)      *  480.56  * 2073.51  *  852.54  *
* E.G. Slope (ft/ft)     *0.000478  * Area (sq ft)           *  480.56  * 2073.51  *  852.54  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  718.81  *11862.65  *  618.54  *
* Top Width (ft)         *  324.68  * Top Width (ft)          *   73.43  *   97.50  *  153.75  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)        *    1.50  *    5.72  *    0.73  *
* Max Chl Dpth (ft)      *   25.63  * Hydr. Depth (ft)        *    6.54  *   21.27  *    5.55  *
* Conv. Total (cfs)      *603442.1  * Conv. (cfs)            * 32860.4  *542304.7  * 28276.9  *
* Length Wtd. (ft)       *  414.36  * Wetted Per. (ft)        *   74.95  *  103.16  *  154.33  *
* Min Ch El (ft)         *  754.43  * Shear (lb/sq ft)        *    0.19  *    0.60  *    0.17  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    0.29  *    3.44  *    0.12  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)    *  603.56  * 5676.85  *  624.50  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *  102.25  *  427.56  *  125.85  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  785.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  784.80  * Reach Len. (ft)        *  417.54  *  414.45  *  407.23  *
* Crit W.S. (ft)         *  769.99  * Flow Area (sq ft)      *  863.18  * 2535.64  * 1652.84  *
* E.G. Slope (ft/ft)     *0.000496  * Area (sq ft)           *  863.18  * 2535.64  * 1652.84  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1712.21  *16888.04  * 1699.74  *
* Top Width (ft)         *  366.90  * Top Width (ft)          *   88.29  *   97.50  *  181.11  *
* Vel Total (ft/s)       *    4.02  * Avg. Vel. (ft/s)        *    1.98  *    6.66  *    1.03  *
* Max Chl Dpth (ft)      *   30.37  * Hydr. Depth (ft)        *    9.78  *   26.01  *    9.13  *
* Conv. Total (cfs)      *911582.9  * Conv. (cfs)            * 76887.9  *758367.0  * 76328.0  *
* Length Wtd. (ft)       *  414.31  * Wetted Per. (ft)        *   90.55  *  103.16  *  182.12  *
* Min Ch El (ft)         *  754.43  * Shear (lb/sq ft)        *    0.30  *    0.76  *    0.28  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.59  *    5.07  *    0.29  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)    * 1128.31  * 7546.54  * 1235.82  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)          *  150.77  *  467.21  *  172.86  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  788.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  788.24  * Reach Len. (ft)        *  417.54  *  414.45  *  407.23  *
* Crit W.S. (ft)         *  772.27  * Flow Area (sq ft)      * 1186.01  * 2871.03  * 2307.57  *
* E.G. Slope (ft/ft)     *0.000498  * Area (sq ft)           * 1186.01  * 2871.03  * 2307.57  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2689.16  *20824.34  * 2806.50  *
* Top Width (ft)         *  393.90  * Top Width (ft)          *   99.40  *   97.50  *  197.00  *
* Vel Total (ft/s)       *    4.14  * Avg. Vel. (ft/s)        *    2.27  *    7.25  *    1.22  *
* Max Chl Dpth (ft)      *   33.81  * Hydr. Depth (ft)        *   11.93  *   29.45  *   11.71  *
* Conv. Total (cfs)      *1178991.0  * Conv. (cfs)            *120459.3  *932815.6  *125715.8  *
* Length Wtd. (ft)       *  414.27  * Wetted Per. (ft)        *  102.18  *  103.16  *  198.43  *
* Min Ch El (ft)         *  754.43  * Shear (lb/sq ft)        *    0.36  *    0.87  *    0.36  *
* Alpha                  *    2.47  * Stream Power (lb/ft s) *    0.82  *    6.28  *    0.44  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)    * 1606.81  * 9065.35  * 1846.49  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *  195.04  *  495.14  *  250.65  *
*********************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	792.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	791.92	Reach Len. (ft)	417.54	414.45	407.23
Crit W.S. (ft)	774.88	Flow Area (sq ft)	1599.85	3230.13	3049.79
E.G. Slope (ft/ft)	0.000517	Area (sq ft)	1599.85	3230.13	3049.79
Q Total (cfs)	34000.00	Flow (cfs)	3786.75	25808.22	4405.02
Top Width (ft)	433.20	Top Width (ft)	129.62	97.50	206.08
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)	2.37	7.99	1.44
Max Chl Dpth (ft)	37.49	Hydr. Depth (ft)	12.34	33.13	14.80
Conv. Total (cfs)	1495619.0	Conv. (cfs)	166574.6	1135273.0	193771.7
Length Wtd. (ft)	414.22	Wetted Per. (ft)	132.80	103.16	208.23
Min Ch El (ft)	754.43	Shear (lb/sq ft)	0.39	1.01	0.47
Alpha	2.65	Stream Power (lb/ft s)	0.92	8.07	0.68
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	2367.64	10652.37	2766.39
C & E Loss (ft)	0.07	Cum SA (acres)	310.46	517.99	340.05

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	797.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	796.61	Reach Len. (ft)	417.54	414.45	407.23
Crit W.S. (ft)	778.52	Flow Area (sq ft)	2244.19	3687.20	4147.37
E.G. Slope (ft/ft)	0.000511	Area (sq ft)	2244.19	3687.20	4147.37
Q Total (cfs)	44500.00	Flow (cfs)	6124.30	31986.55	6389.15
Top Width (ft)	494.80	Top Width (ft)	145.27	97.50	252.03
Vel Total (ft/s)	4.42	Avg. Vel. (ft/s)	2.73	8.68	1.54
Max Chl Dpth (ft)	42.18	Hydr. Depth (ft)	15.45	37.82	16.46
Conv. Total (cfs)	1969186.0	Conv. (cfs)	271008.8	1415449.0	282728.4
Length Wtd. (ft)	414.29	Wetted Per. (ft)	149.13	103.16	254.79
Min Ch El (ft)	754.43	Shear (lb/sq ft)	0.48	1.14	0.52
Alpha	2.84	Stream Power (lb/ft s)	1.31	9.89	0.80
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	4245.55	13115.34	4938.44
C & E Loss (ft)	0.08	Cum SA (acres)	633.08	546.00	719.89

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	800.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	799.70	Reach Len. (ft)	417.54	414.45	407.23
Crit W.S. (ft)	780.56	Flow Area (sq ft)	2707.55	3987.85	4941.33
E.G. Slope (ft/ft)	0.000529	Area (sq ft)	2707.55	3987.85	4941.33
Q Total (cfs)	53690.00	Flow (cfs)	8147.97	37086.50	8455.53
Top Width (ft)	515.56	Top Width (ft)	155.12	97.50	262.93
Vel Total (ft/s)	4.61	Avg. Vel. (ft/s)	3.01	9.30	1.71
Max Chl Dpth (ft)	45.27	Hydr. Depth (ft)	17.45	40.90	18.79
Conv. Total (cfs)	2335114.0	Conv. (cfs)	354375.8	1612985.0	367752.5
Length Wtd. (ft)	414.27	Wetted Per. (ft)	159.46	103.16	266.12
Min Ch El (ft)	754.43	Shear (lb/sq ft)	0.56	1.28	0.61
Alpha	2.89	Stream Power (lb/ft s)	1.69	11.86	1.05
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	6303.43	14586.04	7261.10
C & E Loss (ft)	0.09	Cum SA (acres)	861.98	553.08	1088.47

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	803.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	802.27	Reach Len. (ft)	417.54	414.45	407.23
Crit W.S. (ft)	782.24	Flow Area (sq ft)	3116.62	4238.48	5628.92

```
* E.G. Slope (ft/ft)     *0.000541  * Area (sq ft)           * 3116.62  * 4238.48  * 5628.92  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *10072.85  *41540.43  *10386.72  *
* Top Width (ft)         *  532.65  * Top Width (ft)         *  163.13  *   97.50  *  272.03  *
* Vel Total (ft/s)       *    4.78  * Avg. Vel. (ft/s)       *    3.23  *    9.80  *    1.85  *
* Max Chl Dpth (ft)      *   47.84  * Hydr. Depth (ft)       *   19.11  *   43.47  *   20.69  *
* Conv. Total (cfs)      *2664838.0  * Conv. (cfs)            *432943.7  *1785460.0  *446434.4  *
* Length Wtd. (ft)       *  414.26  * Wetted Per. (ft)       *  167.87  *  103.16  *  275.57  *
* Min Ch El (ft)         *  754.43  * Shear (lb/sq ft)       *    0.63  *    1.39  *    0.69  *
* Alpha                  *    2.92  * Stream Power (lb/ft s) *    2.03  *   13.61  *    1.27  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 8155.75  *15540.91  * 9464.32  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         * 1022.59  *  553.98  * 1447.86  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  807.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  806.48  * Reach Len. (ft)        *  417.54  *  414.45  *  407.23  *
* Crit W.S. (ft)         *  784.51  * Flow Area (sq ft)      *10551.86  * 4649.58  * 6804.87  *
* E.G. Slope (ft/ft)     *0.000383  * Area (sq ft)           *10551.86  * 4649.58  * 6804.87  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *22316.47  *40784.97  *11618.56  *
* Top Width (ft)         * 1242.37  * Top Width (ft)         *  860.22  *   97.50  *  284.65  *
* Vel Total (ft/s)       *    3.40  * Avg. Vel. (ft/s)       *    2.11  *    8.77  *    1.71  *
* Max Chl Dpth (ft)      *   52.05  * Hydr. Depth (ft)       *   12.27  *   47.69  *   23.91  *
* Conv. Total (cfs)      *3816738.0  * Conv. (cfs)            *1139937.0  *2083318.0  *593482.3  *
* Length Wtd. (ft)       *  414.73  * Wetted Per. (ft)       *  902.83  *  103.16  *  288.89  *
* Min Ch El (ft)         *  754.43  * Shear (lb/sq ft)       *    0.28  *    1.08  *    0.56  *
* Alpha                  *    3.80  * Stream Power (lb/ft s) *    0.59  *    9.46  *    0.96  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *12005.46  *17008.17  *13675.49  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1261.87  *  556.28  * 1810.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  794.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.69  * Reach Len. (ft)        *  417.54  *  414.45  *  407.23  *
* Crit W.S. (ft)         *  776.73  * Flow Area (sq ft)      * 1834.24  * 3402.51  * 3426.66  *
* E.G. Slope (ft/ft)     *0.000529  * Area (sq ft)           * 1834.24  * 3402.51  * 3426.66  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 4666.57  *28464.37  * 4869.06  *
* Top Width (ft)         *  474.54  * Top Width (ft)         *  135.53  *   97.50  *  241.51  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *    2.54  *    8.37  *    1.42  *
* Max Chl Dpth (ft)      *   39.26  * Hydr. Depth (ft)       *   13.53  *   34.90  *   14.19  *
* Conv. Total (cfs)      *1652779.0  * Conv. (cfs)            *202968.8  *1238034.0  *211775.8  *
* Length Wtd. (ft)       *  414.26  * Wetted Per. (ft)       *  138.96  *  103.16  *  243.87  *
* Min Ch El (ft)         *  754.43  * Shear (lb/sq ft)       *    0.44  *    1.09  *    0.46  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    1.11  *    9.11  *    0.66  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 2902.18  *11484.76  * 3340.99  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  399.59  *  528.36  *  406.23  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.424

INPUT
Description: IRS Federal Complex on LOB
Station Elevation Data    num=     190
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  798.41    1.28  798.39    4.56  798.46   20.26  798.24   22.99  798.21
   24.19  798.18   29.15  797.97   34.59  797.75   36.59  797.67   37.54  797.64
   49.81  797.49   54.59  797.33   64.71  796.99   71.36  796.77    80.1  795.86
```

```
   80.18  795.86   80.23  795.85   80.25  795.85   101.3  789.91   102.5  789.19
  103.22  788.91  103.65  789.05  111.98   792.7  125.78  797.62   139.5  798.11
  148.35  798.44  158.67  797.46  171.74  796.55  186.91  796.65  191.42  796.57
  200.39  796.81  203.03  796.89   204.2  796.89  231.07   796.8  233.46  796.72
  246.06  796.66   248.7  796.65  266.23  796.95  269.95  796.93  283.18  797.19
  287.83  797.06  301.78  794.72  305.46  793.64  307.53  793.71  310.88  793.71
  341.03  793.69   352.7  795.02  354.41  795.27  357.24   795.4  364.06  795.67
  373.16  795.21  374.46  795.19  386.02   794.9  393.01  794.27  396.27  794.18
  418.34  793.97  424.27   793.9  425.07   793.9  425.69   793.9  436.44  793.87
  446.45  793.69  460.08  793.61  487.22  793.65  494.15  793.49   506.2  793.31
  529.01  793.44  549.88  793.56  693.18  793.56  722.66  793.01  739.24  793.14
   761.6  793.38   777.2  793.27  934.92  793.32  963.13   793.3   976.2  793.22
 1029.05  793.24 1041.25  793.16 1055.63  792.91 1057.87   792.9 1069.38   792.7
 1084.87  792.68 1125.12  792.53 1129.38  792.26 1131.94  792.01 1144.27   790.9
 1149.42  790.33 1157.61  789.53 1160.48  789.22  1165.3  788.59 1171.84  788.52
 1174.67  788.24 1183.77  788.05 1230.68  786.15 1236.98  786.38 1244.26  786.54
 1250.73  787.82 1256.46  789.31 1275.45  800.04 1279.44  801.21 1292.82  805.07
 1295.34  805.07 1296.22  805.07 1300.77  805.07 1325.55  797.59 1326.35  797.35
  1326.8  797.21 1352.08  789.08 1364.61  788.29  1391.2  786.41 1411.11  781.22
 1423.17  777.97 1449.39  776.35 1526.41  774.47 1527.04  774.45 1527.35  774.44
 1527.74  774.43 1528.98   774.4 1535.67  774.22 1542.74  774.03 1545.16  773.99
 1547.15  773.48 1551.63  772.36 1553.55  771.88 1562.98  769.53 1568.27  768.64
 1580.02  766.74 1584.38  763.83 1588.81  760.77 1595.31  757.26 1597.79  755.81
 1598.32  755.61    1600   754.8    1624   753.8    1648   754.8 1650.95  755.23
 1653.97  756.17 1690.79  768.74 1691.97  768.83 1697.95  769.24 1715.23  770.45
 1720.33  770.94 1724.41  771.59 1749.76  774.63 1764.06  775.76 1769.92  776.35
 1771.72  777.05 1788.02  782.63 1807.97  789.35 1824.07  795.05 1825.87  795.13
  1840.9  795.82 1853.22  796.22 1890.89   796.9 1904.05  797.09 1905.27  797.29
 1912.97   798.7 1919.92  799.94 1921.13  800.05 1930.97  801.02 1936.34  801.04
 1937.83  801.04 1942.15     801  1942.4     801 1944.28  800.94 1946.97  800.86
 1952.19   800.6 1953.84  800.52 1955.87  800.44 1962.21  800.15 1966.74  799.33
 1967.45  799.16 1970.56   800.7 1978.37  804.55 1988.79  808.35 1998.34  811.68
  2011.1  815.83 2020.91   820.9 2027.67  824.09 2043.28  824.46 2045.27  824.36
 2054.22  828.78 2054.83  829.17 2057.62  829.53 2074.03  831.38 2093.67  843.51
 2115.44  857.52 2119.35  857.57 2127.14  861.36 2140.86  868.67 2142.01  868.93

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .075 1580.02    .042 1690.79     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1580.02 1690.79           489.85  474.07  470.55             .1       .3
Left Levee      Station=    1300      Elevation=   805.2
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     500    1080     815

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  780.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  779.99  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
* Crit W.S. (ft)         *  765.34  * Flow Area (sq ft)      *  891.43  * 2417.07  *  621.45  *
* E.G. Slope (ft/ft)     *0.000332  * Area (sq ft)           *  891.43  * 2417.07  *  621.45  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  989.43  *11776.26  *  434.32  *
* Top Width (ft)         *  364.62  * Top Width (ft)          *  164.34  *  110.77  *   89.51  *
* Vel Total (ft/s)       *    3.36  * Avg. Vel. (ft/s)       *    1.11  *    4.87  *    0.70  *
* Max Chl Dpth (ft)      *   26.19  * Hydr. Depth (ft)       *    5.42  *   21.82  *    6.94  *
* Conv. Total (cfs)      *724103.9  * Conv. (cfs)            * 54276.3  *646002.6  * 23825.0  *
* Length Wtd. (ft)       *  475.02  * Wetted Per. (ft)       *  165.46  *  116.41  *   90.52  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.11  *    0.43  *    0.14  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    0.12  *    2.10  *    0.10  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *  596.98  * 5655.48  *  617.61  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  101.11  *  426.57  *  124.71  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  785.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  784.76  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
```

```
* Crit W.S. (ft)         *  768.33  * Flow Area (sq ft)      * 1717.99  * 2945.24  * 1081.57  *
* E.G. Slope (ft/ft)     *0.000339  * Area (sq ft)           * 1717.99  * 2945.24  * 1081.57  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 2775.34  *16526.67  *  997.99  *
* Top Width (ft)         *  396.79  * Top Width (ft)         *  182.48  *  110.77  *  103.54  *
* Vel Total (ft/s)       *    3.53  * Avg. Vel. (ft/s)       *    1.62  *    5.61  *    0.92  *
* Max Chl Dpth (ft)      *   30.96  * Hydr. Depth (ft)       *    9.41  *   26.59  *   10.45  *
* Conv. Total (cfs)      *1103057.0  * Conv. (cfs)           *150805.7  *898022.9  * 54228.6  *
* Length Wtd. (ft)       *  475.67  * Wetted Per. (ft)       *  184.22  *  116.41  *  105.34  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.20  *    0.53  *    0.22  *
* Alpha                  *    2.08  * Stream Power (lb/ft s) *    0.32  *    3.00  *    0.20  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 1115.94  * 7520.47  * 1223.04  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  149.47  *  466.22  *  171.52  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.67  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  788.21  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
* Crit W.S. (ft)         *  770.44  * Flow Area (sq ft)      * 2387.16  * 3327.49  * 1456.55  *
* E.G. Slope (ft/ft)     *0.000344  * Area (sq ft)           * 2387.16  * 3327.49  * 1456.55  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 4350.72  *20420.97  * 1548.31  *
* Top Width (ft)         *  438.79  * Top Width (ft)         *  214.24  *  110.77  *  113.79  *
* Vel Total (ft/s)       *    3.67  * Avg. Vel. (ft/s)       *    1.82  *    6.14  *    1.06  *
* Max Chl Dpth (ft)      *   34.41  * Hydr. Depth (ft)       *   11.14  *   30.04  *   12.80  *
* Conv. Total (cfs)      *1418479.0  * Conv. (cfs)           *234475.7  *1100559.0  * 83443.9  *
* Length Wtd. (ft)       *  476.00  * Wetted Per. (ft)       *  216.25  *  116.41  *  116.15  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.24  *    0.61  *    0.27  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.43  *    3.77  *    0.29  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 1589.68  * 9035.86  * 1828.90  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  193.54  *  494.15  *  249.20  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.44  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  791.92  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
* Crit W.S. (ft)         *  772.86  * Flow Area (sq ft)      * 3240.65  * 3739.07  * 1899.37  *
* E.G. Slope (ft/ft)     *0.000348  * Area (sq ft)           * 3240.65  * 3739.07  * 1899.37  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 6801.73  *24921.95  * 2276.32  *
* Top Width (ft)         *  472.00  * Top Width (ft)         *  236.78  *  110.77  *  124.45  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    2.10  *    6.67  *    1.20  *
* Max Chl Dpth (ft)      *   38.12  * Hydr. Depth (ft)       *   13.69  *   33.76  *   15.26  *
* Conv. Total (cfs)      *1823573.0  * Conv. (cfs)           *364807.5  *1336677.0  *122089.0  *
* Length Wtd. (ft)       *  476.37  * Wetted Per. (ft)       *  239.27  *  116.41  *  127.44  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.29  *    0.70  *    0.32  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    0.62  *    4.65  *    0.39  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 2344.44  *10619.22  * 2743.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  308.71  *  517.00  *  338.50  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  797.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  796.63  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
* Crit W.S. (ft)         *  776.77  * Flow Area (sq ft)      * 4389.79  * 4260.55  * 2545.32  *
* E.G. Slope (ft/ft)     *0.000345  * Area (sq ft)           * 4389.79  * 4260.55  * 2545.32  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *10783.52  *30872.49  * 2843.99  *
* Top Width (ft)         *  547.35  * Top Width (ft)         *  251.42  *  110.77  *  185.17  *
* Vel Total (ft/s)       *    3.97  * Avg. Vel. (ft/s)       *    2.46  *    7.25  *    1.12  *
* Max Chl Dpth (ft)      *   42.83  * Hydr. Depth (ft)       *   17.46  *   38.46  *   13.75  *
* Conv. Total (cfs)      *2395062.0  * Conv. (cfs)           *580386.2  *1661607.0  *153068.3  *
* Length Wtd. (ft)       *  476.57  * Wetted Per. (ft)       *  254.64  *  116.41  *  188.73  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.37  *    0.79  *    0.29  *
* Alpha                  *    2.40  * Stream Power (lb/ft s) *    0.91  *    5.72  *    0.32  *
```

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* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   * 4213.75  *13077.53  * 4907.16  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  631.18  *  545.01  *  717.85  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  800.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  799.73  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
* Crit W.S. (ft)         *  779.05  * Flow Area (sq ft)      * 5183.32  * 4603.33  * 3218.91  *
* E.G. Slope (ft/ft)     *0.000359  * Area (sq ft)           * 5183.32  * 4603.33  * 3218.91  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *14121.65  *35828.49  * 3739.86  *
* Top Width (ft)         *  604.27  * Top Width (ft)         *  261.54  *  110.77  *  231.96  *
* Vel Total (ft/s)       *    4.13  * Avg. Vel. (ft/s)       *    2.72  *    7.78  *    1.16  *
* Max Chl Dpth (ft)      *   45.92  * Hydr. Depth (ft)       *   19.82  *   41.56  *   13.88  *
* Conv. Total (cfs)      *2832726.0  * Conv. (cfs)           *745069.3  *1890338.0  *197317.9  *
* Length Wtd. (ft)       *  477.01  * Wetted Per. (ft)       *  265.23  *  116.41  *  235.94  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.44  *    0.89  *    0.31  *
* Alpha                  *    2.49  * Stream Power (lb/ft s) *    1.19  *    6.90  *    0.36  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   * 6265.61  *14545.17  * 7222.95  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  859.98  *  552.09  * 1086.15  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  803.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  802.30  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
* Crit W.S. (ft)         *  780.54  * Flow Area (sq ft)      * 5868.52  * 4888.87  * 3900.65  *
* E.G. Slope (ft/ft)     *0.000370  * Area (sq ft)           * 5868.52  * 4888.87  * 3900.65  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *17251.12  *40218.91  * 4529.97  *
* Top Width (ft)         *  663.87  * Top Width (ft)         *  270.08  *  110.77  *  283.02  *
* Vel Total (ft/s)       *    4.23  * Avg. Vel. (ft/s)       *    2.94  *    8.23  *    1.16  *
* Max Chl Dpth (ft)      *   48.50  * Hydr. Depth (ft)       *   21.73  *   44.14  *   13.78  *
* Conv. Total (cfs)      *3221524.0  * Conv. (cfs)           *896369.4  *2089777.0  *235377.6  *
* Length Wtd. (ft)       *  477.32  * Wetted Per. (ft)       *  274.15  *  116.41  *  287.74  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.49  *    0.97  *    0.31  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    1.46  *    7.99  *    0.36  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 8112.69  *15497.49  * 9419.77  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1020.52  *  552.99  * 1445.26  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  806.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  806.54  * Reach Len. (ft)        *  489.85  *  474.07  *  470.55  *
* Crit W.S. (ft)         *  782.58  * Flow Area (sq ft)      *15847.86  * 5358.62  * 5120.54  *
* E.G. Slope (ft/ft)     *0.000240  * Area (sq ft)           *15847.86  * 5358.62  * 5120.54  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *31367.29  *37750.29  * 5602.42  *
* Top Width (ft)         * 1403.84  * Top Width (ft)         * 1000.02  *  110.77  *  293.05  *
* Vel Total (ft/s)       *    2.84  * Avg. Vel. (ft/s)       *    1.98  *    7.04  *    1.09  *
* Max Chl Dpth (ft)      *   52.74  * Hydr. Depth (ft)       *   15.85  *   48.38  *   17.47  *
* Conv. Total (cfs)      *4819747.0  * Conv. (cfs)           *2023319.0  *2435049.0  *361379.3  *
* Length Wtd. (ft)       *  483.05  * Wetted Per. (ft)       * 1047.40  *  116.41  *  298.64  *
* Min Ch El (ft)         *  753.80  * Shear (lb/sq ft)       *    0.23  *    0.69  *    0.26  *
* Alpha                  *    3.33  * Stream Power (lb/ft s) *    0.45  *    4.87  *    0.28  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *11878.94  *16960.55  *13619.74  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         * 1252.95  *  555.29  * 1807.51  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	794.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.075	0.042	0.140
W.S. Elev (ft)	793.72	Reach Len. (ft)	489.85	474.07	470.55
Crit W.S. (ft)	773.98	Flow Area (sq ft)	3670.79	3937.96	2127.36
E.G. Slope (ft/ft)	0.000346	Area (sq ft)	3670.79	3937.96	2127.36
Q Total (cfs)	38000.00	Flow (cfs)	8219.99	27110.90	2669.10
Top Width (ft)	482.65	Top Width (ft)	242.36	110.77	129.52
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)	2.24	6.88	1.25
Max Chl Dpth (ft)	39.92	Hydr. Depth (ft)	15.15	35.55	16.43
Conv. Total (cfs)	2042573.0	Conv. (cfs)	441840.6	1457264.0	143469.3
Length Wtd. (ft)	476.54	Wetted Per. (ft)	245.13	116.41	132.82
Min Ch El (ft)	753.80	Shear (lb/sq ft)	0.32	0.73	0.35
Alpha	2.30	Stream Power (lb/ft s)	0.72	5.03	0.43
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	2875.79	11449.84	3315.03
C & E Loss (ft)	0.01	Cum SA (acres)	397.78	527.37	404.49

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 19.334

INPUT
Description: Dodson XS 20.95. IRS Federal Complex on LOB.
Station Elevation Data num= 292

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	840.26	.56	840.23	21.07	839.37	27.78	838.86	45.5	837.04
58	835.46	59.93	835.22	83.79	829.79	84.69	829.63	85.13	829.53
100.75	824.82	113.6	821.5	140.33	812.77	141.7	812.3	145.54	811.4
169.91	805.66	179.47	803.91	194.73	800.97	221.2	798.96	225.21	798.56
226.55	798.52	236.9	797.12	238.9	796.83	248.87	797.44	252.7	797.65
292.06	798.55	299.92	799.28	313.97	798.75	316.58	798.72	322.25	798.78
329.52	798.86	346.6	799.27	354.51	799.48	361.16	799.28	372.38	798.66
383.59	801.54	393.1	804	398.74	805.56	404.99	807.22	415.29	807.61
415.65	807.62	415.94	807.55	416.6	807.4	419.67	806.66	437.84	802.33
440.91	801.57	461.98	796.33	462.62	796.18	463.45	796.12	477.38	795.32
480.33	795.25	489.48	795.01	494.97	795.04	500.65	795.06	503.25	795.1
515.92	795.13	546.53	795.16	547.15	795.16	559.55	795.34	561.5	795.32
576.98	794.6	584.26	794.38	599.05	793.94	607.02	793.87	619.08	792.54
622.25	792.15	622.82	792.18	625.35	792.31	638.25	793.3	644.32	793.56
649.51	793.82	658.79	789.15	658.92	789.08	664.14	791.12	670.39	793.64
684.41	793.97	685.73	794	688.77	794.09	707.69	794.64	711.66	794.5
734.9	795.83	746.49	793.21	746.64	793.22	747.11	793.23	765.4	793.28
774.51	792.84	783.15	792.89	783.44	792.89	795.35	782.2	806.75	771.96
806.89	771.87	808.4	771.03	819.44	764.81	820.25	764.41	840.98	764.81
857.88	764.81	875.15	765.05	882.32	765.2	896.47	765.52	904.27	765.65
911.35	764.58	914.35	764.16	915.52	764.44	919.23	764.65	924.8	764.4
926.14	764.37	933.81	764.19	934.83	764.3	938.03	764.54	945.44	764.57
947.7	764.71	947.88	764.72	948.63	764.76	957.75	764.82	961.68	766.71
963.15	771.23	971.9	773.66	977.88	775.23	980.67	775.76	985.31	776.62
990.3	776.62	990.65	776.63	992.52	777.55	997.37	779.95	998.2	780.33
1011.12	786.83	1025.35	793.82	1044.17	793.72	1052.73	793.69	1060.34	790.36
1068.39	787.06	1086.79	776.06	1092.86	772.58	1099.09	772.21	1110.87	770.85
1125.2	770.71	1133.59	770.62	1135.8	770.6	1146.09	770.08	1147.3	769.85
1165.52	766.62	1167.62	766.6	1173.74	766.5	1192.54	766.5	1218.79	766.79
1223.88	766.87	1231.7	767.96	1242.78	769.46	1245.11	770.2	1258.97	773.26
1263.44	773.97	1288.2	774.54	1300.45	775	1306.39	774.77	1344.69	773.68
1351.96	773.74	1365.73	773.64	1388.51	773.16	1393.75	772.99	1401.86	772.97
1414.4	772.93	1467.31	772.68	1468.12	772.68	1482.21	771.94	1491.1	771.79
1513.92	771.44	1536.05	771.27	1556.32	770.8	1573.6	770.65	1589.89	770.46
1600.57	770.33	1625.03	769.65	1633.19	769.41	1642.91	769.32	1649.77	769.49
1657.19	769.38	1677.34	768.83	1699.74	768.83	1755.48	769.29	1765.82	769.28
1773.8	769.22	1775.63	769.21	1795.25	769.38	1819.15	769.51	1822.8	769.61
1830.28	770.4	1834.46	770.76	1849.16	772.08	1863.14	772.73	1866.94	772.91
1868.06	773	1869.39	772.99	1890.45	773.22	1912.13	774.56	1918.13	775.17
1923.31	775.4	1932.84	776.13	1951.88	781.48	1986.5	790.97	2028.56	804.43
2034.26	806.23	2038.25	806.22	2041.61	806.22	2042.23	806.22	2044.69	805.46

```
 2077.67  794.57 2083.08  794.58 2090.18  794.87 2116.64  794.85 2120.41  794.85
 2135.69  794.76 2145.29  794.51 2156.85  794.33  2170.3  794.06 2185.37  793.89
 2198.12  793.86 2200.47  793.86 2226.23  793.74 2228.51  793.76 2237.77  793.81
 2288.03   793.7 2300.03  793.45 2300.89  793.44 2331.01   782.2  2334.4  780.94
 2346.03  776.85 2352.75   774.6 2374.65  773.53 2374.67  773.53 2387.28  771.78
 2391.05   771.4 2399.83  770.43 2421.31  768.05 2422.04  767.67 2435.87  762.87
 2436.64  762.69 2451.35  758.64 2455.32  757.22 2458.16  755.61    2465  754.09
    2485  753.09    2505  754.09 2511.94  755.29 2525.56  761.67 2540.41  768.27
 2542.92  769.39 2556.73  770.95 2567.31  771.99 2586.66  775.28 2586.81  775.31
 2589.21  775.44  2616.4  776.84 2618.08   776.9 2619.93  777.56  2668.5  793.39
 2669.12  793.58 2670.04  793.59 2678.29  793.64 2767.07  794.24 2769.65  794.26
 2771.26  794.31 2776.07  794.38 2838.05  795.43 2880.05  796.72 2894.26  797.04
 2898.89  797.15 2913.94  800.21 2926.27  802.68 2928.85   803.2 2929.23  803.25
 2932.34  803.61 2935.65     804  2936.4  804.08 2937.43  804.11 2948.06  804.42
 2951.76  804.47 2955.85  804.53 2958.67  804.51 2963.62  804.48 2974.21  804.24
  2975.3  804.22  2975.9  804.15 2983.59   803.1 2987.28  802.74 2997.16  801.72
 2998.83  802.46 3007.36  806.46 3031.82   827.4 3032.66  828.03 3033.18   828.3
 3057.22  839.36 3061.39  841.76

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .14   221.2    .075 2421.31    .042 2542.92     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2421.31 2542.92          284.38  256.16  252.08            .1       .3
Left Levee      Station=    2038      Elevation=   806.3

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  780.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  779.85  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  765.01  * Flow Area (sq ft)      *  595.38  * 2594.77  *  472.63  *
* E.G. Slope (ft/ft)     *0.000312  * Area (sq ft)           *  595.38  * 2594.77  *  472.63  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  762.71  *12112.69  *  324.59  *
* Top Width (ft)         *  289.44  * Top Width (ft)         *   83.80  *  121.61  *   84.03  *
* Vel Total (ft/s)       *    3.60  * Avg. Vel. (ft/s)       *    1.28  *    4.67  *    0.69  *
* Max Chl Dpth (ft)      *   26.76  * Hydr. Depth (ft)       *    7.10  *   21.34  *    5.62  *
* Conv. Total (cfs)      *747157.4  * Conv. (cfs)            * 43171.8  *685612.8  * 18372.8  *
* Length Wtd. (ft)       *  258.30  * Wetted Per. (ft)       *   85.03  *  127.13  *   84.97  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.14  *    0.40  *    0.11  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.17  *    1.86  *    0.07  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  588.62  * 5628.21  *  611.70  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   99.72  *  425.30  *  123.77  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  785.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  784.58  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  767.93  * Flow Area (sq ft)      * 1022.28  * 3169.65  *  904.14  *
* E.G. Slope (ft/ft)     *0.000339  * Area (sq ft)           * 1022.28  * 3169.65  *  904.14  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1772.71  *17633.38  *  893.92  *
* Top Width (ft)         *  316.81  * Top Width (ft)         *   96.66  *  121.61  *   98.53  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *    1.73  *    5.56  *    0.99  *
* Max Chl Dpth (ft)      *   31.49  * Hydr. Depth (ft)       *   10.58  *   26.06  *    9.18  *
* Conv. Total (cfs)      *1101775.0  * Conv. (cfs)            * 96212.9  *957045.0  * 48517.0  *
* Length Wtd. (ft)       *  259.05  * Wetted Per. (ft)       *   98.74  *  127.13  *  100.22  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.22  *    0.53  *    0.19  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    0.38  *    2.94  *    0.19  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1100.53  * 7487.19  * 1212.32  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  147.90  *  464.96  *  170.43  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  788.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
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```
* W.S. Elev (ft)         *  788.00  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  769.96  * Flow Area (sq ft)      * 1368.92  * 3585.99  * 1259.45  *
* E.G. Slope (ft/ft)     *0.000353  * Area (sq ft)           * 1368.92  * 3585.99  * 1259.45  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2760.53  *22082.68  * 1476.80  *
* Top Width (ft)         *  336.49  * Top Width (ft)         *  105.84  *  121.61  *  109.04  *
* Vel Total (ft/s)       *    4.24  * Avg. Vel. (ft/s)       *    2.02  *    6.16  *    1.17  *
* Max Chl Dpth (ft)      *   34.91  * Hydr. Depth (ft)       *   12.93  *   29.49  *   11.55  *
* Conv. Total (cfs)      *1401183.0  * Conv. (cfs)           *146960.8  *1175603.0  * 78619.4  *
* Length Wtd. (ft)       *  259.48  * Wetted Per. (ft)       *  108.53  *  127.13  *  111.27  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.28  *    0.62  *    0.25  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.56  *    3.83  *    0.29  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1568.56  * 8998.24  * 1814.23  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  191.74  *  492.88  *  248.00  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  792.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  791.66  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  772.33  * Flow Area (sq ft)      * 1774.55  * 4031.41  * 1679.41  *
* E.G. Slope (ft/ft)     *0.000373  * Area (sq ft)           * 1774.55  * 4031.41  * 1679.41  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 4113.18  *27593.86  * 2292.96  *
* Top Width (ft)         *  357.54  * Top Width (ft)         *  115.65  *  121.61  *  120.28  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    2.32  *    6.84  *    1.37  *
* Max Chl Dpth (ft)      *   38.57  * Hydr. Depth (ft)       *   15.34  *   33.15  *   13.96  *
* Conv. Total (cfs)      *1760655.0  * Conv. (cfs)           *212996.8  *1428920.0  *118738.6  *
* Length Wtd. (ft)       *  259.86  * Wetted Per. (ft)       *  119.00  *  127.13  *  123.09  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.35  *    0.74  *    0.32  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.80  *    5.05  *    0.43  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 2316.25  *10576.94  * 2723.93  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  306.73  *  515.73  *  337.18  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  797.01  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.87  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.14  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  775.31  * Flow Area (sq ft)      * 2757.73  * 4575.66  * 2557.61  *
* E.G. Slope (ft/ft)     *0.000446  * Area (sq ft)           * 2757.73  * 4575.66  * 2557.61  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4550.46  *37282.00  * 2667.54  *
* Top Width (ft)         *  788.14  * Top Width (ft)         *  348.39  *  121.61  *  318.14  *
* Vel Total (ft/s)       *    4.50  * Avg. Vel. (ft/s)       *    1.65  *    8.15  *    1.04  *
* Max Chl Dpth (ft)      *   43.05  * Hydr. Depth (ft)       *    7.92  *   37.63  *    8.04  *
* Conv. Total (cfs)      *2106344.0  * Conv. (cfs)           *215389.6  *1764690.0  *126264.2  *
* Length Wtd. (ft)       *  258.82  * Wetted Per. (ft)       *  352.33  *  127.13  *  321.28  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.22  *    1.00  *    0.22  *
* Alpha                  *    2.76  * Stream Power (lb/ft s) *    0.36  *    8.17  *    0.23  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 4173.56  *13029.44  * 4879.60  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  627.80  *  543.75  *  715.13  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  800.18  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  799.32  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  777.62  * Flow Area (sq ft)      * 3882.11  * 4962.78  * 3681.84  *
* E.G. Slope (ft/ft)     *0.000425  * Area (sq ft)           * 3882.11  * 4962.78  * 3681.84  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 7701.84  *41641.29  * 4346.87  *
* Top Width (ft)         *  846.28  * Top Width (ft)         *  358.03  *  121.61  *  366.64  *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *    1.98  *    8.39  *    1.18  *
* Max Chl Dpth (ft)      *   46.23  * Hydr. Depth (ft)       *   10.84  *   40.81  *   10.04  *
* Conv. Total (cfs)      *2605099.0  * Conv. (cfs)           *373701.9  *2020482.0  *210915.1  *
* Length Wtd. (ft)       *  260.06  * Wetted Per. (ft)       *  362.48  *  127.13  *  370.02  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.28  *    1.04  *    0.26  *
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* Alpha                  *    3.01  * Stream Power (lb/ft s) *    0.56  *    8.69  *    0.31  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 6214.64  *14493.11  * 7185.68  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  856.50  *  550.83  * 1082.92  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  801.99  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  779.20  * Flow Area (sq ft)      * 4848.07  * 5287.23  * 4678.06  *
* E.G. Slope (ft/ft)     *0.000404  * Area (sq ft)           * 4848.07  * 5287.23  * 4678.06  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *10709.09  *45123.55  * 6167.36  *
* Top Width (ft)         *  870.81  * Top Width (ft)         *  366.11  *  121.61  *  383.10  *
* Vel Total (ft/s)       *    4.19  * Avg. Vel. (ft/s)       *    2.21  *    8.53  *    1.32  *
* Max Chl Dpth (ft)      *   48.90  * Hydr. Depth (ft)       *   13.24  *   43.48  *   12.21  *
* Conv. Total (cfs)      *3085185.0  * Conv. (cfs)            *532895.6  *2245395.0  *306894.3  *
* Length Wtd. (ft)       *  260.89  * Wetted Per. (ft)       *  370.99  *  127.13  *  386.81  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.33  *    1.05  *    0.30  *
* Alpha                  *    3.08  * Stream Power (lb/ft s) *    0.73  *    8.95  *    0.40  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 8052.43  *15442.11  * 9373.44  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1016.94  *  551.73  * 1441.66  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  806.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.04  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  806.77  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  781.42  * Flow Area (sq ft)      *54146.63  * 5868.98  * 6749.45  *
* E.G. Slope (ft/ft)     *0.000037  * Area (sq ft)           *54146.63  * 5868.98  * 6749.45  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *55552.55  *16177.69  * 2989.76  *
* Top Width (ft)         * 2826.63  * Top Width (ft)         * 2240.22  *  121.61  *  464.80  *
* Vel Total (ft/s)       *    1.12  * Avg. Vel. (ft/s)       *    1.03  *    2.76  *    0.44  *
* Max Chl Dpth (ft)      *   53.68  * Hydr. Depth (ft)       *   24.17  *   48.26  *   14.52  *
* Conv. Total (cfs)      *12341580.0  * Conv. (cfs)           *9175673.0  *2672086.0  *493822.5  *
* Length Wtd. (ft)       *  269.57  * Wetted Per. (ft)       * 2281.43  *  127.13  *  469.93  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.05  *    0.11  *    0.03  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    0.06  *    0.29  *    0.01  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *11485.38  *16899.46  *13555.63  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1234.74  *  554.03  * 1803.41  *
*****************************************************************************************

Warning: Multiple water surfaces were found that could balance the energy equation. The program
         selected the water surface whose main channel velocity head was the closest to the previously
         computed cross section.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  794.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  793.43  * Reach Len. (ft)        *  284.38  *  256.16  *  252.08  *
* Crit W.S. (ft)         *  773.44  * Flow Area (sq ft)      * 1983.07  * 4246.27  * 1896.70  *
* E.G. Slope (ft/ft)     *0.000380  * Area (sq ft)           * 1983.07  * 4246.27  * 1896.70  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 4862.17  *30386.02  * 2751.81  *
* Top Width (ft)         *  367.70  * Top Width (ft)         *  120.39  *  121.61  *  125.70  *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)       *    2.45  *    7.16  *    1.45  *
* Max Chl Dpth (ft)      *   40.34  * Hydr. Depth (ft)       *   16.47  *   34.92  *   15.09  *
* Conv. Total (cfs)      *1948506.0  * Conv. (cfs)           *249314.7  *1558088.0  *141103.1  *
* Length Wtd. (ft)       *  260.04  * Wetted Per. (ft)       *  124.06  *  127.13  *  128.80  *
* Min Ch El (ft)         *  753.09  * Shear (lb/sq ft)       *    0.38  *    0.79  *    0.35  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.93  *    5.68  *    0.51  *
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* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 2844.00  *11405.31  * 3293.30  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  395.74  *  526.11  *  403.12  *
*****************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 19.285

INPUT
Description: IRS Fed Complex Levee in LOB. Close to Dodson XS 20.86
Station Elevation Data num= 340

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	839.34	2.02	839.13	15.26	837.89	17.48	837.93	19.76	837.37
34.36	835.92	36.52	835.69	39.15	835.32	55.09	833.26	60.41	832.51
78.39	830.17	86.83	828.95	96.15	827.61	106.45	826.01	118.52	824.3
128.83	822.71	148.39	820	163.86	817.86	165.66	817.56	173.47	816.5
180.68	815.24	181.68	815.09	182.99	814.89	193.53	813.1	199.13	812.28
204.89	811.33	215.91	809.8	218.66	809.41	221.09	809.05	223.33	808.69
238.86	805.89	242	805.49	247.43	804.77	259.12	803.66	264.81	803.09
268.74	802.43	281.83	800.23	288.07	800.04	290.49	799.98	296.02	799.87
315.19	799.79	320.46	799.74	326.8	799.47	346.87	797.72	348.32	797.59
350.71	797.79	355.84	798.2	356.4	798.36	361.83	798.69	373.11	799.56
386.63	799.57	413.78	799.67	414.9	799.67	415.05	799.67	416.29	799.35
438.74	793.97	439.91	793.92	453.95	793.22	459.97	794.66	466.62	796.26
467.55	796.5	482.21	800.78	501.59	806.41	505.43	807.5	506.49	807.48
511.87	807.45	513.96	807.43	522.21	807.37	523.88	807.34	527.88	806.48
535.71	804.94	535.84	804.86	535.94	804.81	541.2	802.75	543.57	802.2
552.82	799.01	559.23	797.12	571.64	794.28	585.81	795.25	585.83	795.25
613.84	801.03	616.9	802.01	632.44	805.75	633.7	806.07	642.17	807.4
642.61	807.4	642.77	807.4	653.69	807.41	661.62	807.33	670.86	807.31
676	807.29	676.48	807.29	699.21	806.62	699.75	806.62	700.11	806.61
702.02	806.61	714.84	806.96	716.42	806.96	741.2	807.61	747.05	807.53
748.62	807.67	749.57	807.67	782.34	807.66	784.85	807.7	786.86	807.68
811.82	807.67	816.58	807.7	834.28	807.6	845.39	807.68	862.09	807.62
871.18	807.32	876.3	807.17	879.95	807.51	888.55	807.37	898.63	807.08
900.91	807.02	901.18	807.01	901.81	806.99	901.94	806.95	901.98	806.94
902.02	806.92	902.05	806.92	902.1	806.9	902.16	806.88	902.19	806.87
902.25	806.85	902.34	806.83	902.41	806.81	902.62	806.74	902.7	806.72
903.34	806.33	903.43	806.3	903.57	806.25	903.7	806.2	903.78	806.18
903.86	806.15	904.05	806.09	904.15	806.05	904.22	806.03	904.29	806.01
904.4	805.97	904.74	805.86	904.99	805.78	911.24	804.03	927.07	799.39
937.62	797.88	945.74	796.78	951.87	796.26	961.09	795.8	966.16	797.67
983.71	804.22	988.13	805.4	1004.97	807.33	1005.16	807.35	1005.37	807.35
1016.08	807.45	1016.09	807.45	1016.28	807.45	1049.46	807.62	1050.01	807.62
1057.46	807.72	1062.79	807.7	1063.16	807.7	1064.51	807.71	1065.94	807.71
1093.58	807.63	1097.29	807.62	1117.97	807.56	1123.41	807.55	1137.83	807.51
1147.34	807.48	1167.14	807.47	1195.98	807.46	1198.93	807.46	1206.46	807.46
1208.14	807.46	1217.06	807.45	1249.93	807.1	1279.79	807.54	1284.29	807.55
1304.43	807.61	1307.19	807.62	1325.82	807.67	1331.15	807.69	1352.08	807.75
1363.14	807.78	1373.48	807.81	1378.84	807.82	1389.08	807.84	1414.55	807.91
1423.48	807.9	1433.66	807.93	1438.32	807.92	1460.91	807.9	1470.83	807.92
1477.06	807.91	1489.24	807.9	1495.55	807.9	1507.71	807.88	1521.24	807.87
1530.1	807.86	1535.82	807.85	1543.57	807.85	1552.52	807.84	1572.67	807.82
1584.67	807.81	1600.38	807.79	1613.37	807.78	1629.48	807.8	1650.46	807.83
1665.56	807.82	1687.6	807.86	1699.89	807.92	1713.23	807.94	1725.55	808
1742.3	808.03	1754.72	808.09	1757.77	808.08	1759.89	808.08	1767.18	808.07
1768.44	808.07	1774.45	808.12	1786.18	808.12	1799.86	808.12	1814.02	808.12
1829.27	808.11	1844.65	808.11	1846.87	807.97	1850.49	807.86	1862.4	807.07
1882.98	806.39	1889.35	806.39	1902.49	806.39	1910.28	805.92	1912.41	805.77
1936.69	801.92	1960	798.06	1962.06	797.65	1972.27	795.37	1994.23	795.12
2016.09	795.17	2029.17	795.24	2037.36	795.3	2060.55	795.15	2112.91	794.93
2121.92	794.82	2181.97	794.63	2202.64	794.62	2217	794.56	2228.52	794.44
2301.92	793.88	2308	793.83	2311.55	793.8	2312	793.8	2313.27	793.34
2314.8	792.79	2335.7	785.97	2344.29	781.93	2357.41	777.22	2359.3	776.5
2360.96	775.88	2362.07	775.81	2377.12	774.48	2400.97	768.4	2402.01	768.12
2403.38	767.85	2415.17	765.52	2419.1	764.74	2424.89	763.8	2443.74	760.99
2451.22	756.33	2452.35	755.61	2465	753.7	2490	752.7	2515	753.7
2526.6	755.59	2538.76	761.01	2543.38	762.41	2548.66	763.39	2554.32	764.49
2555.85	764.83	2576.36	769.27	2587.16	771.06	2596.27	772.69	2607.01	774.56
2612.68	776.31	2620.11	777.25	2623.01	777.83	2636.19	781.79	2641.4	782.95

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 2663.84  789.67 2674.31  793.32 2675.16  793.57 2720.25  794.09 2724.87  794.16
 2736.58  794.18 2758.95  794.14 2770.21  794.24 2771.04  794.17 2779.95  793.36
 2829.18   793.8 2864.59  794.35 2886.82   794.5  2921.9  794.69 2934.78  794.62
 2978.64  796.09 2984.18  796.24 2987.07   796.3 2993.37  796.56 3016.18  796.98
 3016.71  797.08  3032.3   800.2 3037.17  801.01 3042.78  801.45 3047.34  801.81
 3050.39  801.91 3059.72  802.21 3060.22  802.22 3063.26  802.27  3067.9  802.35
 3073.06  802.34 3075.95  802.33 3077.09   802.3 3088.08  802.11 3090.81  801.89
 3094.66  801.72 3100.07  801.14 3112.76   800.1 3117.49  801.16 3129.99  804.21
 3134.38  804.38 3145.16  804.66 3166.08  817.62 3173.32  822.84 3183.39  826.58
  3189.6  829.12 3199.53  834.45 3224.51  846.47 3231.54  849.91 3236.98  856.17

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  281.83    .075 2443.74    .042 2543.38     .14 2720.25   .0684
 3100.07     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2443.74 2543.38           334.14  202.94   78.07             .1       .3
Left Levee      Station=    1845      Elevation=  808.25
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     510     650   807.5     880    1050   807.5

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  780.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)          *  779.80  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)          *  763.28  * Flow Area (sq ft)      *  952.96  * 2469.77  *  766.29  *
* E.G. Slope (ft/ft)      *0.000242  * Area (sq ft)           *  952.96  * 2469.77  *  766.29  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             * 1358.91  *11305.90  *  535.19  *
* Top Width (ft)          *  279.33  * Top Width (ft)         *   93.51  *   99.64  *   86.18  *
* Vel Total (ft/s)        *    3.15  * Avg. Vel. (ft/s)       *    1.43  *    4.58  *    0.70  *
* Max Chl Dpth (ft)       *   27.10  * Hydr. Depth (ft)       *   10.19  *   24.79  *    8.89  *
* Conv. Total (cfs)       *848965.8  * Conv. (cfs)            * 87399.0  *727145.8  * 34421.1  *
* Length Wtd. (ft)        *  204.31  * Wetted Per. (ft)       *   95.68  *  102.88  *   88.01  *
* Min Ch El (ft)          *  752.70  * Shear (lb/sq ft)       *    0.15  *    0.36  *    0.13  *
* Alpha                   *    1.83  * Stream Power (lb/ft s) *    0.21  *    1.66  *    0.09  *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)   *  583.57  * 5613.32  *  608.12  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   99.14  *  424.65  *  123.28  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  784.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.41  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)          *  784.50  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)          *  766.12  * Flow Area (sq ft)      * 1421.74  * 2938.73  * 1211.65  *
* E.G. Slope (ft/ft)      *0.000289  * Area (sq ft)           * 1421.74  * 2938.73  * 1211.65  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 2669.50  *16518.79  * 1111.71  *
* Top Width (ft)          *  307.78  * Top Width (ft)         *  104.92  *   99.64  *  103.21  *
* Vel Total (ft/s)        *    3.64  * Avg. Vel. (ft/s)       *    1.88  *    5.62  *    0.92  *
* Max Chl Dpth (ft)       *   31.80  * Hydr. Depth (ft)       *   13.55  *   29.49  *   11.74  *
* Conv. Total (cfs)       *1193922.0  * Conv. (cfs)            *157003.4  *971534.6  * 65383.9  *
* Length Wtd. (ft)        *  205.01  * Wetted Per. (ft)       *  108.04  *  102.88  *  105.69  *
* Min Ch El (ft)          *  752.70  * Shear (lb/sq ft)       *    0.24  *    0.52  *    0.21  *
* Alpha                   *    1.98  * Stream Power (lb/ft s) *    0.45  *    2.90  *    0.19  *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)   * 1092.55  * 7469.23  * 1206.20  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *  147.24  *  464.31  *  169.85  *
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CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)          *  788.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.50  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)          *  787.91  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)          *  768.23  * Flow Area (sq ft)      * 1793.36  * 3278.23  * 1582.71  *
* E.G. Slope (ft/ft)      *0.000317  * Area (sq ft)           * 1793.36  * 3278.23  * 1582.71  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             * 3884.89  *20743.51  * 1691.60  *
* Top Width (ft)          *  328.22  * Top Width (ft)         *  113.99  *   99.64  *  114.59  *
* Vel Total (ft/s)        *    3.96  * Avg. Vel. (ft/s)       *    2.17  *    6.33  *    1.07  *
* Max Chl Dpth (ft)       *   35.21  * Hydr. Depth (ft)       *   15.73  *   32.90  *   13.81  *
* Conv. Total (cfs)       *1479092.0  * Conv. (cfs)            *218317.1  *1165713.0  * 95062.1  *
* Length Wtd. (ft)        *  205.78  * Wetted Per. (ft)       *  117.74  *  102.88  *  117.57  *
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* Min Ch El (ft)         *  752.70  * Shear (lb/sq ft)       *    0.30  *    0.63  *    0.27  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.65  *    3.99  *    0.28  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 1558.24  * 8978.06  * 1806.00  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  191.02  *  492.23  *  247.35  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  792.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  791.55  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)         *  770.49  * Flow Area (sq ft)      * 2227.87  * 3640.35  * 2020.38  *
* E.G. Slope (ft/ft)     *0.000350  * Area (sq ft)           * 2227.87  * 3640.35  * 2020.38  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 5507.49  *25984.88  * 2507.64  *
* Top Width (ft)         *  350.61  * Top Width (ft)         *  125.13  *   99.64  *  125.84  *
* Vel Total (ft/s)       *    4.31  * Avg. Vel. (ft/s)       *    2.47  *    7.14  *    1.24  *
* Max Chl Dpth (ft)      *   38.85  * Hydr. Depth (ft)       *   17.80  *   36.54  *   16.05  *
* Conv. Total (cfs)      *1816307.0  * Conv. (cfs)           *294214.3  *1388133.0  *133959.9  *
* Length Wtd. (ft)       *  206.37  * Wetted Per. (ft)       *  129.46  *  102.88  *  129.40  *
* Min Ch El (ft)         *  752.70  * Shear (lb/sq ft)       *    0.38  *    0.77  *    0.34  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.93  *    5.53  *    0.42  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 2303.18  *10554.38  * 2713.23  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  305.94  *  515.08  *  336.47  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.88  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *   0.075  *   0.042  *   0.135  *
* W.S. Elev (ft)         *  795.91  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)         *  773.26  * Flow Area (sq ft)      * 3195.50  * 4075.27  * 3091.09  *
* E.G. Slope (ft/ft)     *0.000456  * Area (sq ft)           * 3195.50  * 4075.27  * 3091.09  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4792.86  *35774.15  * 3932.99  *
* Top Width (ft)         * 1003.46  * Top Width (ft)         *  473.89  *   99.64  *  429.92  *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *    1.50  *    8.78  *    1.27  *
* Max Chl Dpth (ft)      *   43.21  * Hydr. Depth (ft)       *    6.74  *   40.90  *    7.19  *
* Conv. Total (cfs)      *2084062.0  * Conv. (cfs)           *224463.5  *1675406.0  *184193.2  *
* Length Wtd. (ft)       *  205.39  * Wetted Per. (ft)       *  478.66  *  102.88  *  433.89  *
* Min Ch El (ft)         *  752.70  * Shear (lb/sq ft)       *    0.19  *    1.13  *    0.20  *
* Alpha                  *    3.38  * Stream Power (lb/ft s) *    0.29  *    9.90  *    0.26  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 4154.13  *13004.01  * 4863.25  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  625.12  *  543.09  *  712.96  *
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CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  800.07  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.87  * Wt. n-Val.             *   0.075  *   0.042  *   0.122  *
* W.S. Elev (ft)         *  799.20  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)         *  775.07  * Flow Area (sq ft)      * 4780.76  * 4403.20  * 4633.80  *
* E.G. Slope (ft/ft)     *0.000409  * Area (sq ft)           * 4780.76  * 4403.20  * 4633.80  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 8680.46  *38555.71  * 6453.83  *
* Top Width (ft)         * 1074.21  * Top Width (ft)         *  490.64  *   99.64  *  483.94  *
* Vel Total (ft/s)       *    3.89  * Avg. Vel. (ft/s)       *    1.82  *    8.76  *    1.39  *
* Max Chl Dpth (ft)      *   46.50  * Hydr. Depth (ft)       *    9.74  *   44.19  *    9.58  *
* Conv. Total (cfs)      *2654273.0  * Conv. (cfs)           *429135.8  *1906079.0  *319058.2  *
* Length Wtd. (ft)       *  205.47  * Wetted Per. (ft)       *  495.74  *  102.88  *  488.13  *
* Min Ch El (ft)         *  752.70  * Shear (lb/sq ft)       *    0.25  *    1.09  *    0.24  *
* Alpha                  *    3.70  * Stream Power (lb/ft s) *    0.45  *    9.57  *    0.34  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 6186.36  *14465.57  * 7161.62  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  853.73  *  550.18  * 1080.46  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.71  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *   0.075  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  801.92  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)         *  777.59  * Flow Area (sq ft)      * 6138.86  * 4674.46  * 6001.25  *
* E.G. Slope (ft/ft)     *0.000372  * Area (sq ft)           * 6138.86  * 4674.46  * 6001.25  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *12279.05  *40604.22  * 9116.73  *
* Top Width (ft)         * 1144.44  * Top Width (ft)         *  507.08  *   99.64  *  537.72  *
* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *    2.00  *    8.69  *    1.52  *
* Max Chl Dpth (ft)      *   49.22  * Hydr. Depth (ft)       *   12.11  *   46.91  *   11.16  *
* Conv. Total (cfs)      *3215386.0  * Conv. (cfs)           *636804.6  *2105778.0  *472803.4  *
* Length Wtd. (ft)       *  205.40  * Wetted Per. (ft)       *  512.40  *  102.88  *  542.40  *
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* Min Ch El (ft)          *  752.70  * Shear (lb/sq ft)       *    0.28  *    1.05  *    0.26  *
* Alpha                   *    3.72  * Stream Power (lb/ft s) *    0.56  *    9.16  *    0.39  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)   * 8016.57  *15412.82  * 9342.54  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         * 1014.09  *  551.07  * 1439.00  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  806.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.66  * Wt. n-Val.             *   0.075  *   0.042  *   0.105  *
* W.S. Elev (ft)          *  806.07  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)          *  780.02  * Flow Area (sq ft)      * 8294.55  * 5087.34  * 8436.09  *
* E.G. Slope (ft/ft)      *0.000312  * Area (sq ft)           * 8294.55  * 5087.34  * 8436.09  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *17911.93  *42854.11  *13953.96  *
* Top Width (ft)          * 1239.62  * Top Width (ft)         *  535.92  *   99.64  *  604.05  *
* Vel Total (ft/s)        *    3.42  * Avg. Vel. (ft/s)       *    2.16  *    8.42  *    1.65  *
* Max Chl Dpth (ft)       *   53.37  * Hydr. Depth (ft)       *   15.48  *   51.06  *   13.97  *
* Conv. Total (cfs)       *4227873.0  * Conv. (cfs)            *1013508.0  *2424809.0  *789555.0  *
* Length Wtd. (ft)        *  202.72  * Wetted Per. (ft)       *  541.55  *  102.88  *  609.44  *
* Min Ch El (ft)          *  752.70  * Shear (lb/sq ft)       *    0.30  *    0.96  *    0.27  *
* Alpha                   *    3.61  * Stream Power (lb/ft s) *    0.64  *    8.12  *    0.45  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)   *11281.56  *16867.24  *13511.69  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         * 1225.67  *  553.38  * 1800.32  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  793.98  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.68  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)          *  793.30  * Reach Len. (ft)        *  334.14  *  202.94  *   78.07  *
* Crit W.S. (ft)          *  771.60  * Flow Area (sq ft)      * 2451.95  * 3815.06  * 2245.46  *
* E.G. Slope (ft/ft)      *0.000364  * Area (sq ft)           * 2451.95  * 3815.06  * 2245.46  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             * 6403.49  *28630.26  * 2966.25  *
* Top Width (ft)          *  360.87  * Top Width (ft)         *  130.36  *   99.64  *  130.87  *
* Vel Total (ft/s)        *    4.46  * Avg. Vel. (ft/s)       *    2.61  *    7.50  *    1.32  *
* Max Chl Dpth (ft)       *   40.60  * Hydr. Depth (ft)       *   18.81  *   38.29  *   17.16  *
* Conv. Total (cfs)       *1992146.0  * Conv. (cfs)            *335702.2  *1500938.0  *155505.5  *
* Length Wtd. (ft)        *  206.61  * Wetted Per. (ft)       *  134.97  *  102.88  *  134.72  *
* Min Ch El (ft)          *  752.70  * Shear (lb/sq ft)       *    0.41  *    0.84  *    0.38  *
* Alpha                   *    2.19  * Stream Power (lb/ft s) *    1.08  *    6.32  *    0.50  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)   * 2829.53  *11381.61  * 3281.31  *
* C & E Loss (ft)         *    0.08  * Cum SA (acres)         *  394.92  *  525.46  *  402.37  *
*****************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.247

INPUT
Description: Dodson XS 20.84
Station Elevation Data    num=     260
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  842.81    3.16  842.77   37.98  842.02   69.95  840.69   76.37  840.05
  111.97  836.57  119.64   835.8  127.17  835.05  151.96  832.37  155.82  831.81
  177.38  828.52   199.2  825.87  239.96  819.29  243.77  818.66  260.56  810.28
  264.97  808.01     279  801.01  283.27  798.86  303.96  790.96  311.19  788.51
  315.24  789.65  319.27  790.78   323.4  791.57  327.91  792.39  331.63  792.39
  335.06  792.39  344.58  790.18  345.33  790.01  358.41  785.05  368.73  781.22
  373.77  781.14  381.29  781.08  388.95  784.27  398.43  788.13  407.43  791.91
  417.11  795.89  422.45  797.11  425.38  797.77  429.12  797.77  432.51  797.76
  438.72  796.78  441.24  796.37  452.45  793.01  452.57  792.97  452.73  792.95
  472.74  790.71   480.1  790.17   496.4  788.93  515.07  789.04  519.46  789.13
   555.2  790.39  576.26  791.07  579.49  791.19  604.47  791.99  614.53  792.19
  649.11  792.73  685.54  793.73  687.09  793.71  691.86  793.66  725.74  793.18
  741.54  793.08  764.79   792.8  771.99  793.02   781.6  793.19  793.88  793.16
  795.41  793.16  795.87  793.16  809.06  792.84  829.59  793.62  846.66  792.59
  856.12  791.99  873.67  791.28  878.51  791.44  909.63  792.28  927.51  792.08
  933.02  791.94  953.17  790.74  958.12  790.46   967.1   790.8  991.44  791.76
  1015.9  791.78 1016.36  791.77 1047.45  790.12 1050.31     790 1050.96  789.99
  1053.4  789.91 1057.94  789.81 1069.86  789.27  1090.7  788.44 1097.98   788.2
  1114.9  788.16 1119.84  788.12 1137.76  788.39 1143.67  788.38 1150.92   788.3
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 1170.22  788.05 1189.84  788.24 1204.85  788.46  1227.9  788.71 1239.99  788.83
 1254.32  788.57 1265.88  788.47 1283.83  788.42 1303.92  788.24  1334.1  787.54
 1370.88  787.25 1381.09  788.12 1390.56  789.37 1411.76  791.21 1430.18  791.31
  1471.7   790.7 1542.72  789.97 1551.26  789.97 1568.25  789.98 1574.81  789.84
 1585.47  789.64 1603.66  786.96 1628.23  784.52 1631.34  784.24 1633.77  784.16
 1639.26     784 1654.59  783.28 1676.14  783.08 1680.29  783.07 1690.76  782.88
 1702.58  782.82  1720.3  782.58 1722.04  782.63 1725.09  782.65 1753.18  783.26
 1759.69  783.56 1771.32  785.72 1773.39  786.18 1775.03  786.07 1784.01  785.44
 1818.79  785.29 1833.42  784.46 1840.55  783.88  1855.4  782.74 1866.08  782.37
 1875.86  782.35 1920.03   781.7 1949.65  781.08 1962.03  780.94 1973.79  780.45
 2031.25  778.81 2036.06  779.06 2040.19  779.17 2079.19  779.33 2081.19  779.38
 2110.12  780.33 2112.44  780.37 2112.55  780.38 2112.87  780.39 2119.08   780.6
 2151.52  781.96 2154.61  782.05 2157.09  782.22 2158.87  782.25 2159.54  782.29
 2183.25  783.28 2198.84   784.4 2205.56  783.51  2218.9  781.79 2226.09  781.07
 2238.29  778.14 2258.88  773.36 2259.52   773.1 2261.67  772.74 2268.59  770.92
 2269.65  769.97 2278.29  768.45 2287.49  766.42 2291.82  765.48 2303.85  762.88
 2309.23  761.72 2320.89  757.51 2324.71  755.76    2348  753.39    2368  752.39
    2388  753.39 2410.87  755.61 2421.85  758.09 2445.56  763.11 2445.68  763.12
 2462.11  764.09 2474.83  764.57 2486.87  766.41 2496.82  768.01 2512.17  768.98
 2515.27  769.19 2532.32  773.41 2542.03  776.61 2553.14  780.52 2561.91  783.51
  2567.5  785.48  2590.8  793.64 2596.28  793.92 2609.19  794.21 2621.89  794.48
 2630.13  794.68  2648.5  794.58 2656.24  794.57 2697.45   794.9 2714.54   795.7
 2716.66  795.72  2722.5  795.66 2727.57  795.47 2731.03  795.52 2739.88  795.69
 2766.61  794.15 2769.15  794.18 2774.68  794.27 2794.13  794.77 2800.38  794.77
 2827.83  795.37 2836.95  795.83 2851.97  796.09 2863.56  796.65 2870.72  797.38
 2883.12  798.04 2887.07  798.03 2891.26  797.88 2899.91   798.3 2902.66  798.61
 2919.75  800.03 2928.93  800.12 2932.64  800.29 2943.64  800.35 2960.82  800.68
  2964.5  800.69  2971.6  800.58 2981.22  800.15 2981.97  799.99 2984.14  799.33
 2990.81   798.5 2994.67  797.95 3002.35  799.53 3005.73  800.24 3012.88  800.57
 3019.28  800.82 3041.18  801.83 3049.25  804.13 3062.37  807.87 3064.43  808.54
 3067.64  808.59 3074.89  814.21 3078.78  816.29 3084.16  818.39 3093.95  822.25
    3098  823.65 3121.13  830.99 3158.26  850.68 3160.45  851.88 3160.62  851.89
 3161.26  852.84 3167.79  860.63 3168.64  860.61 3173.09  861.41 3189.33  866.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  422.45    .075 1603.66     .09 2303.85    .042 2445.56     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2303.85 2445.56            67.81   65.57   57.57             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2204.85     810       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1420    1560     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  780.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  779.85  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  762.37  * Flow Area (sq ft)      *  629.69  * 3374.28  * 1179.95  *
* E.G. Slope (ft/ft)     *0.000140  * Area (sq ft)           *  683.45  * 3374.28  * 1179.95  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  508.48  *11554.69  * 1136.83  *
* Top Width (ft)         *  420.49  * Top Width (ft)         *  173.11  *  141.71  *  105.67  *
* Vel Total (ft/s)       *    2.55  * Avg. Vel. (ft/s)       *    0.81  *    3.42  *    0.96  *
* Max Chl Dpth (ft)      *   27.46  * Hydr. Depth (ft)       *    8.67  *   23.81  *   11.17  *
* Conv. Total (cfs)      *1116580.0  * Conv. (cfs)           * 43011.9  *977403.8  * 96164.0  *
* Length Wtd. (ft)       *   64.85  * Wetted Per. (ft)       *   74.83  *  144.03  *  107.59  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)       *    0.07  *    0.20  *    0.10  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *    0.06  *    0.70  *    0.09  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  577.29  * 5599.71  *  606.37  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   98.12  *  424.09  *  123.11  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  784.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
```

```
* W.S. Elev (ft)         *  784.58  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  764.79  * Flow Area (sq ft)      * 1043.68  * 4044.95  * 1712.56  *
* E.G. Slope (ft/ft)     *0.000168  * Area (sq ft)           * 2580.39  * 4044.95  * 1712.56  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1055.08  *17116.16  * 2128.76  *
* Top Width (ft)         *  901.19  * Top Width (ft)         *  640.10  *  141.71  *  119.38  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)       *    1.01  *    4.23  *    1.24  *
* Max Chl Dpth (ft)      *   32.19  * Hydr. Depth (ft)       *   10.54  *   28.54  *   14.35  *
* Conv. Total (cfs)      *1568140.0  * Conv. (cfs)            * 81503.0  *1322194.0  *164443.2  *
* Length Wtd. (ft)       *   64.74  * Wetted Per. (ft)       *  101.46  *  144.03  *  122.10  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)       *    0.11  *    0.29  *    0.15  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    0.11  *    1.24  *    0.18  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1077.21  * 7452.97  * 1203.57  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  144.39  *  463.75  *  169.65  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.30  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  788.01  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  766.49  * Flow Area (sq ft)      * 1383.42  * 4531.25  * 2139.01  *
* E.G. Slope (ft/ft)     *0.000182  * Area (sq ft)           * 5071.10  * 4531.25  * 2139.01  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1756.31  *21524.07  * 3039.62  *
* Top Width (ft)         * 1091.73  * Top Width (ft)         *  820.85  *  141.71  *  129.17  *
* Vel Total (ft/s)       *    3.27  * Avg. Vel. (ft/s)       *    1.27  *    4.75  *    1.42  *
* Max Chl Dpth (ft)      *   35.62  * Hydr. Depth (ft)       *   13.97  *   31.98  *   16.56  *
* Conv. Total (cfs)      *1953579.0  * Conv. (cfs)            *130360.6  *1597605.0  *225613.1  *
* Length Wtd. (ft)       *   64.68  * Wetted Per. (ft)       *  101.46  *  144.03  *  132.47  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)       *    0.15  *    0.36  *    0.18  *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *    0.20  *    1.69  *    0.26  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1531.91  * 8959.87  * 1802.67  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  187.43  *  491.67  *  247.13  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.04  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  791.68  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  768.30  * Flow Area (sq ft)      * 1746.20  * 5050.53  * 2631.50  *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)           * 9394.47  * 5050.53  * 2631.50  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2712.97  *27023.08  * 4263.95  *
* Top Width (ft)         * 1723.31  * Top Width (ft)         * 1441.97  *  141.71  *  139.63  *
* Vel Total (ft/s)       *    3.61  * Avg. Vel. (ft/s)       *    1.55  *    5.35  *    1.62  *
* Max Chl Dpth (ft)      *   39.29  * Hydr. Depth (ft)       *   17.64  *   35.64  *   18.85  *
* Conv. Total (cfs)      *2408497.0  * Conv. (cfs)            *192182.1  *1914265.0  *302050.2  *
* Length Wtd. (ft)       *   64.63  * Wetted Per. (ft)       *  101.46  *  144.03  *  143.55  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)       *    0.21  *    0.44  *    0.23  *
* Alpha                  *    1.79  * Stream Power (lb/ft s) *    0.33  *    2.33  *    0.37  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2258.60  *10534.13  * 2709.06  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  299.93  *  514.52  *  336.23  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  796.68  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  796.16  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  770.88  * Flow Area (sq ft)      * 2190.00  * 5685.81  * 3608.01  *
* E.G. Slope (ft/ft)     *0.000241  * Area (sq ft)           *17228.88  * 5685.81  * 3608.01  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4353.07  *36217.82  * 3929.12  *
* Top Width (ft)         * 2399.37  * Top Width (ft)         * 1849.84  *  141.71  *  407.82  *
* Vel Total (ft/s)       *    3.88  * Avg. Vel. (ft/s)       *    1.99  *    6.37  *    1.09  *
* Max Chl Dpth (ft)      *   43.77  * Hydr. Depth (ft)       *   22.12  *   40.12  *    8.85  *
```

```
* Conv. Total (cfs)      *2865482.0  * Conv. (cfs)            *280306.3  *2332169.0  *253006.9  *
* Length Wtd. (ft)       *   64.77  * Wetted Per. (ft)        *  101.46  *  144.03  *  412.19  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)        *    0.32  *    0.59  *    0.13  *
* Alpha                  *    2.23  * Stream Power (lb/ft s) *    0.65  *    3.79  *    0.14  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 4075.80  *12981.27  * 4857.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  616.21  *  542.53  *  712.21  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  799.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  799.34  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  772.61  * Flow Area (sq ft)      * 2505.35  * 6137.20  * 5013.28  *
* E.G. Slope (ft/ft)     *0.000250  * Area (sq ft)           *23184.52  * 6137.20  * 5013.28  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 5540.48  *41840.70  * 6308.82  *
* Top Width (ft)         * 2506.52  * Top Width (ft)         * 1881.54  *  141.71  *  483.27  *
* Vel Total (ft/s)       *    3.93  * Avg. Vel. (ft/s)       *    2.21  *    6.82  *    1.26  *
* Max Chl Dpth (ft)      *   46.95  * Hydr. Depth (ft)       *   25.31  *   43.31  *   10.37  *
* Conv. Total (cfs)      *3398999.0  * Conv. (cfs)            *350756.0  *2648845.0  *399398.0  *
* Length Wtd. (ft)       *   64.65  * Wetted Per. (ft)        *  101.46  *  144.03  *  488.01  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)        *    0.38  *    0.66  *    0.16  *
* Alpha                  *    2.39  * Stream Power (lb/ft s) *    0.85  *    4.52  *    0.20  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 6079.10  *14441.02  * 7152.97  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  844.63  *  549.61  * 1079.59  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  802.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  801.97  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  774.08  * Flow Area (sq ft)      * 2765.58  * 6509.70  * 6448.60  *
* E.G. Slope (ft/ft)     *0.000259  * Area (sq ft)           *28137.20  * 6509.70  * 6448.60  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 6653.68  *47014.75  * 8331.57  *
* Top Width (ft)         * 2624.61  * Top Width (ft)         * 1886.78  *  141.71  *  596.12  *
* Vel Total (ft/s)       *    3.94  * Avg. Vel. (ft/s)       *    2.41  *    7.22  *    1.29  *
* Max Chl Dpth (ft)      *   49.58  * Hydr. Depth (ft)       *   27.94  *   45.94  *   10.82  *
* Conv. Total (cfs)      *3853587.0  * Conv. (cfs)            *413556.9  *2922184.0  *517845.8  *
* Length Wtd. (ft)       *   64.59  * Wetted Per. (ft)        *  101.46  *  144.03  *  601.16  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)        *    0.44  *    0.73  *    0.17  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    1.06  *    5.27  *    0.22  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 7885.10  *15386.77  * 9331.38  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1004.91  *  550.51  * 1437.98  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  806.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  806.03  * Reach Len. (ft)        *   67.81  *   65.57  *   57.57  *
* Crit W.S. (ft)         *  776.18  * Flow Area (sq ft)      * 3167.47  * 7084.96  * 8897.42  *
* E.G. Slope (ft/ft)     *0.000247  * Area (sq ft)           *35812.99  * 7084.96  * 8897.42  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 8147.81  *52880.80  *13691.40  *
* Top Width (ft)         * 2646.98  * Top Width (ft)         * 1894.91  *  141.71  *  610.36  *
* Vel Total (ft/s)       *    3.90  * Avg. Vel. (ft/s)       *    2.57  *    7.46  *    1.54  *
* Max Chl Dpth (ft)      *   53.64  * Hydr. Depth (ft)       *   31.99  *   50.00  *   14.58  *
* Conv. Total (cfs)      *4754895.0  * Conv. (cfs)            *518495.2  *3365132.0  *871268.1  *
* Length Wtd. (ft)       *   64.31  * Wetted Per. (ft)        *  101.46  *  144.03  *  615.97  *
* Min Ch El (ft)         *  752.39  * Shear (lb/sq ft)        *    0.48  *    0.76  *    0.22  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    1.24  *    5.66  *    0.34  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *11112.39  *16838.89  *13496.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1216.35  *  552.82  * 1799.23  *
*****************************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	793.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.090	0.042	0.090
W.S. Elev (ft)	793.44	Reach Len. (ft)	67.81	65.57	57.57
Crit W.S. (ft)	769.48	Flow Area (sq ft)	1921.16	5300.98	2882.73
E.G. Slope (ft/ft)	0.000207	Area (sq ft)	12243.21	5300.98	2882.73
Q Total (cfs)	38000.00	Flow (cfs)	3239.10	29828.20	4932.70
Top Width (ft)	2073.15	Top Width (ft)	1786.77	141.71	144.68
Vel Total (ft/s)	3.76	Avg. Vel. (ft/s)	1.69	5.63	1.71
Max Chl Dpth (ft)	41.05	Hydr. Depth (ft)	19.41	37.41	19.93
Conv. Total (cfs)	2643567.0	Conv. (cfs)	225336.4	2075075.0	343156.1
Length Wtd. (ft)	64.61	Wetted Per. (ft)	101.46	144.03	148.90
Min Ch El (ft)	752.39	Shear (lb/sq ft)	0.24	0.47	0.25
Alpha	1.80	Stream Power (lb/ft s)	0.41	2.67	0.43
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	2773.16	11360.37	3276.72
C & E Loss (ft)	0.01	Cum SA (acres)	387.57	524.90	402.13

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 19.235

INPUT
Description: U/S of Grandview Rd Bridge. Dodson XS 20.812
Station Elevation Data num= 319

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	835.36	8.69	836.36	16.6	837.27	27	838.24	45.14	839.49
70.25	840.1	76.24	840.28	100.37	829.57	105.93	826.92	111.1	827.1
121	827.46	128.43	831.01	148.88	840.69	156.65	841.67	166.03	842.99
177.9	841.35	188.58	840.63	206.46	839.41	228.79	837.47	241.83	836.19
252.22	835.17	275.46	832.68	283.93	831.51	335.39	825.19	343.24	824.17
347.09	823.6	353.97	822.53	386.25	817.67	388.62	816.5	403.08	809.44
414.75	802.41	419.14	800.04	425.15	797.45	445.14	789.23	447.8	789.83
452.43	790.95	460.62	792.42	460.88	792.47	461.89	792.47	468.03	792.47
470.22	792.07	477.86	790.63	495.18	784.82	499.11	783.42	510.81	785.84
523.85	788.53	526.07	789.49	541.3	796.09	544.59	796.82	549.65	797.97
553.42	797.97	556.71	797.97	563.72	796.66	564.55	796.5	565.39	796.3
575.13	794	587.35	792.35	596.95	791.05	615.05	789.16	625.62	788.09
649.42	789.01	672.69	789.73	687.34	791.2	702.5	791.85	719.28	792.53
732.94	792.59	755.89	793.14	789.29	793.32	824.47	793	845.27	792.32
872.08	792.13	877.05	792.15	899.29	792.72	911.74	793.09	933.54	793.47
940.65	793.5	949.41	793.38	973.09	792.98	990.67	792.93	997.31	792.61
1039.89	790.8	1043.95	790.85	1046.33	790.98	1050.23	791.21	1068.34	792.29
1097.22	791.07	1112.15	790.46	1117.96	790.35	1123.75	790.35	1170.98	790.87
1174.13	790.84	1175.94	790.79	1203.63	790.12	1228.41	788.89	1239.18	788.43
1245.33	788.16	1251.95	787.92	1252.69	787.84	1255.78	788.02	1258.93	788.15
1260.66	788.18	1281.51	788.24	1284.14	788.29	1287.82	788.3	1297.06	787.83
1328.43	787.75	1334.91	787.74	1336.36	787.75	1338.47	787.74	1354.32	787.63
1360.6	787.83	1370.88	788.23	1387.4	788.76	1396.73	788.7	1419.58	788.12
1439.72	787.44	1453.74	787.02	1462.24	786.97	1472.89	786.95	1482.02	787.05
1498.95	788.14	1500.21	788.28	1501.6	788.4	1540.5	790.2	1564.34	790.75
1565.29	790.8	1567	790.81	1570.11	790.78	1623.49	790.22	1691.67	789.57
1706.72	789.36	1721.4	789.43	1762.77	788.88	1763.74	788.87	1764.13	788.86
1802.97	789.4	1805.2	789.2	1807.83	788.84	1815.37	787.52	1831.12	784.31
1835.17	784.08	1839.28	783.83	1843.63	784.11	1848.21	785.41	1856.56	787.52
1871.35	787.68	1900.01	787.82	1904.36	787.84	1907.39	787.8	1934.61	787.46
1966.68	787.08	1986.08	786.97	1995.25	786.89	1997.51	786.92	1998.7	786.92
1999.19	786.92	2028.47	786.47	2040.59	786.19	2048.39	786.06	2050.45	785.83
2053.63	785.46	2060.31	784.09	2063.42	784.82	2066.69	785.63	2075.95	787.86
2090.25	791.25	2103.93	793.4	2113.71	794.93	2118.23	794.76	2121.17	794.59
2121.76	794.57	2138.67	794.88	2151.38	795.09	2170.26	795.47	2170.74	795.49
2171.16	795.5	2173.5	795.54	2188.51	796.08	2192.16	796.23	2206.9	797.01
2208.66	797.08	2225.16	797.96	2228.53	798.1	2245.37	799.01	2247.66	799.1

```
 2259.39  799.74 2260.72   799.8 2266.95  800.08 2279.81  800.61 2282.07  800.73
 2301.15  801.55 2306.69  801.86 2316.52   802.3 2328.95  802.52 2343.26  803.08
 2348.92  803.16 2356.54  803.45 2360.86  803.47 2362.39  803.48 2363.46  803.52
 2364.06  803.59 2365.39  803.32 2366.92  803.13 2369.14  802.22 2369.25  802.18
 2369.33  802.15 2369.43  802.11 2369.58  802.04 2369.66  802.01 2369.73  801.98
 2369.81  801.95 2369.88  801.92 2370.02  801.86 2370.16  801.81 2370.34  801.73
 2370.48  801.68 2370.69  801.59  2370.8  801.55 2371.05  801.45 2371.47  801.28
 2373.23  800.49 2375.39  799.74 2386.22  795.26 2390.87  794.53 2391.89   792.8
  2404.9  787.82 2426.83  779.43 2427.36  779.23 2427.83  779.05 2431.87   777.5
 2434.01  776.69 2462.49  769.68 2463.09  769.51 2464.98  769.32  2491.7  766.58
 2492.28  766.52 2493.49  766.22  2506.2  762.71 2520.81  760.51 2521.85  760.34
 2533.22  756.46    2535   755.8    2540  753.27    2560  752.27    2580  753.27
    2585  755.65 2622.86  761.72 2631.77  762.42 2636.77  762.82 2665.83  764.75
 2679.08  766.99 2682.62  767.57 2699.18  769.22  2701.3  769.41 2702.73  769.92
 2737.02  781.36 2766.17  799.79 2775.58  796.84 2776.14  798.57 2776.18  798.74
 2790.49  805.87 2797.14  805.65 2800.56  806.14 2801.59  806.33 2807.75  806.51
 2812.21  806.38 2817.97  806.37 2818.25  806.36 2818.96  806.36 2824.87  806.14
 2840.04  805.64 2862.79  804.87 2871.18  804.59 2902.19  803.54  2905.1  803.42
 2951.99  801.18 2954.81  801.12 2981.33  800.75  2983.3   800.7 3006.83  800.36
 3017.65  800.43 3046.03  799.96 3052.74  800.09 3061.25  799.89 3074.64  799.65
 3076.57  799.55  3078.8  799.43 3093.75   799.3 3110.19  799.32 3123.23  799.36
 3136.29  799.57 3140.11  799.41 3144.31  799.09 3156.27  798.81  3165.9  798.58
 3171.35  796.07 3171.79  795.72  3176.5  795.28 3176.67  795.28 3177.43  795.55
 3184.81  798.29  3197.3   799.1 3207.47  800.03 3216.08  800.83 3237.45  805.99
  3238.7  806.21 3240.77  806.58 3266.48  808.11 3268.41  808.22 3268.58  808.34
 3278.77  815.31 3281.14  815.98 3287.44  817.66 3294.58  821.43 3295.63  822.03
 3314.86   829.5 3323.54  832.08 3342.11  840.26 3362.34   849.2

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  549.65    .075  2491.7    .042 2622.86     .09 3136.29     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2491.7 2622.86             49.5    48.5   47.36             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2305.07     810       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1560    1730     815

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  779.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  779.80  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  764.14  * Flow Area (sq ft)      *  543.72  * 2924.35  * 1310.47  *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           *  543.72  * 2924.35  * 1310.47  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  594.37  *11071.88  * 1533.75  *
* Top Width (ft)         *  306.50  * Top Width (ft)         *   65.85  *  131.16  *  109.50  *
* Vel Total (ft/s)       *    2.76  * Avg. Vel. (ft/s)       *    1.09  *    3.79  *    1.17  *
* Max Chl Dpth (ft)      *   27.53  * Hydr. Depth (ft)       *    8.26  *   22.30  *   11.97  *
* Conv. Total (cfs)      *961869.6  * Conv. (cfs)            * 43310.8  *806795.8  *111763.0  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)       *   67.44  *  134.29  *  111.62  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)       *    0.09  *    0.26  *    0.14  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *    0.10  *    0.97  *    0.16  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  576.34  * 5594.97  *  604.73  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   97.93  *  423.88  *  122.97  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  784.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  784.53  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  766.67  * Flow Area (sq ft)      *  884.24  * 3544.45  * 1854.52  *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           *  896.47  * 3544.45  * 1854.52  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1266.55  *16287.64  * 2745.81  *
* Top Width (ft)         *  356.16  * Top Width (ft)         *  105.82  *  131.16  *  119.18  *
* Vel Total (ft/s)       *    3.23  * Avg. Vel. (ft/s)       *    1.43  *    4.60  *    1.48  *
* Max Chl Dpth (ft)      *   32.26  * Hydr. Depth (ft)       *   11.31  *   27.02  *   15.56  *
```

```
* Conv. Total (cfs)      *1385480.0  * Conv. (cfs)            * 86442.2  *1111635.0  *187402.4  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)        *   80.68  *  134.29  *  122.47  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)        *    0.15  *    0.35  *    0.20  *
* Alpha                  *    1.66  * Stream Power (lb/ft s) *    0.21  *    1.63  *    0.30  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    * 1074.50  * 7447.25  * 1201.22  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  143.81  *  463.54  *  169.49  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.              *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  787.96  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  768.32  * Flow Area (sq ft)      * 1167.29  * 3993.47  * 2271.79  *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           * 1626.09  * 3993.47  * 2271.79  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1930.13  *20541.77  * 3848.10  *
* Top Width (ft)         *  786.12  * Top Width (ft)         *  530.37  *  131.16  *  124.59  *
* Vel Total (ft/s)       *    3.54  * Avg. Vel. (ft/s)       *    1.65  *    5.14  *    1.69  *
* Max Chl Dpth (ft)      *   35.69  * Hydr. Depth (ft)       *   13.39  *   30.45  *   18.23  *
* Conv. Total (cfs)      *1737587.0  * Conv. (cfs)            *127423.1  *1356121.0  *254042.7  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)        *   90.26  *  134.29  *  128.88  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)        *    0.19  *    0.43  *    0.25  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *    0.31  *    2.19  *    0.43  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    * 1526.70  * 8953.45  * 1799.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  186.38  *  491.47  *  246.96  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.              *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  791.61  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  770.43  * Flow Area (sq ft)      * 1503.17  * 4472.70  * 2737.58  *
* E.G. Slope (ft/ft)     *0.000249  * Area (sq ft)           * 4799.97  * 4472.70  * 2737.58  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2854.37  *25858.60  * 5287.03  *
* Top Width (ft)         * 1411.46  * Top Width (ft)         * 1149.93  *  131.16  *  130.37  *
* Vel Total (ft/s)       *    3.90  * Avg. Vel. (ft/s)       *    1.90  *    5.78  *    1.93  *
* Max Chl Dpth (ft)      *   39.34  * Hydr. Depth (ft)       *   15.54  *   34.10  *   21.00  *
* Conv. Total (cfs)      *2153799.0  * Conv. (cfs)            *180815.8  *1638066.0  *334917.6  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)        *  100.48  *  134.29  *  135.72  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)        *    0.23  *    0.52  *    0.31  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *    0.44  *    3.00  *    0.61  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    * 2247.56  *10526.97  * 2705.51  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  297.91  *  514.31  *  336.05  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  796.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.              *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  796.15  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  772.62  * Flow Area (sq ft)      * 1964.28  * 5068.78  * 3350.80  *
* E.G. Slope (ft/ft)     *0.000266  * Area (sq ft)           *11571.30  * 5068.78  * 3350.80  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4262.31  *32907.30  * 7330.39  *
* Top Width (ft)         * 1951.82  * Top Width (ft)         * 1675.22  *  131.16  *  145.45  *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *    2.17  *    6.49  *    2.19  *
* Max Chl Dpth (ft)      *   43.88  * Hydr. Depth (ft)       *   18.25  *   38.65  *   23.04  *
* Conv. Total (cfs)      *2728697.0  * Conv. (cfs)            *261360.9  *2017844.0  *449492.3  *
```

```
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)       *  112.86  *  134.29  *  152.43  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)       *    0.29  *    0.63  *    0.37  *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *    0.63  *    4.07  *    0.80  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 4053.38  *12973.17  * 4852.65  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  613.46  *  542.33  *  711.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.              *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  799.30  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  774.34  * Flow Area (sq ft)      * 2315.20  * 5481.78  * 3867.88  *
* E.G. Slope (ft/ft)     *0.000288  * Area (sq ft)           *17014.65  * 5481.78  * 3867.88  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 5561.56  *38990.68  * 9137.76  *
* Top Width (ft)         * 2119.33  * Top Width (ft)         * 1775.77  *  131.16  *  212.40  *
* Vel Total (ft/s)       *    4.60  * Avg. Vel. (ft/s)       *    2.40  *    7.11  *    2.36  *
* Max Chl Dpth (ft)      *   47.03  * Hydr. Depth (ft)       *   20.09  *   41.79  *   18.21  *
* Conv. Total (cfs)      *3166042.0  * Conv. (cfs)           *327959.4  *2299239.0  *538843.9  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)       *  121.10  *  134.29  *  223.16  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)       *    0.34  *    0.73  *    0.31  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    0.82  *    5.21  *    0.74  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 6047.81  *14432.27  * 7147.10  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  841.79  *  549.41  * 1079.13  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.              *   0.075  *   0.042  *   0.091  *
* W.S. Elev (ft)         *  801.90  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  775.77  * Flow Area (sq ft)      * 2622.89  * 5821.97  * 4814.97  *
* E.G. Slope (ft/ft)     *0.000308  * Area (sq ft)           *21708.34  * 5821.97  * 4814.97  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 6822.01  *44594.50  *10583.49  *
* Top Width (ft)         * 2417.87  * Top Width (ft)         * 1843.56  *  131.16  *  443.15  *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)       *    2.60  *    7.66  *    2.20  *
* Max Chl Dpth (ft)      *   49.63  * Hydr. Depth (ft)       *   21.12  *   44.39  *   10.87  *
* Conv. Total (cfs)      *3534068.0  * Conv. (cfs)           *388862.1  *2541935.0  *603270.8  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)       *  130.54  *  134.29  *  454.98  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)       *    0.39  *    0.83  *    0.20  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    1.00  *    6.38  *    0.45  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 7846.31  *15377.49  * 9323.94  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1002.01  *  550.31  * 1437.30  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  806.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.              *   0.075  *   0.042  *   0.092  *
* W.S. Elev (ft)         *  805.86  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  777.84  * Flow Area (sq ft)      * 3305.55  * 6341.55  * 6807.97  *
* E.G. Slope (ft/ft)     *0.000321  * Area (sq ft)           *29215.54  * 6341.55  * 6807.97  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 7791.40  *52537.19  *14391.41  *
* Top Width (ft)         * 2622.62  * Top Width (ft)         * 1912.67  *  131.16  *  578.79  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    2.36  *    8.28  *    2.11  *
* Max Chl Dpth (ft)      *   53.59  * Hydr. Depth (ft)       *   17.71  *   48.35  *   11.76  *
* Conv. Total (cfs)      *4168794.0  * Conv. (cfs)           *434699.5  *2931166.0  *802928.5  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)       *  193.30  *  134.29  *  592.12  *
```

```
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)       *    0.34  *    0.95  *    0.23  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.81  *    7.85  *    0.49  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *11061.77  *16828.78  *13485.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         * 1213.39  *  552.61  * 1798.45  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  793.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  793.37  * Reach Len. (ft)        *    3.00  *    3.00  *    3.00  *
* Crit W.S. (ft)         *  771.30  * Flow Area (sq ft)      * 1677.39  * 4703.95  * 2969.88  *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           * 7108.23  * 4703.95  * 2969.88  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 3390.27  *28558.34  * 6051.38  *
* Top Width (ft)         * 1796.43  * Top Width (ft)         * 1532.12  *  131.16  *  133.16  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    2.02  *    6.07  *    2.04  *
* Max Chl Dpth (ft)      *   41.10  * Hydr. Depth (ft)       *   16.75  *   35.86  *   22.30  *
* Conv. Total (cfs)      *2370659.0  * Conv. (cfs)            *211504.7  *1781634.0  *377520.2  *
* Length Wtd. (ft)       *    3.00  * Wetted Per. (ft)       *  104.47  *  134.29  *  139.02  *
* Min Ch El (ft)         *  752.27  * Shear (lb/sq ft)       *    0.26  *    0.56  *    0.34  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.52  *    3.41  *    0.70  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2758.10  *11352.84  * 3272.85  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  384.99  *  524.69  *  401.94  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 19.230

INPUT
Description: Prospect/Grandview Rd Bridge.  Bridge geometry copied from Dodson
             RAS Model.
Distance from Upstream XS =       3
Deck/Roadway Width        =      42
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    2350   803.2     790    2380   804.5     790    2380   804.5   799.5
    2453  806.42  801.42    2457  806.42  801.42    2528   807.6   802.6
    2532   807.6   802.6    2618  808.05  803.05    2622  808.05  803.05
    2693  807.63  802.63    2697  807.63  802.63    2770   806.5   801.5
    2770   806.5     790    2800   805.8     790

Upstream Bridge Cross Section Data
Station Elevation Data    num=     319
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0  835.36    8.69  836.36    16.6  837.27      27  838.24   45.14  839.49
   70.25   840.1   76.24  840.28  100.37  829.57  105.93  826.92   111.1   827.1
     121  827.46  128.43  831.01  148.88  840.69  156.65  841.67  166.03  842.99
   177.9  841.35  188.58  840.63  206.46  839.41  228.79  837.47  241.83  836.19
  252.22  835.17  275.46  832.68  283.93  831.51  335.39  825.19  343.24  824.17
  347.09   823.6  353.97  822.53  386.25  817.67  388.62   816.5  403.08  809.44
  414.75  802.41  419.14  800.04  425.15  797.45  445.14  789.23   447.8  789.83
  452.43  790.95  460.62  792.42  460.88  792.47  461.89  792.47  468.03  792.47
  470.22  792.07  477.86  790.63  495.18  784.82  499.11  783.42  510.81  785.84
  523.85  788.53  526.07  789.49   541.3  796.09  544.59  796.82  549.65  797.97
  553.42  797.97  556.71  797.97  563.72  796.66  564.55   796.5  565.39   796.3
  575.13     794  587.35  792.35  596.95  791.05  615.05  789.16  625.62  788.09
  649.42  789.01  672.69  789.73  687.34   791.2   702.5  791.85  719.28  792.53
```

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  732.94  792.59  755.89  793.14  789.29  793.32  824.47     793  845.27  792.32
  872.08  792.13  877.05  792.15  899.29  792.72  911.74  793.09  933.54  793.47
  940.65   793.5  949.41  793.38  973.09  792.98  990.67  792.93  997.31  792.61
 1039.89   790.8 1043.95  790.85 1046.33  790.98 1050.23  791.21 1068.34  792.29
 1097.22  791.07 1112.15  790.46 1117.96  790.35 1123.75  790.35 1170.98  790.87
 1174.13  790.84 1175.94  790.79 1203.63  790.12 1228.41  788.89 1239.18  788.43
 1245.33  788.16 1251.95  787.92 1252.69  787.84 1255.78  788.02 1258.93  788.15
 1260.66  788.18 1281.51  788.24 1284.14  788.29 1287.82   788.3 1297.06  787.83
 1328.43  787.75 1334.91  787.74 1336.36  787.75 1338.47  787.74 1354.32  787.63
  1360.6  787.83 1370.88  788.23  1387.4  788.76 1396.73   788.7 1419.58  788.12
 1439.72  787.44 1453.74  787.02 1462.24  786.97 1472.89  786.95 1482.02  787.05
 1498.95  788.14 1500.21  788.28  1501.6   788.4  1540.5   790.2 1564.34  790.75
 1565.29   790.8    1567  790.81 1570.11  790.78 1623.49  790.22 1691.67  789.57
 1706.72  789.36  1721.4  789.43 1762.77  788.88 1763.74  788.87 1764.13  788.86
 1802.97   789.4  1805.2   789.2 1807.83  788.84 1815.37  787.52 1831.12  784.31
 1835.17  784.08 1839.28  783.83 1843.63  784.11 1848.21  785.41 1856.56  787.52
 1871.35  787.68 1900.01  787.82 1904.36  787.84 1907.39   787.8 1934.61  787.46
 1966.68  787.08 1986.08  786.97 1995.25  786.89 1997.51  786.92  1998.7  786.92
 1999.19  786.92 2028.47  786.47 2040.59  786.19 2048.39  786.06 2050.45  785.83
 2053.63  785.46 2060.31  784.09 2063.42  784.82 2066.69  785.63 2075.95  787.86
 2090.25  791.25 2103.93   793.4 2113.71  794.93 2118.23  794.76 2121.17  794.59
 2121.76  794.57 2138.67  794.88 2151.38  795.09 2170.26  795.47 2170.74  795.49
 2171.16   795.5  2173.5  795.54 2188.51  796.08 2192.16  796.23  2206.9  797.01
 2208.66  797.08 2225.16  797.96 2228.53   798.1 2245.37  799.01 2247.66   799.1
 2259.39  799.74 2260.72   799.8 2266.95  800.08 2279.81  800.61 2282.07  800.73
 2301.15  801.55 2306.69  801.86 2316.52   802.3 2328.95  802.52 2343.26  803.08
 2348.92  803.16 2356.54  803.45 2360.86  803.47 2362.39  803.48 2363.46  803.52
 2364.06  803.59 2365.39  803.32 2366.92  803.13 2369.14  802.22 2369.25  802.18
 2369.33  802.15 2369.43  802.11 2369.58  802.04 2369.66  802.01 2369.73  801.98
 2369.81  801.95 2369.88  801.92 2370.02  801.86 2370.16  801.81 2370.34  801.73
 2370.48  801.68 2370.69  801.59  2370.8  801.55 2371.05  801.45 2371.47  801.28
 2373.23  800.49 2375.39  799.74 2386.22  795.26 2390.87  794.53 2391.89   792.8
  2404.9  787.82 2426.83  779.43 2427.36  779.23 2427.83  779.05 2431.87   777.5
 2434.01  776.69 2462.49  769.68 2463.09  769.51 2464.98  769.32  2491.7  766.58
 2492.28  766.52 2493.49  766.22  2506.2  762.71 2520.81  760.51 2521.85  760.34
 2533.22  756.46    2535   755.8    2540  753.27    2560  752.27    2580  753.27
    2585  755.65 2622.86  761.72 2631.77  762.42 2636.77  762.82 2665.83  764.75
 2679.08  766.99 2682.62  767.57 2699.18  769.22  2701.3  769.41 2702.73  769.92
 2737.02  781.36 2766.17  799.79 2775.58  796.84 2776.14  798.57 2776.18  798.74
 2790.49  805.87 2797.14  805.65 2800.56  806.14 2801.59  806.33 2807.75  806.51
 2812.21  806.38 2817.97  806.37 2818.25  806.36 2818.96  806.36 2824.87  806.14
 2840.04  805.64 2862.79  804.87 2871.18  804.59 2902.19  803.54  2905.1  803.42
 2951.99  801.18 2954.81  801.12 2981.33  800.75  2983.3   800.7 3006.83  800.36
 3017.65  800.43 3046.03  799.96 3052.74  800.09 3061.25  799.89 3074.64  799.65
 3076.57  799.55  3078.8  799.43 3093.75   799.3 3110.19  799.32 3123.23  799.36
 3136.29  799.57 3140.11  799.41 3144.31  799.09 3156.27  798.81  3165.9  798.58
 3171.35  796.07 3171.79  795.72  3176.5  795.28 3176.67  795.28 3177.43  795.55
 3184.81  798.29  3197.3   799.1 3207.47  800.03 3216.08  800.83 3237.45  805.99
  3238.7  806.21 3240.77  806.58 3266.48  808.11 3268.41  808.22 3268.58  808.34
 3278.77  815.31 3281.14  815.98 3287.44  817.66 3294.58  821.43 3295.63  822.03
 3314.86   829.5 3323.54  832.08 3342.11  840.26 3362.34   849.2

Manning's n Values         num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0     .12  549.65    .075  2491.7    .042 2622.86     .09 3136.29     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
        2491.7 2622.86             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2305.07     810        F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1560    1730     815

Downstream  Deck/Roadway Coordinates
    num=      14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***************************************************************************
    2370     804     795    2390   804.5     795    2390   804.5   799.5
    2463  806.42  801.42    2467  806.42  801.42    2538   807.6   802.6
    2542   807.6   802.6    2628  808.05  803.05    2632  808.05  803.05
    2703  807.63  802.63    2707  807.63  802.63    2780   806.5   801.5
    2780   806.5     795    2810     806     795
```

Downstream Bridge Cross Section Data
Station Elevation Data num= 325

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	839.26	2.19	839.5	7.01	839.92	18.83	840.42	46.37	841.68
62.1	842.23	66	842.34	68.75	842.12	87.89	841.02	98.91	836.17
118.73	826.37	123.76	826.53	133.76	826.81	140.56	830.1	159.24	839.36
161.36	839.66	176.67	839.92	178.39	839.61	183.64	839.17	217.52	835.31
233.82	833.71	242.95	832.83	262.05	830.5	308.07	824.62	317.22	823.52
319.21	823.29	327.29	822.47	333.89	821.52	365.48	817.6	368.9	815.84
381.4	809.29	383.14	808.45	384.09	807.96	398.57	800.95	418.89	792.41
425.07	789.86	426.39	790.06	426.54	790.09	427.57	790.27	431.52	790.97
435.29	791.66	440.05	792.53	444.44	792.52	447.19	792.52	451.78	791.53
457.23	790.3	464.76	788.41	475.23	785.58	476.25	785.32	476.82	785.15
477.44	785.27	484.96	786.74	497.13	789.11	499.15	789.48	500	789.86
513.44	795.66	515.43	796.52	515.57	796.55	523.87	798.12	529.22	798.11
530.93	798.11	534.03	797.51	538.95	796.54	548.88	794.12	549.07	794.08
549.37	794.04	550.21	793.91	572.13	790.59	574.98	790.2	578.97	789.79
603.73	787.36	634.73	787.77	640.31	787.92	644.19	788.27	657.84	789.58
684.29	792.22	698.15	792.91	719.94	793.04	760.47	793.3	778.31	793.41
808.25	793.08	827.01	792.38	835.44	792.03	852.32	792.07	859.77	792.09
864.67	792.11	887.16	791.59	900.92	791.96	908.38	791.96	912.28	792.06
936.26	792.87	944.94	792.71	968.31	792.59	984.51	792.71	992.17	792.6
1014.08	792.81	1020.06	792.85	1052.84	792.55	1060.51	792.19	1103.74	791.12
1114.13	790.79	1116	790.81	1148.82	790.52	1164.93	790.74	1180.66	791.17
1194.42	790.66	1204.6	790.21	1205.43	790.18	1225.69	787.98	1227.91	788.11
1247.53	788.03	1261.83	787.84	1295.93	787.67	1301.99	787.61	1306.53	787.54
1323.77	787	1324.28	786.99	1324.5	786.99	1344.34	787.51	1353.55	787.88
1365.49	787.41	1383.06	788.31	1427.71	787	1430.05	786.94	1431.54	786.89
1432.87	786.91	1455.24	787.89	1457.72	788.03	1462.18	788.03	1482.8	788.64
1515.34	789.45	1521.28	789.57	1554.43	789.69	1558.46	789.8	1562.53	789.95
1573.7	789.98	1575.74	789.98	1637.95	789.46	1644	789.4	1654.71	789.23
1697.29	788.62	1750.24	788.9	1750.95	788.89	1751.51	788.9	1752.05	788.92
1759.34	789.28	1768.21	788.22	1783.48	785.74	1784.57	785.58	1785.94	785.34
1786.88	785.35	1797.11	785.2	1802.9	786.24	1809.11	787.31	1831.08	787.43
1866.21	787.83	1889.18	788.15	1936.77	788.36	1947.55	788.15	1947.94	788.14
1951.32	788.08	1970.29	787.49	1974.07	788.07	1978.13	788.21	1982.84	788.73
1990.2	789.18	1991.69	789.24	2016.6	788.94	2027.48	789.61	2032.74	790.24
2039.96	791.51	2047.34	792.74	2051.39	792.72	2056.64	792.63	2059.27	792.59
2064.06	792.53	2067.23	792.46	2075.66	792.43	2079.04	792.43	2101.05	792.84
2115.54	793.11	2119.55	793.29	2123.46	793.48	2126.69	793.6	2127.36	793.62
2128.91	793.68	2137.66	794.06	2141.82	794.26	2159.18	795.03	2170.66	795.49
2180.2	796.01	2184.44	796.24	2199.53	796.8	2202.71	796.97	2208.03	797.24
2230.88	798.01	2232.13	798.06	2239.57	798.42	2240.88	798.48	2262.49	799.53
2264.2	799.6	2266.21	799.68	2290.02	800.83	2292.53	800.93	2307.91	801.67
2312.4	801.84	2327.16	802.55	2332.44	802.75	2336.28	802.9	2357.13	803.68
2361.1	803.66	2361.45	803.68	2362.19	803.82	2365.5	803.92	2372.67	804.12
2374.11	803.33	2374.75	803.36	2382.12	800.58	2382.82	800.58	2384.82	800.6
2392.1	798.16	2392.15	798.16	2394.64	794.86	2399.7	792.8	2411.65	788.35
2436.04	779.28	2441.29	777.28	2443.96	776.62	2469.19	769.45	2474.65	768.89
2495.1	767.55	2500.05	766.49	2514.29	763.41	2516.32	762.92	2518.76	762.51
2536.04	759.24	2537	758.84	2560	753.17	2585	752.17	2610	753.17
2633.1	762.51	2640.11	763.16	2641.61	763.3	2671.26	765.84	2675.86	766.61
2683.53	768.12	2705.46	769.24	2707.1	769.32	2708.05	769.41	2735.07	779.02
2736.97	779.65	2739.94	781.53	2763.38	789.9	2764.18	790.51	2765.88	792.05
2767.66	793.43	2772.44	796.81	2782.66	799.46	2785.45	801.22	2785.68	801.46
2793.5	802.16	2801.52	805.22	2803.51	806.15	2809.76	806.76	2813.2	806.78
2816.22	806.78	2821.22	806.27	2825.66	806.12	2832.91	805.88	2851.86	805.23
2869.21	804.66	2893.33	803.85	2899.83	803.64	2919.29	802.89	2945.49	801.7
2955.71	801.3	2971.01	800.71	2975.99	800.48	2990.97	799.93	3006.98	799.48
3009.63	799.45	3014.52	799.34	3038.27	798.65	3076.42	798.89	3079	798.91
3088.05	798.85	3089.15	798.84	3090.53	798.84	3138.09	798.65	3150.69	798.44
3154.2	798.24	3161.75	798.13	3168.88	797.95	3189.85	797.46	3191.6	797.42
3191.83	797.41	3192.67	797.41	3205.25	795.35	3209.68	795.38	3217.91	793.88
3220.1	794.06	3222.94	794.14	3226.15	794.3	3229.38	794.31	3232.35	796.12
3235.78	798.45	3236.41	798.55	3243.52	799.83	3248.15	800.41	3252.47	801.28
3266.68	803.83	3281.07	806.95	3299.91	808.38	3309.23	809.36	3310.02	809.8
3310.93	809.92	3321.65	811.26	3326.62	814.81	3328.9	816.23	3331.35	817.75
3338.33	822.5	3356.91	827.73	3371.26	831.16	3405.2	845.79	3412.89	849.27

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	538.95	.075	2495.1	.042	2633.1	.09	3205.25	.15

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
        2495.1  2633.1             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2320.48     810      F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1530    1700     815

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=    2455    Downstream=    2465
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805

Pier Data
Pier Station     Upstream=    2530    Downstream=    2540
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805

Pier Data
Pier Station     Upstream=    2620    Downstream=    2630
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805

Pier Data
Pier Station     Upstream=    2695    Downstream=    2705
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     750       4     805

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
       Yarnell                 KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
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        Add Friction component to Momentum
        Do not add Weight component to Momentum
        Class B flow critical depth computations use critical depth
            inside the bridge at the upstream end
        Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     779.99  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     779.80  * E.G. Elev (ft)         *     779.98  *     779.74  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     779.79  *     779.55  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     764.36  *     763.31  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.52  *      27.38  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.91  *       2.96  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4535.24  *    4454.00  *
* Weir Submerg           *             * Froude # Chl           *       0.14  *       0.14  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   44874.89  *   44799.14  *
* Min El Weir Flow (ft)  *     795.29  * Hydr Depth (ft)        *      15.61  *      15.61  *
* Min El Prs (ft)        *     803.05  * W.P. Total (ft)        *     416.93  *     409.89  *
* Delta EG (ft)          *       0.26  * Conv. Total (cfs)       *  692344.1  *   708848.6  *
* Delta WS (ft)          *       0.26  * Top Width (ft)         *     290.44  *     285.35  *
* BR Open Area (sq ft)   *   12062.27  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       2.96  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.25  *       0.24  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       0.72  *       0.70  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     784.80  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     784.53  * E.G. Elev (ft)         *     784.80  *     784.78  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     784.54  *     784.52  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     766.97  *     766.29  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.27  *      32.35  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.40  *       3.42  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5970.58  *    5930.83  *
* Weir Submerg           *             * Froude # Chl           *       0.15  *       0.15  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   70864.02  *   71638.55  *
* Min El Weir Flow (ft)  *     795.29  * Hydr Depth (ft)        *      19.10  *      19.11  *
* Min El Prs (ft)        *     803.05  * W.P. Total (ft)        *     479.12  *     476.62  *
* Delta EG (ft)          *       0.03  * Conv. Total (cfs)       *  953809.9  *   985741.0  *
* Delta WS (ft)          *       0.02  * Top Width (ft)         *     312.59  *     310.36  *
* BR Open Area (sq ft)   *   12062.27  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       3.42  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.35  *       0.33  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.20  *       1.13  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     788.29  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     787.96  * E.G. Elev (ft)         *     788.28  *     788.25  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     787.97  *     787.94  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     768.89  *     768.12  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.70  *      35.77  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.72  *       3.75  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7067.50  *    7025.73  *
* Weir Submerg           *             * Froude # Chl           *       0.16  *       0.16  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   94234.32  *   94847.13  *
* Min El Weir Flow (ft)  *     795.29  * Hydr Depth (ft)        *      21.61  *      21.34  *
* Min El Prs (ft)        *     803.05  * W.P. Total (ft)        *     522.58  *     524.02  *
* Delta EG (ft)          *       0.03  * Conv. Total (cfs)       *  1160802.0  *  1195446.0  *
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* Delta WS (ft)          *       0.03  * Top Width (ft)         *     326.98  *     329.15  *
* BR Open Area (sq ft)   *   12062.27  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       3.75  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.43  *       0.41  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.62  *       1.52  *
*******************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*******************************************************************************************
* E.G. US. (ft)          *     792.02  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     791.61  * E.G. Elev (ft)         *     792.00  *     791.98  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     791.64  *     791.60  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     770.80  *     770.47  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.37  *      39.43  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.10  *       4.11  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8293.64  *    8264.17  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  123809.80  *  124266.30  *
* Min El Weir Flow (ft)  *     795.29  * Hydr Depth (ft)        *      24.23  *      23.85  *
* Min El Prs (ft)        *     803.05  * W.P. Total (ft)        *     568.99  *     572.22  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *  1397580.0  *  1437063.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     342.34  *     346.46  *
* BR Open Area (sq ft)   *   12062.27  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       4.11  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.54  *       0.50  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.21  *       2.08  *
*******************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     796.66  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     796.15  * E.G. Elev (ft)         *     796.64  *     796.61  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     796.20  *     796.16  *
* Q Bridge (cfs)         *   44499.17  * Crit W.S. (ft)         *     772.96  *     772.66  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.93  *      43.99  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.50  *       4.48  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9897.80  *    9925.24  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  167368.80  *  167743.80  *
* Min El Weir Flow (ft)  *     795.29  * Hydr Depth (ft)        *      26.85  *      25.19  *
* Min El Prs (ft)        *     803.05  * W.P. Total (ft)        *     634.86  *     659.66  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  1713840.0  *  1763199.0  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *    1937.73  *    1970.95  *
* BR Open Area (sq ft)   *   12062.27  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.50  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.66  *       0.60  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.95  *       2.68  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	799.90	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	799.30	E.G. Elev (ft)	799.87	799.84
Q Total (cfs)	53690.00	W.S. Elev (ft)	799.36	799.32
Q Bridge (cfs)	53667.39	Crit W.S. (ft)	774.66	774.39
Q Weir (cfs)		Max Chl Dpth (ft)	47.09	47.15
Weir Sta Lft (ft)		Vel Total (ft/s)	4.83	4.73
Weir Sta Rgt (ft)		Flow Area (sq ft)	11126.91	11351.93
Weir Submerg		Froude # Chl	0.16	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	202668.40	203271.70
Min El Weir Flow (ft)	795.29	Hydr Depth (ft)	23.77	18.93
Min El Prs (ft)	803.05	W.P. Total (ft)	761.99	893.04
Delta EG (ft)	0.07	Conv. Total (cfs)	1950862.0	2007661.0
Delta WS (ft)	0.06	Top Width (ft)	2129.87	2285.27
BR Open Area (sq ft)	12062.27	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	4.86	C & E Loss (ft)	0.00	0.01
Coef of Q		Shear Total (lb/sq ft)	0.69	0.57
Br Sel Method	Energy only	Power Total (lb/ft s)	3.33	2.68

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	802.58	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	801.90	E.G. Elev (ft)	802.56	802.52
Q Total (cfs)	62000.00	W.S. Elev (ft)	801.94	801.90
Q Bridge (cfs)	61572.46	Crit W.S. (ft)	776.07	775.81
Q Weir (cfs)		Max Chl Dpth (ft)	49.67	49.73
Weir Sta Lft (ft)		Vel Total (ft/s)	4.95	4.80
Weir Sta Rgt (ft)		Flow Area (sq ft)	12514.28	12908.88
Weir Submerg		Froude # Chl	0.15	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	235410.60	236848.80
Min El Weir Flow (ft)	795.29	Hydr Depth (ft)	23.63	23.02
Min El Prs (ft)	803.05	W.P. Total (ft)	1112.50	1134.00
Delta EG (ft)	0.06	Conv. Total (cfs)	2056773.0	2141716.0
Delta WS (ft)	0.04	Top Width (ft)	2249.04	2307.88
BR Open Area (sq ft)	12062.27	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	5.18	C & E Loss (ft)	0.00	0.00
Coef of Q		Shear Total (lb/sq ft)	0.64	0.60
Br Sel Method	Energy only	Power Total (lb/ft s)	3.16	2.86

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	806.63	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	805.86	E.G. Elev (ft)	806.62	806.54
Q Total (cfs)	74720.00	W.S. Elev (ft)	805.87	805.81
Q Bridge (cfs)	71014.23	Crit W.S. (ft)	778.05	777.79
Q Weir (cfs)		Max Chl Dpth (ft)	53.60	53.64
Weir Sta Lft (ft)		Vel Total (ft/s)	5.24	5.07
Weir Sta Rgt (ft)		Flow Area (sq ft)	14264.26	14744.12
Weir Submerg		Froude # Chl	0.15	0.15

```
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *  291600.10  *  294238.30  *
* Min El Weir Flow (ft)  *     795.29  * Hydr Depth (ft)        *      26.81  *      26.32  *
* Min El Prs (ft)        *     803.05  * W.P. Total (ft)        *    1604.07  *    1630.74  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1745912.0  *  1828312.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *    2258.07  *    2322.12  *
* BR Open Area (sq ft)   *   12062.27  * Frctn Loss (ft)        *       0.07  *       0.00  *
* BR Open Vel (ft/s)     *       5.89  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *            * Shear Total (lb/sq ft) *       1.02  *       0.94  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.33  *       4.78  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     793.82  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     793.37  * E.G. Elev (ft)         *     793.80  *     793.78  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     793.40  *     793.37  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     771.70  *     771.34  *
* Q Weir (cfs)           *            * Max Chl Dpth (ft)      *      41.13  *      41.20  *
* Weir Sta Lft (ft)      *            * Vel Total (ft/s)       *       4.27  *       4.28  *
* Weir Sta Rgt (ft)      *            * Flow Area (sq ft)      *    8905.32  *    8882.07  *
* Weir Submerg           *            * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *  139812.60  *  140210.90  *
* Min El Weir Flow (ft)  *     795.29  * Hydr Depth (ft)        *      25.55  *      25.14  *
* Min El Prs (ft)        *     803.05  * W.P. Total (ft)        *     590.41  *     594.11  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  1517963.0  *  1560010.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     348.54  *     353.27  *
* BR Open Area (sq ft)   *   12062.27  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.28  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *            * Shear Total (lb/sq ft) *       0.59  *       0.55  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.52  *       2.37  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.225

INPUT
Description: D/S of Grandview Rd Bridge.  Dodson XS 20.811
Station Elevation Data     num=     325
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*********************************************************************************
       0   839.26    2.19   839.5    7.01   839.92   18.83   840.42   46.37   841.68
    62.1   842.23      66   842.34   68.75   842.12   87.89   841.02   98.91   836.17
  118.73   826.37  123.76   826.53  133.76   826.81  140.56    830.1  159.24   839.36
  161.36   839.66  176.67   839.92  178.39   839.61  183.64   839.17  217.52   835.31
  233.82   833.71  242.95   832.83  262.05    830.5  308.07   824.62  317.22   823.52
  319.21   823.29  327.29   822.47  333.89   821.52  365.48    817.6   368.9   815.84
   381.4   809.29  383.14   808.45  384.09   807.96  398.57   800.95  418.89   792.41
  425.07   789.86  426.39   790.06  426.54   790.09  427.57   790.27  431.52   790.97
  435.29   791.66  440.05   792.53  444.44   792.52  447.19   792.52  451.78   791.53
  457.23    790.3  464.76   788.41  475.23   785.58  476.25   785.32  476.82   785.15
  477.44   785.27  484.96   786.74  497.13   789.11  499.15   789.48     500   789.86
  513.44   795.66  515.43   796.52  515.57   796.55  523.87   798.12  529.22   798.11
  530.93   798.11  534.03   797.51  538.95   796.54  548.88   794.12  549.07   794.08
```

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  549.37  794.04  550.21  793.91  572.13  790.59  574.98   790.2  578.97  789.79
  603.73  787.36  634.73  787.77  640.31  787.92  644.19  788.27  657.84  789.58
  684.29  792.22  698.15  792.91  719.94  793.04  760.47   793.3  778.31  793.41
  808.25  793.08  827.01  792.38  835.44  792.03  852.32  792.07  859.77  792.09
  864.67  792.11  887.16  791.59  900.92  791.96  908.38  791.96  912.28  792.06
  936.26  792.87  944.94  792.71  968.31  792.59  984.51  792.71  992.17   792.6
 1014.08  792.81 1020.06  792.85 1052.84  792.55 1060.51  792.19 1103.74  791.12
 1114.13  790.79    1116  790.81 1148.82  790.52 1164.93  790.74 1180.66  791.17
 1194.42  790.66  1204.6  790.21 1205.43  790.18 1225.69  787.98 1227.91  788.11
 1247.53  788.03 1261.83  787.84 1295.93  787.67 1301.99  787.61 1306.53  787.54
 1323.77     787 1324.28  786.99  1324.5  786.99 1344.34  787.51 1353.55  787.88
 1365.49  787.41 1383.06  788.31 1427.71     787 1430.05  786.94 1431.54  786.89
 1432.87  786.91 1455.24  787.89 1457.72  788.03 1462.18  788.03  1482.8  788.64
 1515.34  789.45 1521.28  789.57 1554.43  789.69 1558.46   789.8 1562.53  789.95
  1573.7  789.98 1575.74  789.98 1637.95  789.46    1644   789.4 1654.71  789.23
 1697.29  788.62 1750.24   788.9 1750.95  788.89 1751.51   788.9 1752.05  788.92
 1759.34  789.28 1768.21  788.22 1783.48  785.74 1784.57  785.58 1785.94  785.34
 1786.88  785.35 1797.11   785.2  1802.9  786.24 1809.11  787.31 1831.08  787.43
 1866.21  787.83 1889.18  788.15 1936.77  788.36 1947.55  788.15 1947.94  788.14
 1951.32  788.08 1970.29  787.49 1974.07  788.07 1978.13  788.21 1982.84  788.73
  1990.2  789.18 1991.69  789.24  2016.6  788.94 2027.48  789.61 2032.74  790.24
 2039.96  791.51 2047.34  792.74 2051.39  792.72 2056.64  792.63 2059.27  792.59
 2064.06  792.53 2067.23  792.46 2075.66  792.43 2079.04  792.43 2101.05  792.84
 2115.54  793.11 2119.55  793.29 2123.46  793.48 2126.69   793.6 2127.36  793.62
 2128.91  793.68 2137.66  794.06 2141.82  794.26 2159.18  795.03 2170.66  795.49
  2180.2  796.01 2184.44  796.24 2199.53   796.8 2202.71  796.97 2208.03  797.24
 2230.88  798.01 2232.13  798.06 2239.57  798.42 2240.88  798.48 2262.49  799.53
  2264.2   799.6 2266.21  799.68 2290.02  800.83 2292.53  800.93 2307.91  801.67
  2312.4  801.84 2327.16  802.55 2332.44  802.75 2336.28   802.9 2357.13  803.68
  2361.1  803.66 2361.45  803.68 2362.19  803.82  2365.5  803.92 2372.67  804.12
 2374.11  803.33 2374.75  803.36 2382.12  800.58 2382.82  800.58 2384.82   800.6
  2392.1  798.16 2392.15  798.16 2394.64  794.86  2399.7   792.8 2411.65  788.35
 2436.04  779.28 2441.29  777.28 2443.96  776.62 2469.19  769.45 2474.65  768.89
  2495.1  767.55 2500.05  766.49 2514.29  763.41 2516.32  762.92 2518.76  762.51
 2536.04  759.24    2537  758.84    2560  753.17    2585  752.17    2610  753.17
  2633.1  762.51 2640.11  763.16 2641.61   763.3 2671.26  765.84 2675.86  766.61
 2683.53  768.12 2705.46  769.24  2707.1  769.32 2708.05  769.41 2735.07  779.02
 2736.97  779.65 2739.94  781.53 2763.38   789.9 2764.18  790.51 2765.88  792.05
 2767.66  793.43 2772.44  796.81 2782.66  799.46 2785.45  801.22 2785.68  801.46
  2793.5  802.16 2801.52  805.22 2803.51  806.15 2809.76  806.76  2813.2  806.78
 2816.22  806.78 2821.22  806.27 2825.66  806.12 2832.91  805.88 2851.86  805.23
 2869.21  804.66 2893.33  803.85 2899.83  803.64 2919.29  802.89 2945.49   801.7
 2955.71   801.3 2971.01  800.71 2975.99  800.48 2990.97  799.93 3006.98  799.48
 3009.63  799.45 3014.52  799.34 3038.27  798.65 3076.42  798.89    3079  798.91
 3088.05  798.85 3089.15  798.84 3090.53  798.84 3138.09  798.65 3150.69  798.44
  3154.2  798.24 3161.75  798.13 3168.88  797.95 3189.85  797.46  3191.6  797.42
 3191.83  797.41 3192.67  797.41 3205.25  795.35 3209.68  795.38 3217.91  793.88
  3220.1  794.06 3222.94  794.14 3226.15   794.3 3229.38  794.31 3232.35  796.12
 3235.78  798.45 3236.41  798.55 3243.52  799.83 3248.15  800.41 3252.47  801.28
 3266.68  803.83 3281.07  806.95 3299.91  808.38 3309.23  809.36 3310.02   809.8
 3310.93  809.92 3321.65  811.26 3326.62  814.81  3328.9  816.23 3331.35  817.75
 3338.33   822.5 3356.91  827.73 3371.26  831.16  3405.2  845.79 3412.89  849.27

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  538.95    .075  2495.1    .042  2633.1     .09 3205.25     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2495.1  2633.1           141.84  239.53  354.12              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2320.48     810       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1530    1700     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  779.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  779.55  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)         *  763.22  * Flow Area (sq ft)      *  466.27  * 3073.28  * 1149.72  *
* E.G. Slope (ft/ft)     *0.000183  * Area (sq ft)           *  466.27  * 3073.28  * 1149.72  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  483.26  *11455.65  * 1261.09  *
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```
* Top Width (ft)          *  301.34  * Top Width (ft)          *   59.78  *  138.00  *  103.56  *
* Vel Total (ft/s)        *    2.81  * Avg. Vel. (ft/s)        *    1.04  *    3.73  *    1.10  *
* Max Chl Dpth (ft)       *   27.38  * Hydr. Depth (ft)        *    7.80  *   22.27  *   11.10  *
* Conv. Total (cfs)       *975441.0  * Conv. (cfs)             * 35711.6  *846538.6  * 93190.8  *
* Length Wtd. (ft)        *  243.75  * Wetted Per. (ft)        *   61.35  *  141.47  *  105.69  *
* Min Ch El (ft)          *  752.17  * Shear (lb/sq ft)        *    0.09  *    0.25  *    0.12  *
* Alpha                   *    1.54  * Stream Power (lb/ft s)  *    0.09  *    0.93  *    0.14  *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)    *  575.81  * 5591.79  *  603.40  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   97.87  *  423.74  *  122.85  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  784.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.27  * Wt. n-Val.              *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  784.51  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)          *  765.99  * Flow Area (sq ft)      *  796.03  * 3758.10  * 1689.22  *
* E.G. Slope (ft/ft)      *0.000203  * Area (sq ft)           *  796.03  * 3758.10  * 1689.22  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 1080.55  *16879.96  * 2339.49  *
* Top Width (ft)          *  326.31  * Top Width (ft)          *   73.12  *  138.00  *  115.18  *
* Vel Total (ft/s)        *    3.25  * Avg. Vel. (ft/s)        *    1.36  *    4.49  *    1.38  *
* Max Chl Dpth (ft)       *   32.34  * Hydr. Depth (ft)        *   10.89  *   27.23  *   14.67  *
* Conv. Total (cfs)       *1423580.0  * Conv. (cfs)            * 75775.9  *1183743.0  *164061.6  *
* Length Wtd. (ft)        *  245.74  * Wetted Per. (ft)        *   75.58  *  141.47  *  118.40  *
* Min Ch El (ft)          *  752.17  * Shear (lb/sq ft)        *    0.13  *    0.34  *    0.18  *
* Alpha                   *    1.62  * Stream Power (lb/ft s)  *    0.18  *    1.51  *    0.25  *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)    * 1073.62  * 7443.39  * 1199.31  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  143.72  *  463.40  *  169.37  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  788.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.33  * Wt. n-Val.              *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  787.92  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)          *  767.84  * Flow Area (sq ft)      * 1061.38  * 4229.29  * 2098.84  *
* E.G. Slope (ft/ft)      *0.000219  * Area (sq ft)           * 1278.93  * 4229.29  * 2098.84  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             * 1671.24  *21345.86  * 3302.90  *
* Top Width (ft)          *  711.22  * Top Width (ft)          *  448.47  *  138.00  *  124.75  *
* Vel Total (ft/s)        *    3.56  * Avg. Vel. (ft/s)        *    1.57  *    5.05  *    1.57  *
* Max Chl Dpth (ft)       *   35.75  * Hydr. Depth (ft)        *   12.90  *   30.65  *   16.82  *
* Conv. Total (cfs)       *1777174.0  * Conv. (cfs)            *112845.2  *1441311.0  *223017.5  *
* Length Wtd. (ft)        *  246.74  * Wetted Per. (ft)        *   85.38  *  141.47  *  128.55  *
* Min Ch El (ft)          *  752.17  * Shear (lb/sq ft)        *    0.17  *    0.41  *    0.22  *
* Alpha                   *    1.67  * Stream Power (lb/ft s)  *    0.27  *    2.07  *    0.35  *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)    * 1525.50  * 8949.10  * 1797.40  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *  186.26  *  491.32  *  246.83  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  791.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.41  * Wt. n-Val.              *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  791.57  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)          *  770.04  * Flow Area (sq ft)      * 1379.18  * 4732.23  * 2569.88  *
* E.G. Slope (ft/ft)      *0.000239  * Area (sq ft)           * 4278.68  * 4732.23  * 2569.88  *
* Q Total (cfs)           *34000.00  * Flow (cfs)             * 2499.37  *26870.14  * 4630.49  *
* Top Width (ft)          * 1325.33  * Top Width (ft)          * 1055.08  *  138.00  *  132.25  *
* Vel Total (ft/s)        *    3.92  * Avg. Vel. (ft/s)        *    1.81  *    5.68  *    1.80  *
* Max Chl Dpth (ft)       *   39.40  * Hydr. Depth (ft)        *   14.98  *   34.29  *   19.43  *
* Conv. Total (cfs)       *2199362.0  * Conv. (cfs)            *161677.3  *1738152.0  *299532.9  *
* Length Wtd. (ft)        *  248.22  * Wetted Per. (ft)        *   95.82  *  141.47  *  137.01  *
* Min Ch El (ft)          *  752.17  * Shear (lb/sq ft)        *    0.21  *    0.50  *    0.28  *
* Alpha                   *    1.71  * Stream Power (lb/ft s)  *    0.39  *    2.83  *    0.50  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)    * 2245.80  *10522.10  * 2702.64  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *  297.74  *  514.17  *  335.91  *
```

```
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  796.11  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)         *  772.24  * Flow Area (sq ft)      * 1822.07  * 5358.34  * 3225.28  *
* E.G. Slope (ft/ft)     *0.000254  * Area (sq ft)           *11065.96  * 5358.34  * 3225.28  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 3824.13  *34086.55  * 6589.31  *
* Top Width (ft)         * 1985.03  * Top Width (ft)         * 1677.00  *  138.00  *  170.03  *
* Vel Total (ft/s)       *    4.28  * Avg. Vel. (ft/s)       *    2.10  *    6.36  *    2.04  *
* Max Chl Dpth (ft)      *   43.94  * Hydr. Depth (ft)       *   17.97  *   38.83  *   18.97  *
* Conv. Total (cfs)      *2791295.0  * Conv. (cfs)           *239871.2  *2138104.0  *413319.4  *
* Length Wtd. (ft)       *  247.07  * Wetted Per. (ft)       *  106.38  *  141.47  *  177.01  *
* Min Ch El (ft)         *  752.17  * Shear (lb/sq ft)       *    0.27  *    0.60  *    0.29  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.57  *    3.82  *    0.59  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 4040.80  *12967.67  * 4849.10  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  611.60  *  542.19  *  711.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  799.24  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)         *  773.98  * Flow Area (sq ft)      * 2145.08  * 5791.04  * 3919.42  *
* E.G. Slope (ft/ft)     *0.000276  * Area (sq ft)           *16508.86  * 5791.04  * 3919.42  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 5041.41  *40423.63  * 8224.97  *
* Top Width (ft)         * 2299.16  * Top Width (ft)         * 1790.13  *  138.00  *  371.03  *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)       *    2.35  *    6.98  *    2.10  *
* Max Chl Dpth (ft)      *   47.07  * Hydr. Depth (ft)       *   20.19  *   41.96  *   10.56  *
* Conv. Total (cfs)      *3232193.0  * Conv. (cfs)           *303497.9  *2433543.0  *495151.2  *
* Length Wtd. (ft)       *  246.78  * Wetted Per. (ft)       *  112.40  *  141.47  *  379.47  *
* Min Ch El (ft)         *  752.17  * Shear (lb/sq ft)       *    0.33  *    0.71  *    0.18  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.77  *    4.92  *    0.37  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 6029.14  *14426.32  * 7142.88  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  839.81  *  549.27  * 1078.79  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.075  *   0.042  *   0.091  *
* W.S. Elev (ft)         *  801.85  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)         *  775.44  * Flow Area (sq ft)      * 2436.04  * 6151.62  * 5026.41  *
* E.G. Slope (ft/ft)     *0.000291  * Area (sq ft)           *21280.12  * 6151.62  * 5026.41  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 6022.63  *45875.51  *10101.85  *
* Top Width (ft)         * 2470.88  * Top Width (ft)         * 1862.34  *  138.00  *  470.54  *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *    2.47  *    7.46  *    2.01  *
* Max Chl Dpth (ft)      *   49.68  * Hydr. Depth (ft)       *   20.94  *   44.58  *   10.68  *
* Conv. Total (cfs)      *3637229.0  * Conv. (cfs)           *353317.6  *2691286.0  *592625.1  *
* Length Wtd. (ft)       *  246.99  * Wetted Per. (ft)       *  122.99  *  141.47  *  479.91  *
* Min Ch El (ft)         *  752.17  * Shear (lb/sq ft)       *    0.36  *    0.79  *    0.19  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.89  *    5.88  *    0.38  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 7822.56  *15371.17  * 9318.61  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1000.06  *  550.17  * 1436.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  806.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.75  * Wt. n-Val.             *   0.075  *   0.042  *   0.091  *
* W.S. Elev (ft)          *  805.79  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)          *  777.48  * Flow Area (sq ft)      * 3044.46  * 6695.33  * 7148.96  *
* E.G. Slope (ft/ft)      *0.000303  * Area (sq ft)           *28812.90  * 6695.33  * 7148.96  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             * 6869.91  *53924.80  *13925.29  *
* Top Width (ft)          * 2684.49  * Top Width (ft)         * 1936.54  *  138.00  *  609.96  *
* Vel Total (ft/s)        *    4.42  * Avg. Vel. (ft/s)       *    2.26  *    8.05  *    1.95  *
* Max Chl Dpth (ft)       *   53.62  * Hydr. Depth (ft)       *   17.43  *   48.52  *   11.72  *
* Conv. Total (cfs)       *4294500.0  * Conv. (cfs)           *394845.2  *3099305.0  *800350.4  *
* Length Wtd. (ft)        *  248.29  * Wetted Per. (ft)       *  181.78  *  141.47  *  620.49  *
* Min Ch El (ft)          *  752.17  * Shear (lb/sq ft)       *    0.32  *    0.89  *    0.22  *
* Alpha                   *    2.45  * Stream Power (lb/ft s) *    0.71  *    7.20  *    0.42  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)   *11030.15  *16822.33  *13478.76  *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)         * 1211.30  *  552.60  * 1797.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  793.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *   0.075  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  793.33  * Reach Len. (ft)        *  141.84  *  239.53  *  354.12  *
* Crit W.S. (ft)          *  770.92  * Flow Area (sq ft)      * 1545.28  * 4974.96  * 2804.35  *
* E.G. Slope (ft/ft)      *0.000247  * Area (sq ft)           * 6530.31  * 4974.96  * 2804.35  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             * 2967.56  *29665.36  * 5367.08  *
* Top Width (ft)          * 1835.79  * Top Width (ft)         * 1563.36  *  138.00  *  134.43  *
* Vel Total (ft/s)        *    4.08  * Avg. Vel. (ft/s)       *    1.92  *    5.96  *    1.91  *
* Max Chl Dpth (ft)       *   41.16  * Hydr. Depth (ft)       *   15.98  *   36.05  *   20.86  *
* Conv. Total (cfs)       *2420070.0  * Conv. (cfs)           *188992.1  *1889269.0  *341808.2  *
* Length Wtd. (ft)        *  248.41  * Wetted Per. (ft)       *  100.75  *  141.47  *  139.81  *
* Min Ch El (ft)          *  752.17  * Shear (lb/sq ft)       *    0.24  *    0.54  *    0.31  *
* Alpha                   *    1.72  * Stream Power (lb/ft s) *    0.45  *    3.23  *    0.59  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)   * 2756.01  *11347.73  * 3269.73  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  384.77  *  524.55  *  401.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.180

INPUT
Description: close to Dodson XS 20.77
Station Elevation Data    num=     285
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   844.63     7.94   844.64    15.47   844.55    28.05   843.43    44.22   841.86
    46.9   841.58    59.25    839.9    66.19   839.32     90.8   836.97    99.94   836.11
  113.84    834.6   118.63      834   124.15   833.42   130.89   832.45   169.19   827.07
  173.22   826.62   179.29   824.37   184.69    822.3    187.7   822.55   197.41   823.47
  201.77    824.2   211.27   824.57   226.23   823.39   234.21   821.89   253.03   819.71
  255.96   819.22   260.31   818.61    267.9   817.47   276.01   816.58   284.09   815.28
  289.65    814.2   296.63   812.84   302.39   811.58   304.61   811.13   305.12   811.02
  308.51   810.36   323.75   807.36   340.08   803.82   343.16   803.11   348.78   801.76
   370.4   796.89   393.49   791.33    399.5   792.59   400.96   792.91   402.65   792.91
  408.14   792.91   414.26   791.32   416.64   790.73   422.81   790.99   438.49   790.98
   446.3   791.77   457.59   795.24   462.13   796.82   468.97   798.01   470.59   798.32
  475.64   798.32   477.58   798.32   483.07   797.22   486.35   796.59   493.18   795.13
  496.69   794.36   502.91   793.48   511.58   792.21   518.85   791.16   537.84   789.78
  546.78   789.47   571.11   788.36   583.91   787.87   611.48   788.53   618.48   788.04
  633.62   789.21    646.2   789.75   674.79   791.06   689.49   792.04    696.5   792.23
  712.69   792.65   724.01   793.11   731.31   793.16   796.54   793.59   824.31   793.39
  828.42   793.37   839.12   793.34   880.61   792.82   899.58   791.63   913.94   791.22
  945.36   791.65    949.1   791.83   951.33   791.77   985.84   792.92   988.93   792.95
 1040.86    793.5  1051.62   793.61  1052.17   793.59  1053.26   793.57  1097.79   792.43
 1126.29   792.18  1145.51   791.59  1205.76   790.24  1207.39   790.22  1208.25   790.17
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 1243.17  788.61 1249.94  787.92 1288.37  785.41 1294.07  785.21 1296.62  785.27
 1320.24  786.24 1360.92  786.28 1375.61  786.23 1378.66  786.21 1380.43  786.16
 1386.29  786.17 1449.99  785.11 1463.01  784.64 1490.29  783.65 1502.18   783.2
 1525.05  782.66 1526.54  782.66 1526.86  782.67 1537.69  784.98 1554.46  788.56
 1556.88  788.64 1565.52  788.92 1585.31  788.64  1594.4  788.49 1599.85  788.09
 1604.56  787.73 1612.18  786.18  1618.4  785.07 1633.33  782.17 1640.29  781.65
  1653.4  782.11 1666.61  782.17 1677.86  782.23  1683.7   783.4 1689.09   784.6
  1690.3  784.72 1697.26  786.08 1698.49  786.41 1705.63   786.8 1717.52  787.09
 1736.58  787.67 1736.71  787.68 1738.43  787.67 1739.79  787.59 1745.92  787.82
 1768.52  787.97 1773.24  788.17 1792.71  788.47 1812.03  788.65 1830.95  788.95
 1840.58  789.25 1848.15  789.39 1852.14  789.47 1860.09  789.53 1870.19   789.6
  1885.3  789.86 1891.87  789.76 1894.74  789.91 1896.56  789.94 1900.05  789.97
 1911.47  789.48 1916.14  789.48 1916.85  789.48 1919.96  789.49 1929.74  789.52
  1933.7  789.53 1938.54  789.47 1949.61  789.19 1950.36  789.21 1951.26  789.19
 1952.54  789.19 1962.98  789.31 1976.05  789.47 1978.56   789.5 1982.96  789.47
 1984.12  789.45 1989.79  789.78 1998.84  790.23 1999.33  790.26 1999.56  790.27
 2000.26   790.3 2003.74  790.42 2020.75  791.02 2033.65  791.99 2054.88  793.08
 2073.42  794.08  2080.8  794.22 2083.97   794.1 2089.49  794.02 2103.84  793.79
  2107.7  793.53 2126.36  792.78 2136.77  792.81 2161.66  792.72 2164.53  792.71
  2175.5  792.69 2184.37   792.8 2238.29  792.79 2296.23  792.03 2307.29  791.83
 2308.14  791.83 2312.71  791.76 2336.18  791.37 2349.67  791.09 2354.64  791.05
 2356.41  791.05 2370.58  790.62 2407.29  789.45 2413.19  789.28    2427  788.86
 2437.27  788.62 2444.04  786.52 2451.08  784.21  2465.3  779.82    2473  777.49
 2489.17  772.73 2503.09  772.04 2508.21  771.82 2522.01   767.8 2522.68   767.6
 2524.44  767.08 2527.93  766.04 2536.25  763.56 2540.32  762.61 2550.81  760.42
 2555.13   757.3 2557.21  755.76    2560  752.99    2592  751.99    2625  752.99
 2638.36  758.91  2644.2  761.26 2650.32  762.47 2656.05  764.02 2663.64  766.25
 2664.29  766.44 2671.33  767.74 2698.56  772.78 2699.65  773.02 2702.75  773.16
 2708.46  773.42 2709.91  773.56 2710.23  773.59 2723.24   774.8 2755.16   775.6
 2768.77  775.97 2771.02  776.01 2772.42     776 2773.56     776 2811.24  776.01
 2826.31  776.23 2828.19  776.41 2857.86  777.08 2867.41  777.21 2886.01  778.07
 2893.97  777.86 2897.15  778.43  2902.1  779.21 2914.77  782.89 2930.44  787.66
 2934.28  788.64 2949.44  793.61 2951.35  794.24 2951.92  794.29 2955.68  794.67
 2962.81  795.38 2965.08  795.44 2971.65  795.62 2977.55  795.68 2981.49  795.65
 2983.44  795.63 2985.54  795.57 2992.28  795.39 2998.84  794.72 3000.54  794.55
 3004.25  794.14 3009.82  793.47 3016.24  793.66 3018.38  793.75 3026.65  794.73
  3031.7  795.04 3037.22   798.2  3066.9   811.1 3093.93  836.52 3118.03  859.35

Manning's n Values        num=       4
     Sta   n Val      Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0      .1  611.48    .075 2508.21    .042 2698.56     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2508.21 2698.56           527.58  467.17  329.69              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2254.96     810        F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    1800    1920     815    2040    2200     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  779.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.18  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)          *  779.50  * Reach Len. (ft)        *  527.58  *  467.17  *  329.69  *
* Crit W.S. (ft)          *  762.76  * Flow Area (sq ft)      *  215.61  * 3634.99  *  694.97  *
* E.G. Slope (ft/ft)      *0.000202  * Area (sq ft)           *  215.61  * 3634.99  *  694.97  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *  178.30  *12745.45  *  276.25  *
* Top Width (ft)          *  436.77  * Top Width (ft)         *   41.86  *  190.35  *  204.55  *
* Vel Total (ft/s)        *    2.90  * Avg. Vel. (ft/s)       *    0.83  *    3.51  *    0.40  *
* Max Chl Dpth (ft)       *   27.51  * Hydr. Depth (ft)       *    5.15  *   19.10  *    3.40  *
* Conv. Total (cfs)       *928361.6  * Conv. (cfs)            * 12539.9  *896392.6  * 19429.1  *
* Length Wtd. (ft)        *  462.01  * Wetted Per. (ft)       *   42.87  *  197.53  *  204.86  *
* Min Ch El (ft)          *  751.99  * Shear (lb/sq ft)       *    0.06  *    0.23  *    0.04  *
* Alpha                   *    1.41  * Stream Power (lb/ft s) *    0.05  *    0.81  *    0.02  *
* Frctn Loss (ft)         *    0.15  * Cum Volume (acre-ft)   *  574.70  * 5573.35  *  595.91  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   97.70  *  422.84  *  121.60  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	784.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	784.48	Reach Len. (ft)	527.58	467.17	329.69
Crit W.S. (ft)	765.60	Flow Area (sq ft)	464.25	4582.57	1755.71
E.G. Slope (ft/ft)	0.000198	Area (sq ft)	667.55	4582.57	1755.71
Q Total (cfs)	20300.00	Flow (cfs)	508.48	18577.57	1213.96
Top Width (ft)	604.86	Top Width (ft)	193.07	190.35	221.44
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)	1.10	4.05	0.69
Max Chl Dpth (ft)	32.49	Hydr. Depth (ft)	8.01	24.07	7.93
Conv. Total (cfs)	1441059.0	Conv. (cfs)	36095.7	1318787.0	86176.5
Length Wtd. (ft)	455.18	Wetted Per. (ft)	59.72	197.53	222.47
Min Ch El (ft)	751.99	Shear (lb/sq ft)	0.10	0.29	0.10
Alpha	1.70	Stream Power (lb/ft s)	0.11	1.17	0.07
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	1071.24	7420.46	1185.31
C & E Loss (ft)	0.05	Cum SA (acres)	143.29	462.50	168.00

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	788.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	787.91	Reach Len. (ft)	527.58	467.17	329.69
Crit W.S. (ft)	767.60	Flow Area (sq ft)	681.05	5235.20	2534.26
E.G. Slope (ft/ft)	0.000200	Area (sq ft)	1894.27	5235.20	2534.26
Q Total (cfs)	26320.00	Flow (cfs)	862.02	23287.72	2170.26
Top Width (ft)	953.26	Top Width (ft)	530.05	190.35	232.86
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)	1.27	4.45	0.86
Max Chl Dpth (ft)	35.92	Hydr. Depth (ft)	9.92	27.50	10.88
Conv. Total (cfs)	1860834.0	Conv. (cfs)	60945.0	1646451.0	153438.5
Length Wtd. (ft)	451.38	Wetted Per. (ft)	70.95	197.53	234.39
Min Ch El (ft)	751.99	Shear (lb/sq ft)	0.12	0.33	0.14
Alpha	1.82	Stream Power (lb/ft s)	0.15	1.47	0.12
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	1520.34	8923.08	1778.57
C & E Loss (ft)	0.06	Cum SA (acres)	184.67	490.42	245.38

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	791.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	791.56	Reach Len. (ft)	527.58	467.17	329.69
Crit W.S. (ft)	769.79	Flow Area (sq ft)	1091.20	5930.56	3407.35
E.G. Slope (ft/ft)	0.000211	Area (sq ft)	4983.85	5930.56	3407.35
Q Total (cfs)	34000.00	Flow (cfs)	1021.37	29449.84	3528.79
Top Width (ft)	1616.36	Top Width (ft)	1181.37	190.35	244.64
Vel Total (ft/s)	3.26	Avg. Vel. (ft/s)	0.94	4.97	1.04
Max Chl Dpth (ft)	39.57	Hydr. Depth (ft)	5.94	31.16	13.93
Conv. Total (cfs)	2339999.0	Conv. (cfs)	70294.5	2026841.0	242863.4
Length Wtd. (ft)	447.76	Wetted Per. (ft)	186.11	197.53	246.73
Min Ch El (ft)	751.99	Shear (lb/sq ft)	0.08	0.40	0.18
Alpha	2.02	Stream Power (lb/ft s)	0.07	1.97	0.19
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	2230.72	10492.79	2678.35
C & E Loss (ft)	0.06	Cum SA (acres)	294.10	513.27	334.38

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

```
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  796.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.13  * Reach Len. (ft)        *  527.58  *  467.17  *  329.69  *
* Crit W.S. (ft)         *  772.31  * Flow Area (sq ft)      * 2209.75  * 6799.06  * 4655.13  *
* E.G. Slope (ft/ft)     *0.000211  * Area (sq ft)           *12503.02  * 6799.06  * 4655.13  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 2680.44  *37005.23  * 4814.33  *
* Top Width (ft)         * 2351.64  * Top Width (ft)         * 1826.25  *  190.35  *  335.04  *
* Vel Total (ft/s)       *    3.26  * Avg. Vel. (ft/s)       *    1.21  *    5.44  *    1.03  *
* Max Chl Dpth (ft)      *   44.14  * Hydr. Depth (ft)       *    8.73  *   35.72  *   13.89  *
* Conv. Total (cfs)      *3060823.0  * Conv. (cfs)            *184367.5  *2545313.0  *331141.9  *
* Length Wtd. (ft)       *  445.85  * Wetted Per. (ft)       *  255.70  *  197.53  *  338.09  *
* Min Ch El (ft)         *  751.99  * Shear (lb/sq ft)       *    0.11  *    0.45  *    0.18  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    0.14  *    2.47  *    0.19  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 4002.43  *12934.24  * 4817.06  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  605.90  *  541.28  *  709.62  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  799.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  799.31  * Reach Len. (ft)        *  527.58  *  467.17  *  329.69  *
* Crit W.S. (ft)         *  774.10  * Flow Area (sq ft)      * 3015.05  * 7404.35  * 5729.67  *
* E.G. Slope (ft/ft)     *0.000210  * Area (sq ft)           *18382.13  * 7404.35  * 5729.67  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 4484.04  *42514.51  * 6691.45  *
* Top Width (ft)         * 2400.09  * Top Width (ft)         * 1868.54  *  190.35  *  341.20  *
* Vel Total (ft/s)       *    3.32  * Avg. Vel. (ft/s)       *    1.49  *    5.74  *    1.17  *
* Max Chl Dpth (ft)      *   47.32  * Hydr. Depth (ft)       *   11.91  *   38.90  *   16.79  *
* Conv. Total (cfs)      *3705334.0  * Conv. (cfs)            *309459.4  *2934074.0  *461800.1  *
* Length Wtd. (ft)       *  446.54  * Wetted Per. (ft)       *  255.70  *  197.53  *  345.04  *
* Min Ch El (ft)         *  751.99  * Shear (lb/sq ft)       *    0.15  *    0.49  *    0.22  *
* Alpha                  *    2.39  * Stream Power (lb/ft s) *    0.23  *    2.82  *    0.25  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 5972.34  *14390.04  * 7103.66  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  833.85  *  548.37  * 1075.90  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  802.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  801.95  * Reach Len. (ft)        *  527.58  *  467.17  *  329.69  *
* Crit W.S. (ft)         *  775.57  * Flow Area (sq ft)      * 3685.08  * 7907.96  * 6640.44  *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           *23341.23  * 7907.96  * 6640.44  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 6249.29  *47323.34  * 8427.36  *
* Top Width (ft)         * 2417.87  * Top Width (ft)         * 1880.23  *  190.35  *  347.29  *
* Vel Total (ft/s)       *    3.40  * Avg. Vel. (ft/s)       *    1.70  *    5.98  *    1.27  *
* Max Chl Dpth (ft)      *   49.96  * Hydr. Depth (ft)       *   14.55  *   41.54  *   19.12  *
* Conv. Total (cfs)      *4289597.0  * Conv. (cfs)            *432370.2  *3274162.0  *583064.4  *
* Length Wtd. (ft)       *  446.30  * Wetted Per. (ft)       *  255.70  *  197.53  *  351.67  *
* Min Ch El (ft)         *  751.99  * Shear (lb/sq ft)       *    0.19  *    0.52  *    0.25  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.32  *    3.12  *    0.31  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 7749.91  *15332.51  * 9271.18  *
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* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  993.97  *  549.26  * 1433.51  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  806.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  805.94  * Reach Len. (ft)        *  527.58  *  467.17  *  329.69  *
* Crit W.S. (ft)         *  778.18  * Flow Area (sq ft)      * 4694.15  * 8666.41  * 8042.49  *
* E.G. Slope (ft/ft)     *0.000203  * Area (sq ft)           *30867.35  * 8666.41  * 8042.49  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 9213.32  *54295.96  *11210.72  *
* Top Width (ft)         * 2444.70  * Top Width (ft)         * 1897.89  *  190.35  *  356.46  *
* Vel Total (ft/s)       *    3.49  * Avg. Vel. (ft/s)       *    1.96  *    6.27  *    1.39  *
* Max Chl Dpth (ft)      *   53.95  * Hydr. Depth (ft)       *   18.54  *   45.53  *   22.56  *
* Conv. Total (cfs)      *5248809.0  * Conv. (cfs)            *647202.2  *3814094.0  *787512.6  *
* Length Wtd. (ft)       *  446.13  * Wetted Per. (ft)       *  255.70  *  197.53  *  361.67  *
* Min Ch El (ft)         *  751.99  * Shear (lb/sq ft)       *    0.23  *    0.56  *    0.28  *
* Alpha                  *    2.40  * Stream Power (lb/ft s) *    0.46  *    3.48  *    0.39  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *10932.99  *16780.09  *13417.01  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         * 1205.06  *  551.70  * 1794.03  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  793.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  793.33  * Reach Len. (ft)        *  527.58  *  467.17  *  329.69  *
* Crit W.S. (ft)         *  770.81  * Flow Area (sq ft)      * 1502.43  * 6267.42  * 3845.05  *
* E.G. Slope (ft/ft)     *0.000212  * Area (sq ft)           * 7464.84  * 6267.42  * 3845.05  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 1410.18  *32333.00  * 4256.82  *
* Top Width (ft)         * 2111.37  * Top Width (ft)         * 1670.98  *  190.35  *  250.04  *
* Vel Total (ft/s)       *    3.27  * Avg. Vel. (ft/s)       *    0.94  *    5.16  *    1.11  *
* Max Chl Dpth (ft)      *   41.34  * Hydr. Depth (ft)       *    5.93  *   32.93  *   15.38  *
* Conv. Total (cfs)      *2611832.0  * Conv. (cfs)            * 96925.2  *2222325.0  *292581.6  *
* Length Wtd. (ft)       *  445.43  * Wetted Per. (ft)       *  255.70  *  197.53  *  252.41  *
* Min Ch El (ft)         *  751.99  * Shear (lb/sq ft)       *    0.08  *    0.42  *    0.20  *
* Alpha                  *    2.13  * Stream Power (lb/ft s) *    0.07  *    2.16  *    0.22  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 2733.23  *11316.82  * 3242.70  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  379.51  *  523.65  *  400.24  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 19.092

INPUT
Description: close to Dodson XS 20.67
Station Elevation Data    num=     256
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
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```
       0  848.55   24.83  847.94   31.23  847.64   37.19  847.39   63.12  845.97
    72.4  845.73   89.65  845.13   98.85  844.73  123.88  843.81  148.09  842.95
  154.59  842.83  155.78  842.81  185.02     842  189.66  841.84  213.78  840.58
   218.1  840.48  230.57  839.62  238.62  839.09  246.93   838.7  251.29  838.27
  261.52  837.03  276.92  834.95  308.95  830.62  313.96  829.95  316.99  829.08
  326.74  826.21  333.73  821.05  337.71  818.57  345.53  819.68  348.11  819.74
  360.14  827.03  392.63  825.07     395  824.85  404.84  816.89  417.36  806.96
  422.55  802.99  425.63  801.85  432.53  799.27  447.26  793.77  452.88  794.33
  457.44  794.76  463.45  794.76  464.18  794.76   470.4  793.98  472.79  793.71
  474.48  794.09  487.68  796.84  493.11  797.82  495.19  797.84  504.14  797.27
  513.95  796.78  522.62  794.97  531.05  793.51  538.48  792.09  561.76  790.26
  573.65  789.47  586.09  789.29   625.2  789.35  645.58  789.51  674.16  790.14
  707.85  790.84  710.54  790.91  718.06  791.04  745.01  791.52  749.04  791.59
  760.03  791.51  773.41   791.9     797  792.56  814.94  792.54  841.86  792.36
  843.93   792.3  846.95  792.41  895.18  792.76  904.88  792.58  912.35  792.74
  938.32  792.01  956.27  791.82  991.99  791.58  999.92  791.59 1032.96  791.82
 1041.09  791.87 1042.15  791.87 1062.71  792.14 1070.13  792.24 1077.59  792.06
 1086.91  792.04 1092.08  791.67 1095.61  791.55 1110.39  790.88 1115.51  790.97
 1149.77  791.24 1241.77  791.38 1252.41   791.4 1258.04  791.39 1261.33  791.17
 1270.36  791.38 1299.07  790.77 1318.03  790.47 1338.69  791.34 1338.89  791.35
  1339.2  791.36  1339.8  791.33 1377.56  790.12 1384.79  789.89 1398.17  789.85
 1433.92  789.45 1445.14  789.37 1465.33   788.1 1465.68  788.08 1469.79  787.94
 1497.66  786.97 1507.01   786.6 1516.72  786.34  1544.3  786.31 1578.66  786.29
 1598.89  786.45 1615.22  786.71 1616.56  786.73 1622.64  786.83  1625.2   786.9
 1627.01  787.09 1644.41  787.56 1645.52  787.52 1649.85  787.48 1666.05  787.45
 1682.22  787.69 1686.88   787.9 1711.67  788.98 1713.38  789.04 1724.75  789.06
 1725.32  789.06 1760.12  786.67 1762.15  786.54 1765.11  786.44 1781.61  786.04
 1795.94  785.49 1804.19  787.17 1816.76  789.83 1825.37  791.33 1832.18  791.86
 1835.44  792.18  1860.3  793.18  1871.8  793.78 1878.02  794.15 1879.94  794.15
 1895.88  794.22 1897.16  794.23 1898.57  794.26 1905.43  794.33    1923   794.5
 1923.78  794.51  1925.5   794.5 1944.18   794.5 1949.54  794.59 1949.94  794.59
 1951.52  794.65 1962.13  794.83 1981.35  794.65 2012.59  794.22 2056.52  793.76
 2059.37  793.74 2060.35  793.73 2085.47  793.56 2184.96  792.77 2209.98  793.29
 2211.96  793.31 2230.62  793.34  2233.1  793.34 2233.36  793.33 2239.43  793.21
 2259.84  793.48 2269.63  793.61 2281.96  793.67 2282.51  793.67 2315.22   793.8
 2325.38  793.84 2370.84  793.66 2375.86  793.71 2467.56   792.9 2470.38  792.88
 2471.57  792.85  2478.4  792.81 2507.92  792.68 2522.24  792.52 2532.53  792.39
 2575.65  792.33 2606.78  792.22 2610.51  792.15 2633.15  791.25 2641.25  791.16
 2650.07  790.99 2659.46  785.31 2666.03  780.62 2669.11  778.43 2688.32  768.84
 2694.14  766.03 2700.33  765.35 2704.44  764.97 2710.68  759.22 2713.98  755.76
    2717  752.61    2737  751.61    2757  752.61 2760.45  755.61 2766.99  758.77
 2775.68  762.17 2785.04  763.23 2786.46  763.35 2787.73  764.06 2791.42  765.37
 2805.48   771.2 2805.51  771.21 2805.86  771.27 2806.78  771.41  2807.1  771.46
 2821.84  773.96 2827.19   773.2 2837.09  771.67 2841.25  771.76 2850.55  772.09
 2854.53  771.79 2858.72  771.29    2860  771.16 2860.17  771.15 2860.63  771.24
 2871.66  773.83    2907  774.43 2915.51  774.73  2926.5  774.71 2934.25  774.83
 2972.86  775.02 2985.55  775.31 3002.04  776.29 3028.92  778.45  3042.8   780.7
 3055.07   787.1 3068.71  794.04 3077.14  796.18 3080.07   796.9 3084.36  796.85
 3085.62  796.83 3086.94  796.82 3087.44   796.8 3091.52  796.67 3092.94   796.6
 3096.08  796.45 3101.29  796.09 3102.96  795.97 3104.38  795.83 3111.88  794.84
  3136.7  806.98 3144.89  811.06 3173.04  833.31 3218.75  869.36 3235.22  872.86
 3239.17  873.63

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0      .1   625.2    .075 2704.44    .042 2775.68     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2704.44 2775.68           470.97  603.47  622.77              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0 2505.51  807.83       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1930    2360     815

CROSS SECTION OUTPUT  Profile #2-yr
***********************************************************************************************
* E.G. Elev (ft)         *  779.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  778.87  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)         *  765.21  * Flow Area (sq ft)      *  305.05  * 1707.03  * 1397.26  *
* E.G. Slope (ft/ft)     *0.000607  * Area (sq ft)           *  305.05  * 1707.03  * 1397.26  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  586.55  *11562.41  * 1051.05  *
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```
* Top Width (ft)          *  362.99  * Top Width (ft)          *   35.94  *   71.24  *  255.81  *
* Vel Total (ft/s)        *    3.87  * Avg. Vel. (ft/s)        *    1.92  *    6.77  *    0.75  *
* Max Chl Dpth (ft)       *   27.26  * Hydr. Depth (ft)        *    8.49  *   23.96  *    5.46  *
* Conv. Total (cfs)       *535568.4  * Conv. (cfs)             * 23798.2  *469125.7  * 42644.5  *
* Length Wtd. (ft)        *  598.51  * Wetted Per. (ft)        *   39.04  *   78.85  *  258.38  *
* Min Ch El (ft)          *  751.61  * Shear (lb/sq ft)        *    0.30  *    0.82  *    0.21  *
* Alpha                   *    2.69  * Stream Power (lb/ft s) *    0.57  *    5.56  *    0.15  *
* Frctn Loss (ft)         *    0.35  * Cum Volume (acre-ft)    *  571.55  * 5544.71  *  587.99  *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)          *   97.23  *  421.44  *  119.86  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  784.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.76  * Wt. n-Val.              *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  783.76  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)          *  768.72  * Flow Area (sq ft)      *  497.77  * 2055.67  * 2703.13  *
* E.G. Slope (ft/ft)      *0.000629  * Area (sq ft)           *  497.77  * 2055.67  * 2703.13  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 1185.30  *16042.82  * 3071.88  *
* Top Width (ft)          *  387.04  * Top Width (ft)          *   42.81  *   71.24  *  272.99  *
* Vel Total (ft/s)        *    3.86  * Avg. Vel. (ft/s)        *    2.38  *    7.80  *    1.14  *
* Max Chl Dpth (ft)       *   32.15  * Hydr. Depth (ft)        *   11.63  *   28.86  *    9.90  *
* Conv. Total (cfs)       *809144.8  * Conv. (cfs)             * 47245.2  *639456.3  *122443.3  *
* Length Wtd. (ft)        *  596.33  * Wetted Per. (ft)        *   47.47  *   78.85  *  276.45  *
* Min Ch El (ft)          *  751.61  * Shear (lb/sq ft)        *    0.41  *    1.02  *    0.38  *
* Alpha                   *    3.26  * Stream Power (lb/ft s) *    0.98  *    8.00  *    0.44  *
* Frctn Loss (ft)         *    0.35  * Cum Volume (acre-ft)    * 1064.18  * 7384.86  * 1168.43  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)          *  141.86  *  461.09  *  166.13  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  787.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.85  * Wt. n-Val.              *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  787.12  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)          *  771.21  * Flow Area (sq ft)      *  650.11  * 2295.31  * 3632.24  *
* E.G. Slope (ft/ft)      *0.000649  * Area (sq ft)           *  783.07  * 2295.31  * 3632.24  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             * 1730.93  *19573.62  * 5015.45  *
* Top Width (ft)          *  584.15  * Top Width (ft)          *  233.47  *   71.24  *  279.44  *
* Vel Total (ft/s)        *    4.00  * Avg. Vel. (ft/s)        *    2.66  *    8.53  *    1.38  *
* Max Chl Dpth (ft)       *   35.51  * Hydr. Depth (ft)        *   13.55  *   32.22  *   13.00  *
* Conv. Total (cfs)       *1033326.0  * Conv. (cfs)             * 67956.5  *768462.0  *196907.2  *
* Length Wtd. (ft)        *  595.08  * Wetted Per. (ft)        *   53.64  *   78.85  *  283.73  *
* Min Ch El (ft)          *  751.61  * Shear (lb/sq ft)        *    0.49  *    1.18  *    0.52  *
* Alpha                   *    3.43  * Stream Power (lb/ft s) *    1.31  *   10.05  *    0.72  *
* Frctn Loss (ft)         *    0.36  * Cum Volume (acre-ft)    * 1504.12  * 8882.70  * 1755.23  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)          *  180.04  *  489.02  *  243.44  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  791.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.98  * Wt. n-Val.              *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  790.70  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)          *  773.96  * Flow Area (sq ft)      *  831.99  * 2549.71  * 4642.66  *
* E.G. Slope (ft/ft)      *0.000683  * Area (sq ft)           * 2337.67  * 2549.71  * 4642.66  *
* Q Total (cfs)           *34000.00  * Flow (cfs)             * 2471.00  *23923.76  * 7605.24  *
* Top Width (ft)          * 1037.92  * Top Width (ft)          *  680.22  *   71.24  *  286.46  *
* Vel Total (ft/s)        *    4.24  * Avg. Vel. (ft/s)        *    2.97  *    9.38  *    1.64  *
* Max Chl Dpth (ft)       *   39.09  * Hydr. Depth (ft)        *   15.44  *   35.79  *   16.21  *
* Conv. Total (cfs)       *1301232.0  * Conv. (cfs)             * 94569.0  *915598.9  *291063.9  *
* Length Wtd. (ft)        *  593.72  * Wetted Per. (ft)        *   60.54  *   78.85  *  291.60  *
* Min Ch El (ft)          *  751.61  * Shear (lb/sq ft)        *    0.59  *    1.38  *    0.68  *
* Alpha                   *    3.52  * Stream Power (lb/ft s) *    1.74  *   12.93  *    1.11  *
* Frctn Loss (ft)         *    0.37  * Cum Volume (acre-ft)    * 2186.39  *10447.31  * 2647.88  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)          *  282.82  *  511.87  *  332.37  *
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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  795.11  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)         *  779.17  * Flow Area (sq ft)      * 1502.99  * 2864.14  * 5927.61  *
* E.G. Slope (ft/ft)     *0.000728  * Area (sq ft)           * 8523.15  * 2864.14  * 5927.61  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 3024.89  *29983.20  *11491.91  *
* Top Width (ft)         * 2159.25  * Top Width (ft)         * 1788.18  *   71.24  *  299.83  *
* Vel Total (ft/s)       *    4.32  * Avg. Vel. (ft/s)       *    2.01  *   10.47  *    1.94  *
* Max Chl Dpth (ft)      *   43.50  * Hydr. Depth (ft)       *    7.56  *   40.20  *   19.77  *
* Conv. Total (cfs)      *1649530.0  * Conv. (cfs)           *112126.9  *1111420.0  *425983.1  *
* Length Wtd. (ft)       *  594.18  * Wetted Per. (ft)       *  205.70  *   78.85  *  305.99  *
* Min Ch El (ft)         *  751.61  * Shear (lb/sq ft)       *    0.33  *    1.65  *    0.88  *
* Alpha                  *    4.02  * Stream Power (lb/ft s) *    0.67  *   17.28  *    1.71  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 3875.10  *12882.42  * 4777.02  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  584.01  *  539.88  *  707.22  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  798.20  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)         *  781.44  * Flow Area (sq ft)      * 2117.81  * 3084.32  * 6934.88  *
* E.G. Slope (ft/ft)     *0.000751  * Area (sq ft)           *14121.88  * 3084.32  * 6934.88  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 5442.90  *34465.80  *13781.30  *
* Top Width (ft)         * 2253.35  * Top Width (ft)         * 1839.04  *   71.24  *  343.07  *
* Vel Total (ft/s)       *    4.42  * Avg. Vel. (ft/s)       *    2.57  *   11.17  *    1.99  *
* Max Chl Dpth (ft)      *   46.59  * Hydr. Depth (ft)       *   10.65  *   43.29  *   20.21  *
* Conv. Total (cfs)      *1958805.0  * Conv. (cfs)           *198576.5  *1257437.0  *502791.5  *
* Length Wtd. (ft)       *  590.25  * Wetted Per. (ft)       *  205.70  *   78.85  *  350.25  *
* Min Ch El (ft)         *  751.61  * Shear (lb/sq ft)       *    0.48  *    1.83  *    0.93  *
* Alpha                  *    4.18  * Stream Power (lb/ft s) *    1.24  *   20.50  *    1.85  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 5775.50  *14333.79  * 7055.73  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  811.40  *  546.96  * 1073.31  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  800.86  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)         *  783.09  * Flow Area (sq ft)      * 2647.20  * 3273.90  * 7855.09  *
* E.G. Slope (ft/ft)     *0.000734  * Area (sq ft)           *19025.41  * 3273.90  * 7855.09  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 7802.43  *37624.10  *16573.47  *
* Top Width (ft)         * 2265.91  * Top Width (ft)         * 1846.16  *   71.24  *  348.51  *
* Vel Total (ft/s)       *    4.50  * Avg. Vel. (ft/s)       *    2.95  *   11.49  *    2.11  *
* Max Chl Dpth (ft)      *   49.25  * Hydr. Depth (ft)       *   13.31  *   45.96  *   22.54  *
* Conv. Total (cfs)      *2288702.0  * Conv. (cfs)           *288023.3  *1388877.0  *611802.2  *
* Length Wtd. (ft)       *  587.54  * Wetted Per. (ft)       *  205.70  *   78.85  *  356.30  *
* Min Ch El (ft)         *  751.61  * Shear (lb/sq ft)       *    0.59  *    1.90  *    1.01  *
* Alpha                  *    4.07  * Stream Power (lb/ft s) *    1.74  *   21.86  *    2.13  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 7493.35  *15272.55  * 9216.33  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  971.40  *  547.86  * 1430.87  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
```

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*****************************************************************************************
* E.G. Elev (ft)          *  806.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.27  * Wt. n-Val.             *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  804.89  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)          *  785.33  * Flow Area (sq ft)      * 3448.27  * 3560.77  * 9275.06  *
* E.G. Slope (ft/ft)      *0.000693  * Area (sq ft)           *26478.95  * 3560.77  * 9275.06  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *11779.44  *42053.61  *20886.95  *
* Top Width (ft)          * 2282.35  * Top Width (ft)         * 1854.37  *   71.24  *  356.74  *
* Vel Total (ft/s)        *    4.59  * Avg. Vel. (ft/s)       *    3.42  *   11.81  *    2.25  *
* Max Chl Dpth (ft)       *   53.28  * Hydr. Depth (ft)       *   17.33  *   49.98  *   26.00  *
* Conv. Total (cfs)       *2838543.0  * Conv. (cfs)            *447490.1  *1597577.0  *793475.8  *
* Length Wtd. (ft)        *  584.05  * Wetted Per. (ft)       *  205.70  *   78.85  *  365.47  *
* Min Ch El (ft)          *  751.61  * Shear (lb/sq ft)       *    0.73  *    1.95  *    1.10  *
* Alpha                   *    3.88  * Stream Power (lb/ft s) *    2.48  *   23.07  *    2.47  *
* Frctn Loss (ft)         *    0.38  * Cum Volume (acre-ft)   *10585.71  *16714.52  *13351.47  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         * 1182.34  *  550.30  * 1791.34  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  793.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.13  * Wt. n-Val.             *   0.075  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  792.32  * Reach Len. (ft)        *  470.97  *  603.47  *  622.77  *
* Crit W.S. (ft)          *  777.16  * Flow Area (sq ft)      *  956.35  * 2665.53  * 5110.99  *
* E.G. Slope (ft/ft)      *0.000742  * Area (sq ft)           * 3938.12  * 2665.53  * 5110.99  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             * 1922.27  *26849.97  * 9227.76  *
* Top Width (ft)          * 1651.30  * Top Width (ft)         * 1290.41  *   71.24  *  289.65  *
* Vel Total (ft/s)        *    4.35  * Avg. Vel. (ft/s)       *    2.01  *   10.07  *    1.81  *
* Max Chl Dpth (ft)       *   40.71  * Hydr. Depth (ft)       *    7.58  *   37.42  *   17.65  *
* Conv. Total (cfs)       *1395409.0  * Conv. (cfs)            * 70588.1  *985965.3  *338855.2  *
* Length Wtd. (ft)        *  596.01  * Wetted Per. (ft)       *  133.00  *   78.85  *  295.19  *
* Min Ch El (ft)          *  751.61  * Shear (lb/sq ft)       *    0.33  *    1.57  *    0.80  *
* Alpha                   *    3.84  * Stream Power (lb/ft s) *    0.67  *   15.77  *    1.45  *
* Frctn Loss (ft)         *    0.40  * Cum Volume (acre-ft)   * 2664.17  *11268.92  * 3208.81  *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)         *  361.57  *  522.24  *  398.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 18.977

INPUT
Description: Dodson XS 20.57
Station Elevation Data     num=     278
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      843     9.18  843.02    16.73  843.01    24.58  842.98    37.28  843.04
   37.37      843    37.55  842.94    50.82  835.98    50.94  835.93    51.41  835.65
   62.86   828.57    78.81  829.87    82.07  830.14    86.32  822.93    87.03  821.77
   87.97   820.69   102.02  820.52   143.66  820.09   176.12   819.3   204.78  818.98
  230.36   818.53   233.68  818.35   241.42  817.86   250.05   816.2   250.21  816.17
  263.69   812.59   265.09   812.1   265.77  812.11   267.71  811.75   284.02  809.94
  297.61   805.01   299.64   804.4   311.47  800.69   312.07   800.5   312.47  800.38
  312.83   800.31   333.46  796.61   339.86  796.56   345.39  796.36      359  796.95
  362.37   797.12   364.85  797.12   369.16  797.11   371.97  796.97   375.72  796.86
  381.71   796.93   405.09  795.57   408.02  795.13   422.22  793.37   423.82  793.11
  426.41   792.78    427.5  792.63   429.29  792.56    463.1  789.56   468.65  789.66
  484.41   789.94   493.14  790.03   517.09  790.48   529.26  790.76    551.3  791.62
  578.71   792.13   591.19   792.5   602.82  792.34   611.29  792.03   635.98  791.07
  648.92   790.82    677.1  791.18   684.58  791.14   698.75  790.83    717.1  790.32
   733.4   789.98   750.96  790.39   755.17  790.74   767.15  791.85   768.86  791.81
  769.99   791.79   772.18  791.68    785.3  791.12   786.91  790.93   791.29  790.43
   813.9   790.16   826.62  789.79   839.12  790.13   848.47  789.97    875.3   789.4
   904.1   788.72    911.1  788.73   918.39  788.74   948.42  788.42   953.05  788.44
  961.55   788.31   1001.8  788.11  1019.19  788.23  1026.02  788.15  1041.76  787.96
 1046.75      788  1063.94  787.64  1073.89   787.2  1074.26  787.18  1087.94   786.9
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 1098.19  786.68 1109.45  786.51 1142.01  786.65 1154.33  786.85 1174.32  787.09
 1200.24  787.59 1202.39  787.61 1202.87  787.61 1217.37  788.04 1259.97  788.11
 1262.27  788.18 1278.21  788.08 1282.63  788.09 1301.58  788.22 1324.49  789.42
 1334.15  789.73  1337.5  789.74  1394.3  790.01 1395.02     790 1396.01  789.99
 1437.28  789.76 1469.16  788.46  1474.7  788.37 1480.32  788.39 1519.81   788.4
 1529.63  788.17 1553.33  787.64 1565.65  787.49 1570.16   787.3 1579.25   786.6
  1581.9  786.37 1603.78  785.76 1610.74  785.78 1630.79  783.91 1633.94  783.87
 1634.81  783.93 1636.04  783.86 1646.68  784.41 1670.29  784.67 1674.48  784.75
 1688.67  785.47 1692.87  785.71  1693.7  785.91 1695.42  786.28  1705.7  788.46
 1712.78  791.17 1714.39  791.39 1716.77  792.14 1718.67  792.14  1722.3  792.19
 1729.96  793.05 1730.79  793.08 1731.31  793.21 1731.87  793.21 1754.33  793.21
 1756.31  793.13 1763.09   792.9 1763.84  792.96 1769.65  793.41 1779.68  793.65
 1799.53  794.13 1839.57  795.12 1878.37  795.61 1951.98  795.34 1993.15  795.43
 1998.25  795.36 2019.43  795.07 2067.79  794.83 2115.15  794.85 2130.39  794.65
 2161.43  794.65 2168.53  794.56 2176.48   794.6 2230.82  793.81 2241.83  793.84
 2257.53  793.53 2265.96  794.12 2266.78  794.18 2302.79  792.78 2304.62  792.78
 2328.17  792.85 2341.98  792.88 2343.34  792.87 2361.74  792.76 2378.49  792.88
 2383.45  792.94 2418.96  792.62 2472.26  791.89 2475.63  791.98 2504.84  792.19
  2506.8  792.22 2508.79  792.28 2527.88  792.61 2531.38  792.68 2535.11  792.91
 2545.65  793.05 2560.88  793.07 2562.26  793.07 2581.89  793.15 2640.45  792.33
 2663.26  792.02 2689.11  791.77 2699.27   791.6 2708.24  791.74 2709.14  791.87
 2718.77  791.87 2722.62  791.86 2727.01  790.63 2740.03  786.53 2750.99  784.91
  2756.5  784.05 2761.19   783.1 2771.41  781.03 2777.76  780.27  2789.6  778.65
 2814.11   776.9 2815.71  776.61 2830.02  774.17    2836   773.4 2848.03  772.02
  2858.5  771.19 2870.04  771.11 2891.24  770.44 2891.26  770.44 2897.39  769.32
 2901.73  767.48 2903.88  767.09  2905.2  766.56  2907.3  768.37 2910.55  770.01
 2911.95  769.84 2914.76  769.32  2918.8  767.21 2925.49  764.19 2927.21  763.07
 2931.81  761.69 2940.21  759.01 2942.97  757.73 2945.55  755.76    2952  752.12
    2972  751.12    2992  752.12 2996.93  755.61 3013.99  766.81 3021.47   771.6
 3023.16  772.28 3039.19  777.67 3039.42  777.65 3040.04  777.65 3043.05  777.65
 3067.51  777.65 3068.83  777.65 3069.24  777.64 3072.69  779.32 3085.86  786.05
 3094.32  789.23 3100.88  791.79 3102.84  792.54 3108.39  793.28 3115.74  794.46
  3119.6   794.8 3123.54  795.15 3126.73  795.39 3128.74  795.53 3132.38  795.73
 3133.94  795.81 3140.34  796.04 3141.75  796.09 3142.89  795.75 3147.25  794.18
 3151.32  795.98 3159.64  799.59 3195.62  819.82 3199.41  822.02 3206.15  826.72
 3225.47  840.31 3234.25  847.14 3253.59  862.53

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09 1754.33    .075 2545.65     .14 2911.95    .042 3039.19     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2911.95 3039.19           519.11  531.47  524.03             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2598.02  806.96       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1820    2100     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  779.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  778.65  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  764.43  * Flow Area (sq ft)      *  704.02  * 2322.35  *   31.14  *
* E.G. Slope (ft/ft)     *0.000550  * Area (sq ft)           *  704.02  * 2322.35  *   31.14  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  556.05  *12636.39  *    7.55  *
* Top Width (ft)         *  281.73  * Top Width (ft)         *  122.36  *  127.24  *   32.13  *
* Vel Total (ft/s)       *    4.32  * Avg. Vel. (ft/s)       *    0.79  *    5.44  *    0.24  *
* Max Chl Dpth (ft)      *   27.53  * Hydr. Depth (ft)       *    5.75  *   18.25  *    0.97  *
* Conv. Total (cfs)      *562979.8  * Conv. (cfs)            * 23715.6  *538941.9  *   322.2  *
* Length Wtd. (ft)       *  530.60  * Wetted Per. (ft)       *  124.51  *  138.24  *   32.36  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.19  *    0.58  *    0.03  *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    0.15  *    3.14  *    0.01  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  566.09  * 5516.79  *  577.78  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   96.37  *  420.06  *  117.80  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
```

```
* E.G. Elev (ft)         *  784.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  783.54  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  767.76  * Flow Area (sq ft)      * 1383.90  * 2943.99  *  211.75  *
* E.G. Slope (ft/ft)     *0.000545  * Area (sq ft)           * 1383.90  * 2943.99  *  211.75  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1472.30  *18676.25  *  151.46  *
* Top Width (ft)         *  321.91  * Top Width (ft)         *  152.92  *  127.24  *   41.75  *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *    1.06  *    6.34  *    0.72  *
* Max Chl Dpth (ft)      *   32.42  * Hydr. Depth (ft)       *    9.05  *   23.14  *    5.07  *
* Conv. Total (cfs)      *869823.8  * Conv. (cfs)            * 63085.6  *800248.4  *  6489.7  *
* Length Wtd. (ft)       *  530.13  * Wetted Per. (ft)       *  155.48  *  138.24  *   43.16  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.30  *    0.72  *    0.17  *
* Alpha                  *    1.86  * Stream Power (lb/ft s) *    0.32  *    4.59  *    0.12  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 1054.01  * 7350.23  * 1147.60  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  140.80  *  459.72  *  163.88  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  787.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  786.88  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  770.23  * Flow Area (sq ft)      * 1929.86  * 3369.95  *  362.74  *
* E.G. Slope (ft/ft)     *0.000554  * Area (sq ft)           * 2157.09  * 3369.95  *  362.74  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2381.46  *23603.47  *  335.07  *
* Top Width (ft)         *  540.47  * Top Width (ft)         *  364.34  *  127.24  *   48.89  *
* Vel Total (ft/s)       *    4.65  * Avg. Vel. (ft/s)       *    1.23  *    7.00  *    0.92  *
* Max Chl Dpth (ft)      *   35.76  * Hydr. Depth (ft)       *   11.15  *   26.48  *    7.42  *
* Conv. Total (cfs)      *1117753.0  * Conv. (cfs)           *101135.4  *1002388.0  * 14229.5  *
* Length Wtd. (ft)       *  529.85  * Wetted Per. (ft)       *  175.90  *  138.24  *   51.05  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.38  *    0.84  *    0.25  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.47  *    5.91  *    0.23  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 1488.23  * 8843.46  * 1726.67  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  176.81  *  487.64  *  241.09  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  791.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  790.44  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  773.04  * Flow Area (sq ft)      * 2564.58  * 3821.92  *  553.12  *
* E.G. Slope (ft/ft)     *0.000575  * Area (sq ft)           * 4816.82  * 3821.92  *  553.12  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 3731.36  *29656.53  *  612.11  *
* Top Width (ft)         * 1389.63  * Top Width (ft)         * 1204.17  *  127.24  *   58.22  *
* Vel Total (ft/s)       *    4.90  * Avg. Vel. (ft/s)       *    1.45  *    7.76  *    1.11  *
* Max Chl Dpth (ft)      *   39.32  * Hydr. Depth (ft)       *   13.91  *   30.04  *    9.50  *
* Conv. Total (cfs)      *1417398.0  * Conv. (cfs)           *155553.5  *1236326.0  * 25517.6  *
* Length Wtd. (ft)       *  529.58  * Wetted Per. (ft)       *  187.72  *  138.24  *   61.04  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.49  *    0.99  *    0.33  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.71  *    7.71  *    0.36  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 2147.71  *10403.18  * 2610.74  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  272.64  *  510.49  *  329.90  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  795.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  794.80  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  776.12  * Flow Area (sq ft)      * 3716.94  * 4377.41  *  844.26  *
```

```
* E.G. Slope (ft/ft)     *0.000614  * Area (sq ft)           *12261.03  * 4377.41  *  844.26  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 5041.43  *38424.36  * 1034.21  *
* Top Width (ft)         * 2413.34  * Top Width (ft)         * 2202.52  *  127.24  *   83.58  *
* Vel Total (ft/s)       *    4.98  * Avg. Vel. (ft/s)       *    1.36  *    8.78  *    1.22  *
* Max Chl Dpth (ft)      *   43.68  * Hydr. Depth (ft)       *   11.84  *   34.40  *   10.10  *
* Conv. Total (cfs)      *1795197.0  * Conv. (cfs)            *203379.0  *1550097.0  * 41721.6  *
* Length Wtd. (ft)       *  529.64  * Wetted Per. (ft)       *  317.55  *  138.24  *   87.18  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.45  *    1.21  *    0.37  *
* Alpha                  *    2.69  * Stream Power (lb/ft s) *    0.61  *   10.66  *    0.46  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   * 3762.74  *12832.26  * 4728.61  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  562.43  *  538.51  *  704.48  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  799.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.15  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  797.88  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  778.20  * Flow Area (sq ft)      * 4683.28  * 4769.08  * 1172.52  *
* E.G. Slope (ft/ft)     *0.000627  * Area (sq ft)           *19208.31  * 4769.08  * 1172.52  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 7487.44  *44785.92  * 1416.63  *
* Top Width (ft)         * 2549.33  * Top Width (ft)         * 2305.58  *  127.24  *  116.51  *
* Vel Total (ft/s)       *    5.05  * Avg. Vel. (ft/s)       *    1.60  *    9.39  *    1.21  *
* Max Chl Dpth (ft)      *   46.76  * Hydr. Depth (ft)       *   14.92  *   37.48  *   10.06  *
* Conv. Total (cfs)      *2143579.0  * Conv. (cfs)            *298936.8  *1788082.0  * 56559.2  *
* Length Wtd. (ft)       *  529.28  * Wetted Per. (ft)       *  317.55  *  138.24  *  121.02  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.58  *    1.35  *    0.38  *
* Alpha                  *    2.90  * Stream Power (lb/ft s) *    0.92  *   12.69  *    0.46  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 5595.32  *14279.39  * 6997.78  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  788.99  *  545.59  * 1070.02  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  801.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  800.50  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  780.16  * Flow Area (sq ft)      * 5506.42  * 5102.71  * 1485.72  *
* E.G. Slope (ft/ft)     *0.000628  * Area (sq ft)           *25272.84  * 5102.71  * 1485.72  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 9811.82  *50153.62  * 2034.56  *
* Top Width (ft)         * 2569.20  * Top Width (ft)         * 2319.89  *  127.24  *  122.07  *
* Vel Total (ft/s)       *    5.13  * Avg. Vel. (ft/s)       *    1.78  *    9.83  *    1.37  *
* Max Chl Dpth (ft)      *   49.38  * Hydr. Depth (ft)       *   17.54  *   40.10  *   12.17  *
* Conv. Total (cfs)      *2474122.0  * Conv. (cfs)            *391542.6  *2001390.0  * 81189.3  *
* Length Wtd. (ft)       *  528.99  * Wetted Per. (ft)       *  317.55  *  138.24  *  127.17  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.68  *    1.45  *    0.46  *
* Alpha                  *    3.00  * Stream Power (lb/ft s) *    1.21  *   14.22  *    0.63  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 7253.87  *15214.53  * 9149.56  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  948.88  *  546.49  * 1427.51  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
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*****************************************************************************************
* E.G. Elev (ft)         *  805.77  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  804.47  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  782.60  * Flow Area (sq ft)      * 6752.68  * 5607.83  * 1984.35  *
* E.G. Slope (ft/ft)     *0.000613  * Area (sq ft)           *34507.55  * 5607.83  * 1984.35  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *13616.75  *57979.27  * 3123.97  *
* Top Width (ft)         * 2588.93  * Top Width (ft)         * 2332.55  *  127.24  *  129.13  *
* Vel Total (ft/s)       *    5.21  * Avg. Vel. (ft/s)       *    2.02  *   10.34  *    1.57  *
* Max Chl Dpth (ft)      *   53.35  * Hydr. Depth (ft)       *   21.51  *   44.07  *   15.37  *
* Conv. Total (cfs)      *3018697.0  * Conv. (cfs)           *550118.5  *2342370.0  *126208.8  *
* Length Wtd. (ft)       *  528.64  * Wetted Per. (ft)       *  317.55  *  138.24  *  135.27  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.81  *    1.55  *    0.56  *
* Alpha                  *    3.09  * Stream Power (lb/ft s) *    1.64  *   16.04  *    0.88  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *10256.02  *16651.01  *13270.98  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         * 1159.70  *  548.92  * 1787.86  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  792.99  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  792.05  * Reach Len. (ft)        *  519.11  *  531.47  *  524.03  *
* Crit W.S. (ft)         *  774.32  * Flow Area (sq ft)      * 2880.46  * 4027.30  *  650.44  *
* E.G. Slope (ft/ft)     *0.000613  * Area (sq ft)           * 6974.58  * 4027.30  *  650.44  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 3814.40  *33395.95  *  789.66  *
* Top Width (ft)         * 1710.80  * Top Width (ft)         * 1521.19  *  127.24  *   62.37  *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *    1.32  *    8.29  *    1.21  *
* Max Chl Dpth (ft)      *   40.93  * Hydr. Depth (ft)       *   11.48  *   31.65  *   10.43  *
* Conv. Total (cfs)      *1535009.0  * Conv. (cfs)           *154082.4  *1349028.0  * 31898.2  *
* Length Wtd. (ft)       *  529.58  * Wetted Per. (ft)       *  254.58  *  138.24  *   65.49  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.43  *    1.11  *    0.38  *
* Alpha                  *    2.40  * Stream Power (lb/ft s) *    0.57  *    9.24  *    0.46  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   * 2605.18  *11222.56  * 3167.63  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  346.37  *  520.87  *  395.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 18.877

INPUT
Description: Dodson XS 20.47
Station Elevation Data    num=     345
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0  847.69    26.82  846.86    30.71  846.76     41.3  845.89    46.46  845.69
   55.74  844.58    76.58  843.85   109.51   842.8    131.1  842.56    132.5  842.55
  135.18  842.41   149.93  841.46   157.37  841.21   166.19  840.48   178.42  840.61
  188.63  840.52   224.28  840.57   237.46  840.47   241.64  840.26   256.71  839.85
  267.25  838.24   273.06  838.07   288.61  838.02   297.01  838.02   303.46  837.32
  311.67  827.73   317.51  820.35   335.84  819.96   349.51  819.66   391.04  818.76
  421.24  817.98   441.59  817.41   452.85  817.46   467.79  817.44   510.09  817.88
  598.88  816.96   627.97  816.09   635.32  810.04   637.74  808.12   650.44  807.38
  654.09  807.16    655.3  807.18    655.4   807.1   660.97  806.51   669.35  806.84
  672.56  804.75   679.65   803.5   683.43  802.89   691.63  803.15   691.72  803.15
  693.03   802.8    703.7  799.97   705.78  799.77   709.25   799.4    720.4  798.21
   728.6  798.31   730.49  798.37   732.11  798.56    742.9  800.01    745.9  800.01
  749.67  800.01   755.68  799.17   761.65  798.32   768.52  798.74   777.21  799.25
  780.95  799.25    783.9  799.25   789.31  798.82   793.43  798.48   796.46  797.56
```

```
  801.44  796.13  803.41  796.28  806.13  796.45  825.73  796.51  835.46  796.42
  857.01  796.32  886.03  796.29   902.4  796.01  911.82  795.92  920.76  795.68
   942.9  794.28   950.6  793.97  967.02   794.8  971.76  794.75   994.6  794.53
 1005.51  794.42 1008.02  794.22 1019.39  793.86 1026.61  794.04 1029.06  794.03
 1039.05  793.52 1052.55  793.42 1053.82  793.38 1055.78  793.33  1057.2   793.3
 1067.01  793.04 1075.21  792.99 1081.54  793.12 1083.54  793.26  1085.8  793.28
 1089.98  793.39 1094.04  793.39 1122.74  793.03 1130.11  793.04 1137.08  792.97
 1146.12  792.81 1157.76  792.77 1163.88  792.72 1180.36  793.56 1182.99  793.62
  1187.8   793.8  1198.5  794.59 1203.26  794.61 1213.78  794.32 1216.44  794.18
 1217.82  794.17  1242.4  793.53 1257.67  793.12 1269.86  792.85 1272.46  792.84
 1295.19   792.5 1296.91  792.48 1322.87  791.98 1327.87  791.35 1340.61  789.35
 1341.85  789.24 1348.21  788.36    1350  788.76 1356.71  790.27 1362.75  791.66
 1365.55  792.28 1390.67  792.25 1413.72  792.78 1417.64  792.83 1453.39  793.03
 1454.06  793.05 1454.69  793.04 1473.16  792.78 1479.58  792.76 1492.26  793.05
 1510.81  792.77 1543.91  792.51 1549.56  792.23 1552.63  792.29 1565.84  792.54
 1571.67  792.52 1587.77  792.29 1617.63  791.97 1624.12  791.92 1626.43  791.94
 1644.45  777.02 1644.98  776.91 1645.41  776.43 1646.08  776.14 1648.34  776.09
 1651.35  776.27  1653.2  778.34 1654.16  778.57 1657.52   779.2 1658.85  779.33
  1661.2  781.03 1664.82  781.58 1668.72  783.01 1677.47  788.55 1680.25  789.54
 1683.74  790.85 1687.39  791.39 1689.83  791.54  1691.2  791.68 1700.99  792.81
 1707.31  792.81 1721.42  792.81 1731.04  792.81 1754.45  792.13 1754.89  792.11
 1755.54  792.12 1775.36  793.75 1778.93  793.87 1782.58  793.83 1787.72  793.75
 1802.85  793.49 1810.07  793.49 1839.97  793.49 1840.92  793.49 1851.34  793.66
 1890.99   793.2 1915.29  793.06 1937.51  793.21 1942.09  793.22  1944.3  793.27
 1949.35  793.43 1950.26  793.46 1951.32  793.51 1955.21  793.57 1982.95  793.77
 2010.04  793.85 2035.63  793.93 2049.59  793.93 2057.35  793.85  2148.4  791.62
 2209.18  790.06 2216.65  789.78 2220.51  789.63 2275.34  787.48 2305.31  787.05
 2317.09  786.87 2342.24  786.19 2349.66  786.03  2356.6  786.19 2363.77  786.51
 2380.84  786.92 2396.17  787.93 2408.98  788.81 2419.58  788.62 2445.77  788.21
 2460.74  788.16 2471.67  788.21 2483.55  788.22 2491.45   788.3 2498.24  788.48
 2507.72  788.53 2511.61  788.55  2536.9  788.73 2543.64  788.84 2549.76  788.87
 2577.05  788.87 2581.86   788.9 2586.24  788.99 2600.98   789.2  2617.2  789.58
 2620.09  789.61 2622.72  789.69 2637.24  789.23 2642.68  789.03 2655.75  789.06
 2657.92  789.05  2659.2  789.03 2677.64  788.84 2695.68  788.65 2697.21  788.67
 2715.06  788.94 2729.56  788.97 2753.42  789.14 2788.48   789.7 2804.02  791.62
 2807.45  791.82 2815.92  792.56 2834.17  793.11  2858.1  793.21 2878.09  793.44
 2887.68  793.65 2898.25  793.79 2914.57  793.81 2933.98   793.7  3005.4  793.22
 3024.25   793.1    3042   792.9 3057.08  792.89 3061.99  792.91 3077.75  793.03
 3115.24  793.08 3118.33  792.32 3134.51  788.29 3137.14  786.88 3150.38  778.65
 3156.26     775 3157.13  774.95 3165.81  774.41 3190.63  774.75 3195.58  774.76
 3196.29  774.41  3199.4  772.91 3201.89   771.7 3213.29  766.31 3214.59     766
 3229.32  762.97 3237.49  761.31 3239.75  760.92  3246.8  760.15 3253.54  759.84
 3257.81  757.45 3261.93  755.94    3267  752.12    3285  751.12    3305  752.12
 3307.88  755.94 3313.38  760.94 3314.16  761.59 3315.35  761.87 3323.33  764.48
 3328.75  765.26 3340.49  766.79 3344.68  767.34 3346.86  768.95 3350.74  772.23
 3353.03  772.55    3363   774.2  3366.5   775.3 3377.96  778.15 3383.64  778.31
  3387.4  778.39 3394.81  778.77 3415.29   780.5 3427.56  786.67 3457.53  799.94
 3464.32  800.18 3471.21  800.51 3475.69  800.63 3478.53   800.7 3481.55  800.72
 3483.41  800.74 3486.41   800.7 3488.28  800.68  3491.3  800.59 3495.61  800.46
 3497.48  800.06 3499.98  799.43  3517.8  812.68 3525.97  819.02  3531.1  823.44
 3538.59  829.38 3555.45  843.97 3558.88  846.86 3561.21  848.53 3572.71  868.01
 3572.91  868.36 3579.33  868.76 3600.57  880.81 3628.62  897.76 3640.37  899.19
 3641.35  899.32 3649.95  900.47 3660.95  901.85 3661.92     902 3681.73  903.53
 3689.93  904.27 3716.17  904.29 3720.33   904.5 3731.18  904.83 3746.95  905.08
 3754.99  905.07 3773.57   904.2 3800.38  903.48 3815.98  902.47 3821.55  902.54

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .09 1700.99    .075 2914.57     .14 3253.54    .042 3323.33     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3253.54 3323.33          364.19  371.98  367.58             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 3013.22  808.57       F
Blocked Obstructions      num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
     480     630     830     835    1000     815    1930    2215     815
    2290    2390     815

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  778.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.72  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
```

```
* W.S. Elev (ft)         *  778.01  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  765.21  * Flow Area (sq ft)      *  899.95  * 1622.38  *  393.30  *
* E.G. Slope (ft/ft)     *0.000712  * Area (sq ft)           *  913.96  * 1622.38  *  393.30  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1063.93  *11730.70  *  405.38  *
* Top Width (ft)         *  235.63  * Top Width (ft)         *  111.78  *   69.79  *   54.06  *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)       *    1.18  *    7.23  *    1.03  *
* Max Chl Dpth (ft)      *   26.89  * Hydr. Depth (ft)       *    8.81  *   23.25  *    7.27  *
* Conv. Total (cfs)      *494709.2  * Conv. (cfs)            * 39873.8  *439642.7  * 15192.7  *
* Length Wtd. (ft)       *  371.48  * Wetted Per. (ft)       *  105.51  *   76.53  *   56.64  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.38  *    0.94  *    0.31  *
* Alpha                  *    2.27  * Stream Power (lb/ft s) *    0.45  *    6.81  *    0.32  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *  556.45  * 5492.73  *  575.22  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   94.98  *  418.86  *  117.28  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  783.72  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  782.71  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  768.65  * Flow Area (sq ft)      * 1397.76  * 1950.42  *  790.31  *
* E.G. Slope (ft/ft)     *0.000818  * Area (sq ft)           * 1506.11  * 1950.42  *  790.31  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 2251.03  *17094.16  *  954.82  *
* Top Width (ft)         *  306.16  * Top Width (ft)         *  140.01  *   69.79  *   96.35  *
* Vel Total (ft/s)       *    4.91  * Avg. Vel. (ft/s)       *    1.61  *    8.76  *    1.21  *
* Max Chl Dpth (ft)      *   31.59  * Hydr. Depth (ft)       *   12.74  *   27.95  *    8.20  *
* Conv. Total (cfs)      *709644.4  * Conv. (cfs)            * 78691.1  *597575.0  * 33378.4  *
* Length Wtd. (ft)       *  371.15  * Wetted Per. (ft)       *  114.42  *   76.53  *   99.56  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.62  *    1.30  *    0.41  *
* Alpha                  *    2.70  * Stream Power (lb/ft s) *    1.01  *   11.41  *    0.49  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 1036.79  * 7320.38  * 1141.57  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  139.06  *  458.52  *  163.05  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  787.15  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  785.93  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  771.02  * Flow Area (sq ft)      * 1759.56  * 2175.29  * 1111.10  *
* E.G. Slope (ft/ft)     *0.000885  * Area (sq ft)           * 1981.14  * 2175.29  * 1111.10  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 3319.42  *21327.62  * 1672.97  *
* Top Width (ft)         *  327.08  * Top Width (ft)         *  154.52  *   69.79  *  102.76  *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *    1.89  *    9.80  *    1.51  *
* Max Chl Dpth (ft)      *   34.81  * Hydr. Depth (ft)       *   15.32  *   31.17  *   10.81  *
* Conv. Total (cfs)      *884544.3  * Conv. (cfs)            *111556.7  *716763.6  * 56223.9  *
* Length Wtd. (ft)       *  370.96  * Wetted Per. (ft)       *  120.52  *   76.53  *  106.73  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.81  *    1.57  *    0.58  *
* Alpha                  *    2.88  * Stream Power (lb/ft s) *    1.52  *   15.40  *    0.87  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 1463.57  * 8809.63  * 1717.81  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *  173.72  *  486.44  *  240.18  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  790.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  789.29  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  773.64  * Flow Area (sq ft)      * 2156.80  * 2409.99  * 1468.86  *
* E.G. Slope (ft/ft)     *0.000982  * Area (sq ft)           * 2803.78  * 2409.99  * 1468.86  *
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* Q Total (cfs)          *34000.00  * Flow (cfs)             * 4680.07  *26647.89  * 2672.04  *
* Top Width (ft)         *  767.99  * Top Width (ft)         *  588.04  *   69.79  *  110.16  *
* Vel Total (ft/s)       *    5.63  * Avg. Vel. (ft/s)       *    2.17  *   11.06  *    1.82  *
* Max Chl Dpth (ft)      *   38.17  * Hydr. Depth (ft)       *   17.53  *   34.53  *   13.33  *
* Conv. Total (cfs)      *1084813.0  * Conv. (cfs)           *149323.6  *850234.5  * 85254.9  *
* Length Wtd. (ft)       *  370.79  * Wetted Per. (ft)       *  129.46  *   76.53  *  114.86  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    1.02  *    1.93  *    0.78  *
* Alpha                  *    3.05  * Stream Power (lb/ft s) *    2.22  *   21.35  *    1.43  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 2102.30  *10365.16  * 2598.58  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *  261.96  *  509.29  *  328.89  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  795.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.15  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.14  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  777.95  * Flow Area (sq ft)      * 2672.74  * 2678.26  * 1908.98  *
* E.G. Slope (ft/ft)     *0.001210  * Area (sq ft)           * 5770.42  * 2678.26  * 1908.98  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4889.76  *35257.66  * 4352.59  *
* Top Width (ft)         * 1562.88  * Top Width (ft)         * 1374.25  *   69.79  *  118.84  *
* Vel Total (ft/s)       *    6.13  * Avg. Vel. (ft/s)       *    1.83  *   13.16  *    2.28  *
* Max Chl Dpth (ft)      *   42.02  * Hydr. Depth (ft)       *   11.36  *   38.38  *   16.06  *
* Conv. Total (cfs)      *1279498.0  * Conv. (cfs)           *140594.1  *1013755.0  *125148.8  *
* Length Wtd. (ft)       *  370.77  * Wetted Per. (ft)       *  242.24  *   76.53  *  124.35  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    0.83  *    2.64  *    1.16  *
* Alpha                  *    3.68  * Stream Power (lb/ft s) *    1.52  *   34.79  *    2.64  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   * 3655.30  *12789.22  * 4712.05  *
* C & E Loss (ft)        *    0.40  * Cum SA (acres)         *  541.12  *  703.26  *  703.26  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  798.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.37  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  796.09  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  780.99  * Flow Area (sq ft)      * 3380.85  * 2883.92  * 2268.98  *
* E.G. Slope (ft/ft)     *0.001260  * Area (sq ft)           *11060.23  * 2883.92  * 2268.98  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 7284.02  *40702.43  * 5703.55  *
* Top Width (ft)         * 2063.83  * Top Width (ft)         * 1868.54  *   69.79  *  125.49  *
* Vel Total (ft/s)       *    6.29  * Avg. Vel. (ft/s)       *    2.15  *   14.11  *    2.51  *
* Max Chl Dpth (ft)      *   44.97  * Hydr. Depth (ft)       *   14.07  *   41.32  *   18.08  *
* Conv. Total (cfs)      *1512714.0  * Conv. (cfs)           *205227.0  *1146790.0  *160697.4  *
* Length Wtd. (ft)       *  370.60  * Wetted Per. (ft)       *  247.18  *   76.53  *  131.63  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    1.08  *    2.96  *    1.36  *
* Alpha                  *    3.85  * Stream Power (lb/ft s) *    2.32  *   41.83  *    3.41  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 5414.96  *14232.71  * 6977.07  *
* C & E Loss (ft)        *    0.42  * Cum SA (acres)         *  764.12  *  544.39  * 1068.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
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* E.G. Elev (ft)         *  801.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.52  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  798.61  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  782.92  * Flow Area (sq ft)      * 3988.69  * 3060.43  * 2593.62  *
* E.G. Slope (ft/ft)     *0.001283  * Area (sq ft)           *15875.13  * 3060.43  * 2593.62  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 9681.77  *45345.19  * 6973.04  *
* Top Width (ft)         * 2135.55  * Top Width (ft)         * 1934.55  *   69.79  *  131.21  *
* Vel Total (ft/s)       *    6.43  * Avg. Vel. (ft/s)       *    2.43  *   14.82  *    2.69  *
* Max Chl Dpth (ft)      *   47.49  * Hydr. Depth (ft)       *   16.60  *   43.85  *   19.77  *
* Conv. Total (cfs)      *1731193.0  * Conv. (cfs)           *270338.8  *1266149.0  *194704.4  *
* Length Wtd. (ft)       *  370.48  * Wetted Per. (ft)       *  247.18  *   76.53  *  137.88  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    1.29  *    3.20  *    1.51  *
* Alpha                  *    3.93  * Stream Power (lb/ft s) *    3.14  *   47.44  *    4.05  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   * 7008.69  *15164.73  * 9125.02  *
* C & E Loss (ft)        *    0.43  * Cum SA (acres)         *  923.53  *  545.28  * 1425.99  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  805.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.81  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  802.35  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  785.58  * Flow Area (sq ft)      * 4886.56  * 3321.18  * 3180.36  *
* E.G. Slope (ft/ft)     *0.001326  * Area (sq ft)           *23314.81  * 3321.18  * 3180.36  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *13806.82  *52832.05  * 8081.12  *
* Top Width (ft)         * 2259.19  * Top Width (ft)         * 2008.82  *   69.79  *  180.58  *
* Vel Total (ft/s)       *    6.56  * Avg. Vel. (ft/s)       *    2.83  *   15.91  *    2.54  *
* Max Chl Dpth (ft)      *   51.23  * Hydr. Depth (ft)       *   20.33  *   47.59  *   17.61  *
* Conv. Total (cfs)      *2052138.0  * Conv. (cfs)           *379195.8  *1450999.0  *221943.0  *
* Length Wtd. (ft)       *  370.34  * Wetted Per. (ft)       *  247.18  *   76.53  *  188.64  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    1.64  *    3.59  *    1.40  *
* Alpha                  *    4.21  * Stream Power (lb/ft s) *    4.62  *   57.14  *    3.55  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 9911.48  *16596.54  *13239.92  *
* C & E Loss (ft)        *    0.46  * Cum SA (acres)         * 1133.83  *  547.72  * 1786.00  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  792.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.65  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  790.85  * Reach Len. (ft)        *  364.19  *  371.98  *  367.58  *
* Crit W.S. (ft)         *  776.09  * Flow Area (sq ft)      * 2353.60  * 2518.83  * 1643.39  *
* E.G. Slope (ft/ft)     *0.001032  * Area (sq ft)           * 3842.89  * 2518.83  * 1643.39  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 5371.12  *29398.51  * 3230.38  *
* Top Width (ft)         *  879.87  * Top Width (ft)         *  696.40  *   69.79  *  113.68  *
* Vel Total (ft/s)       *    5.83  * Avg. Vel. (ft/s)       *    2.28  *   11.67  *    1.97  *
* Max Chl Dpth (ft)      *   39.73  * Hydr. Depth (ft)       *   18.20  *   36.09  *   14.46  *
* Conv. Total (cfs)      *1182955.0  * Conv. (cfs)           *167205.0  *915186.8  *100562.8  *
* Length Wtd. (ft)       *  370.73  * Wetted Per. (ft)       *  135.91  *   76.53  *  118.71  *
* Min Ch El (ft)         *  751.12  * Shear (lb/sq ft)       *    1.12  *    2.12  *    0.89  *
* Alpha                  *    3.13  * Stream Power (lb/ft s) *    2.55  *   24.75  *    1.75  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 2540.72  *11182.62  * 3153.83  *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)         *  333.16  *  519.67  *  394.62  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.806

INPUT
Description: Dodson XS 20.4
Station Elevation Data num= 349

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	829.91	33.9	823.69	44.77	823.41	53.7	823.09	56.62	823.42
80.07	822.87	82.8	822.69	89.56	822.45	125.31	821.04	132.55	820.76
137.66	820.83	149.74	821	166.5	820.92	173.59	820.47	173.76	820.46
181.31	816.39	183.4	815.22	190.2	814.52	194.01	814.14	197.65	813.81
207.78	813.41	218	813.03	222.62	812.8	229.18	812.48	237.5	811.8
241.04	811.55	252.45	811.2	263.02	810.89	266.72	810.7	270.84	810.48
279.53	810.12	285.83	809.86	288.44	809.75	293.74	809.5	297.86	809.28
313.81	808.48	323.65	807.87	325.43	808.49	326.9	807.89	334.34	807.93
336.83	807.96	345.9	807.74	355.8	805.92	363.52	805.43	368.1	804.86
376.2	804.96	379.65	804.91	390.84	804.67	399.03	804.66	400.86	804.69
405.13	804.78	408.43	804.85	408.8	804.8	421.34	804.33	422.08	804.29
433.52	803.62	444.34	803.09	454.8	802.22	457.81	802.06	462.16	801.97
486.91	801.42	520.22	800.33	527.85	800.13	569.86	799.33	573.58	799.26
573.88	799.26	621.28	798.84	624.04	798.83	626.9	798.78	636.28	798.8
646.84	800.1	651.67	800.55	653.41	800.48	664.39	800.07	676.25	800.15
682.36	800.2	713.85	800.41	724.9	800.49	726.17	800.47	727.06	800.49
730.59	800.42	744.26	800.25	752.19	799.98	756.91	799.98	758.54	799.98
768.78	798.22	769.12	798.16	769.29	798.16	787.91	799.51	804.44	798.8
845.57	797.39	862.04	797.47	862.13	797.52	881.45	797.3	1029.59	796.51
1048.6	795.65	1055.96	795.32	1070.12	794.7	1092.33	794.91	1163.33	795.59
1166.91	795.68	1185.76	804.64	1187.15	805.26	1192.18	803.8	1192.51	803.8
1199.44	803.62	1206.35	803.73	1209.4	803.84	1213.69	803.78	1219.31	803.83
1223.99	803.53	1225.83	802.68	1228.86	802.18	1230.27	801.45	1238.03	795.48
1249.76	795.51	1252.62	795.51	1255.6	795.56	1262.04	795.56	1294.02	795.36
1296.25	796.03	1303.94	796.62	1306.2	796.8	1315.16	794.76	1316.87	794.74
1318.35	794.72	1321.01	794.78	1321.64	794.73	1324.86	794.71	1340.79	794.23
1348.59	794	1367.18	793.53	1382.25	793.14	1389	792.99	1393.62	792.96
1405.77	792.89	1468.72	792.55	1489.56	792.75	1508.09	792.84	1532.97	792.9
1588.49	793.14	1624.8	793.12	1640.03	792.86	1666.71	792.47	1687.45	791.28
1690.09	791.2	1691.27	791.17	1698.1	790.97	1717.5	792.08	1753.09	791.77
1791.71	792.01	1840.92	792.32	1879.55	792.41	1895.32	792.79	1923.04	792.79
1979.29	792.82	1981.71	792.84	1983.4	792.84	1991.86	792.75	2032.45	791.89
2054.16	791.92	2061.75	791.88	2066.4	791.85	2083.02	791.83	2095.21	791.63
2104.36	791.58	2118.41	791.49	2136.41	790.82	2142.42	790.55	2146.3	790.36
2150.02	790.24	2165.72	789.58	2168.3	789.19	2169.35	789.3	2171.43	789.25
2186.73	787.81	2187.86	787.69	2199.43	786.73	2202.95	786.46	2205.21	786.25
2211.99	786.02	2228.35	785.87	2232.05	785.82	2234.98	785.69	2238.46	785.47
2249.7	784.77	2253.25	784.76	2254.08	784.77	2259.62	784.82	2261.07	785.26
2264.48	785.46	2267.59	785.8	2270.61	783.88	2274.77	782.92	2277.06	783.02
2283.14	784.07	2286.53	783.42	2287.73	783.49	2292.69	782.98	2293.82	782.83
2294.59	782.55	2295.49	782.58	2300.97	783.07	2307.42	780.54	2311.84	778.71
2313.87	779.01	2319.63	778.55	2325.74	777.23	2326.1	777.23	2326.26	777.24
2333.18	777.22	2342.65	777.18	2349.1	777.16	2352.06	777.14	2360.46	779.95
2372.16	785.23	2374.16	786.04	2374.98	786.5	2389.71	786.52	2424.83	786.45
2455.93	786.47	2461.91	786.46	2478	786.44	2501.2	778.16	2509.31	775.26
2516.19	775.2	2518.58	775.2	2538.84	775.66	2602.89	775.84	2612.53	775.88
2622.52	775.96	2654.76	776.12	2711.6	776.69	2720.19	777.07	2730.7	777.74
2736.22	777.86	2741.97	777.99	2749.8	778.39	2757.47	778.73	2780.56	779.98
2795.26	780.75	2819.16	780.94	2831.58	780.86	2845.33	780.68	2845.76	780.72
2846.85	781.04	2848.11	781.28	2854.71	781.99	2864.56	781.3	2866.24	781.04
2867.81	780.82	2872.29	780.63	2884.11	780.28	2911.82	779.4	2932.29	777.44
2936.33	776.97	2937.35	776.91	2943.61	776.58	2946.44	776.46	2949.98	776.34
2988.47	774.54	2998.82	774.53	3009.25	773.02	3009.69	772.94	3010.68	772.95
3017.34	773.09	3020.76	773.15	3021.06	773.16	3022.89	773.34	3029.96	774
3041.95	774.05	3058.66	774.23	3075.15	773.65	3115.84	775.16	3116.48	775.19
3129.76	774.86	3132.19	774.68	3134.06	774.54	3138.26	774.22	3141.17	772.84
3146.51	769.86	3154.55	764.31	3160.65	760.09	3164.99	758.67	3171.8	755.94
3178	751.39	3200	750.39	3222	751.39	3228.08	755.94	3231.79	758.3
3234.21	759.75	3238.81	761.16	3243.36	762.43	3251.03	765.01	3254.99	766.76
3257.03	767.44	3260.4	768.56	3262.95	769.59	3271.06	772.05	3273.38	772.23
3282.29	772.49	3289.86	772.77	3295.43	773.04	3304.06	774.49	3308.99	774.9
3310.96	775.07	3319.8	775.27	3325.45	775.08	3328.58	774.81	3330.53	774.6

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 3336.47   775.1 3346.18  775.91 3352.43  776.95 3374.09  785.23 3374.66  785.42
 3375.01  785.62 3400.04  797.67 3402.47  798.07 3414.23  800.34 3416.95  800.86
 3417.46  800.88  3418.4  800.91 3424.24  801.07 3428.56  801.11 3429.11  801.11
 3429.65  801.11 3433.96  801.07 3439.08  800.92 3441.27  800.86 3445.71  800.04
 3447.64  799.67 3470.55  815.33 3506.31  840.15 3517.45  855.12 3526.87  866.37
 3538.99  869.11 3554.66  871.99 3587.95  890.88 3590.29   891.9 3618.17   894.4
 3644.11  898.06 3647.54  898.47 3665.48  898.77 3676.03  899.34 3697.16  900.71
 3727.12  902.41 3738.41  903.15 3752.62  903.74 3764.87  903.17

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  752.19    .075    2478     .14 3138.26    .042 3271.06     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3138.26 3271.06           646.54  682.71  701.86             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2995.59  808.94       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
     230     420     825     850    1020     815    1525    1850     815
    1950    2010     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  778.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  778.04  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  763.35  * Flow Area (sq ft)      *  555.29  * 2524.00  *  306.41  *
* E.G. Slope (ft/ft)     *0.000446  * Area (sq ft)           * 1185.53  * 2524.00  *  306.41  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  307.59  *12730.68  *  161.74  *
* Top Width (ft)         *  703.55  * Top Width (ft)         *  486.52  *  132.80  *   84.23  *
* Vel Total (ft/s)       *    3.90  * Avg. Vel. (ft/s)       *    0.55  *    5.04  *    0.53  *
* Max Chl Dpth (ft)      *   27.65  * Hydr. Depth (ft)       *    3.89  *   19.01  *    3.64  *
* Conv. Total (cfs)      *625165.3  * Conv. (cfs)            * 14567.7  *602937.6  *  7660.0  *
* Length Wtd. (ft)       *  681.96  * Wetted Per. (ft)       *  142.90  *  143.86  *   84.77  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.11  *    0.49  *    0.10  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.06  *    2.46  *    0.05  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *  547.68  * 5475.03  *  572.27  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   92.48  *  417.99  *  116.70  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  783.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  782.86  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  766.52  * Flow Area (sq ft)      * 1242.51  * 3163.67  *  742.47  *
* E.G. Slope (ft/ft)     *0.000443  * Area (sq ft)           * 4152.05  * 3163.67  *  742.47  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1173.46  *18487.98  *  638.57  *
* Top Width (ft)         *  950.28  * Top Width (ft)         *  720.65  *  132.80  *   96.83  *
* Vel Total (ft/s)       *    3.94  * Avg. Vel. (ft/s)       *    0.94  *    5.84  *    0.86  *
* Max Chl Dpth (ft)      *   32.47  * Hydr. Depth (ft)       *    8.71  *   23.82  *    7.67  *
* Conv. Total (cfs)      *964680.3  * Conv. (cfs)            * 55764.0  *878570.8  * 30345.5  *
* Length Wtd. (ft)       *  681.63  * Wetted Per. (ft)       *  142.90  *  143.86  *   98.26  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.24  *    0.61  *    0.21  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *    0.23  *    3.55  *    0.18  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 1013.13  * 7298.54  * 1135.10  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  135.46  *  457.65  *  162.23  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  786.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  786.16  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
```

```
* Crit W.S. (ft)         *  768.85  * Flow Area (sq ft)      * 1713.32  * 3601.91  * 1076.13  *
* E.G. Slope (ft/ft)     *0.000451  * Area (sq ft)           * 6673.89  * 3601.91  * 1076.13  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2023.53  *23167.06  * 1129.41  *
* Top Width (ft)         * 1063.84  * Top Width (ft)         *  825.97  *  132.80  *  105.07  *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *    1.18  *    6.43  *    1.05  *
* Max Chl Dpth (ft)      *   35.77  * Hydr. Depth (ft)       *   12.01  *   27.12  *   10.24  *
* Conv. Total (cfs)      *1239065.0  * Conv. (cfs)            * 95261.6  *1090634.0  * 53169.4  *
* Length Wtd. (ft)       *  681.31  * Wetted Per. (ft)       *  142.90  *  143.86  *  107.14  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.34  *    0.71  *    0.28  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.40  *    4.54  *    0.30  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 1427.39  * 8784.96  * 1708.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  169.62  *  485.58  *  239.30  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  790.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  789.63  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  771.39  * Flow Area (sq ft)      * 2207.75  * 4062.14  * 1452.73  *
* E.G. Slope (ft/ft)     *0.000474  * Area (sq ft)           * 9941.32  * 4062.14  * 1452.73  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 3164.86  *29015.61  * 1819.53  *
* Top Width (ft)         * 1218.68  * Top Width (ft)         *  973.61  *  132.80  *  112.27  *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)       *    1.43  *    7.14  *    1.25  *
* Max Chl Dpth (ft)      *   39.24  * Hydr. Depth (ft)       *   15.47  *   30.59  *   12.94  *
* Conv. Total (cfs)      *1561575.0  * Conv. (cfs)            *145357.7  *1332649.0  * 83568.5  *
* Length Wtd. (ft)       *  681.28  * Wetted Per. (ft)       *  142.90  *  143.86  *  115.13  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.46  *    0.84  *    0.37  *
* Alpha                  *    2.26  * Stream Power (lb/ft s) *    0.66  *    5.97  *    0.47  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 2049.02  *10337.52  * 2586.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  255.43  *  508.43  *  327.95  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  794.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.79  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  774.67  * Flow Area (sq ft)      * 2801.87  * 4615.16  * 1938.26  *
* E.G. Slope (ft/ft)     *0.000499  * Area (sq ft)           *14622.35  * 4615.16  * 1938.26  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4828.48  *36811.01  * 2860.51  *
* Top Width (ft)         * 1650.06  * Top Width (ft)         * 1396.34  *  132.80  *  120.92  *
* Vel Total (ft/s)       *    4.76  * Avg. Vel. (ft/s)       *    1.72  *    7.98  *    1.48  *
* Max Chl Dpth (ft)      *   43.40  * Hydr. Depth (ft)       *   19.64  *   34.75  *   16.03  *
* Conv. Total (cfs)      *1992895.0  * Conv. (cfs)            *216239.5  *1648550.0  *128105.5  *
* Length Wtd. (ft)       *  679.99  * Wetted Per. (ft)       *  142.90  *  143.86  *  124.73  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.61  *    1.00  *    0.48  *
* Alpha                  *    2.35  * Stream Power (lb/ft s) *    1.05  *    7.97  *    0.71  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 3570.05  *12758.08  * 4695.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  529.54  *  536.44  *  702.25  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  797.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  796.78  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  777.39  * Flow Area (sq ft)      * 3228.15  * 5011.95  * 2308.83  *
* E.G. Slope (ft/ft)     *0.000531  * Area (sq ft)           *19191.85  * 5011.95  * 2308.83  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 6307.34  *43571.66  * 3810.99  *
* Top Width (ft)         * 1925.68  * Top Width (ft)         * 1665.75  *  132.80  *  127.13  *
* Vel Total (ft/s)       *    5.09  * Avg. Vel. (ft/s)       *    1.95  *    8.69  *    1.65  *
* Max Chl Dpth (ft)      *   46.39  * Hydr. Depth (ft)       *   22.63  *   37.74  *   18.16  *
* Conv. Total (cfs)      *2330724.0  * Conv. (cfs)            *273806.6  *1891479.0  *165438.1  *
* Length Wtd. (ft)       *  679.08  * Wetted Per. (ft)       *  142.90  *  143.86  *  131.62  *
```

```
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.75  *    1.15  *    0.58  *
* Alpha                  *    2.39  * Stream Power (lb/ft s) *    1.46  *   10.03  *    0.96  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 5288.50  *14199.00  * 6957.76  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  749.34  *  543.52  * 1067.50  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  800.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  799.32  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  779.05  * Flow Area (sq ft)      * 3590.76  * 5349.47  * 2643.37  *
* E.G. Slope (ft/ft)     *0.000555  * Area (sq ft)           *23534.46  * 5349.47  * 2643.37  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 7702.41  *49671.14  * 4626.45  *
* Top Width (ft)         * 2096.03  * Top Width (ft)         * 1825.35  *  132.80  *  137.88  *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *    2.15  *    9.29  *    1.75  *
* Max Chl Dpth (ft)      *   48.93  * Hydr. Depth (ft)       *   25.17  *   40.28  *   19.17  *
* Conv. Total (cfs)      *2631857.0  * Conv. (cfs)           *326961.9  *2108506.0  *196389.5  *
* Length Wtd. (ft)       *  678.38  * Wetted Per. (ft)       *  142.90  *  143.86  *  142.73  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.87  *    1.29  *    0.64  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    1.87  *   11.96  *    1.12  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 6843.94  *15128.82  * 9102.92  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  907.81  *  544.42  * 1424.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  804.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  803.12  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  781.22  * Flow Area (sq ft)      * 4132.81  * 5854.03  * 3269.43  *
* E.G. Slope (ft/ft)     *0.000582  * Area (sq ft)           *31164.81  * 5854.03  * 3269.43  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 9972.57  *59123.27  * 5624.16  *
* Top Width (ft)         * 2411.60  * Top Width (ft)         * 2097.17  *  132.80  *  181.62  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    2.41  *   10.10  *    1.72  *
* Max Chl Dpth (ft)      *   52.73  * Hydr. Depth (ft)       *   28.97  *   44.08  *   18.00  *
* Conv. Total (cfs)      *3096659.0  * Conv. (cfs)           *413298.2  *2450276.0  *233085.1  *
* Length Wtd. (ft)       *  677.45  * Wetted Per. (ft)       *  142.90  *  143.86  *  187.81  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    1.05  *    1.48  *    0.63  *
* Alpha                  *    2.57  * Stream Power (lb/ft s) *    2.54  *   14.94  *    1.09  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 9683.74  *16557.37  *13212.71  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         * 1116.67  *  546.85  * 1784.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  791.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.              *   0.140  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  791.24  * Reach Len. (ft)        *  646.54  *  682.71  *  701.86  *
* Crit W.S. (ft)         *  772.58  * Flow Area (sq ft)      * 2438.25  * 4276.69  * 1636.82  *
* E.G. Slope (ft/ft)     *0.000486  * Area (sq ft)           *11545.69  * 4276.69  * 1636.82  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 3782.06  *32017.06  * 2200.88  *
* Top Width (ft)         * 1261.58  * Top Width (ft)         * 1013.15  *  132.80  *  115.63  *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *    1.55  *    7.49  *    1.34  *
* Max Chl Dpth (ft)      *   40.85  * Hydr. Depth (ft)       *   17.09  *   32.20  *   14.16  *
* Conv. Total (cfs)      *1723348.0  * Conv. (cfs)           *171521.2  *1452014.0  * 99812.8  *
* Length Wtd. (ft)       *  680.86  * Wetted Per. (ft)       *  142.90  *  143.86  *  118.86  *
* Min Ch El (ft)         *  750.39  * Shear (lb/sq ft)       *    0.52  *    0.90  *    0.42  *
* Alpha                  *    2.30  * Stream Power (lb/ft s) *    0.80  *    6.76  *    0.56  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 2476.39  *11153.61  * 3139.99  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  326.01  *  518.80  *  393.65  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.677

INPUT
Description: Dodson XS 20.266
Station Elevation Data num= 327

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	848.37	1.98	848.26	6.08	847.98	14.57	846.17	17.41	845.96
19.17	845.61	22.67	845.36	27.26	845.04	31.24	844.71	58	843.81
60.11	843.74	64.64	843.57	93.29	842.65	93.93	842.6	96.61	842.31
108.25	840.82	120.14	839.02	124.49	838.71	125.67	838.64	156.21	836.08
159.8	835.88	168.33	835.36	175.91	834.91	181.41	834.65	205.11	833.1
219.88	832.23	221.99	832.13	229.6	830.7	229.96	830.64	231.84	830.48
248.32	825.63	250.46	824.98	264.23	824.48	288.41	823.13	291.67	822.85
293.71	823.15	306.01	825.82	308.86	823.28	322.65	814.65	329.44	810.17
331.74	809.6	340.03	809.81	340.82	809.8	341.41	809.57	348.17	804.55
365	804.64	375.06	804.33	378.81	804.23	379.21	804.23	379.6	804.22
379.96	804.22	380.14	804.22	380.23	804.22	380.31	804.22	391.35	803.9
398.22	803.9	404.67	803.79	405.72	803.71	407.21	803.61	413.47	803.17
424.76	803.11	431.2	803.13	435.61	803.14	441.07	803.07	450.3	802.96
462.86	802.61	465.03	802.55	466.69	802.48	487.08	801.62	487.99	801.58
495.87	801.53	500.15	801.48	500.22	801.48	508.76	801.37	541.16	800.42
570.53	799.65	579.78	797.32	582.05	796.58	584.04	797.16	592.74	799.28
595.21	799.48	621.93	799.29	632.5	799.29	647.37	799.33	694.8	799.31
705.58	799.38	720.72	799.72	730.05	799.92	749.69	800.09	759.64	800.54
766.47	800.68	780.65	800.63	782.1	800.63	784.18	800.61	788.71	800.54
818.64	800.03	825.7	799.75	830.77	799.33	832.84	799.6	838.93	798.68
843.15	798.33	845.8	798.04	847.63	797.87	856.41	797.83	863.02	797.37
889.91	797.53	897.78	797.58	918.85	797.19	945.14	796.87	955.42	796.45
960.22	796.23	970.92	796.12	1089.92	795.21	1091.98	795.22	1158.01	794.52
1173.44	794.39	1220.14	794.64	1253.97	794.83	1255.99	794.83	1257.26	795.48
1259.36	796.58	1270.88	800.84	1273.03	800.72	1275.62	800.48	1299.66	801.3
1313.91	802.08	1318.81	802.22	1336.14	800.58	1350.04	798.87	1353.55	798.53
1367.5	797.16	1370.97	797.29	1372.8	797.28	1377.97	796.63	1383.53	795.93
1383.63	795.92	1384.07	795.91	1386.37	795.83	1394.91	794.63	1395.31	794.6
1399.56	792.54	1399.92	792.34	1408.24	792.74	1409.21	792.8	1416.32	794.1
1416.62	794.14	1417.03	794.14	1428.07	794.03	1441.8	793.9	1443.16	793.89
1443.17	793.89	1443.23	793.89	1443.49	793.88	1451.54	793.84	1518.36	793.34
1533.35	793.36	1545.52	793.21	1549.17	793.21	1561.45	793.22	1610.27	793.27
1626.9	793.55	1629.19	793.27	1686.34	792.79	1698.19	792.65	1724.01	791.57
1728.69	791.34	1732.02	791.22	1827.47	789.66	1832.57	789.62	1846.59	789.52
1854.31	789.53	1925.36	789.08	1925.42	789.08	1925.5	789.08	1935.14	789.6
1947.31	790.26	1959.13	790.9	1981.23	790.97	1985.92	790.69	1992.5	790.84
2005.72	790.55	2013.08	790.58	2031.47	790.47	2048.57	790.24	2050.86	790.2
2060.2	790.17	2061.24	790.19	2100.33	790.48	2107.28	790.08	2110.08	790.24
2115.51	790.19	2126.18	790.31	2141.93	790.38	2158.41	790.59	2174.3	790.79
2183.77	790.85	2193.92	785.76	2199.59	781.28	2201.89	781.28	2205.79	781.28
2218.76	781.28	2220.73	781.28	2229.11	781.28	2232.79	781.28	2238.24	781.28
2240.67	781.28	2242.93	781.28	2248.86	784.64	2249.85	785.37	2252.66	786.12
2264.59	789.51	2300.75	790.52	2306.14	790.6	2313.11	790.76	2321.47	790.78
2340.99	790.82	2353.29	790.98	2374.95	791.14	2408.78	790.86	2414.46	790.86
2418.29	790.85	2430.89	790.96	2436.51	791.05	2441.45	791.1	2468.06	790.99
2470.15	790.97	2474.19	790.97	2487.57	790.72	2506.12	790.4	2507.4	790.38
2510.12	790.35	2515.79	790.52	2529.95	790.91	2539.67	790.76	2544.33	790.57
2551.11	790.41	2560.03	790.56	2593.18	790.8	2605.05	791.02	2641.28	791.27
2646.86	791.34	2652.25	791.34	2711.27	791.25	2713.04	791.04	2718.18	790.81
2743.74	790.18	2759.73	789.79	2767.39	789.33	2772.5	789.05	2779.52	789.03
2812.77	788.31	2819.43	788.16	2833.72	788.06	2845.63	787.88	2861.21	787.7
2891.05	787.93	2915.85	785.47	2920.87	785.33	2926.36	785.41	2929.32	785.47
2965.61	786.96	2968.18	786.97	2984.56	787.07	2997.36	787.27	2999.73	787.28
3000.08	787.28	3000.53	787.29	3004.46	787.19	3008.07	787.2	3011.77	787.21
3012.73	786.91	3016.79	785.63	3022.93	783.7	3046.18	781.01	3056.2	779.95
3058.24	779.09	3073.51	769.32	3075.68	768.81	3083.76	767.07	3092.42	766.4
3098.59	765.93	3100.3	765.43	3118.6	760.44	3120.89	759.48	3126.16	755.96
3132	750.85	3152	749.85	3172	750.85	3177.04	755.94	3177.52	756.1
3178.69	756.44	3180.72	756.34	3205.24	760.98	3209.09	763.48	3217.68	769.69
3231.74	771.03	3240.12	771.79	3241.97	771.87	3248.54	772.16	3259.55	772.58
3269.33	773.03	3272.67	773.06	3289.53	773.71	3316.19	774.66	3318.98	775.56
3341.07	784.41	3388.1	803.86	3395.64	805.15	3396.45	805.29	3397.03	805.3
3403.74	805.49	3404.41	805.5	3408.59	805.54	3409.67	805.53	3413.42	805.49

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  3418.3  805.36 3420.74  805.29 3426.31  805.27 3428.51  805.22 3436.92   809.9
 3458.95   822.1 3473.75  831.22  3489.3  840.87 3490.63  841.54 3492.37  844.45
 3499.41  855.58 3500.71  856.02

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .12  404.67    .075 3098.59    .042 3217.68     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3098.59 3217.68           496.55  522.52  517.48             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2722.47  809.81       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************************************
     740     960     815    1000    1250     815    1500    1650     815
    1850    2000     815

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  778.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  777.78  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  763.24  * Flow Area (sq ft)      *  321.65  * 2505.18  *  514.13  *
* E.G. Slope (ft/ft)     *0.000374  * Area (sq ft)           *  321.65  * 2505.18  *  514.13  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  485.89  *12414.78  *  299.33  *
* Top Width (ft)         *  264.23  * Top Width (ft)         *   38.30  *  119.09  *  106.84  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *    1.51  *    4.96  *    0.58  *
* Max Chl Dpth (ft)      *   27.93  * Hydr. Depth (ft)       *    8.40  *   21.04  *    4.81  *
* Conv. Total (cfs)      *682809.1  * Conv. (cfs)            * 25134.2  *642191.2  * 15483.8  *
* Length Wtd. (ft)       *  521.84  * Wetted Per. (ft)       *   41.06  *  128.45  *  107.56  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)       *    0.18  *    0.46  *    0.11  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.28  *    2.26  *    0.06  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *  536.49  * 5435.61  *  565.66  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   88.58  *  416.02  *  115.16  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  783.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  782.54  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  766.22  * Flow Area (sq ft)      *  549.07  * 3071.65  * 1050.58  *
* E.G. Slope (ft/ft)     *0.000418  * Area (sq ft)           *  605.91  * 3071.65  * 1050.58  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  886.15  *18447.10  *  966.75  *
* Top Width (ft)         *  350.55  * Top Width (ft)         *  112.75  *  119.09  *  118.71  *
* Vel Total (ft/s)       *    4.35  * Avg. Vel. (ft/s)       *    1.61  *    6.01  *    0.92  *
* Max Chl Dpth (ft)      *   32.69  * Hydr. Depth (ft)       *    8.37  *   25.79  *    8.85  *
* Conv. Total (cfs)      *992633.1  * Conv. (cfs)            * 43331.3  *902029.6  * 47272.1  *
* Length Wtd. (ft)       *  521.55  * Wetted Per. (ft)       *   69.07  *  128.45  *  120.35  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)       *    0.21  *    0.62  *    0.23  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.34  *    3.75  *    0.21  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *  977.82  * 7249.68  * 1120.66  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  129.28  *  455.68  *  160.49  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  786.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  785.80  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  768.29  * Flow Area (sq ft)      *  803.98  * 3459.77  * 1450.65  *
* E.G. Slope (ft/ft)     *0.000446  * Area (sq ft)           * 1030.51  * 3459.77  * 1450.65  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1469.37  *23219.30  * 1631.33  *
* Top Width (ft)         *  410.43  * Top Width (ft)         *  164.60  *  119.09  *  126.74  *
* Vel Total (ft/s)       *    4.61  * Avg. Vel. (ft/s)       *    1.83  *    6.71  *    1.12  *
* Max Chl Dpth (ft)      *   35.95  * Hydr. Depth (ft)       *    7.51  *   29.05  *   11.45  *
```

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* Conv. Total (cfs)      *1246760.0  * Conv. (cfs)            * 69603.1  *1099882.0  * 77274.8  *
* Length Wtd. (ft)       *  521.26  * Wetted Per. (ft)        *  110.88  *  128.45  *  129.02  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)        *    0.20  *    0.75  *    0.31  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    0.37  *    5.03  *    0.35  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 1370.21  * 8729.62  * 1688.22  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  162.27  *  483.60  *  237.43  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  789.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  789.17  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  770.61  * Flow Area (sq ft)      * 1514.25  * 3861.15  * 1891.54  *
* E.G. Slope (ft/ft)     *0.000502  * Area (sq ft)           * 1966.45  * 3861.15  * 1891.54  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1846.17  *29576.69  * 2577.15  *
* Top Width (ft)         *  658.43  * Top Width (ft)         *  404.45  *  119.09  *  134.89  *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)       *    1.22  *    7.66  *    1.36  *
* Max Chl Dpth (ft)      *   39.32  * Hydr. Depth (ft)       *    4.61  *   32.42  *   14.02  *
* Conv. Total (cfs)      *1518182.0  * Conv. (cfs)            * 82435.7  *1320670.0  *115075.9  *
* Length Wtd. (ft)       *  521.15  * Wetted Per. (ft)       *  332.45  *  128.45  *  137.84  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)        *    0.14  *    0.94  *    0.43  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    0.17  *    7.21  *    0.59  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 1960.65  *10275.43  * 2559.31  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  245.20  *  506.45  *  325.96  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  794.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.47  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  773.41  * Flow Area (sq ft)      * 3087.98  * 4373.21  * 2493.90  *
* E.G. Slope (ft/ft)     *0.000473  * Area (sq ft)           * 6104.85  * 4373.21  * 2493.90  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 5375.92  *35357.74  * 3766.34  *
* Top Width (ft)         * 1578.17  * Top Width (ft)         * 1313.79  *  119.09  *  145.29  *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *    1.74  *    8.09  *    1.51  *
* Max Chl Dpth (ft)      *   43.62  * Hydr. Depth (ft)       *    8.21  *   36.72  *   17.17  *
* Conv. Total (cfs)      *2045548.0  * Conv. (cfs)            *247116.7  *1625303.0  *173128.7  *
* Length Wtd. (ft)       *  519.92  * Wetted Per. (ft)       *  380.39  *  128.45  *  149.09  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)        *    0.24  *    1.01  *    0.49  *
* Alpha                  *    2.63  * Stream Power (lb/ft s) *    0.42  *    8.13  *    0.75  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 3416.23  *12687.64  * 4660.11  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  509.43  *  534.46  *  700.11  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  797.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  796.53  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  775.82  * Flow Area (sq ft)      * 4240.79  * 4738.22  * 2950.56  *
* E.G. Slope (ft/ft)     *0.000462  * Area (sq ft)           *10423.28  * 4738.22  * 2950.56  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 9011.36  *39923.36  * 4755.29  *
* Top Width (ft)         * 1740.88  * Top Width (ft)         * 1469.10  *  119.09  *  152.70  *
* Vel Total (ft/s)       *    4.50  * Avg. Vel. (ft/s)       *    2.12  *    8.43  *    1.61  *
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* Max Chl Dpth (ft)      *   46.68  * Hydr. Depth (ft)       *   11.28  *   39.79  *   19.32  *
* Conv. Total (cfs)      *2498191.0  * Conv. (cfs)            *419297.7  *1857630.0  *221262.9  *
* Length Wtd. (ft)       *  519.08  * Wetted Per. (ft)       *  380.39  *  128.45  *  157.11  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)       *    0.32  *    1.06  *    0.54  *
* Alpha                  *    2.66  * Stream Power (lb/ft s) *    0.68  *    8.96  *    0.87  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   * 5068.72  *14122.59  * 6915.39  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  726.08  *  541.55  * 1065.25  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  799.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  799.15  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  777.57  * Flow Area (sq ft)      * 5225.58  * 5050.03  * 3358.65  *
* E.G. Slope (ft/ft)     *0.000449  * Area (sq ft)           *14346.78  * 5050.03  * 3358.65  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *12580.76  *43765.22  * 5654.02  *
* Top Width (ft)         * 1804.92  * Top Width (ft)         * 1526.81  *  119.09  *  159.03  *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *    2.41  *    8.67  *    1.68  *
* Max Chl Dpth (ft)      *   49.30  * Hydr. Depth (ft)       *   13.89  *   42.41  *   21.12  *
* Conv. Total (cfs)      *2926531.0  * Conv. (cfs)            *593838.7  *2065811.0  *266881.5  *
* Length Wtd. (ft)       *  518.46  * Wetted Per. (ft)       *  380.39  *  128.45  *  163.96  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)       *    0.38  *    1.10  *    0.57  *
* Alpha                  *    2.63  * Stream Power (lb/ft s) *    0.93  *    9.55  *    0.97  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   * 6562.82  *15047.33  * 9054.57  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  882.94  *  542.44  * 1422.46  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  803.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  803.08  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
* Crit W.S. (ft)         *  779.90  * Flow Area (sq ft)      * 6704.37  * 5518.26  * 4002.59  *
* E.G. Slope (ft/ft)     *0.000422  * Area (sq ft)           *21287.72  * 5518.26  * 4002.59  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *18477.95  *49190.70  * 7051.35  *
* Top Width (ft)         * 2175.97  * Top Width (ft)         * 1888.34  *  119.09  *  168.54  *
* Vel Total (ft/s)       *    4.61  * Avg. Vel. (ft/s)       *    2.76  *    8.91  *    1.76  *
* Max Chl Dpth (ft)      *   53.23  * Hydr. Depth (ft)       *   17.83  *   46.34  *   23.75  *
* Conv. Total (cfs)      *3637678.0  * Conv. (cfs)            *899582.9  *2394806.0  *343288.9  *
* Length Wtd. (ft)       *  517.61  * Wetted Per. (ft)       *  380.39  *  128.45  *  174.25  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)       *    0.46  *    1.13  *    0.61  *
* Alpha                  *    2.57  * Stream Power (lb/ft s) *    1.28  *   10.09  *    1.07  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 9294.47  *16468.25  *13154.12  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         * 1087.09  *  544.88  * 1781.65  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  791.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.075  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  790.81  * Reach Len. (ft)        *  496.55  *  522.52  *  517.48  *
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* Crit W.S. (ft)         *  771.69  * Flow Area (sq ft)      * 2089.49  * 4057.06  * 2116.72  *
* E.G. Slope (ft/ft)     *0.000500  * Area (sq ft)           * 2864.06  * 4057.06  * 2116.72  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2882.33  *32076.38  * 3041.29  *
* Top Width (ft)         * 1162.64  * Top Width (ft)          *  904.68  *  119.09  *  138.87  *
* Vel Total (ft/s)       *    4.60  * Avg. Vel. (ft/s)       *    1.38  *    7.91  *    1.44  *
* Max Chl Dpth (ft)      *   40.96  * Hydr. Depth (ft)       *    5.56  *   34.07  *   15.24  *
* Conv. Total (cfs)      *1699095.0  * Conv. (cfs)            *128877.5  *1434232.0  *135985.4  *
* Length Wtd. (ft)       *  520.73  * Wetted Per. (ft)       *  380.39  *  128.45  *  142.14  *
* Min Ch El (ft)         *  749.85  * Shear (lb/sq ft)       *    0.17  *    0.99  *    0.47  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    0.24  *    7.80  *    0.67  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 2369.45  *11088.30  * 3109.75  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  311.78  *  516.83  *  391.60  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 18.578

INPUT
Description: Dodson XS 20.166
Station Elevation Data    num=     310
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  843.83    1.21  843.72   19.73   842.4   28.22  842.02   34.18  841.17
   37.51  840.68   46.91  838.98   48.54  838.63   62.15   834.1   64.09  833.48
   67.49  832.44   78.74  828.49   83.34  826.79    87.3  826.07   94.14  824.86
  101.18  823.42  106.02  823.48  118.15  823.63  120.71  823.62  129.46   823.6
  130.59  823.58  140.56  823.39  140.75  823.38  140.78  823.38  140.85  823.38
  157.76  822.81  165.64  823.14  176.04  823.43  226.27  823.47  271.06  823.09
  277.22     822  279.98  821.53  288.42   820.4  292.37  819.88  298.91  817.71
  345.54  803.64  372.14   802.8  406.38  801.67  407.13  801.67  471.25  801.87
  558.48  800.93  596.61  800.37  620.81   799.9  670.09  799.37  703.46  799.39
  712.08  799.35  760.23   799.2  775.31  799.15  797.09  798.96  804.98  798.89
  807.12  798.89  809.43  799.03  817.36   799.5  819.72   799.5  823.23   799.5
   828.3  799.45  831.79  799.42  834.06  799.42  834.47  799.42  838.44  799.42
  840.38  799.32  843.29  799.15  844.05  799.11  844.17   799.1  844.24   799.1
   844.3  799.09  844.46  799.09  844.63  799.08  844.77  799.07  844.91  799.06
  845.17  799.04  845.45  799.03  846.08  798.99  847.18  798.93  849.31  798.81
  849.34  798.81  849.68  798.81  849.87  798.81  850.04  798.81  854.27   798.8
  857.68  798.49  863.56  797.96  864.69  797.85  870.87  797.27  910.01  796.57
  936.87  796.08  939.95  796.28  941.73   796.4  942.56  796.44  950.68  796.37
 1006.08   795.7 1050.46   795.9 1055.84  795.91 1057.88  795.89 1066.38  795.89
 1134.16  795.04    1158  794.86  1164.1  794.85 1193.65   794.8  1200.3  794.75
 1202.59  794.64 1242.94  792.79 1247.33  792.82 1253.52  792.39 1256.59  792.26
 1268.38  791.78 1274.84   791.8  1300.6  792.02 1300.81  792.02 1301.41  792.03
 1319.05   792.1 1335.35  791.95 1337.42  791.93 1345.46  791.77 1364.97  791.37
 1368.15  791.56  1371.1  791.73 1376.41  791.99 1380.59  791.93 1381.89   791.8
 1391.83  791.98 1403.35  791.91  1444.3  791.34 1445.46  791.34 1459.11  791.09
 1484.27  790.74 1494.36  790.63 1506.99  790.45 1509.03  790.45  1509.1  790.45
 1547.98  790.41 1563.18  790.41 1590.66  790.41 1593.02  790.41 1610.31  790.34
 1621.63   790.3 1627.48   790.3 1684.13  790.23 1802.07  790.25 1834.03  790.42
 1869.46   790.3 1880.07  790.41  1896.7  790.34 1898.75  790.97 1902.05  791.52
 1925.54  791.53 2010.95  791.26  2035.2     791 2043.36     791 2090.85  790.73
  2104.3  790.66  2114.2  790.62 2120.08  789.75 2127.95  788.65 2139.56  790.86
 2142.17  791.37 2157.12  791.41 2168.35  791.43 2171.84  790.55 2174.72  789.78
 2180.96  791.05  2185.8  792.05 2231.86  792.46 2262.29  792.66 2278.21  792.71
 2292.52  791.98 2297.03  791.68 2298.16  791.68 2309.27  791.33 2315.67  791.13
 2317.64  790.91 2327.04  789.17 2330.36  788.46 2340.81  786.39 2348.54  782.87
 2351.46  781.15 2354.21  779.28 2360.28   774.3 2365.05  774.17 2368.72  774.27
 2383.19  773.48  2385.5  773.61 2398.98  774.62 2405.16  780.26 2407.31  782.48
 2409.93  783.04 2423.27  787.89 2424.92  788.46 2436.02  789.36 2452.54  790.62
 2459.81  790.91 2471.94  790.46 2474.27   790.4 2475.28  790.73 2481.17  791.28
 2482.12  791.26 2482.48  790.94 2485.77  790.67 2495.94  790.87 2497.66  790.87
  2508.8  791.07 2540.23  790.23 2560.33  789.72 2591.11  789.23 2597.86  789.04
 2599.71  788.66 2601.39   788.3 2606.39  787.22    2619  784.39    2625  783.03
 2625.68  783.14 2627.73   783.5 2628.33   783.6 2629.72  783.56 2654.68  783.37
 2662.69  783.18 2670.59  782.43 2671.91  782.29 2673.98  781.98 2680.17  781.82
 2694.71  782.16 2695.38  782.22 2699.76  782.45 2701.77  784.13 2703.51   783.8
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 2704.68  783.51 2705.62  783.18 2706.43  782.44 2706.73  782.43 2711.06  781.19
 2711.52  781.18 2712.19  780.97 2713.01  780.93 2718.62  777.82  2721.6  776.83
 2739.88  772.81 2743.46  772.21 2744.34  772.21 2745.51  772.22 2759.91   772.3
 2781.34  772.45 2791.05  775.45 2795.91  776.85  2807.7  780.42 2835.18  781.94
 2838.84   782.7  2843.8  783.41 2870.15  784.12 2875.08  784.44 2877.97  784.62
  2891.6  785.74 2911.74  785.96 2923.38     786  2932.7  786.06 2949.53  786.14
 2962.41  786.12 2981.75  786.18  2982.2  786.18 2998.53  786.21 3013.69  786.24
  3021.1   786.1 3033.22  785.97 3045.33  785.87 3060.38  785.56  3085.1  785.28
 3089.83  785.21 3099.86   782.7 3115.88  777.61 3135.44  771.39 3144.88  767.72
 3158.24  759.27 3163.31  755.96    3168  750.42    3188  749.42    3208  750.42
 3212.74  755.43 3218.74   756.8 3223.16  760.59 3229.96     763 3230.95  763.67
 3234.66  764.66 3241.25  766.25 3245.82  765.87 3246.15  765.98 3256.36  769.55
 3257.56  769.97 3263.75  770.74 3269.05  771.66 3271.23  772.62  3272.7     773
 3276.13  775.03 3276.92  775.49 3316.21  793.43 3336.94  796.03 3341.12  796.48
 3344.14  796.43 3348.49  796.37 3350.92  796.29 3353.41  796.22 3356.36  796.06
 3358.31  795.96  3360.7  795.79 3365.69  795.44 3368.26  795.23 3371.06  795.01
 3383.41  823.14 3397.59   846.4 3400.32  850.99 3405.71     857 3409.69  857.71

Manning's n Values         num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .09  406.38    .075 2262.29     .12 3144.88    .042 3241.25     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3144.88 3241.25              293  312.58  208.33             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0 3006.61  808.32       F
Blocked Obstructions     num=        3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     420     580     815    1020    1280     815    1560    2120     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  777.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.120  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  777.29  * Reach Len. (ft)        *  293.00  *  312.58  *  208.33  *
* Crit W.S. (ft)         *  763.39  * Flow Area (sq ft)      *  127.62  * 2062.04  *  270.58  *
* E.G. Slope (ft/ft)     *0.000601  * Area (sq ft)           *  552.16  * 2062.04  *  270.58  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  102.69  *12852.56  *  244.74  *
* Top Width (ft)         *  286.33  * Top Width (ft)         *  150.36  *   96.37  *   39.60  *
* Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *    0.80  *    6.23  *    0.90  *
* Max Chl Dpth (ft)      *   27.87  * Hydr. Depth (ft)       *    4.56  *   21.40  *    6.83  *
* Conv. Total (cfs)      *538313.5  * Conv. (cfs)            *  4188.0  *524144.5  *  9981.0  *
* Length Wtd. (ft)       *  307.89  * Wetted Per. (ft)       *   29.58  *  107.07  *   41.76  *
* Min Ch El (ft)         *  749.42  * Shear (lb/sq ft)       *    0.16  *    0.72  *    0.24  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.13  *    4.51  *    0.22  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  531.51  * 5408.22  *  561.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   87.51  *  414.73  *  114.29  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  782.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.120  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  781.84  * Reach Len. (ft)        *  293.00  *  312.58  *  208.33  *
* Crit W.S. (ft)         *  767.01  * Flow Area (sq ft)      *  287.54  * 2500.62  *  473.48  *
* E.G. Slope (ft/ft)     *0.000719  * Area (sq ft)           * 1365.71  * 2500.62  *  473.48  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  330.75  *19386.86  *  582.39  *
* Top Width (ft)         *  370.47  * Top Width (ft)         *  224.53  *   96.37  *   49.57  *
* Vel Total (ft/s)       *    6.22  * Avg. Vel. (ft/s)       *    1.15  *    7.75  *    1.23  *
* Max Chl Dpth (ft)      *   32.42  * Hydr. Depth (ft)       *    6.80  *   25.95  *    9.55  *
* Conv. Total (cfs)      *756873.3  * Conv. (cfs)            * 12332.0  *722827.3  * 21714.0  *
* Length Wtd. (ft)       *  304.26  * Wetted Per. (ft)       *   44.61  *  107.07  *   52.72  *
* Min Ch El (ft)         *  749.42  * Shear (lb/sq ft)       *    0.29  *    1.05  *    0.40  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.33  *    8.13  *    0.50  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *  966.59  * 7216.26  * 1111.60  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  127.35  *  454.39  *  159.49  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	786.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.	0.120	0.042	0.140
W.S. Elev (ft)	784.90	Reach Len. (ft)	293.00	312.58	208.33
Crit W.S. (ft)	769.21	Flow Area (sq ft)	434.21	2796.30	635.88
E.G. Slope (ft/ft)	0.000811	Area (sq ft)	2327.10	2796.30	635.88
Q Total (cfs)	26320.00	Flow (cfs)	595.95	24797.84	926.21
Top Width (ft)	542.20	Top Width (ft)	389.54	96.37	56.29
Vel Total (ft/s)	6.81	Avg. Vel. (ft/s)	1.37	8.87	1.46
Max Chl Dpth (ft)	35.48	Hydr. Depth (ft)	8.07	29.02	11.30
Conv. Total (cfs)	924276.3	Conv. (cfs)	20928.0	870822.8	32525.6
Length Wtd. (ft)	302.25	Wetted Per. (ft)	56.54	107.07	60.10
Min Ch El (ft)	749.42	Shear (lb/sq ft)	0.39	1.32	0.54
Alpha	1.60	Stream Power (lb/ft s)	0.53	11.72	0.78
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	1351.08	8692.10	1675.83
C & E Loss (ft)	0.10	Cum SA (acres)	159.11	482.31	236.35

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	789.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.51	Wt. n-Val.	0.120	0.042	0.140
W.S. Elev (ft)	788.03	Reach Len. (ft)	293.00	312.58	208.33
Crit W.S. (ft)	771.84	Flow Area (sq ft)	795.27	3097.79	822.69
E.G. Slope (ft/ft)	0.000938	Area (sq ft)	4041.39	3097.79	822.69
Q Total (cfs)	34000.00	Flow (cfs)	955.41	31630.30	1414.29
Top Width (ft)	792.93	Top Width (ft)	633.42	96.37	63.14
Vel Total (ft/s)	7.21	Avg. Vel. (ft/s)	1.20	10.21	1.72
Max Chl Dpth (ft)	38.61	Hydr. Depth (ft)	5.75	32.14	13.03
Conv. Total (cfs)	1110243.0	Conv. (cfs)	31198.1	1032862.0	46182.5
Length Wtd. (ft)	300.47	Wetted Per. (ft)	141.03	107.07	67.64
Min Ch El (ft)	749.42	Shear (lb/sq ft)	0.33	1.69	0.71
Alpha	1.87	Stream Power (lb/ft s)	0.40	17.30	1.22
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	1926.41	10233.70	2543.19
C & E Loss (ft)	0.16	Cum SA (acres)	239.29	505.16	324.78

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	793.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.85	Wt. n-Val.	0.120	0.042	0.140
W.S. Elev (ft)	791.98	Reach Len. (ft)	293.00	312.58	208.33
Crit W.S. (ft)	774.99	Flow Area (sq ft)	1341.39	3478.42	1089.16
E.G. Slope (ft/ft)	0.001018	Area (sq ft)	7193.44	3478.42	1089.16
Q Total (cfs)	44500.00	Flow (cfs)	2378.55	39967.38	2154.07
Top Width (ft)	1329.84	Top Width (ft)	1161.67	96.37	71.79
Vel Total (ft/s)	7.53	Avg. Vel. (ft/s)	1.77	11.49	1.98
Max Chl Dpth (ft)	42.56	Hydr. Depth (ft)	9.70	36.09	15.17
Conv. Total (cfs)	1395022.0	Conv. (cfs)	74564.7	1252930.0	67527.4
Length Wtd. (ft)	299.23	Wetted Per. (ft)	141.03	107.07	77.15
Min Ch El (ft)	749.42	Shear (lb/sq ft)	0.60	2.06	0.90
Alpha	2.10	Stream Power (lb/ft s)	1.07	23.71	1.77
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	3340.43	12640.55	4638.82
C & E Loss (ft)	0.20	Cum SA (acres)	495.32	533.17	698.82

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	796.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.19	Wt. n-Val.	0.120	0.042	0.140
W.S. Elev (ft)	794.69	Reach Len. (ft)	293.00	312.58	208.33
Crit W.S. (ft)	777.47	Flow Area (sq ft)	1715.26	3739.00	1295.85
E.G. Slope (ft/ft)	0.001117	Area (sq ft)	10672.93	3739.00	1295.85
Q Total (cfs)	53690.00	Flow (cfs)	3754.01	47230.15	2705.84
Top Width (ft)	1486.23	Top Width (ft)	1304.88	96.37	84.98
Vel Total (ft/s)	7.95	Avg. Vel. (ft/s)	2.19	12.63	2.09
Max Chl Dpth (ft)	45.27	Hydr. Depth (ft)	12.41	38.80	15.25
Conv. Total (cfs)	1606532.0	Conv. (cfs)	112328.8	1413238.0	80965.0
Length Wtd. (ft)	297.86	Wetted Per. (ft)	141.03	107.07	90.73
Min Ch El (ft)	749.42	Shear (lb/sq ft)	0.85	2.43	1.00
Alpha	2.23	Stream Power (lb/ft s)	1.86	30.76	2.08
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	4948.48	14071.75	6890.17
C & E Loss (ft)	0.26	Cum SA (acres)	710.27	540.25	1063.84

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	799.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.53	Wt. n-Val.	0.120	0.042	0.140
W.S. Elev (ft)	796.93	Reach Len. (ft)	293.00	312.58	208.33
Crit W.S. (ft)	779.58	Flow Area (sq ft)	2025.84	3955.46	1536.57
E.G. Slope (ft/ft)	0.001211	Area (sq ft)	13698.44	3955.46	1536.57
Q Total (cfs)	62000.00	Flow (cfs)	5157.87	54009.96	2832.17
Top Width (ft)	1662.18	Top Width (ft)	1435.16	96.37	130.65
Vel Total (ft/s)	8.25	Avg. Vel. (ft/s)	2.55	13.65	1.84
Max Chl Dpth (ft)	47.51	Hydr. Depth (ft)	14.65	41.04	11.76
Conv. Total (cfs)	1781843.0	Conv. (cfs)	148234.1	1552214.0	81394.8
Length Wtd. (ft)	297.18	Wetted Per. (ft)	141.03	107.07	137.81
Min Ch El (ft)	749.42	Shear (lb/sq ft)	1.09	2.79	0.84
Alpha	2.40	Stream Power (lb/ft s)	2.76	38.13	1.55
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	6402.97	14993.31	9025.49
C & E Loss (ft)	0.32	Cum SA (acres)	866.05	541.15	1420.74

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	803.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.79	Wt. n-Val.	0.120	0.042	0.140
W.S. Elev (ft)	800.60	Reach Len. (ft)	293.00	312.58	208.33
Crit W.S. (ft)	782.57	Flow Area (sq ft)	2532.69	4308.73	2018.46
E.G. Slope (ft/ft)	0.001229	Area (sq ft)	19378.47	4308.73	2018.46
Q Total (cfs)	74720.00	Flow (cfs)	7541.18	62767.05	4411.76
Top Width (ft)	1972.46	Top Width (ft)	1743.83	96.37	132.26
Vel Total (ft/s)	8.43	Avg. Vel. (ft/s)	2.98	14.57	2.19
Max Chl Dpth (ft)	51.18	Hydr. Depth (ft)	18.32	44.71	15.26
Conv. Total (cfs)	2130965.0	Conv. (cfs)	215069.3	1790075.0	125820.6
Length Wtd. (ft)	295.25	Wetted Per. (ft)	141.03	107.07	141.82
Min Ch El (ft)	749.42	Shear (lb/sq ft)	1.38	3.09	1.09
Alpha	2.52	Stream Power (lb/ft s)	4.10	44.99	2.39
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	9062.69	16409.31	13118.36
C & E Loss (ft)	0.36	Cum SA (acres)	1066.39	543.59	1779.86

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	791.20	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.65	Wt. n-Val.	0.120	0.042	0.140	
W.S. Elev (ft)	789.55	Reach Len. (ft)	293.00	312.58	208.33	
Crit W.S. (ft)	773.11	Flow Area (sq ft)	1004.60	3243.68	920.79	
E.G. Slope (ft/ft)	0.000978	Area (sq ft)	5030.58	3243.68	920.79	
Q Total (cfs)	38000.00	Flow (cfs)	1440.27	34877.03	1682.70	
Top Width (ft)	861.10	Top Width (ft)	698.28	96.37	66.46	
Vel Total (ft/s)	7.35	Avg. Vel. (ft/s)	1.43	10.75	1.83	
Max Chl Dpth (ft)	40.13	Hydr. Depth (ft)	7.27	33.66	13.86	
Conv. Total (cfs)	1215061.0	Conv. (cfs)	46053.1	1115203.0	53804.7	
Length Wtd. (ft)	299.67	Wetted Per. (ft)	141.03	107.07	71.28	
Min Ch El (ft)	749.42	Shear (lb/sq ft)	0.43	1.85	0.79	
Alpha	1.97	Stream Power (lb/ft s)	0.62	19.89	1.44	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	2324.46	11044.51	3091.71	
C & E Loss (ft)	0.19	Cum SA (acres)	302.64	515.54	390.38	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.519

INPUT
Description: close to Dodson XS 20.077
Station Elevation Data num= 265

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	829.74	4.29	829.52	20.97	829.17	33.53	828.68	53.08	827.27
68.14	826.16	76.56	825.57	89.7	824.08	93.09	823.51	99.45	821.75
113.18	817.94	115.96	817.12	140.08	810.84	145.77	809.56	147.59	809.09
149.05	808.86	150.02	808.6	161.68	803.62	169.85	800	170.43	799.97
171.41	799.95	174.73	799.87	177.59	801.13	182.6	803.26	187.07	803.63
193.89	804.07	204.14	803.84	211.36	803.68	231.6	803.47	246	803.22
250.6	803.12	253.85	803.08	260.76	802.99	267.11	802.9	352.84	801.93
365	801.76	378.34	801.58	409.13	801.33	445.67	800.87	448.97	800.82
453.4	800.6	506.17	798.5	518.79	796.01	519.12	795.97	519.63	796.08
527.72	797.62	537.34	797.78	553.29	798.14	559.62	798.29	563.9	798.39
565.53	798.42	569.43	798.42	571.31	798.42	578.35	798.69	580.61	798.78
584.49	798.78	587.08	798.77	588.67	798.67	598.05	798.06	598.78	798.06
602.81	798.06	604.3	797.92	616.77	796.46	627.03	796.24	639.79	795.74
663.19	794.98	666.62	794.97	671.91	794.45	686.82	794.43	700.64	793.97
703.43	793.71	750.17	793.32	845.85	792.38	856.49	792.23	866.46	792.09
873.1	792.22	901.45	792.5	904.89	792.52	907.62	792.57	931.79	792.64
942.14	792.69	944.68	792.72	946.69	792.74	982.83	793.1	995.34	793.05
1020.2	793.02	1041.08	792.92	1049.43	792.89	1051.16	792.9	1113.07	791.77
1116.73	791.69	1118.53	791.7	1142.59	791.36	1145.04	791.29	1215.24	790.77
1334.72	790.07	1339.71	789.88	1382.72	789.58	1455.06	788.8	1456.25	788.78
1456.44	788.78	1456.57	788.78	1456.92	788.78	1458.56	788.78	1461.64	788.78
1500.55	788.74	1501.49	788.74	1503.02	788.85	1514.53	788.91	1514.9	788.92
1528.54	789.61	1532.22	789.63	1532.49	789.64	1549.19	789.74	1549.25	789.74
1549.28	789.74	1549.4	789.74	1549.65	789.74	1549.97	789.75	1550.62	789.75
1552.41	789.76	1558.17	789.8	1572.66	789.89	1575.35	789.91	1577.57	789.93
1587.3	789.88	1596.39	789.85	1598.93	789.81	1601.13	789.77	1606.14	789.77
1614.68	789.75	1618.13	789.71	1621.17	789.66	1627.34	789.59	1641.84	789.39
1658.67	790.43	1676.18	790.86	1682.51	791.06	1710.11	790.81	1739.34	790.59
1744.59	790.57	1760.91	790.32	1807.97	790.31	1813.48	790.12	1821.16	790.08
1825.48	790.07	1827.46	790.07	1886.01	790.05	1914.47	790.03	1918.72	789.77
1936.81	789.01	1985.48	788.62	2013.38	788.28	2018.27	788.25	2028.39	788.36
2057.1	788.74	2070.71	788.67	2091.14	787.75	2102.77	787.62	2105.52	787.52
2110.15	784.6	2126.54	772.62	2144.25	772.62	2162.97	772.62	2165.37	773.74
2169.23	775.22	2185.02	781.84	2186.62	781.9	2191.36	782.68	2194.76	782.76
2196.06	782.88	2200.53	783.89	2206.52	784.09	2215.64	784.05	2221.92	783.54
2223.38	783.32	2226.32	783.38	2241.07	783.45	2242.14	783.59	2247.86	784.43
2248.4	784.44	2264.12	784.82	2269.12	784.95	2287.12	785.48	2290.67	785.55
2307.99	785.67	2319.78	785.93	2338.64	785.67	2352.45	785.5	2381.94	785.88
2385.12	785.93	2385.72	785.93	2386.6	785.9	2417.78	785.84	2438.65	785.68
2462.55	785.76	2464.79	785.87	2476.15	785.81	2495.66	785.63	2502.59	785.69
2534.26	785.45	2548.45	785.14	2560.61	784.67	2578.47	785.02	2580.04	785.07

```
 2581.12  785.06 2586.77  785.21 2613.78  785.72 2626.43  785.77 2638.34  785.43
 2655.82  784.75 2665.11  784.24 2676.54  783.59 2694.48  774.91 2704.16  770.22
  2718.2  762.84 2731.26  760.63 2732.82  760.29 2733.47  759.71 2739.31  755.96
    2746  750.12    2766  749.12    2786  750.12 2792.91  756.33 2813.75  770.39
 2816.21  771.76 2820.06  772.54 2825.04  772.61 2827.64  772.63 2843.42  772.22
 2870.14  772.47 2888.82  772.64  2895.1  772.42 2914.85  771.92 2948.25  771.18
 2983.41  770.67  2992.8  771.22 3012.82  772.34 3035.58  783.88 3046.82  789.82
 3056.78  790.46 3063.69  790.69 3070.36  790.88 3071.97  790.91 3074.11  790.93
 3077.47  790.96 3081.99  790.91 3082.94   790.9 3083.94  790.87 3091.15  790.66
 3095.39  790.91 3096.42  790.93  3100.9  795.24 3105.19  797.84 3125.35  812.89
  3132.5  819.69 3142.76  825.26 3143.93  825.99 3148.86   827.7 3153.72  835.87
 3157.05  851.35 3166.62  853.33 3179.82  856.06 3184.72  857.42 3186.28  857.59

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  553.29    .075  2057.1      .1 2731.26    .042 2820.06     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2731.26 2820.06            378.8  376.99  440.23             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2648.13     808       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     170     390     815    1050    1650     810    1750    1840     810

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  777.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  777.14  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  762.99  * Flow Area (sq ft)      *  399.47  * 1898.26  * 1042.68  *
* E.G. Slope (ft/ft)     *0.000602  * Area (sq ft)           *  602.15  * 1898.26  * 1042.68  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  624.81  *11767.78  *  807.40  *
* Top Width (ft)         *  385.85  * Top Width (ft)         *   94.83  *   88.80  *  202.22  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *    1.56  *    6.20  *    0.77  *
* Max Chl Dpth (ft)      *   28.02  * Hydr. Depth (ft)       *    9.65  *   21.38  *    5.16  *
* Conv. Total (cfs)      *537817.1  * Conv. (cfs)            * 25457.3  *479463.3  * 32896.6  *
* Length Wtd. (ft)       *  380.91  * Wetted Per. (ft)       *   44.98  *   99.51  *  203.45  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    0.33  *    0.72  *    0.19  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.52  *    4.45  *    0.15  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  527.63  * 5394.01  *  557.86  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   86.68  *  414.06  *  113.71  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  782.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  781.78  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  766.59  * Flow Area (sq ft)      *  613.76  * 2310.32  * 2002.27  *
* E.G. Slope (ft/ft)     *0.000636  * Area (sq ft)           * 1104.83  * 2310.32  * 2002.27  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1139.97  *16777.81  * 2382.22  *
* Top Width (ft)         *  422.01  * Top Width (ft)         *  121.83  *   88.80  *  211.37  *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *    1.86  *    7.26  *    1.19  *
* Max Chl Dpth (ft)      *   32.66  * Hydr. Depth (ft)       *   12.04  *   26.02  *    9.47  *
* Conv. Total (cfs)      *804837.9  * Conv. (cfs)            * 45196.7  *665193.0  * 94448.2  *
* Length Wtd. (ft)       *  384.25  * Wetted Per. (ft)       *   55.63  *   99.51  *  213.71  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    0.44  *    0.92  *    0.37  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    0.81  *    6.70  *    0.44  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *  958.28  * 7198.99  * 1105.68  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  126.19  *  453.72  *  158.87  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
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* E.G. Elev (ft)         *  785.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  784.91  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  769.13  * Flow Area (sq ft)      *  797.21  * 2588.35  * 2673.71  *
* E.G. Slope (ft/ft)     *0.000684  * Area (sq ft)           * 1614.09  * 2588.35  * 2673.71  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1381.73  *21022.17  * 3916.10  *
* Top Width (ft)         *  562.01  * Top Width (ft)         *  255.75  *   88.80  *  217.47  *
* Vel Total (ft/s)       *    4.34  * Avg. Vel. (ft/s)       *    1.73  *    8.12  *    1.46  *
* Max Chl Dpth (ft)      *   35.79  * Hydr. Depth (ft)       *   10.03  *   29.15  *   12.29  *
* Conv. Total (cfs)      *1006486.0  * Conv. (cfs)            * 52837.9  *803895.3  *149753.0  *
* Length Wtd. (ft)       *  386.02  * Wetted Per. (ft)       *   84.63  *   99.51  *  220.56  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    0.40  *    1.11  *    0.52  *
* Alpha                  *    2.82  * Stream Power (lb/ft s) *    0.70  *    9.02  *    0.76  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 1337.82  * 8672.78  * 1667.91  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  156.94  *  481.65  *  235.69  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  789.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  788.16  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  773.29  * Flow Area (sq ft)      * 1067.65  * 2877.50  * 3391.86  *
* E.G. Slope (ft/ft)     *0.000727  * Area (sq ft)           * 3403.95  * 2877.50  * 3391.86  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2254.83  *25864.52  * 5880.65  *
* Top Width (ft)         *  961.76  * Top Width (ft)         *  649.33  *   88.80  *  223.63  *
* Vel Total (ft/s)       *    4.63  * Avg. Vel. (ft/s)       *    2.11  *    8.99  *    1.73  *
* Max Chl Dpth (ft)      *   39.04  * Hydr. Depth (ft)       *   12.84  *   32.40  *   15.17  *
* Conv. Total (cfs)      *1260749.0  * Conv. (cfs)            * 83610.9  *959078.5  *218059.5  *
* Length Wtd. (ft)       *  387.39  * Wetted Per. (ft)       *   88.24  *   99.51  *  227.53  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    0.55  *    1.31  *    0.68  *
* Alpha                  *    2.90  * Stream Power (lb/ft s) *    1.16  *   11.80  *    1.17  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 1901.37  *10212.26  * 2533.11  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  234.97  *  504.49  *  324.10  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  793.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.             *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  792.18  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  776.43  * Flow Area (sq ft)      * 1401.28  * 3233.89  * 4375.24  *
* E.G. Slope (ft/ft)     *0.000788  * Area (sq ft)           * 6895.53  * 3233.89  * 4375.24  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 3692.91  *32707.55  * 8099.55  *
* Top Width (ft)         * 1368.52  * Top Width (ft)         * 1002.06  *   88.80  *  277.66  *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *    2.64  *   10.11  *    1.85  *
* Max Chl Dpth (ft)      *   43.06  * Hydr. Depth (ft)       *   16.86  *   36.42  *   15.76  *
* Conv. Total (cfs)      *1585193.0  * Conv. (cfs)            *131549.8  *1165118.0  *288524.5  *
* Length Wtd. (ft)       *  388.24  * Wetted Per. (ft)       *   88.24  *   99.51  *  282.51  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    0.78  *    1.60  *    0.76  *
* Alpha                  *    3.13  * Stream Power (lb/ft s) *    2.06  *   16.17  *    1.41  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 3293.05  *12616.47  * 4625.76  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  488.04  *  532.51  *  697.98  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  796.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.             *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  795.00  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  778.53  * Flow Area (sq ft)      * 1636.14  * 3484.76  * 5163.81  *
* E.G. Slope (ft/ft)     *0.000827  * Area (sq ft)           *10463.83  * 3484.76  * 5163.81  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 4898.72  *37956.50  *10834.77  *
* Top Width (ft)         * 1748.19  * Top Width (ft)         * 1378.79  *   88.80  *  280.59  *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *    2.99  *   10.89  *    2.10  *
```

```
* Max Chl Dpth (ft)      *   45.88  * Hydr. Depth (ft)       *   19.68  *   39.24  *   18.40  *
* Conv. Total (cfs)      *1866624.0  * Conv. (cfs)            *170312.5  *1319623.0  *376689.4  *
* Length Wtd. (ft)       *  386.37  * Wetted Per. (ft)       *   88.24  *   99.51  *  286.58  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    0.96  *    1.81  *    0.93  *
* Alpha                  *    3.14  * Stream Power (lb/ft s) *    2.87  *   19.70  *    1.95  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 4877.39  *14045.83  * 6874.72  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  701.24  *  539.59  * 1062.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  798.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.              *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  797.39  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  780.20  * Flow Area (sq ft)      * 1834.57  * 3696.73  * 5837.96  *
* E.G. Slope (ft/ft)     *0.000856  * Area (sq ft)           *13843.56  * 3696.73  * 5837.96  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 6028.91  *42591.72  *13379.37  *
* Top Width (ft)         * 1820.35  * Top Width (ft)         * 1447.16  *   88.80  *  284.39  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    3.29  *   11.52  *    2.29  *
* Max Chl Dpth (ft)      *   48.27  * Hydr. Depth (ft)       *   22.07  *   41.63  *   20.53  *
* Conv. Total (cfs)      *2119616.0  * Conv. (cfs)            *206112.5  *1456099.0  *457405.3  *
* Length Wtd. (ft)       *  388.14  * Wetted Per. (ft)       *   88.24  *   99.51  *  291.07  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    1.11  *    1.98  *    1.07  *
* Alpha                  *    3.14  * Stream Power (lb/ft s) *    3.65  *   22.86  *    2.46  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   * 6310.34  *14965.86  * 9007.86  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  856.36  *  540.49  * 1419.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.58  * Wt. n-Val.              *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  801.14  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  782.49  * Flow Area (sq ft)      * 2146.31  * 4029.73  * 6914.33  *
* E.G. Slope (ft/ft)     *0.000861  * Area (sq ft)           *19622.54  * 4029.73  * 6914.33  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 7855.36  *49327.22  *17537.42  *
* Top Width (ft)         * 1998.15  * Top Width (ft)         * 1619.80  *   88.80  *  289.55  *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)       *    3.66  *   12.24  *    2.54  *
* Max Chl Dpth (ft)      *   52.02  * Hydr. Depth (ft)       *   25.82  *   45.38  *   23.88  *
* Conv. Total (cfs)      *2546663.0  * Conv. (cfs)            *267732.2  *1681207.0  *597723.5  *
* Length Wtd. (ft)       *  390.35  * Wetted Per. (ft)       *   88.24  *   99.51  *  297.46  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    1.31  *    2.18  *    1.25  *
* Alpha                  *    3.13  * Stream Power (lb/ft s) *    4.78  *   26.64  *    3.17  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 8931.52  *16379.39  *13097.00  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         * 1055.08  *  542.92  * 1778.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  790.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.03  * Wt. n-Val.              *   0.100  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  789.72  * Reach Len. (ft)        *  378.80  *  376.99  *  440.23  *
* Crit W.S. (ft)         *  774.66  * Flow Area (sq ft)      * 1197.32  * 3016.02  * 3742.98  *
* E.G. Slope (ft/ft)     *0.000744  * Area (sq ft)           * 4586.49  * 3016.02  * 3742.98  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2761.09  *28296.55  * 6942.36  *
* Top Width (ft)         * 1126.84  * Top Width (ft)         *  811.46  *   88.80  *  226.58  *
* Vel Total (ft/s)       *    4.78  * Avg. Vel. (ft/s)       *    2.31  *    9.38  *    1.85  *
* Max Chl Dpth (ft)      *   40.60  * Hydr. Depth (ft)       *   14.40  *   33.96  *   16.52  *
* Conv. Total (cfs)      *1392944.0  * Conv. (cfs)            *101211.6  *1037251.0  *254482.1  *
* Length Wtd. (ft)       *  387.94  * Wetted Per. (ft)       *   88.24  *   99.51  *  230.87  *
* Min Ch El (ft)         *  749.12  * Shear (lb/sq ft)       *    0.63  *    1.41  *    0.75  *
* Alpha                  *    2.92  * Stream Power (lb/ft s) *    1.45  *   13.21  *    1.40  *
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* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 2292.11  *11022.05  * 3080.55  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  297.57  *  514.87  *  389.68  *
*****************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.447

INPUT
Description: close to Dodson XS 20.02
Station Elevation Data num= 279

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	838.66	10.81	838.27	28.73	837.52	30.28	837.45	33.07	837.3
35.1	836.76	37.94	836.3	41.37	835.78	43.45	835.5	52.13	835.08
52.36	835.06	52.59	835.05	52.91	835.03	60.37	834.61	64.9	834.33
78.5	832.82	82.56	832.42	82.79	832.4	85.39	832.18	102.78	830.81
117.08	828.94	135.09	827.34	149.53	825.91	159.6	824.22	174.04	822.21
177.65	821.29	186.73	819.15	203.57	815.08	205.51	814.38	227.32	808.29
240.8	804.34	244.76	803.89	265.71	801.96	272.99	801.58	279.55	800.05
288.15	797.59	291.7	796.43	293.09	795.99	300.37	797.5	300.8	797.59
316.43	797.99	317.57	798.03	324.89	797.27	325.31	797.22	325.85	797.22
333.94	797.23	340	797.75	345.69	798.26	350.35	798.26	350.73	798.26
351.15	798.27	360.38	798.58	360.77	798.58	367.05	798.58	367.31	798.58
376.14	798.55	377.88	798.55	381.33	798.54	391.18	796.48	391.75	796.36
391.98	796.32	419.58	795.75	420.98	795.72	426.54	795.23	435.46	794.43
436.43	794.35	440.71	794.28	476.05	793.61	506.33	792.66	520.49	792.44
528.17	792.3	564.15	792.15	569.13	791.94	580.69	791.63	588.98	791.41
603.78	791.4	627.78	791.32	646.68	791.31	659.87	791.34	670.72	791.57
689.95	791.69	700.47	791.53	713.31	790.89	724.86	790.56	741.49	790.5
798.5	790.33	803.54	790.34	808.24	790.29	822.51	790.44	892.81	791.65
901.66	792.01	931.28	789.41	938.36	788.79	956.06	789.46	971.7	789.93
1013.28	788.61	1036.3	789.19	1077.01	790.31	1274.96	790.84	1363.19	791.3
1413.76	791.68	1458.82	791.65	1475.01	791.71	1488.72	791.77	1495.96	791.46
1497.26	791.46	1499.53	791.44	1503.13	791.35	1559.81	790	1563.98	790.06
1565.67	790.07	1570.33	790.02	1581.01	789.67	1590.93	789.76	1622.87	790.08
1633.25	789.99	1639.7	789.92	1642.64	789.93	1645.87	789.89	1666.31	789.86
1667.6	789.93	1671.2	790.13	1676.26	790.41	1685.06	789.77	1687.16	789.58
1695.2	789.25	1698.38	789.11	1704.2	788.76	1738.71	787.96	1739.51	788
1748.4	788.66	1755.62	788.59	1767.33	788.44	1776.88	788.41	1778.45	788.4
1781.75	788.37	1837.38	788.04	1852.3	787.95	1852.42	787.95	1852.56	787.95
1852.92	787.94	1853.19	787.94	1882.5	787.57	1895.93	787.49	1919.45	787.21
1931.36	787.34	1947.11	787.31	1987.3	786.91	2020.77	786.36	2065.95	786.27
2066.28	786.27	2094.87	785.96	2102.84	785.89	2103.48	785.88	2109	788.25
2109.32	788.44	2127.88	788.44	2130.14	788.44	2132.26	786.97	2135.15	785.62
2136.24	785.11	2143.46	785.05	2153.17	785.14	2153.64	785.14	2154.73	785.15
2159.52	785.1	2160.67	785.1	2163.75	784.72	2167.27	784.52	2190.3	784.23
2196.27	783.72	2199.98	783.73	2203.12	783.7	2209.12	782.95	2209.74	782.88
2210.65	782.8	2214.73	782.53	2214.93	782.5	2215.04	782.46	2221.49	779
2231.9	771.44	2237.34	767.9	2240.6	766.26	2245.29	763.27	2258.47	755.64
2267	749.35	2292	748.35	2317	749.35	2326.68	756.55	2335.1	760.37
2341.42	763.71	2350.58	768.51	2352.59	769.43	2355.63	770.83	2357.64	771.62
2358.27	771.89	2358.77	771.96	2367.06	771.91	2399.87	771.94	2407.24	771.95
2425.66	771.75	2448.06	770.83	2451.57	770.75	2473.04	770.4	2473.41	770.36
2473.68	770.34	2481.65	769.59	2488.61	769.17	2502.85	769.29	2506.77	769.31
2513.26	769.47	2516.13	770.49	2538.04	778.15	2561.83	778.33	2566.55	778.35
2571.44	778.51	2599.72	778.85	2609.8	778.49	2636.48	777.67	2660.45	777.3
2677.89	776.82	2701.25	776.8	2716.49	777.09	2735.87	777.24	2741.02	777.39
2764.43	778.6	2773.42	778.95	2784.84	779.33	2805.3	780.07	2817.24	780.92
2828	780.69	2845.47	781.68	2859.6	786.1	2860.72	786.22	2862.25	786.51
2869.43	789.79	2870.4	789.8	2884.17	789.79	2890.39	789.76	2907.1	789.79
2912.47	789.79	2921.91	789.82	2923.6	789.86	2924.53	789.86	2937.05	790.04
2937.43	790.03	2940.19	790.11	2962.51	790.64	2964.95	790.69	2968.6	790.77
2981.65	790.93	2983.23	790.95	2984.55	790.96	3000.42	791	3000.47	791
3010.86	790.93	3020.25	790.88	3022.12	790.86	3024.38	790.85	3039.44	789.51
3049.2	788.62	3052.42	788.67	3060.66	788.81	3070.62	789.01	3077.06	789.87
3082	790.7	3091.28	792.44	3131.96	803.96	3131.99	803.97	3132.07	803.99
3156.98	811.63	3180.56	816.52	3185.01	817.33	3193.45	819.2	3201.04	819.53
3203.63	819.66	3224.96	818.85	3227.28	818.67	3229.8	818.61		

Manning's n Values num= 5

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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .14  440.71    .075 1676.26     .09 2214.73    .042 2357.64     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2214.73 2357.64           154.57  118.69   64.48             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0    1500     810       F
    1500    2120   794.5       T
  2532.5    3150     794       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     750    1500     810

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  777.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  777.11  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  760.65  * Flow Area (sq ft)      *          * 2645.02  * 1036.57  *
* E.G. Slope (ft/ft)     *0.000374  * Area (sq ft)           *          * 2645.02  * 1048.74  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *12390.56  *  809.44  *
* Top Width (ft)         *  362.49  * Top Width (ft)         *          *  133.55  *  228.95  *
* Vel Total (ft/s)       *    3.59  * Avg. Vel. (ft/s)       *          *    4.68  *    0.78  *
* Max Chl Dpth (ft)      *   28.76  * Hydr. Depth (ft)       *          *   19.81  *    5.93  *
* Conv. Total (cfs)      *682272.4  * Conv. (cfs)            *          *640434.8  * 41837.7  *
* Length Wtd. (ft)       *  115.98  * Wetted Per. (ft)       *          *  147.73  *  176.15  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *          *    0.42  *    0.14  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *          *    1.96  *    0.11  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  525.01  * 5374.35  *  547.29  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   86.27  *  413.10  *  111.53  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  782.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  781.77  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  763.96  * Flow Area (sq ft)      *          * 3283.68  * 1850.83  *
* E.G. Slope (ft/ft)     *0.000418  * Area (sq ft)           *          * 3283.68  * 2918.37  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *18051.42  * 2248.58  *
* Top Width (ft)         *  629.41  * Top Width (ft)         *          *  141.31  *  488.10  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *          *    5.50  *    1.21  *
* Max Chl Dpth (ft)      *   33.42  * Hydr. Depth (ft)       *          *   23.24  *   10.58  *
* Conv. Total (cfs)      *992579.6  * Conv. (cfs)            *          *882633.9  *109945.7  *
* Length Wtd. (ft)       *  114.10  * Wetted Per. (ft)       *          *  156.80  *  176.15  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *          *    0.55  *    0.27  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *          *    3.01  *    0.33  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  953.47  * 7174.79  * 1080.82  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  125.66  *  452.73  *  155.34  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. Elev (ft)         *  785.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  784.93  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  766.31  * Flow Area (sq ft)      *   49.86  * 3734.70  * 2403.51  *
* E.G. Slope (ft/ft)     *0.000439  * Area (sq ft)           *   49.86  * 3734.70  * 4477.09  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *   16.61  *22742.96  * 3560.44  *
* Top Width (ft)         *  693.77  * Top Width (ft)         *   52.65  *  142.91  *  498.21  *
* Vel Total (ft/s)       *    4.25  * Avg. Vel. (ft/s)       *    0.33  *    6.09  *    1.48  *
* Max Chl Dpth (ft)      *   36.58  * Hydr. Depth (ft)       *    0.95  *   26.13  *   13.75  *
* Conv. Total (cfs)      *1256300.0  * Conv. (cfs)            *   792.7  *1085561.0  *169945.9  *
* Length Wtd. (ft)       *  113.19  * Wetted Per. (ft)       *   52.76  *  158.59  *  176.15  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *    0.03  *    0.65  *    0.37  *
* Alpha                  *    1.79  * Stream Power (lb/ft s) *    0.01  *    3.93  *    0.55  *
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* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1330.59  * 8645.42  * 1631.78  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  155.60  *  480.64  *  232.08  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  788.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  788.19  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  768.94  * Flow Area (sq ft)      *  311.69  * 4201.79  * 2975.03  *
* E.G. Slope (ft/ft)     *0.000465  * Area (sq ft)           *  651.44  * 4201.79  * 6123.70  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  263.71  *28504.19  * 5232.10  *
* Top Width (ft)         * 1046.54  * Top Width (ft)         *  395.33  *  142.91  *  508.30  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    0.85  *    6.78  *    1.76  *
* Max Chl Dpth (ft)      *   39.84  * Hydr. Depth (ft)       *    3.70  *   29.40  *   17.01  *
* Conv. Total (cfs)      *1575877.0  * Conv. (cfs)           * 12222.7  *1321150.0  *242504.3  *
* Length Wtd. (ft)       *  112.61  * Wetted Per. (ft)       *   85.15  *  158.59  *  176.15  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *    0.11  *    0.77  *    0.49  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    0.09  *    5.22  *    0.86  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1883.74  *10181.62  * 2485.03  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  230.43  *  503.49  *  320.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  792.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  792.27  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  773.07  * Flow Area (sq ft)      *  695.11  * 4784.05  * 3687.46  *
* E.G. Slope (ft/ft)     *0.000481  * Area (sq ft)           * 3330.89  * 4784.05  * 8676.95  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  943.41  *35953.84  * 7602.75  *
* Top Width (ft)         * 1804.73  * Top Width (ft)         *  929.09  *  142.91  *  732.73  *
* Vel Total (ft/s)       *    4.85  * Avg. Vel. (ft/s)       *    1.36  *    7.52  *    2.06  *
* Max Chl Dpth (ft)      *   43.92  * Hydr. Depth (ft)       *    7.34  *   33.48  *   21.09  *
* Conv. Total (cfs)      *2030027.0  * Conv. (cfs)           * 43037.2  *1640163.0  *346826.6  *
* Length Wtd. (ft)       *  112.15  * Wetted Per. (ft)       *   95.72  *  158.59  *  176.15  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *    0.22  *    0.90  *    0.63  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    0.30  *    6.80  *    1.29  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 3248.58  *12581.77  * 4559.80  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  479.64  *  531.51  *  692.88  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  794.80  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  775.26  * Flow Area (sq ft)      * 1119.22  * 5145.44  * 4578.69  *
* E.G. Slope (ft/ft)     *0.000673  * Area (sq ft)           * 5833.32  * 5145.44  *10541.92  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *  730.95  *48029.14  * 4929.90  *
* Top Width (ft)         * 1918.25  * Top Width (ft)         * 1033.37  *  142.91  *  741.97  *
* Vel Total (ft/s)       *    4.95  * Avg. Vel. (ft/s)       *    0.65  *    9.33  *    1.08  *
* Max Chl Dpth (ft)      *   46.45  * Hydr. Depth (ft)       *    1.57  *   36.00  *    6.17  *
* Conv. Total (cfs)      *2070081.0  * Conv. (cfs)           * 28182.8  *1851820.0  *190078.1  *
* Length Wtd. (ft)       *  113.92  * Wetted Per. (ft)       *  719.77  *  158.59  *  745.89  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *    0.07  *    1.36  *    0.26  *
* Alpha                  *    3.18  * Stream Power (lb/ft s) *    0.04  *   12.72  *    0.28  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 4806.53  *14008.48  * 6795.36  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         *  690.76  *  538.59  * 1057.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
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         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  798.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.07  * Wt. n-Val.             *   0.088  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  797.38  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  776.96  * Flow Area (sq ft)      * 2966.86  * 5514.87  * 6501.41  *
* E.G. Slope (ft/ft)     *0.000592  * Area (sq ft)           * 8578.25  * 5514.87  *12471.76  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3198.14  *50575.58  * 8226.28  *
* Top Width (ft)         * 1994.81  * Top Width (ft)         * 1100.80  *  142.91  *  751.09  *
* Vel Total (ft/s)       *    4.14  * Avg. Vel. (ft/s)       *    1.08  *    9.17  *    1.27  *
* Max Chl Dpth (ft)      *   49.03  * Hydr. Depth (ft)       *    4.15  *   38.59  *    8.66  *
* Conv. Total (cfs)      *2548227.0  * Conv. (cfs)            *131445.1  *2078678.0  *338103.7  *
* Length Wtd. (ft)       *  113.18  * Wetted Per. (ft)       *  722.36  *  158.59  *  755.38  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *    0.15  *    1.29  *    0.32  *
* Alpha                  *    4.02  * Stream Power (lb/ft s) *    0.16  *   11.79  *    0.40  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 6212.85  *14926.00  * 8915.34  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  845.28  *  539.49  * 1414.51  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  802.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.087  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  801.44  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  779.17  * Flow Area (sq ft)      * 5863.91  * 6094.14  * 9563.70  *
* E.G. Slope (ft/ft)     *0.000457  * Area (sq ft)           *13317.97  * 6094.14  *15545.21  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 8684.46  *52466.04  *13569.50  *
* Top Width (ft)         * 2099.44  * Top Width (ft)         * 1191.12  *  142.91  *  765.41  *
* Vel Total (ft/s)       *    3.47  * Avg. Vel. (ft/s)       *    1.48  *    8.61  *    1.42  *
* Max Chl Dpth (ft)      *   53.09  * Hydr. Depth (ft)       *    8.20  *   42.64  *   12.49  *
* Conv. Total (cfs)      *3496553.0  * Conv. (cfs)            *406392.8  *2455170.0  *634990.4  *
* Length Wtd. (ft)       *  112.51  * Wetted Per. (ft)       *  726.41  *  158.59  *  770.26  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *    0.23  *    1.10  *    0.35  *
* Alpha                  *    4.37  * Stream Power (lb/ft s) *    0.34  *    9.43  *    0.50  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 8788.30  *16335.58  *12983.50  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         * 1042.86  *  541.92  * 1773.52  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  790.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  789.76  * Reach Len. (ft)        *  154.57  *  118.69  *   64.48  *
* Crit W.S. (ft)         *  770.40  * Flow Area (sq ft)      *  457.58  * 4425.70  * 3249.00  *
* E.G. Slope (ft/ft)     *0.000475  * Area (sq ft)           * 1435.37  * 4425.70  * 6952.52  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  467.43  *31409.00  * 6123.58  *
* Top Width (ft)         * 1237.71  * Top Width (ft)         *  542.42  *  142.91  *  552.39  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    1.02  *    7.10  *    1.88  *
* Max Chl Dpth (ft)      *   41.41  * Hydr. Depth (ft)       *    4.83  *   30.97  *   18.58  *
* Conv. Total (cfs)      *1742853.0  * Conv. (cfs)            * 21438.4  *1440560.0  *280855.1  *
* Length Wtd. (ft)       *  112.42  * Wetted Per. (ft)       *   95.72  *  158.59  *  176.15  *
* Min Ch El (ft)         *  748.35  * Shear (lb/sq ft)       *    0.14  *    0.83  *    0.55  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.14  *    5.88  *    1.03  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 2265.93  *10989.85  * 3026.51  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  291.68  *  513.87  *  385.74  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.425

INPUT
Description: U/S of Hickman Mills Bridge. Close to Dodson XS 19.995
Station Elevation Data num= 373

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	838.53	10.37	838.2	14.69	838.1	23.77	837.83	31.68	837.67
37.99	837.52	51.15	837.27	55.97	837.13	71.48	836.79	74.14	836.74
91.14	836.36	97.18	836.23	107.54	836.01	113.64	835.87	123.25	835.59
131.26	835.35	139.98	835.09	148.86	834.83	158.71	834.53	166.44	834.3
177.25	833.98	184	833.78	190.41	833.65	201.92	833.4	208.98	833.25
219.73	833.02	230.44	832.79	243.7	832.51	253.6	832.29	260.85	832.14
268.56	831.98	274.66	831.84	279.81	831.66	285.28	831.45	286.29	831.42
291.59	831.18	293.31	831.15	293.64	831.14	293.98	831.12	295.8	828.58
300.23	823.67	305.32	821.23	320.15	813.58	339	804.03	351.12	797.71
356.97	797.71	360.82	797.7	367.52	797.38	378.26	796.89	386.61	796.97
389.53	796.99	393.8	797.26	404.49	797.98	408.03	797.98	410	797.98
411.69	798.06	420.19	798.47	424.91	798.47	427.52	798.47	430.67	798.27
437.78	797.79	438.85	797.79	442.91	797.78	443.5	797.78	444.65	797.65
451.05	796.91	453.32	796.67	459.07	796.04	462.03	795.72	465.17	795.79
476.47	795.63	493.61	804.55	515.77	813.82	522.18	818.26	525.99	820.96
526.85	821.59	543.26	820.79	544.3	820.87	547.45	820.71	552.62	820.44
554.38	820.26	570.69	819.17	571.24	819.13	587.01	818.08	588.02	818.01
604.41	816.91	605.76	816.82	621.94	815.74	638.91	814.62	643.36	814.33
660.15	813.23	665.19	812.91	677.92	812.08	689.88	811.29	692.8	811.1
693.62	811.05	703.07	810.43	706.8	810.2	716.27	809.58	721.54	809.24
737.99	808.33	744.7	807.9	759.93	807.04	768	806.53	782.07	805.73
791.64	805.11	804.79	804.36	811.8	804.07	824.15	803.48	833.59	803.08
845.27	802.52	854.77	802.12	862.74	801.74	864.89	801.65	878.62	801.07
886.59	800.69	895.21	800.31	902.12	800.02	911.52	799.6	922.92	799.11
934.02	798.54	945.07	798.12	956.63	797.76	968.57	797.3	985.47	796.79
996.87	796.36	1014.47	795.82	1038.45	794.94	1046.67	794.63	1064.94	793.96
1070.93	793.7	1074.75	793.59	1088.31	793.37	1090.93	793.3	1113.87	792.94
1115.26	792.87	1119.86	792.89	1120.24	792.89	1141.3	792.74	1145.53	792.72
1159.56	792.63	1164.23	792.05	1164.47	792.01	1175.59	791.86	1180.82	792.26
1193.23	791.99	1196.99	791.92	1210.6	791.63	1211.97	791.6	1217.36	791.55
1239.69	791.4	1247.85	791.34	1257.28	791.25	1271.35	791.15	1282.23	791.03
1293.2	790.95	1308.01	790.78	1309.73	790.77	1316.35	790.67	1324.76	790.5
1328.6	790.44	1336.01	790.41	1342.38	790.38	1346.99	790.4	1354.28	790.43
1361.62	790.46	1368.47	790.48	1379.94	790.54	1386.66	790.56	1393.82	790.58
1405.55	790.63	1412.56	790.65	1421.27	790.69	1430.04	790.73	1436.96	790.76
1451.17	790.82	1457.94	790.84	1461.39	790.84	1467.5	790.84	1473.5	790.84
1486.12	790.83	1491.06	790.83	1504.74	790.82	1522.88	791.07	1524.72	791.1
1526.01	791.12	1536.11	791.26	1544.12	791.36	1544.93	791.37	1551.38	791.46
1552.37	791.47	1569.68	791.7	1571.78	791.73	1587.41	791.93	1589.67	791.97
1593.17	791.98	1610.12	792.05	1613.95	792.06	1630.33	792.13	1636.88	792.15
1650.99	792.21	1658.14	792.24	1671.91	792.29	1672.57	792.29	1672.91	792.29
1673.24	792.29	1673.73	792.3	1682.63	792.33	1683.13	792.34	1684.1	792.34
1684.74	792.34	1688.37	792.41	1690.89	792.47	1696.88	792.59	1699.34	792.63
1702.13	792.69	1706.51	792.78	1716.57	792.98	1719.42	793.04	1727.32	793.19
1736.57	793.38	1745.62	793.56	1748.06	793.61	1758.62	793.82	1758.88	793.82
1759.11	793.83	1766.76	793.98	1775.47	794.06	1805.27	794.34	1807	794.35
1813.45	794.74	1817.67	794.76	1820.93	794.79	1845.32	795.08	1846.85	795.08
1850.55	795.12	1877.3	795.41	1884.08	795.41	1898.9	795.91	1926.27	796.89
1936.21	797.14	1936.65	797.14	1945.3	797.35	1972.69	798	1975.53	798.07
1978.23	798.13	2025.42	799.25	2025.88	799.27	2027.57	799.35	2047.42	799.78
2058.17	799.91	2058.43	799.87	2058.87	799.87	2067.34	799.93	2070.64	800.03
2074.15	799.19	2075.32	798.91	2079.01	793.52	2084.27	791.47	2091.24	788.2
2103.24	782.59	2121.15	774.38	2121.72	773.78	2122.47	773.64	2125.54	773.49
2127.05	773.47	2130.66	773.71	2173.36	773.28	2187.28	773.28	2202.41	772.72
2228.7	770.43	2234.71	769.91	2235.95	769.76	2239.22	769.34	2248.89	768.39
2267.88	765.77	2269.43	765.12	2273.12	763.53	2280.83	759.89	2292.77	755.64
2302	749.73	2327	748.73	2352	749.73	2362.17	755.22	2378.13	762.51
2382.9	764.57	2386.26	765.84	2389.74	767.15	2395.47	769.55	2413.36	770.52
2429.08	771.32	2444	771.27	2519.02	771.01	2521.95	771.02	2524.13	770.99
2524.87	770.92	2539.09	769.56	2552.85	770.44	2557.9	770.57	2558.84	770.92
2571.04	776.34	2601.49	791.47	2604.03	792.49	2608.24	794.32	2616.59	797.7
2620.57	798.8	2620.75	798.79	2621.81	798.74	2626	798.24	2637.56	796.96
2658.03	796.27	2666.87	796.18	2695.98	795.45	2703.93	795.27	2718.93	794.9
2744.65	794.73	2750.38	794.75	2777.21	794.55	2781.04	794.61	2798.74	794.77

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 2831.57  794.23 2839.88   794.1 2849.59  793.94 2879.94  793.52 2907.37  793.06
 2918.76  792.79 2926.04  792.58 2933.44  792.41 2964.07  791.97 2965.77  791.95
 2969.27  791.91 2973.76  791.84 2989.08  791.85 3004.29  791.48  3007.8  791.49
 3009.72  791.42 3024.37  791.04 3024.64  791.01 3025.02  790.94 3027.95   790.6
 3036.87  789.68 3039.96   789.4 3046.37  789.83 3053.72  790.02 3059.55  789.74
 3060.93  789.67 3069.37  789.14 3074.88  788.78 3076.78  788.44 3077.92  788.58
 3085.07  789.76 3092.44  790.69 3095.76  791.01 3097.02  791.12 3098.75  791.29
 3111.66  791.47 3122.03  791.55 3137.24  791.99 3149.29  792.41 3156.21  792.69
 3177.16  800.47 3185.94  804.41  3201.7  810.39 3211.95  813.13 3227.71  819.03
 3228.83  819.49 3229.61  819.54 3244.73  819.98  3260.1  819.62 3264.66  819.53
 3267.75  819.24 3275.71  818.59 3279.72  818.51

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .09 2267.88    .042 2395.47     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2267.88 2395.47          110.31  123.89  116.49             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1600     810       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     720    1600     810

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  777.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  777.13  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  760.71  * Flow Area (sq ft)      *  805.27  * 2770.32  * 1075.35  *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           *  805.27  * 2770.32  * 1075.35  *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *  636.35  *11630.43  *  933.23  *
* Top Width (ft)         *  457.47  * Top Width (ft)         *  152.72  *  127.59  *  177.16  *
* Vel Total (ft/s)       *    2.84  * Avg. Vel. (ft/s)       *    0.79  *    4.20  *    0.87  *
* Max Chl Dpth (ft)      *   28.40  * Hydr. Depth (ft)       *    5.27  *   21.71  *    6.07  *
* Conv. Total (cfs)      *830825.2  * Conv. (cfs)            * 40052.6  *732034.2  * 58738.5  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  154.00  *  135.72  *  178.70  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.08  *    0.32  *    0.09  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    0.07  *    1.35  *    0.08  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  523.58  * 5366.97  *  545.72  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   86.00  *  412.75  *  111.23  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  782.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  781.82  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  763.82  * Flow Area (sq ft)      * 1546.18  * 3369.21  * 1929.08  *
* E.G. Slope (ft/ft)     *0.000253  * Area (sq ft)           * 1546.18  * 3369.21  * 1929.08  *
* Q Total (cfs)          *20300.00  * Flow (cfs)              * 1801.13  *16119.46  * 2379.41  *
* Top Width (ft)         *  477.16  * Top Width (ft)         *  162.96  *  127.59  *  186.60  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.16  *    4.78  *    1.23  *
* Max Chl Dpth (ft)      *   33.09  * Hydr. Depth (ft)       *    9.49  *   26.41  *   10.34  *
* Conv. Total (cfs)      *1277444.0  * Conv. (cfs)           *113342.0  *1014370.0  *149732.1  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  165.27  *  135.72  *  189.25  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.15  *    0.39  *    0.16  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    0.17  *    1.87  *    0.20  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  950.73  * 7165.72  * 1077.23  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  125.37  *  452.36  *  154.84  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. Elev (ft)         *  785.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  785.01  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
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* Crit W.S. (ft)         *  766.03  * Flow Area (sq ft)      * 2077.07  * 3776.27  * 2534.65  *
* E.G. Slope (ft/ft)     *0.000259  * Area (sq ft)           * 2077.07  * 3776.27  * 2534.65  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2893.03  *19725.05  * 3701.92  *
* Top Width (ft)         *  490.44  * Top Width (ft)         *  169.82  *  127.59  *  193.02  *
* Vel Total (ft/s)       *    3.14  * Avg. Vel. (ft/s)       *    1.39  *    5.22  *    1.46  *
* Max Chl Dpth (ft)      *   36.28  * Hydr. Depth (ft)       *   12.23  *   29.60  *   13.13  *
* Conv. Total (cfs)      *1636901.0  * Conv. (cfs)           *179924.2  *1226746.0  *230230.7  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  172.83  *  135.72  *  196.42  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.19  *    0.45  *    0.21  *
* Alpha                  *    2.13  * Stream Power (lb/ft s) *    0.27  *    2.35  *    0.30  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1326.81  * 8635.19  * 1626.59  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  155.21  *  480.27  *  231.56  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  788.69  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  788.31  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  768.43  * Flow Area (sq ft)      * 2649.21  * 4197.38  * 3182.69  *
* E.G. Slope (ft/ft)     *0.000274  * Area (sq ft)           * 2649.21  * 4197.38  * 3182.69  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 4339.34  *24225.46  * 5435.20  *
* Top Width (ft)         *  504.14  * Top Width (ft)         *  176.88  *  127.59  *  199.67  *
* Vel Total (ft/s)       *    3.39  * Avg. Vel. (ft/s)       *    1.64  *    5.77  *    1.71  *
* Max Chl Dpth (ft)      *   39.58  * Hydr. Depth (ft)       *   14.98  *   32.90  *   15.94  *
* Conv. Total (cfs)      *2053460.0  * Conv. (cfs)           *262078.2  *1463118.0  *328263.8  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  180.62  *  135.72  *  203.84  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.25  *    0.53  *    0.27  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    0.41  *    3.05  *    0.46  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1877.88  *10170.18  * 2478.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  229.41  *  503.12  *  319.88  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  792.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  792.42  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  772.39  * Flow Area (sq ft)      * 3415.69  * 4721.83  * 4306.10  *
* E.G. Slope (ft/ft)     *0.000285  * Area (sq ft)           * 3415.69  * 4721.83  * 4306.10  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 6447.46  *30031.00  * 8021.54  *
* Top Width (ft)         *  827.73  * Top Width (ft)         *  274.98  *  127.59  *  425.15  *
* Vel Total (ft/s)       *    3.58  * Avg. Vel. (ft/s)       *    1.89  *    6.36  *    1.86  *
* Max Chl Dpth (ft)      *   43.69  * Hydr. Depth (ft)       *   12.42  *   37.01  *   10.13  *
* Conv. Total (cfs)      *2638090.0  * Conv. (cfs)           *382224.3  *1780325.0  *475540.4  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  280.03  *  135.72  *  430.64  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.22  *    0.62  *    0.18  *
* Alpha                  *    2.22  * Stream Power (lb/ft s) *    0.41  *    3.93  *    0.33  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 3236.61  *12568.82  * 4550.19  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  477.51  *  531.14  *  692.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  795.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  795.26  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  775.08  * Flow Area (sq ft)      * 4424.44  * 5083.56  * 5803.94  *
* E.G. Slope (ft/ft)     *0.000296  * Area (sq ft)           * 4424.44  * 5083.56  * 5803.94  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 8454.16  *34636.65  *10599.20  *
```

```
* Top Width (ft)         * 1254.78  * Top Width (ft)         *  453.37  *  127.59  *  673.81  *
* Vel Total (ft/s)       *    3.51  * Avg. Vel. (ft/s)       *    1.91  *    6.81  *    1.83  *
* Max Chl Dpth (ft)      *   46.53  * Hydr. Depth (ft)       *    9.76  *   39.84  *    8.61  *
* Conv. Total (cfs)      *3120944.0  * Conv. (cfs)           *491431.3  *2013392.0  *616120.3  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  462.41  *  135.72  *  680.37  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.18  *    0.69  *    0.16  *
* Alpha                  *    2.54  * Stream Power (lb/ft s) *    0.34  *    4.72  *    0.29  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 4788.33  *13994.55  * 6783.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  688.12  *  538.22  * 1056.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  798.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  797.74  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  776.49  * Flow Area (sq ft)      * 5686.26  * 5400.81  * 7610.99  *
* E.G. Slope (ft/ft)     *0.000290  * Area (sq ft)           * 5760.20  * 5400.81  * 7610.99  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *10587.79  *37899.62  *13512.59  *
* Top Width (ft)         * 1528.59  * Top Width (ft)         *  640.37  *  127.59  *  760.63  *
* Vel Total (ft/s)       *    3.32  * Avg. Vel. (ft/s)       *    1.86  *    7.02  *    1.78  *
* Max Chl Dpth (ft)      *   49.01  * Hydr. Depth (ft)       *   10.27  *   42.33  *   10.01  *
* Conv. Total (cfs)      *3643377.0  * Conv. (cfs)           *622182.6  *2227138.0  *794055.5  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  566.57  *  135.72  *  768.19  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.18  *    0.72  *    0.18  *
* Alpha                  *    2.85  * Stream Power (lb/ft s) *    0.34  *    5.05  *    0.32  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 6187.41  *14911.13  * 8900.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  842.19  *  539.12  * 1413.39  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  802.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  801.57  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  778.32  * Flow Area (sq ft)      * 8093.85  * 5888.54  *10582.94  *
* E.G. Slope (ft/ft)     *0.000309  * Area (sq ft)           * 8674.66  * 5888.54  *10582.94  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *12187.54  *45238.33  *17294.14  *
* Top Width (ft)         * 1723.76  * Top Width (ft)         *  812.04  *  127.59  *  784.14  *
* Vel Total (ft/s)       *    3.04  * Avg. Vel. (ft/s)       *    1.51  *    7.68  *    1.63  *
* Max Chl Dpth (ft)      *   52.84  * Hydr. Depth (ft)       *   12.12  *   46.15  *   13.50  *
* Conv. Total (cfs)      *4248725.0  * Conv. (cfs)           *693007.1  *2572340.0  *983378.3  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  685.35  *  135.72  *  792.62  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.23  *    0.84  *    0.26  *
* Alpha                  *    3.97  * Stream Power (lb/ft s) *    0.34  *    6.44  *    0.42  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 8749.28  *16319.26  *12964.17  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         * 1039.30  *  541.55  * 1772.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  790.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  789.89  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  769.62  * Flow Area (sq ft)      * 2931.62  * 4399.17  * 3523.23  *
* E.G. Slope (ft/ft)     *0.000280  * Area (sq ft)           * 2931.62  * 4399.17  * 3523.23  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 5126.30  *26498.97  * 6374.73  *
* Top Width (ft)         *  554.56  * Top Width (ft)         *  180.25  *  127.59  *  246.72  *
```

```
* Vel Total (ft/s)       *    3.50  * Avg. Vel. (ft/s)       *    1.75  *    6.02  *    1.81  *
* Max Chl Dpth (ft)      *   41.16  * Hydr. Depth (ft)       *   16.26  *   34.48  *   14.28  *
* Conv. Total (cfs)      *2268932.0  * Conv. (cfs)            *306084.6  *1582220.0  *380627.2  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  184.35  *  135.72  *  251.48  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.28  *    0.57  *    0.25  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    0.49  *    3.42  *    0.44  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2258.18  *10977.83  * 3018.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  290.40  *  513.50  *  385.15  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 18.414

INPUT
Description: Hickman Mills Bridge.  Bridge geometry copied from Dodson RAS
             Model.
Distance from Upstream XS =       5
Deck/Roadway Width        =     105
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      17
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
     290  831.15  826.15     527   821.6   816.6     530     780     775
    1900     780     775    1950     797     787  2077.9  797.82   781.8
    2078  797.82  792.82    2138   798.8   793.8    2197  799.58  794.58
    2286  800.29  795.29    2375  800.49  795.49    2453  800.24  795.24
    2531  799.59  794.59    2610  798.54  793.54  2610.1  798.54     784
    2717   796.5     788    2800  794.75     788

Upstream Bridge Cross Section Data
Station Elevation Data    num=     373
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  838.53   10.37   838.2   14.69   838.1   23.77  837.83   31.68  837.67
   37.99  837.52   51.15  837.27   55.97  837.13   71.48  836.79   74.14  836.74
   91.14  836.36   97.18  836.23  107.54  836.01  113.64  835.87  123.25  835.59
  131.26  835.35  139.98  835.09  148.86  834.83  158.71  834.53  166.44   834.3
  177.25  833.98     184  833.78  190.41  833.65  201.92   833.4  208.98  833.25
  219.73  833.02  230.44  832.79   243.7  832.51   253.6  832.29  260.85  832.14
  268.56  831.98  274.66  831.84  279.81  831.66  285.28  831.45  286.29  831.42
  291.59  831.18  293.31  831.15  293.64  831.14  293.98  831.12   295.8  828.58
  300.23  823.67  305.32  821.23  320.15  813.58     339  804.03  351.12  797.71
  356.97  797.71  360.82   797.7  367.52  797.38  378.26  796.89  386.61  796.97
  389.53  796.99   393.8  797.26  404.49  797.98  408.03  797.98     410  797.98
  411.69  798.06  420.19  798.47  424.91  798.47  427.52  798.47  430.67  798.27
  437.78  797.79  438.85  797.79  442.91  797.78   443.5  797.78  444.65  797.65
  451.05  796.91  453.32  796.67  459.07  796.04  462.03  795.72  465.17  795.79
  476.47  795.63  493.61  804.55  515.77  813.82  522.18  818.26  525.99  820.96
  526.85  821.59  543.26  820.79   544.3  820.87  547.45  820.71  552.62  820.44
  554.38  820.26  570.69  819.17  571.24  819.13  587.01  818.08  588.02  818.01
  604.41  816.91  605.76  816.82  621.94  815.74  638.91  814.62  643.36  814.33
  660.15  813.23  665.19  812.91  677.92  812.08  689.88  811.29   692.8   811.1
  693.62  811.05  703.07  810.43   706.8   810.2  716.27  809.58  721.54  809.24
  737.99  808.33   744.7   807.9  759.93  807.04     768  806.53  782.07  805.73
  791.64  805.11  804.79  804.36   811.8  804.07  824.15  803.48  833.59  803.08
  845.27  802.52  854.77  802.12  862.74  801.74  864.89  801.65  878.62  801.07
  886.59  800.69  895.21  800.31  902.12  800.02  911.52   799.6  922.92  799.11
  934.02  798.54  945.07  798.12  956.63  797.76  968.57   797.3  985.47  796.79
  996.87  796.36 1014.47  795.82 1038.45  794.94 1046.67  794.63 1064.94  793.96
 1070.93   793.7 1074.75  793.59 1088.31  793.37 1090.93   793.3 1113.87  792.94
 1115.26  792.87 1119.86  792.89 1120.24  792.89  1141.3  792.74 1145.53  792.72
 1159.56  792.63 1164.23  792.05 1164.47  792.01 1175.59  791.86 1180.82  792.26
 1193.23  791.99 1196.99  791.92  1210.6  791.63 1211.97   791.6 1217.36  791.55
 1239.69   791.4 1247.85  791.34 1257.28  791.25 1271.35  791.15 1282.23  791.03
  1293.2  790.95 1308.01  790.78 1309.73  790.77 1316.35  790.67 1324.76   790.5
  1328.6  790.44 1336.01  790.41 1342.38  790.38 1346.99   790.4 1354.28  790.43
```

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 1361.62  790.46 1368.47  790.48 1379.94  790.54 1386.66  790.56 1393.82  790.58
 1405.55  790.63 1412.56  790.65 1421.27  790.69 1430.04  790.73 1436.96  790.76
 1451.17  790.82 1457.94  790.84 1461.39  790.84  1467.5  790.84  1473.5  790.84
 1486.12  790.83 1491.06  790.83 1504.74  790.82 1522.88  791.07 1524.72   791.1
 1526.01  791.12 1536.11  791.26 1544.12  791.36 1544.93  791.37 1551.38  791.46
 1552.37  791.47 1569.68   791.7 1571.78  791.73 1587.41  791.93 1589.67  791.97
 1593.17  791.98 1610.12  792.05 1613.95  792.06 1630.33  792.13 1636.88  792.15
 1650.99  792.21 1658.14  792.24 1671.91  792.29 1672.57  792.29 1672.91  792.29
 1673.24  792.29 1673.73   792.3 1682.63  792.33 1683.13  792.34  1684.1  792.34
 1684.74  792.34 1688.37  792.41 1690.89  792.47 1696.88  792.59 1699.34  792.63
 1702.13  792.69 1706.51  792.78 1716.57  792.98 1719.42  793.04 1727.32  793.19
 1736.57  793.38 1745.62  793.56 1748.06  793.61 1758.62  793.82 1758.88  793.82
 1759.11  793.83 1766.76  793.98 1775.47  794.06 1805.27  794.34    1807  794.35
 1813.45  794.74 1817.67  794.76 1820.93  794.79 1845.32  795.08 1846.85  795.08
 1850.55  795.12  1877.3  795.41 1884.08  795.41  1898.9  795.91 1926.27  796.89
 1936.21  797.14 1936.65  797.14  1945.3  797.35 1972.69     798 1975.53  798.07
 1978.23  798.13 2025.42  799.25 2025.88  799.27 2027.57  799.35 2047.42  799.78
 2058.17  799.91 2058.43  799.87 2058.87  799.87 2067.34  799.93 2070.64  800.03
 2074.15  799.19 2075.32  798.91 2079.01  793.52 2084.27  791.47 2091.24   788.2
 2103.24  782.59 2121.15  774.38 2121.72  773.78 2122.47  773.64 2125.54  773.49
 2127.05  773.47 2130.66  773.71 2173.36  773.28 2187.28  773.28 2202.41  772.72
  2228.7  770.43 2234.71  769.91 2235.95  769.76 2239.22  769.34 2248.89  768.39
 2267.88  765.77 2269.43  765.12 2273.12  763.53 2280.83  759.89 2292.77  755.64
    2302  749.73    2327  748.73    2352  749.73 2362.17  755.22 2378.13  762.51
  2382.9  764.57 2386.26  765.84 2389.74  767.15 2395.47  769.55 2413.36  770.52
 2429.08  771.32    2444  771.27 2519.02  771.01 2521.95  771.02 2524.13  770.99
 2524.87  770.92 2539.09  769.56 2552.85  770.44  2557.9  770.57 2558.84  770.92
 2571.04  776.34 2601.49  791.47 2604.03  792.49 2608.24  794.32 2616.59   797.7
 2620.57   798.8 2620.75  798.79 2621.81  798.74    2626  798.24 2637.56  796.96
 2658.03  796.27 2666.87  796.18 2695.98  795.45 2703.93  795.27 2718.93   794.9
 2744.65  794.73 2750.38  794.75 2777.21  794.55 2781.04  794.61 2798.74  794.77
 2831.57  794.23 2839.88   794.1 2849.59  793.94 2879.94  793.52 2907.37  793.06
 2918.76  792.79 2926.04  792.58 2933.44  792.41 2964.07  791.97 2965.77  791.95
 2969.27  791.91 2973.76  791.84 2989.08  791.85 3004.29  791.48  3007.8  791.49
 3009.72  791.42 3024.37  791.04 3024.64  791.01 3025.02  790.94 3027.95   790.6
 3036.87  789.68 3039.96   789.4 3046.37  789.83 3053.72  790.02 3059.55  789.74
 3060.93  789.67 3069.37  789.14 3074.88  788.78 3076.78  788.44 3077.92  788.58
 3085.07  789.76 3092.44  790.69 3095.76  791.01 3097.02  791.12 3098.75  791.29
 3111.66  791.47 3122.03  791.55 3137.24  791.99 3149.29  792.41 3156.21  792.69
 3177.16  800.47 3185.94  804.41  3201.7  810.39 3211.95  813.13 3227.71  819.03
 3228.83  819.49 3229.61  819.54 3244.73  819.98  3260.1  819.62 3264.66  819.53
 3267.75  819.24 3275.71  818.59 3279.72  818.51

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0     .09 2267.88    .042 2395.47     .09

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2267.88 2395.47            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1600     810       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     720    1600     810

Downstream  Deck/Roadway Coordinates
    num=      16
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
     295   830.4   825.4     535   820.5   815.5     550     780     775
    1950     780     775    2000  796.75     787  2032.9  797.82   781.8
    2033  797.82  792.82    2093   798.8   793.8    2152  799.58  794.58
    2241  800.29  795.29    2330  800.49  795.49    2408  800.24  795.24
    2486  799.59  794.59    2565  798.54  793.54  2565.1  798.54     784
    2672   796.5     788

Downstream Bridge Cross Section Data
Station Elevation Data    num=     425
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  838.22    3.56  838.16   16.05  837.96   19.53  837.89   22.26  837.83
   40.96  837.47   51.97  837.16    62.9  836.84   69.89  836.64   85.15   836.2
   87.66  836.12  100.42  835.75  101.73  835.72  118.01  835.18  119.51  835.11
```

121.46	835.08	138.82	834.53	144.11	834.45	155.18	834.11	158.98	834.1
161	834.11	166.86	833.95	167.06	833.94	167.26	833.93	167.52	833.93
169.94	833.86	179.31	833.6	184.8	833.49	200.08	833.06	205.22	832.96
209.45	832.87	227.63	832.36	231.62	832.28	250.33	831.75	254.36	831.67
276.09	831.05	281.91	830.87	290.86	830.62	292.7	830.56	299.18	830.38
302.66	825.08	303.94	822.55	308.62	820.13	348.82	798.57	351.06	797.56
351.34	797.42	354.1	797.35	361.43	797.16	362.53	797.13	377.98	796.87
390.48	796.96	391.38	796.97	392.32	797.02	394.65	797.14	404.61	797.66
409	797.89	412.04	797.89	414.48	797.88	417.74	798.04	425.17	798.39
426.87	798.39	432.47	798.39	438.39	797.93	442.57	797.59	444.09	797.59
448.26	797.58	450.05	797.4	455.81	796.82	464.63	795.89	466.22	795.72
467.06	795.77	477.61	796.1	495.92	803.2	521.87	813.24	527.61	817.99
531.28	820.53	531.41	820.52	531.47	820.52	531.53	820.51	532.15	820.47
535	820.28	536.23	820.2	539.17	820.02	549.03	819.37	553.2	819.12
553.98	819.07	564.31	818.39	576.57	817.64	588.07	816.88	600.18	816.08
609.33	815.52	622.97	814.63	625.73	814.45	635.69	813.82	650.53	812.85
666.07	811.84	672.27	811.45	683.93	810.68	687.71	810.44	699.59	809.66
703.07	809.45	716.51	808.71	731.14	807.91	733.94	807.73	752.16	806.74
753.81	806.65	765.24	806.03	777.47	805.36	777.66	805.35	779.7	805.24
789.62	804.7	789.75	804.7	809.39	803.8	810.39	803.76	829.39	802.89
831.05	802.82	841.65	802.34	843.39	802.26	853.86	801.78	856.18	801.67
858.33	801.58	866.53	801.2	881.21	800.54	884.24	800.41	887.29	800.27
901.95	799.61	919.06	798.76	922.9	798.56	931.41	798.46	935.04	798.4
946.37	798.26	950.97	798.18	961.31	798.05	961.5	798.04	967.03	797.95
978.55	797.8	985.07	797.68	995.42	797.54	1000.31	797.45	1008.57	797.29
1016.98	797.09	1025.31	796.92	1033.61	796.72	1043.19	796.54	1049.09	796.4
1058.78	796.21	1064.61	796.07	1072.99	795.98	1079.18	795.91	1089.92	795.8
1094.47	795.74	1106.69	795.62	1108.66	795.6	1121.96	795.52	1122.82	795.51
1123.02	795.51	1135.56	795.43	1138.66	795.4	1154.04	795.28	1163.96	795.27
1169.58	795.24	1173.04	795.2	1187.09	795.08	1193.22	795.03	1211.86	794.77
1216.1	794.72	1229.63	794.5	1233.11	794.41	1246.95	794.19	1249.79	794.11
1270.41	793.79	1272.24	793.77	1289.23	793.51	1299.23	793.39	1306.71	793.32
1311.93	793.26	1316.06	793.21	1322.67	793.14	1330.27	793.04	1337.93	792.95
1344	792.88	1349.36	792.81	1358.46	792.7	1362.72	792.65	1371.67	792.54
1376.08	792.49	1385.1	792.38	1402.23	792.17	1413.57	792.04	1423.57	791.88
1430.46	791.8	1436.84	791.73	1451.38	791.49	1456.94	791.42	1462.1	791.36
1475.54	791.13	1479.13	791.09	1482.51	791.04	1487.37	790.96	1494.69	790.9
1512.27	790.75	1516.03	790.72	1525.79	790.64	1530.33	790.6	1543.33	790.49
1545.92	790.47	1563.08	790.33	1565.18	790.31	1575.2	790.22	1577.41	790.21
1582.37	790.17	1582.88	790.16	1585.59	790.2	1612.43	790.17	1615.12	790.21
1621.79	790.21	1623.24	790.2	1623.37	790.2	1623.67	790.2	1624.02	790.2
1627.58	790.25	1647.68	790.56	1649.42	790.57	1668.74	790.87	1669.17	790.87
1676.77	791	1695.25	791.3	1696.16	791.33	1704.31	791.46	1704.74	791.48
1724.75	791.78	1727.25	791.78	1741.06	791.97	1754.32	792.16	1755.72	792.16
1770.11	792.36	1770.12	792.36	1770.65	792.37	1771.01	792.38	1771.28	792.38
1772.04	792.39	1772.49	792.4	1775.59	792.33	1775.78	792.34	1776.25	792.34
1776.73	792.35	1777	792.35	1777.26	792.36	1777.8	792.36	1777.98	792.36
1778.69	792.37	1778.93	792.38	1779.18	792.38	1779.25	792.38	1780.07	792.39
1780.36	792.4	1780.59	792.4	1780.82	792.4	1781.17	792.41	1781.52	792.41
1782.6	792.42	1786.25	792.47	1789.85	792.52	1792.74	792.46	1806.26	792.62
1808.09	792.58	1820.31	792.72	1820.76	792.72	1820.8	792.72	1820.85	792.71
1820.97	792.71	1821.04	792.69	1821.89	792.6	1823.8	792.75	1846.67	793.51
1847.2	793.54	1848.14	793.63	1863.91	794.18	1865.17	794.18	1876.79	794.3
1915.26	794.82	1921.45	794.97	1930.43	795.19	1936.03	795.26	1979.9	795.81
1999.28	796.76	2001.9	796.81	2012.12	797.12	2022.46	796.96	2023.07	796.97
2024.09	796.65	2028.82	796.65	2030.82	796.65	2032.17	796.85	2033.55	796.82
2034.67	796.6	2037.7	795.83	2052.49	791.52	2053.99	791.08	2054.47	790.89
2055.5	790.5	2056.27	790.14	2073.81	781.94	2079.54	779.73	2086.18	777.12
2100.28	774.99	2118.95	773.37	2125.7	772.87	2127.64	772.76	2178.37	771.04
2199.83	770.31	2212.87	769.91	2213.09	769.91	2217.09	768.84	2234.77	763.53
2235.84	762.98	2250.85	755.64	2260	749.73	2285	748.73	2310	749.73
2319.19	754.97	2321.69	755.95	2335.36	760.75	2341.92	763.05	2344.4	765.89
2347.61	768.98	2350.35	769.06	2353.56	769.02	2364.71	769.07	2401.42	769.95
2410.99	770.21	2421.04	770.48	2451.25	770.38	2487.9	770.26	2498.23	769.89
2509.22	769.67	2526.77	770.75	2527.96	770.82	2572.08	792.16	2572.16	792.19
2573.12	793.05	2579.93	798.33	2580.33	798.64	2587.57	798.58	2588.19	798.6
2588.28	798.57	2588.64	798.58	2591.7	798.55	2603.05	798.03	2604.3	798.3
2613.17	798.08	2623.13	797.92	2625.98	797.9	2650.13	797.5	2652.05	797.42
2672.24	796.93	2672.67	796.92	2672.69	796.92	2693.84	796.33	2694.87	796.3
2739.08	795.08	2745.26	794.91	2748.42	794.92	2764.18	794.96	2775.53	794.77
2779.8	794.7	2790.82	794.51	2799.53	794.36	2813.99	794.12	2826.01	793.91
2850.18	793.48	2859.03	793.38	2872.29	793.24	2882.06	793.14	2894.27	793.01
2917.5	792.76	2936.35	792.56	2943	792.42	2956.98	791.85	2957.35	791.84
3000.65	792.05	3007.36	792.07	3008.24	792.1	3008.77	792.11	3009.26	792.11
3009.93	792.1	3013.54	792.13	3015.72	792.15	3018.4	792.14	3058.65	791.68
3061.91	791.67	3065.17	791.65	3070.65	791.47	3071.09	791.46	3071.65	791.46

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 3089.67  791.35 3102.37  791.17 3110.09   791.1 3119.65  791.01 3123.08  790.64
 3125.81  790.36 3131.36  790.83 3134.34  791.03 3160.57  791.47  3162.4  791.53
 3171.64  791.66 3173.81  792.28 3175.31  792.64 3176.85  793.02 3197.88  801.03
 3209.62  803.54 3217.97  808.06  3232.5  811.67 3232.75  811.73 3233.34  811.89
 3241.13     812 3247.98  812.12 3248.63  812.49 3249.31  812.97 3258.76   819.6
 3264.76  819.53 3274.47  819.41 3284.48  819.33 3285.57  819.24 3285.82  819.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0     .09 2213.09    .042 2347.61     .09

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2213.09 2347.61            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1600     810       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     720    1600     810

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  6

Pier Data
Pier Station     Upstream=    2135    Downstream=    2090
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     796
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     796

Pier Data
Pier Station     Upstream=    2195    Downstream=    2150
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     797
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     797

Pier Data
Pier Station     Upstream=    2280    Downstream=    2235
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     798
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     798

Pier Data
Pier Station     Upstream=    2375    Downstream=    2330
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     798
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     798
```

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Pier Data
Pier Station     Upstream=    2450    Downstream=    2405
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     740       4     797
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     740       4     797

Pier Data
Pier Station     Upstream=    2530    Downstream=    2485
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     740       4     797
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       4     740       4     797

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     777.37  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     777.13  * E.G. Elev (ft)         *     777.36  *     777.18  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     777.11  *     776.94  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     760.62  *     760.73  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      28.38  *      28.21  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.98  *       2.95  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4432.16  *    4469.54  *
* Weir Submerg           *             * Froude # Chl           *       0.16  *       0.16  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   38833.66  *   38614.71  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      10.23  *      10.41  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *     549.38  *     541.53  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)       *   624566.8  *   626209.9  *
* Delta WS (ft)          *       0.19  * Top Width (ft)          *     433.41  *     429.23  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)         *             *             *
* BR Open Vel (ft/s)     *       2.98  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       0.22  *       0.23  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)   *       0.67  *       0.68  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     782.11  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     781.82  * E.G. Elev (ft)         *     782.09  *     781.87  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     781.81  *     781.60  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     763.78  *     763.82  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.08  *      32.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.12  *       3.11  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6514.92  *    6522.11  *
* Weir Submerg           *             * Froude # Chl           *       0.16  *       0.16  *
```

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* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   65463.26  *   65120.09  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      14.38  *      14.44  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *     627.60  *     621.65  *
* Delta EG (ft)          *       0.25  * Conv. Total (cfs)      *   917645.9  *   924555.8  *
* Delta WS (ft)          *       0.24  * Top Width (ft)         *     453.11  *     451.54  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.12  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.32  *       0.32  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       0.99  *       0.98  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. US. (ft)          *     785.34  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     785.01  * E.G. Elev (ft)         *     785.31  *     785.08  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     785.01  *     784.78  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     766.15  *     766.13  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.28  *      36.05  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.30  *       3.30  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7983.54  *    7979.53  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   89497.30  *   89056.28  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      17.12  *      17.16  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *     680.68  *     674.76  *
* Delta EG (ft)          *       0.26  * Conv. Total (cfs)      *  1143133.0  *  1154345.0  *
* Delta WS (ft)          *       0.25  * Top Width (ft)         *     466.41  *     465.07  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.30  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.39  *       0.38  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.28  *       1.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     788.69  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     788.31  * E.G. Elev (ft)         *     788.68  *     788.62  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     788.33  *     788.28  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     768.72  *     768.72  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.60  *      39.55  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.56  *       3.53  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9558.62  *    9635.35  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  119945.00  *  121142.20  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      19.90  *      20.08  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *     735.95  *     733.14  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  1397085.0  *  1428219.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     480.22  *     479.81  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *       0.06  *       0.01  *
* BR Open Vel (ft/s)     *       3.56  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.48  *       0.46  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.71  *       1.64  *
*****************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     792.86  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     792.42  * E.G. Elev (ft)         *     792.85  *     792.78  *
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* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     792.46  *     792.40  *
* Q Bridge (cfs)         *   44345.91  * Crit W.S. (ft)         *     773.35  *     773.33  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.73  *      43.67  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.74  *       3.70  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11892.07  *   12024.96  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  165577.00  *  166925.90  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      14.72  *      13.33  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *    1115.57  *    1212.10  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  1741631.0  *  1782305.0  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *     807.70  *     902.36  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *       0.07  *       0.01  *
* BR Open Vel (ft/s)     *       3.83  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.43  *       0.39  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.63  *       1.43  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     795.74  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     795.26  * E.G. Elev (ft)         *     795.73  *     795.63  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     795.19  *     795.13  *
* Q Bridge (cfs)         *   52210.59  * Crit W.S. (ft)         *     775.47  *     775.15  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.46  *      46.40  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.77  *       3.64  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   14258.10  *   14762.11  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.16  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  203844.10  *  205770.40  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      17.52  *      15.36  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *    1811.45  *    1914.52  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *  1792972.0  *  1863308.0  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *     813.95  *     961.34  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       4.12  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.44  *       0.40  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.66  *       1.45  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     798.23  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     797.74  * E.G. Elev (ft)         *     798.23  *     798.07  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     797.71  *     797.60  *
* Q Bridge (cfs)         *   56353.77  * Crit W.S. (ft)         *     776.83  *     776.54  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      48.98  *      48.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.82  *       3.65  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   16212.10  *   16977.86  *
* Weir Submerg           *             * Froude # Chl           *       0.16  *       0.15  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  243222.70  *  245796.80  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      18.48  *      17.49  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *    2223.56  *    2304.57  *
* Delta EG (ft)          *       0.18  * Conv. Total (cfs)      *  1613542.0  *  1686637.0  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *     962.93  *    1062.24  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *       0.15  *       0.01  *
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* BR Open Vel (ft/s)     *       4.44  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.67  *       0.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.57  *       2.27  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     802.14  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     801.57  * E.G. Elev (ft)         *     802.08  *     801.89  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     801.70  *     801.55  *
* Q Bridge (cfs)         *   57030.62  * Crit W.S. (ft)         *     778.62  *     778.27  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      52.97  *      52.82  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.51  *       3.38  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   21275.56  *   22126.40  *
* Weir Submerg           *             * Froude # Chl           *       0.13  *       0.13  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  317107.30  *  322345.10  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      13.47  *      13.83  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *    2931.98  *    2938.97  *
* Delta EG (ft)          *       0.28  * Conv. Total (cfs)      *  1776598.0  *  1864453.0  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *    1724.56  *    1748.72  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *       0.18  *       0.01  *
* BR Open Vel (ft/s)     *       4.49  * C & E Loss (ft)        *       0.01  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.80  *       0.75  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.81  *       2.55  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     790.30  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     789.89  * E.G. Elev (ft)         *     790.29  *     790.22  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     789.92  *     789.86  *
* Q Bridge (cfs)         *   37993.36  * Crit W.S. (ft)         *     769.95  *     771.26  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.19  *      41.13  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.67  *       3.65  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10348.90  *   10398.72  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  136414.10  *  137689.20  *
* Min El Weir Flow (ft)  *     790.18  * Hydr Depth (ft)        *      19.43  *      21.48  *
* Min El Prs (ft)        *     825.82  * W.P. Total (ft)        *     808.32  *     758.07  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1524646.0  *  1559080.0  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *     532.62  *     484.18  *
* BR Open Area (sq ft)   *   16894.77  * Frctn Loss (ft)        *       0.06  *       0.01  *
* BR Open Vel (ft/s)     *       3.68  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.50  *       0.51  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.82  *       1.86  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
```

0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.401

INPUT
Description: D/S of Hickman Mills Bridge. close to Dodson XS 19.975
Station Elevation Data num= 425

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	838.22	3.56	838.16	16.05	837.96	19.53	837.89	22.26	837.83
40.96	837.47	51.97	837.16	62.9	836.84	69.89	836.64	85.15	836.2
87.66	836.12	100.42	835.75	101.73	835.72	118.01	835.18	119.51	835.11
121.46	835.08	138.82	834.53	144.11	834.45	155.18	834.11	158.98	834.1
161	834.11	166.86	833.95	167.06	833.94	167.26	833.93	167.52	833.93
169.94	833.86	179.31	833.6	184.8	833.49	200.08	833.06	205.22	832.96
209.45	832.87	227.63	832.36	231.62	832.28	250.33	831.75	254.36	831.67
276.09	831.05	281.91	830.87	290.86	830.62	292.7	830.56	299.18	830.38
302.66	825.08	303.94	822.55	308.62	820.13	348.82	798.57	351.06	797.56
351.34	797.42	354.1	797.35	361.43	797.16	362.53	797.13	377.98	796.87
390.48	796.96	391.38	796.97	392.32	797.02	394.65	797.14	404.61	797.66
409	797.89	412.04	797.89	414.48	797.88	417.74	798.04	425.17	798.39
426.87	798.39	432.47	798.39	438.39	797.93	442.57	797.59	444.09	797.59
448.26	797.58	450.05	797.4	455.81	796.82	464.63	795.89	466.22	795.72
467.06	795.77	477.61	796.1	495.92	803.2	521.87	813.24	527.61	817.99
531.28	820.53	531.41	820.52	531.47	820.52	531.53	820.51	532.15	820.47
535	820.28	536.23	820.2	539.17	820.02	549.03	819.37	553.2	819.12
553.98	819.07	564.31	818.39	576.57	817.64	588.07	816.88	600.18	816.08
609.33	815.52	622.97	814.63	625.73	814.45	635.69	813.82	650.53	812.85
666.07	811.84	672.27	811.45	683.93	810.68	687.71	810.44	699.59	809.66
703.07	809.45	716.51	808.71	731.14	807.91	733.94	807.73	752.16	806.74
753.81	806.65	765.24	806.03	777.47	805.36	777.66	805.35	779.7	805.24
789.62	804.7	789.75	804.7	809.39	803.8	810.39	803.76	829.39	802.89
831.05	802.82	841.65	802.34	843.39	802.26	853.86	801.78	856.18	801.67
858.33	801.58	866.53	801.2	881.21	800.54	884.24	800.41	887.29	800.27
901.95	799.61	919.06	798.76	922.9	798.56	931.41	798.46	935.04	798.4
946.37	798.26	950.97	798.18	961.31	798.05	961.5	798.04	967.03	797.95
978.55	797.8	985.07	797.68	995.42	797.54	1000.31	797.45	1008.57	797.29
1016.98	797.09	1025.31	796.92	1033.61	796.72	1043.19	796.54	1049.09	796.4
1058.78	796.21	1064.61	796.07	1072.99	795.98	1079.18	795.91	1089.92	795.8
1094.47	795.74	1106.69	795.62	1108.66	795.6	1121.96	795.52	1122.82	795.51
1123.02	795.51	1135.56	795.43	1138.66	795.4	1154.04	795.28	1163.96	795.27
1169.58	795.24	1173.04	795.2	1187.09	795.08	1193.22	795.03	1211.86	794.77
1216.1	794.72	1229.63	794.5	1233.11	794.41	1246.95	794.19	1249.79	794.11
1270.41	793.79	1272.24	793.77	1289.23	793.51	1299.23	793.39	1306.71	793.32
1311.93	793.26	1316.06	793.21	1322.67	793.14	1330.27	793.04	1337.93	792.95
1344	792.88	1349.36	792.81	1358.46	792.7	1362.72	792.65	1371.67	792.54
1376.08	792.49	1385.1	792.38	1402.23	792.17	1413.57	792.04	1423.57	791.88
1430.46	791.8	1436.84	791.73	1451.38	791.49	1456.94	791.42	1462.1	791.36
1475.54	791.13	1479.13	791.09	1482.51	791.04	1487.37	790.96	1494.69	790.9
1512.27	790.75	1516.03	790.72	1525.79	790.64	1530.33	790.6	1543.33	790.49
1545.92	790.47	1563.08	790.33	1565.18	790.31	1575.2	790.22	1577.41	790.21
1582.37	790.17	1582.88	790.16	1585.59	790.2	1612.43	790.17	1615.12	790.21
1621.79	790.21	1623.24	790.2	1623.37	790.2	1623.67	790.2	1624.02	790.2
1627.58	790.25	1647.68	790.56	1649.42	790.57	1668.74	790.87	1669.17	790.87
1676.77	791	1695.25	791.3	1696.16	791.33	1704.31	791.46	1704.74	791.48
1724.75	791.78	1727.25	791.78	1741.06	791.97	1754.32	792.16	1755.72	792.16
1770.11	792.36	1770.12	792.36	1770.65	792.37	1771.01	792.38	1771.28	792.38
1772.04	792.39	1772.49	792.4	1775.59	792.33	1775.78	792.34	1776.25	792.34
1776.73	792.35	1777	792.35	1777.26	792.36	1777.8	792.36	1777.98	792.36
1778.69	792.37	1778.93	792.38	1779.18	792.38	1779.25	792.38	1780.07	792.39
1780.36	792.4	1780.59	792.4	1780.82	792.4	1781.17	792.41	1781.52	792.41
1782.6	792.42	1786.25	792.47	1789.85	792.52	1792.74	792.46	1806.26	792.62
1808.09	792.58	1820.31	792.72	1820.76	792.72	1820.8	792.72	1820.85	792.71
1820.97	792.71	1821.04	792.69	1821.89	792.6	1823.8	792.75	1846.67	793.51
1847.2	793.54	1848.14	793.63	1863.91	794.18	1865.17	794.18	1876.79	794.3
1915.26	794.82	1921.45	794.97	1930.43	795.19	1936.03	795.26	1979.9	795.81
1999.28	796.76	2001.9	796.81	2012.12	797.12	2022.46	796.96	2023.07	796.97
2024.09	796.65	2028.82	796.65	2030.82	796.65	2032.17	796.85	2033.55	796.82
2034.67	796.6	2037.7	795.83	2052.49	791.52	2053.99	791.08	2054.47	790.89
2055.5	790.5	2056.27	790.14	2073.81	781.94	2079.54	779.73	2086.18	777.12

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 2100.28  774.99 2118.95  773.37  2125.7  772.87 2127.64  772.76 2178.37  771.04
 2199.83  770.31 2212.87  769.91 2213.09  769.91 2217.09  768.84 2234.77  763.53
 2235.84  762.98 2250.85  755.64    2260  749.73    2285  748.73    2310  749.73
 2319.19  754.97 2321.69  755.95 2335.36  760.75 2341.92  763.05  2344.4  765.89
 2347.61  768.98 2350.35  769.06 2353.56  769.02 2364.71  769.07 2401.42  769.95
 2410.99  770.21 2421.04  770.48 2451.25  770.38  2487.9  770.26 2498.23  769.89
 2509.22  769.67 2526.77  770.75 2527.96  770.82 2572.08  792.16 2572.16  792.19
 2573.12  793.05 2579.93  798.33 2580.33  798.64 2587.57  798.58 2588.19   798.6
 2588.28  798.57 2588.64  798.58  2591.7  798.55 2603.05  798.03  2604.3   798.3
 2613.17  798.08 2623.13  797.92 2625.98   797.9 2650.13   797.5 2652.05  797.42
 2672.24  796.93 2672.67  796.92 2672.69  796.92 2693.84  796.33 2694.87   796.3
 2739.08  795.08 2745.26  794.91 2748.42  794.92 2764.18  794.96 2775.53  794.77
  2779.8   794.7 2790.82  794.51 2799.53  794.36 2813.99  794.12 2826.01  793.91
 2850.18  793.48 2859.03  793.38 2872.29  793.24 2882.06  793.14 2894.27  793.01
  2917.5  792.76 2936.35  792.56    2943  792.42 2956.98  791.85 2957.35  791.84
 3000.65  792.05 3007.36  792.07 3008.24   792.1 3008.77  792.11 3009.26  792.11
 3009.93   792.1 3013.54  792.13 3015.72  792.15  3018.4  792.14 3058.65  791.68
 3061.91  791.67 3065.17  791.65 3070.65  791.47 3071.09  791.46 3071.65  791.46
 3089.67  791.35 3102.37  791.17 3110.09   791.1 3119.65  791.01 3123.08  790.64
 3125.81  790.36 3131.36  790.83 3134.34  791.03 3160.57  791.47  3162.4  791.53
 3171.64  791.66 3173.81  792.28 3175.31  792.64 3176.85  793.02 3197.88  801.03
 3209.62  803.54 3217.97  808.06  3232.5  811.67 3232.75  811.73 3233.34  811.89
 3241.13     812 3247.98  812.12 3248.63  812.49 3249.31  812.97 3258.76   819.6
 3264.76  819.53 3274.47  819.41 3284.48  819.33 3285.57  819.24 3285.82  819.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .09 2213.09    .042 2347.61     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2213.09 2347.61           273.81  291.88  312.33              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0    1600     810       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     720    1600     810

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  777.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  776.93  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)         *  760.77  * Flow Area (sq ft)      *  577.93  * 2800.26  * 1291.74  *
* E.G. Slope (ft/ft)     *0.000261  * Area (sq ft)           *  577.93  * 2800.26  * 1291.74  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  425.72  *11556.49  * 1217.79  *
* Top Width (ft)         *  453.19  * Top Width (ft)         *  125.68  *  134.52  *  192.99  *
* Vel Total (ft/s)       *    2.83  * Avg. Vel. (ft/s)       *    0.74  *    4.13  *    0.94  *
* Max Chl Dpth (ft)      *   28.20  * Hydr. Depth (ft)       *    4.60  *   20.82  *    6.69  *
* Conv. Total (cfs)      *816889.6  * Conv. (cfs)            * 26345.9  *715180.1  * 75363.7  *
* Length Wtd. (ft)       *  292.62  * Wetted Per. (ft)       *  125.97  *  144.38  *  194.46  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.07  *    0.32  *    0.11  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.06  *    1.30  *    0.10  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  521.71  * 5359.39  *  542.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   85.63  *  412.39  *  110.73  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  781.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  781.59  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)         *  763.85  * Flow Area (sq ft)      * 1193.56  * 3425.95  * 2211.75  *
* E.G. Slope (ft/ft)     *0.000259  * Area (sq ft)           * 1193.56  * 3425.95  * 2211.75  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1326.49  *16105.74  * 2867.77  *
* Top Width (ft)         *  475.49  * Top Width (ft)         *  138.36  *  134.52  *  202.61  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.11  *    4.70  *    1.30  *
* Max Chl Dpth (ft)      *   32.86  * Hydr. Depth (ft)       *    8.63  *   25.47  *   10.92  *
* Conv. Total (cfs)      *1261540.0  * Conv. (cfs)            * 82434.6  *1000889.0  *178216.8  *
* Length Wtd. (ft)       *  292.93  * Wetted Per. (ft)       *  139.50  *  144.38  *  205.14  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.14  *    0.38  *    0.17  *
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* Alpha                  *    2.02  * Stream Power (lb/ft s) *    0.15  *    1.80  *    0.23  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  947.04  * 7156.49  * 1071.55  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  124.97  *  452.01  *  154.30  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  785.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  784.76  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)         *  766.05  * Flow Area (sq ft)      * 1644.40  * 3853.30  * 2865.84  *
* E.G. Slope (ft/ft)     *0.000264  * Area (sq ft)           * 1644.40  * 3853.30  * 2865.84  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2202.92  *19764.31  * 4352.77  *
* Top Width (ft)         *  489.01  * Top Width (ft)         *  145.32  *  134.52  *  209.18  *
* Vel Total (ft/s)       *    3.15  * Avg. Vel. (ft/s)       *    1.34  *    5.13  *    1.52  *
* Max Chl Dpth (ft)      *   36.03  * Hydr. Depth (ft)       *   11.32  *   28.64  *   13.70  *
* Conv. Total (cfs)      *1621351.0  * Conv. (cfs)            *135702.9  *1217511.0  *268137.3  *
* Length Wtd. (ft)       *  293.21  * Wetted Per. (ft)       *  147.15  *  144.38  *  212.43  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.18  *    0.44  *    0.22  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *    0.25  *    2.25  *    0.34  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1321.80  * 8624.83  * 1619.18  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  154.78  *  479.92  *  231.01  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  788.25  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)         *  768.50  * Flow Area (sq ft)      * 2163.90  * 4322.18  * 3607.49  *
* E.G. Slope (ft/ft)     *0.000271  * Area (sq ft)           * 2163.90  * 4322.18  * 3607.49  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 3404.89  *24274.05  * 6321.06  *
* Top Width (ft)         *  503.68  * Top Width (ft)         *  152.77  *  134.52  *  216.38  *
* Vel Total (ft/s)       *    3.37  * Avg. Vel. (ft/s)       *    1.57  *    5.62  *    1.75  *
* Max Chl Dpth (ft)      *   39.52  * Hydr. Depth (ft)       *   14.16  *   32.13  *   16.67  *
* Conv. Total (cfs)      *2065024.0  * Conv. (cfs)            *206799.7  *1474309.0  *383915.6  *
* Length Wtd. (ft)       *  293.45  * Wetted Per. (ft)       *  155.38  *  144.38  *  220.44  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.24  *    0.51  *    0.28  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.37  *    2.85  *    0.49  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1871.38  *10158.62  * 2468.80  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  228.97  *  502.77  *  319.30  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  792.35  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)         *  772.70  * Flow Area (sq ft)      * 3012.10  * 4873.38  * 4678.18  *
* E.G. Slope (ft/ft)     *0.000281  * Area (sq ft)           * 3012.10  * 4873.38  * 4678.18  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 5172.78  *30198.35  * 9128.86  *
* Top Width (ft)         *  922.63  * Top Width (ft)         *  334.12  *  134.52  *  453.98  *
* Vel Total (ft/s)       *    3.54  * Avg. Vel. (ft/s)       *    1.72  *    6.20  *    1.95  *
* Max Chl Dpth (ft)      *   43.62  * Hydr. Depth (ft)       *    9.01  *   36.23  *   10.30  *
* Conv. Total (cfs)      *2653655.0  * Conv. (cfs)            *308467.0  *1800809.0  *544378.6  *
* Length Wtd. (ft)       *  293.76  * Wetted Per. (ft)       *  339.70  *  144.38  *  459.18  *
* Min Ch El (ft)         *  748.73  * Shear (lb/sq ft)       *    0.16  *    0.59  *    0.18  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    0.27  *    3.67  *    0.35  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 3227.87  *12555.81  * 4537.81  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  476.64  *  530.78  *  690.79  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
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*****************************************************************************************
* E.G. Elev (ft)          *  795.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.46  * Wt. n-Val.              *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  795.15  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)          *  774.67  * Flow Area (sq ft)      * 4208.81  * 5251.17  * 6262.33  *
* E.G. Slope (ft/ft)      *0.000291  * Area (sq ft)           * 4208.81  * 5251.17  * 6262.33  *
* Q Total (cfs)           *53690.00  * Flow (cfs)             * 6987.90  *34760.54  *11941.56  *
* Top Width (ft)          * 1310.83  * Top Width (ft)         *  502.03  *  134.52  *  674.28  *
* Vel Total (ft/s)        *    3.41  * Avg. Vel. (ft/s)       *    1.66  *    6.62  *    1.91  *
* Max Chl Dpth (ft)       *   46.42  * Hydr. Depth (ft)       *    8.38  *   39.04  *    9.29  *
* Conv. Total (cfs)       *3150058.0  * Conv. (cfs)           *409988.8  *2039443.0  *700626.1  *
* Length Wtd. (ft)        *  293.82  * Wetted Per. (ft)       *  510.87  *  144.38  *  680.97  *
* Min Ch El (ft)          *  748.73  * Shear (lb/sq ft)       *    0.15  *    0.66  *    0.17  *
* Alpha                   *    2.53  * Stream Power (lb/ft s) *    0.25  *    4.37  *    0.32  *
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)   * 4777.02  *13980.57  * 6767.01  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  687.24  *  537.88  * 1055.34  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  798.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.52  * Wt. n-Val.              *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  797.53  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)          *  776.09  * Flow Area (sq ft)      * 5563.48  * 5571.31  * 7981.34  *
* E.G. Slope (ft/ft)      *0.000309  * Area (sq ft)           * 5622.63  * 5571.31  * 7981.34  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             * 6942.97  *39595.00  *15462.04  *
* Top Width (ft)          * 1603.20  * Top Width (ft)         *  696.76  *  134.52  *  771.91  *
* Vel Total (ft/s)        *    3.24  * Avg. Vel. (ft/s)       *    1.25  *    7.11  *    1.94  *
* Max Chl Dpth (ft)       *   48.80  * Hydr. Depth (ft)       *    9.07  *   41.42  *   10.34  *
* Conv. Total (cfs)       *3524509.0  * Conv. (cfs)           *394686.4  *2250853.0  *878968.9  *
* Length Wtd. (ft)        *  294.27  * Wetted Per. (ft)       *  624.62  *  144.38  *  779.88  *
* Min Ch El (ft)          *  748.73  * Shear (lb/sq ft)       *    0.17  *    0.75  *    0.20  *
* Alpha                   *    3.17  * Stream Power (lb/ft s) *    0.21  *    5.30  *    0.38  *
* Frctn Loss (ft)         *    0.11  * Cum Volume (acre-ft)   * 6173.31  *14897.01  * 8880.73  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  840.78  *  539.09  * 1411.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  801.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.53  * Wt. n-Val.              *   0.090  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  801.33  * Reach Len. (ft)        *  273.81  *  291.88  *  312.33  *
* Crit W.S. (ft)          *  777.95  * Flow Area (sq ft)      * 7893.37  * 6082.52  *11158.92  *
* E.G. Slope (ft/ft)      *0.000298  * Area (sq ft)           * 8459.75  * 6082.52  *11158.92  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *12161.84  *44998.81  *17559.35  *
* Top Width (ft)          * 1746.75  * Top Width (ft)         *  760.53  *  134.52  *  851.69  *
* Vel Total (ft/s)        *    2.97  * Avg. Vel. (ft/s)       *    1.54  *    7.40  *    1.57  *
* Max Chl Dpth (ft)       *   52.60  * Hydr. Depth (ft)       *   12.87  *   45.22  *   13.10  *
* Conv. Total (cfs)       *4326396.0  * Conv. (cfs)           *704187.9  *2605496.0  *1016712.0  *
* Length Wtd. (ft)        *  292.44  * Wetted Per. (ft)       *  628.42  *  144.38  *  860.77  *
* Min Ch El (ft)          *  748.73  * Shear (lb/sq ft)       *    0.23  *    0.78  *    0.24  *
* Alpha                   *    3.84  * Stream Power (lb/ft s) *    0.36  *    5.80  *    0.38  *
* Frctn Loss (ft)         *    0.12  * Cum Volume (acre-ft)   * 8727.41  *16304.60  *12936.52  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         * 1037.07  *  541.18  * 1770.04  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  790.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.39  * Wt. n-Val.              *   0.090  *   0.042  *   0.090  *
```

W.S. Elev (ft)	789.82	Reach Len. (ft)	273.81	291.88	312.33	
Crit W.S. (ft)	769.81	Flow Area (sq ft)	2407.35	4534.20	3951.12	
E.G. Slope (ft/ft)	0.000277	Area (sq ft)	2407.35	4534.20	3951.12	
Q Total (cfs)	38000.00	Flow (cfs)	4049.05	26591.20	7359.74	
Top Width (ft)	510.31	Top Width (ft)	156.14	134.52	219.64	
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)	1.68	5.86	1.86	
Max Chl Dpth (ft)	41.09	Hydr. Depth (ft)	15.42	33.71	17.99	
Conv. Total (cfs)	2281908.0	Conv. (cfs)	243146.5	1596808.0	441954.2	
Length Wtd. (ft)	293.54	Wetted Per. (ft)	159.10	144.38	224.06	
Min Ch El (ft)	748.73	Shear (lb/sq ft)	0.26	0.54	0.31	
Alpha	2.06	Stream Power (lb/ft s)	0.44	3.19	0.57	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	2250.97	10965.71	3008.47	
C & E Loss (ft)	0.02	Cum SA (acres)	289.94	513.15	384.51	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.346

INPUT
Description: Dodson XS 19.935
Station Elevation Data num= 312

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	841.01	1.41	841	3.41	841.03	16.66	841.26	39.88	839.6
53.21	838.64	68.9	837.1	79.89	836.1	89.66	835.06	109.45	832.4
125.93	830.41	137.25	828.96	149.89	827.7	156.37	827	162.2	826.47
190.32	823.78	198.46	822.92	230.76	819.04	233.54	818.65	234.73	818.51
237.97	818.05	270.49	813.24	298.22	810.51	309.82	809.17	327.17	805.95
337.3	804.2	341	803.74	371.33	801.09	378.58	800.44	385.93	799.86
404.94	798.51	416.08	798.03	432.94	797.26	443.18	796.72	453.47	796.45
467.05	796.55	495.33	795.09	498.8	794.91	503.34	794.8	524.89	794.35
554.26	793.98	557.9	793.99	561.16	794.07	594.69	794.37	596.14	794.36
597.64	794.38	631.13	794.74	633.79	794.73	648.63	794.73	650.71	794.84
664.57	795.81	674.99	795.87	686.92	795.81	704.66	795.51	707.66	795.5
709.93	795.73	712.56	796.02	715.65	796.36	716.39	796.36	720.59	796.36
727.03	796.52	729.69	796.59	734.78	796.59	736.25	796.59	741.26	796.27
744.81	796.05	745.53	796	746.92	796	750.64	796	754.94	795.72
763.18	795.19	766.58	793.87	773.67	790.91	774.39	791	781.39	791.85
790.5	791.99	806.89	792.42	821.63	792.82	824.5	792.89	825.4	792.9
843.44	792.96	984.35	793.35	1147.2	793.96	1207.07	794.19	1209.3	794.2
1210.43	794.19	1211.9	794.19	1218.47	794.15	1237.87	793.71	1251.25	793.46
1295.81	792.76	1334.04	792.47	1346.05	792.4	1370.7	792.18	1371.02	792.18
1371.1	792.16	1374.98	791.36	1380.29	790.65	1385.39	789.94	1391.86	789.73
1406.01	789.27	1425.14	789.87	1428.54	790.02	1434.85	790.2	1448.68	790.59
1453.35	790.72	1462.37	790.78	1463.8	790.78	1542.23	790.84	1582.83	790.79
1606.17	789.23	1655.84	787.77	1683.07	787.23	1697.08	786.99	1701.13	786.94
1706.45	787.07	1725.13	787.08	1766.43	787.24	1769	787.22	1776.42	787.17
1784.29	786.7	1791.23	786.26	1797.52	786.12	1809.78	786.07	1826.96	785.99
1863.58	785.95	1870.72	786.35	1892.29	787.35	1895	787.47	1901.25	787.54
1910.49	787.74	1911.49	787.78	1911.89	787.79	1912.81	787.8	1914.15	787.7
1922.33	787.44	1934.63	787.4	1934.86	787.39	1934.97	787.39	1935.03	787.38
1950.35	786.24	1970.09	785.53	1975.22	785.39	1978.8	785.24	2005.72	786.38
2011.65	786.75	2039.97	787.49	2055.3	787.9	2068.17	788.45	2088.54	789.15
2093.39	789.36	2098.29	789.64	2106.24	789.86	2152.05	791.3	2153.12	791.32
2153.18	791.33	2153.28	791.33	2154.34	791.34	2164.31	791.44	2193.45	791.68
2198.13	791.4	2231.31	781.22	2231.32	781.22	2235.53	779.72	2236.15	779.66
2238.97	779.47	2240	779.4	2243.16	779.18	2245.3	779.04	2247.92	778.85
2248.29	778.83	2248.38	778.82	2248.47	778.82	2248.57	778.81	2248.66	778.8
2248.8	778.79	2248.94	778.78	2261.26	778.15	2272.77	777.83	2276.84	777.72
2279.17	777.68	2282.65	777.64	2282.68	777.64	2282.73	777.64	2282.77	777.63
2282.78	777.63	2282.97	777.63	2285.42	777.67	2288.09	777.48	2292.66	776.14
2293.53	776.14	2295.8	776.15	2297.63	775.85	2301.94	774.97	2308.34	772.79
2314.63	771.48	2320.32	770.17	2326.27	769.21	2331	768.44	2340.26	766.93
2341.39	766.9	2342.7	766.99	2348.51	767.14	2352.08	766.97	2358.49	765.15
2377.55	754.78	2377.58	754.78	2385	749.3	2410	748.3	2435	749.3
2440.87	754.97	2441.97	755.95	2443.65	757.03	2448.78	760.02	2452.62	762.09
2453.24	762.17	2462.17	764.9	2470.81	766.57	2471.73	766.61	2483.9	767.15
2514.29	768.2	2535.45	776.32	2541.39	778.14	2542.93	778.17	2544.53	778.18
2545.17	778.18	2545.8	778.19	2555.89	777.97	2558.03	777.98	2559.16	777.99
2581.77	778.06	2586.09	778.08	2609.24	778.09	2620.62	777.87	2626.89	777.87

```
 2652.98  777.36 2665.03  777.43 2667.91  777.59 2674.92  777.57 2679.41  777.59
 2696.33  777.26 2713.21  776.97 2722.84  776.98 2740.21  777.01  2768.2  777.04
  2787.1  777.08 2801.61  777.22 2810.43  777.31 2825.84  777.46 2845.02  777.46
 2861.49  777.62 2873.31  777.74 2892.12  777.76 2916.49  777.83 2933.35  778.12
 2957.67  778.17 2964.92  778.28    2985   778.5 2995.15  778.66 3002.35  778.78
  3006.4  778.84 3022.77  779.04 3040.98  779.33 3065.71  779.62 3081.06  779.98
  3096.8  780.35 3124.15  780.74 3131.43  780.84 3147.66  781.24 3152.72  781.38
 3156.23  781.66 3161.17  781.98 3183.17   783.4 3187.94  783.64 3191.42  783.92
 3193.82  783.97 3197.11  784.04 3200.28  784.11  3201.8  784.12 3206.25  784.14
 3207.08  784.13 3212.19  784.05 3218.46  783.85 3221.09  783.77 3224.79  783.64
 3231.71  783.42 3234.24  783.22 3245.19  778.38 3249.77  776.79 3259.81  776.84
 3280.04  776.73 3282.73  776.95 3285.24  777.61 3291.01  778.95 3302.83  781.57
  3309.2  782.69 3340.23  783.62 3372.97  784.19 3386.98  788.94 3393.42  791.61
 3419.03  797.93 3427.14  802.96 3439.79  808.15 3443.96  809.95 3448.07  811.04
 3458.62  812.34 3478.37  814.71 3478.76  814.78  3479.4  814.97 3506.85  814.47
 3527.05  814.23 3529.58  814.23

Manning's n Values         num=       3
     Sta   n Val      Sta   n Val     Sta   n Val
***********************************************
       0     .09 2352.08    .042 2470.81     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2352.08 2470.81           259.51   209.7  108.23              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  2167.4     805       T
 2744.49 3529.58  800.37       T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
     750    1250     810    1460    1730     810

CROSS SECTION OUTPUT  Profile #2-yr
***********************************************************************************************
* E.G. Elev (ft)         *  777.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  776.72  * Reach Len. (ft)        *  259.51  *  209.70  *  108.23  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  367.32  * 2544.51  *  498.68  *
* E.G. Slope (ft/ft)     *0.000353  * Area (sq ft)           *  367.32  * 2544.51  *  498.68  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  371.00  *12389.12  *  439.88  *
* Top Width (ft)         *  246.08  * Top Width (ft)          *   61.40  *  118.73  *   65.95  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    1.01  *    4.87  *    0.88  *
* Max Chl Dpth (ft)      *   28.42  * Hydr. Depth (ft)        *    5.98  *   21.43  *    7.56  *
* Conv. Total (cfs)      *702567.5  * Conv. (cfs)            * 19746.5  *659408.4  * 23412.6  *
* Length Wtd. (ft)       *  207.69  * Wetted Per. (ft)        *   62.52  *  128.35  *   67.55  *
* Min Ch El (ft)         *  748.30  * Shear (lb/sq ft)        *    0.13  *    0.44  *    0.16  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.13  *    2.13  *    0.14  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *  518.74  * 5341.48  *  536.05  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   85.04  *  411.54  *  109.80  *
***********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
***********************************************************************************************
* E.G. Elev (ft)         *  781.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  781.27  * Reach Len. (ft)        *  259.51  *  209.70  *  108.23  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  815.10  * 3084.43  * 1556.78  *
* E.G. Slope (ft/ft)     *0.000398  * Area (sq ft)           *  815.10  * 3084.43  * 2886.95  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  949.90  *18130.00  * 1220.10  *
* Top Width (ft)         *  980.37  * Top Width (ft)          *  120.93  *  118.73  *  740.71  *
* Vel Total (ft/s)       *    3.72  * Avg. Vel. (ft/s)       *    1.17  *    5.88  *    0.78  *
* Max Chl Dpth (ft)      *   32.97  * Hydr. Depth (ft)        *    6.74  *   25.98  *    5.69  *
* Conv. Total (cfs)      *1017504.0  * Conv. (cfs)            * 47612.2  *908736.4  * 61155.2  *
* Length Wtd. (ft)       *  205.02  * Wetted Per. (ft)        *  122.48  *  128.35  *  275.51  *
* Min Ch El (ft)         *  748.30  * Shear (lb/sq ft)        *    0.17  *    0.60  *    0.14  *
* Alpha                  *    2.24  * Stream Power (lb/ft s) *    0.19  *    3.51  *    0.11  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *  940.72  * 7134.68  * 1053.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  124.15  *  451.16  *  150.92  *
***********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
***********************************************************************************************
* E.G. Elev (ft)         *  784.96  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  784.43  * Reach Len. (ft)        *  259.51  *  209.70  *  108.23  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1213.95  * 3460.02  * 2422.53  *
* E.G. Slope (ft/ft)     *0.000400  * Area (sq ft)           * 1213.95  * 3460.02  * 5420.00  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1748.69  *22014.99  * 2556.31  *
* Top Width (ft)         * 1152.84  * Top Width (ft)         *  131.24  *  118.73  *  902.87  *
* Vel Total (ft/s)       *    3.71  * Avg. Vel. (ft/s)       *    1.44  *    6.36  *    1.06  *
* Max Chl Dpth (ft)      *   36.13  * Hydr. Depth (ft)       *    9.25  *   29.14  *    8.85  *
* Conv. Total (cfs)      *1315764.0  * Conv. (cfs)            * 87419.0  *1100552.0  *127792.8  *
* Length Wtd. (ft)       *  201.84  * Wetted Per. (ft)       *  133.27  *  128.35  *  275.51  *
* Min Ch El (ft)         *  748.30  * Shear (lb/sq ft)       *    0.23  *    0.67  *    0.22  *
* Alpha                  *    2.48  * Stream Power (lb/ft s) *    0.33  *    4.28  *    0.23  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1312.81  * 8600.33  * 1589.47  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  153.91  *  479.07  *  227.03  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  787.91  * Reach Len. (ft)        *  259.51  *  209.70  *  108.23  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1689.70  * 3872.62  * 3373.60  *
* E.G. Slope (ft/ft)     *0.000403  * Area (sq ft)           * 2097.09  * 3872.62  * 8575.39  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2877.99  *26665.39  * 4456.63  *
* Top Width (ft)         * 1499.89  * Top Width (ft)         *  468.04  *  118.73  *  913.12  *
* Vel Total (ft/s)       *    3.80  * Avg. Vel. (ft/s)       *    1.70  *    6.89  *    1.32  *
* Max Chl Dpth (ft)      *   39.61  * Hydr. Depth (ft)       *   11.85  *   32.62  *   12.33  *
* Conv. Total (cfs)      *1693110.0  * Conv. (cfs)            *143316.3  *1327866.0  *221928.1  *
* Length Wtd. (ft)       *  198.55  * Wetted Per. (ft)       *  145.11  *  128.35  *  275.51  *
* Min Ch El (ft)         *  748.30  * Shear (lb/sq ft)       *    0.29  *    0.76  *    0.31  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    0.50  *    5.23  *    0.41  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1857.99  *10131.16  * 2425.12  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  227.02  *  501.92  *  315.25  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  791.97  * Reach Len. (ft)        *  259.51  *  209.70  *  108.23  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2307.04  * 4354.59  * 4484.59  *
* E.G. Slope (ft/ft)     *0.000419  * Area (sq ft)           * 4427.15  * 4354.59  *12304.11  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4151.40  *33048.16  * 7300.44  *
* Top Width (ft)         * 1752.83  * Top Width (ft)         *  710.04  *  118.73  *  924.06  *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *    1.80  *    7.59  *    1.63  *
* Max Chl Dpth (ft)      *   43.67  * Hydr. Depth (ft)       *   12.49  *   36.68  *   16.39  *
* Conv. Total (cfs)      *2174063.0  * Conv. (cfs)            *202817.9  *1614580.0  *356665.6  *
* Length Wtd. (ft)       *  196.37  * Wetted Per. (ft)       *  187.76  *  128.35  *  275.51  *
* Min Ch El (ft)         *  748.30  * Shear (lb/sq ft)       *    0.32  *    0.89  *    0.43  *
* Alpha                  *    2.73  * Stream Power (lb/ft s) *    0.58  *    6.73  *    0.69  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 3204.49  *12524.89  * 4476.93  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  473.36  *  529.94  *  685.85  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  795.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  794.73  * Reach Len. (ft)        *  259.51  *  209.70  *  108.23  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2817.96  * 4683.07  * 5241.73  *
* E.G. Slope (ft/ft)     *0.000437  * Area (sq ft)           * 6687.14  * 4683.07  *14876.06  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 5917.78  *38102.07  * 9670.15  *
* Top Width (ft)         * 2025.85  * Top Width (ft)         *  971.86  *  118.73  *  935.27  *
* Vel Total (ft/s)       *    4.21  * Avg. Vel. (ft/s)       *    2.10  *    8.14  *    1.84  *
* Max Chl Dpth (ft)      *   46.43  * Hydr. Depth (ft)       *   15.26  *   39.44  *   19.15  *
* Conv. Total (cfs)      *2568278.0  * Conv. (cfs)            *283078.8  *1822624.0  *462574.8  *
* Length Wtd. (ft)       *  196.01  * Wetted Per. (ft)       *  187.76  *  128.35  *  275.51  *
* Min Ch El (ft)         *  748.30  * Shear (lb/sq ft)       *    0.41  *    1.00  *    0.52  *
* Alpha                  *    2.71  * Stream Power (lb/ft s) *    0.86  *    8.10  *    0.96  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 4742.77  *13947.29  * 6691.23  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  682.61  *  537.04  * 1049.57  *
**********************************************************************************************
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Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	797.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.090	0.042	0.120
W.S. Elev (ft)	797.11	Reach Len. (ft)	259.51	209.70	108.23
Crit W.S. (ft)		Flow Area (sq ft)	3257.40	4965.58	5892.94
E.G. Slope (ft/ft)	0.000447	Area (sq ft)	9205.69	4965.58	17112.95
Q Total (cfs)	62000.00	Flow (cfs)	7620.71	42490.46	11888.83
Top Width (ft)	2209.99	Top Width (ft)	1146.35	118.73	944.91
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	2.34	8.56	2.02
Max Chl Dpth (ft)	48.81	Hydr. Depth (ft)	17.64	41.82	21.53
Conv. Total (cfs)	2932221.0	Conv. (cfs)	360413.0	2009539.0	562268.8
Length Wtd. (ft)	195.80	Wetted Per. (ft)	187.76	128.35	275.51
Min Ch El (ft)	748.30	Shear (lb/sq ft)	0.48	1.08	0.60
Alpha	2.68	Stream Power (lb/ft s)	1.13	9.24	1.20
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	6126.71	14861.71	8790.77
C & E Loss (ft)	0.04	Cum SA (acres)	834.98	538.24	1405.68

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	801.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.	0.090	0.042	0.120
W.S. Elev (ft)	800.41	Reach Len. (ft)	259.51	209.70	108.23
Crit W.S. (ft)		Flow Area (sq ft)	3866.17	5356.95	6821.55
E.G. Slope (ft/ft)	0.000591	Area (sq ft)	13089.04	5356.95	20242.20
Q Total (cfs)	74720.00	Flow (cfs)	11662.21	55459.27	7598.53
Top Width (ft)	2274.06	Top Width (ft)	1203.11	118.73	952.22
Vel Total (ft/s)	4.66	Avg. Vel. (ft/s)	3.02	10.35	1.11
Max Chl Dpth (ft)	52.11	Hydr. Depth (ft)	20.93	45.12	7.16
Conv. Total (cfs)	3072361.0	Conv. (cfs)	479530.5	2280392.0	312438.6
Length Wtd. (ft)	195.62	Wetted Per. (ft)	187.76	128.35	958.92
Min Ch El (ft)	748.30	Shear (lb/sq ft)	0.76	1.54	0.26
Alpha	3.74	Stream Power (lb/ft s)	2.29	15.96	0.29
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	8659.68	16266.28	12823.95
C & E Loss (ft)	0.04	Cum SA (acres)	1030.90	540.33	1763.58

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	790.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.	0.090	0.042	0.120
W.S. Elev (ft)	789.48	Reach Len. (ft)	259.51	209.70	108.23
Crit W.S. (ft)		Flow Area (sq ft)	1917.38	4058.89	3802.96
E.G. Slope (ft/ft)	0.000409	Area (sq ft)	2868.16	4058.89	10011.49
Q Total (cfs)	38000.00	Flow (cfs)	3491.48	29030.51	5478.01
Top Width (ft)	1562.21	Top Width (ft)	526.02	118.73	917.46
Vel Total (ft/s)	3.89	Avg. Vel. (ft/s)	1.82	7.15	1.44
Max Chl Dpth (ft)	41.18	Hydr. Depth (ft)	12.98	34.19	13.90
Conv. Total (cfs)	1879693.0	Conv. (cfs)	172708.0	1436012.0	270973.3
Length Wtd. (ft)	197.82	Wetted Per. (ft)	150.46	128.35	275.51
Min Ch El (ft)	748.30	Shear (lb/sq ft)	0.33	0.81	0.35
Alpha	2.63	Stream Power (lb/ft s)	0.59	5.77	0.51
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	2234.39	10936.92	2958.41
C & E Loss (ft)	0.04	Cum SA (acres)	287.80	512.30	380.44

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.306

INPUT

Description: close to Dodson XS 19.91
Station Elevation Data num= 411

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	850.72	2.59	850.61	2.62	850.61	2.69	850.61	19.88	849.27
24.99	847.38	31.23	845.13	33.52	844.82	40.67	843.24	43.98	842.22
45.27	841.81	56.66	838.25	63.29	837.18	71.68	835.48	83.61	832.89
102.69	829.93	103.43	829.82	104.73	829.64	133.7	825.55	159.62	820.5
162.88	819.9	164.71	819.51	189.05	813.97	190.72	813.7	193.36	813.59
214.52	812.27	222.32	811.56	226.73	811.38	242.59	810.76	257.74	810.14
269.41	809.49	281.77	808.56	288.75	808.46	301.59	808.1	319.76	807.14
324.31	806.9	341.22	805.95	350.77	805.33	361.04	804.88	379.2	803.88
381.78	803.74	400.67	803.09	412.8	802.31	422.53	801.71	434.09	801.07
443.81	800.49	456.42	799.72	474.82	798.46	488.99	797.38	499.75	796.4
505.83	796.25	527.69	795.25	536.84	794.86	539.38	794.78	543.88	794.62
567.85	793.68	598.77	792.39	598.83	792.39	598.86	792.39	598.97	792.39
629.87	791.59	653.67	791.65	658.28	791.72	672.28	791.71	689.84	791.66
691.86	791.68	697.1	790.92	702.26	790.13	709.13	790.69	713.84	791.31
720.39	791.89	720.92	791.95	721.44	791.98	723.61	792.16	727.48	792.64
729.66	793	730.15	793.06	731.39	793.3	735.58	793.36	757.5	793.63
766.52	793.66	772.47	793.67	781.2	795.41	781.23	795.41	785.9	795.41
786.24	795.41	787.35	795.42	795.86	795.52	799.31	795.52	802.54	795.51
812.76	795.21	812.95	795.2	813.28	795.17	828.76	793.63	835.51	791.54
840.34	789.31	844.01	789.25	855.27	789.25	863.49	789.28	932.99	789.41
946.5	789.56	949.06	789.54	956.32	789.52	975.45	789.47	998.46	789.51
998.59	789.51	1003.32	789.55	1015.22	789.43	1024.28	789.27	1029.61	789.34
1038.08	789.43	1041.21	789.39	1051.01	788.83	1054.46	788.57	1055.8	788.5
1058.55	788.4	1076.33	787.94	1081.69	787.81	1091.99	787.54	1112.97	787.5
1113.34	787.49	1114.9	787.47	1117.28	787.45	1137.26	787.25	1152.87	787.07
1159.91	786.95	1174.59	786.83	1188.97	786.78	1195.84	786.83	1202.57	786.57
1206.5	786.28	1211.79	785.88	1212.28	785.82	1221.72	784.69	1222.34	784.71
1223.28	784.73	1232.29	785	1242.15	785.25	1247.65	786.47	1256.33	788.34
1257.24	788.45	1259.78	788.6	1265.98	788.98	1269.59	789.19	1273.74	789.24
1285.08	789.15	1290.18	788.74	1301.28	787.86	1311.07	787.47	1326.51	787.57
1336.06	787.51	1354.38	787.38	1363.21	783.97	1368.69	782.3	1373.14	782.24
1380.59	782.15	1386.7	782.08	1390.9	784.08	1402.32	788.84	1403.04	789.15
1403.84	789.47	1404.23	789.64	1420.87	790.07	1423.15	790.13	1424.78	790.21
1450.23	790.56	1453.96	790.59	1460.43	790.67	1488.88	791.54	1491.31	791.59
1494.7	791.67	1502.74	792.95	1518	795.14	1522.89	795.37	1528.22	795.34
1533.82	795.34	1550.09	793.29	1551.22	792.86	1554.42	792.57	1556.73	792.3
1564.07	791.44	1564.94	791.42	1597.36	791.08	1604.02	790.99	1606.57	790.94
1631.82	790.97	1640.85	791.13	1644.36	790.85	1654.36	790.52	1668.24	790.21
1687.69	789.95	1694.26	789.87	1697.62	789.86	1709.95	789.93	1719.43	789.88
1731.41	789.5	1735.28	789.33	1746.52	784.29	1751.28	782.02	1760.22	782.1
1763.42	782.12	1770.39	786.83	1773.91	789.03	1776.73	788.92	1789.96	788.36
1805.99	788.19	1812.4	788.16	1822.3	787.89	1825.55	788	1827.27	788.9
1828.8	788.61	1829.42	788.82	1830.82	789.09	1833.45	789.56	1838.67	788.17
1839.12	788.09	1840.55	788.03	1841.03	787.9	1843.27	787.9	1851.09	787.81
1871.08	787.54	1877.35	787.27	1896.86	787.12	1914.75	787.09	1918.48	787.11
1947.59	787.13	1951.14	787.22	1964.52	787.28	1986.73	787.37	1993.72	787.25
2002.43	787.05	2021.92	787.03	2029.14	787.11	2041	787	2048.64	786.68
2056.91	786.22	2058.46	786.28	2060.33	786.36	2067.59	786.65	2075.64	786.95
2086.28	787.45	2093.41	787.44	2108.28	787.47	2117.58	787.49	2126.92	787.51
2145.35	787.55	2147.76	787.56	2153.46	787.57	2161.32	787.41	2167.6	787.09
2176.66	786.78	2182.04	786.72	2198.06	786.05	2199.12	786.03	2201.08	785.97
2211.34	785.99	2220.22	785.99	2222.53	785.85	2223.42	785.84	2230.69	784.46
2237.43	783.32	2239.7	782.83	2247.87	785.36	2261.45	789.51	2262.94	790.01
2265.34	790.16	2272.29	790.53	2275.58	790.56	2286.65	790.68	2293.99	790.64
2296.24	790.63	2305.71	790.39	2305.81	790.39	2305.92	790.39	2320.19	789.76
2337.5	786.14	2353.35	782.67	2361.32	785.38	2364.62	786.44	2399.96	786.07
2402.37	786.06	2405.86	786.08	2427.61	785.88	2432.46	785.84	2433.18	785.83
2438.48	785.12	2440.19	784.8	2445.21	782.25	2449.36	782.79	2450.65	782.32
2456.22	782.03	2463.29	775.53	2465.29	774.53	2471.85	772.17	2476.88	770.84
2477.02	770.8	2480.84	769.59	2489.66	767.67	2499.64	765.07	2504.63	762.25
2507.08	760.77	2514.53	759.47	2515.16	759.16	2517.84	757.37	2520.87	754.5
2528	749.16	2548	748.16	2568	749.16	2575.67	754.89	2582.2	758.5
2592.55	763.16	2599.9	766.09	2604.46	767.4	2606.06	767.88	2611.73	768.52
2617.05	769.13	2620.43	769.53	2627.85	770.36	2631.62	770.56	2632.79	770.63
2643.61	770.66	2662.85	771.15	2672.8	771.52	2674.7	771.58	2681.24	772.23
2682.54	772.5	2682.95	772.92	2685.93	773.7	2687.72	774.15	2689.55	774.88
2691.04	771.59	2717.45	771.22	2718.93	771.2	2721.63	771.47	2722.41	771.54
2750.45	773.19	2755.65	774.59	2784.05	778.02	2797.89	780.07	2804.52	780.87
2825.63	780.47	2844.23	780.32	2851.86	780.19	2872.89	779.99	2888.81	780.02
2905.88	780.69	2921.91	781.32	2928.95	781.32	2945.83	781.42	2959.15	781.2
2977.89	780.47	2985.62	780.32	2994.56	780.41	3003.64	780.61	3008.39	780.71
3020.5	780.83	3032.13	780.94	3047.38	781.28	3058.67	781.41	3093.36	781.51

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 3107.92  781.64 3111.81  781.45 3144.33  781.52 3149.16  781.91 3160.93  781.78
 3166.32  781.65  3173.5  781.67 3180.16  781.78 3191.93  781.87 3207.82  781.82
 3212.36  781.81 3232.44  781.99 3256.77  783.29 3266.66  782.66  3276.4  782.67
 3294.21  782.88 3295.28   782.9  3296.1  783.21 3299.24  784.43    3303  785.89
 3305.14  785.06 3309.27  783.58 3311.22  783.62 3323.79  783.98 3335.82  784.45
 3337.61  784.54 3338.68  784.55 3345.04  784.62 3348.88   784.6  3349.9   784.6
 3349.98   784.6 3353.64  784.51 3354.68  784.48 3354.95  784.48 3362.02   784.2
 3362.41  784.18 3378.92  783.48 3379.93  783.47 3381.95  783.43 3419.27  784.43
 3433.36  784.84 3434.38  785.21 3435.47  785.64 3459.33  793.51 3490.39  804.14
 3503.43  808.02  3511.2  810.74 3527.73   812.6 3536.51  813.34 3549.26  815.09
  3569.4  814.93

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
****************************************************************
       0    .075 1301.28     .09 2514.53    .042 2604.46     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2514.53 2604.46           220.47  183.47   88.91             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2281.94     805       T
 2819.38  3569.4  800.37       T

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  776.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  776.48  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  466.54  * 2020.93  *  797.93  *
* E.G. Slope (ft/ft)     *0.000489  * Area (sq ft)           *  466.54  * 2020.93  *  797.93  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  704.58  *11883.10  *  612.32  *
* Top Width (ft)         *  309.07  * Top Width (ft)         *   52.28  *   89.93  *  166.86  *
* Vel Total (ft/s)       *    4.02  * Avg. Vel. (ft/s)       *    1.51  *    5.88  *    0.77  *
* Max Chl Dpth (ft)      *   28.32  * Hydr. Depth (ft)       *    8.92  *   22.47  *    4.78  *
* Conv. Total (cfs)      *596847.8  * Conv. (cfs)            * 31858.1  *537303.3  * 27686.4  *
* Length Wtd. (ft)       *  179.62  * Wetted Per. (ft)       *   55.47  *   98.10  *  170.11  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.26  *    0.63  *    0.14  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    0.39  *    3.70  *    0.11  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  516.25  * 5330.49  *  534.44  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   84.70  *  411.04  *  109.51  *
*************************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  781.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  780.98  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  712.79  * 2425.60  * 1630.25  *
* E.G. Slope (ft/ft)     *0.000550  * Area (sq ft)           *  712.79  * 2425.60  * 1718.68  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1404.61  *17086.93  * 1808.46  *
* Top Width (ft)         *  525.25  * Top Width (ft)         *   57.17  *   89.93  *  378.15  *
* Vel Total (ft/s)       *    4.26  * Avg. Vel. (ft/s)       *    1.97  *    7.04  *    1.11  *
* Max Chl Dpth (ft)      *   32.82  * Hydr. Depth (ft)       *   12.47  *   26.97  *    7.59  *
* Conv. Total (cfs)      *865298.6  * Conv. (cfs)            * 59872.2  *728339.7  * 77086.7  *
* Length Wtd. (ft)       *  174.94  * Wetted Per. (ft)       *   62.12  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.39  *    0.85  *    0.26  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.78  *    5.98  *    0.28  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  936.17  * 7121.42  * 1047.55  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  123.62  *  450.66  *  149.53  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  784.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  784.07  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  921.71  * 2703.18  * 2293.63  *
* E.G. Slope (ft/ft)     *0.000587  * Area (sq ft)           * 1002.74  * 2703.18  * 3622.20  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1877.05  *21143.05  * 3299.90  *
* Top Width (ft)         *  984.06  * Top Width (ft)         *  141.35  *   89.93  *  752.78  *
* Vel Total (ft/s)       *    4.45  * Avg. Vel. (ft/s)       *    2.04  *    7.82  *    1.44  *
* Max Chl Dpth (ft)      *   35.91  * Hydr. Depth (ft)       *   11.05  *   30.06  *   10.67  *
* Conv. Total (cfs)      *1086121.0  * Conv. (cfs)            * 77458.2  *872488.8  *136173.4  *
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* Length Wtd. (ft)       *  171.65  * Wetted Per. (ft)       *   89.70  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.38  *    1.01  *    0.38  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    0.77  *    7.90  *    0.55  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1306.21  * 8585.50  * 1578.24  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  153.10  *  478.57  *  224.97  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  787.41  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1348.10  * 3003.41  * 3011.14  *
* E.G. Slope (ft/ft)     *0.000647  * Area (sq ft)           * 1969.92  * 3003.41  * 6366.24  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2088.21  *26458.30  * 5453.49  *
* Top Width (ft)         * 1624.40  * Top Width (ft)         *  698.10  *   89.93  *  836.37  *
* Vel Total (ft/s)       *    4.62  * Avg. Vel. (ft/s)       *    1.55  *    8.81  *    1.81  *
* Max Chl Dpth (ft)      *   39.25  * Hydr. Depth (ft)       *    7.36  *   33.40  *   14.01  *
* Conv. Total (cfs)      *1336318.0  * Conv. (cfs)           * 82073.7  *1039903.0  *214341.1  *
* Length Wtd. (ft)       *  167.85  * Wetted Per. (ft)       *  190.38  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.29  *    1.24  *    0.56  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    0.44  *   10.90  *    1.01  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1845.87  *10114.61  * 2406.56  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  223.54  *  501.42  *  313.08  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  791.46  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2163.36  * 3368.02  * 3882.49  *
* E.G. Slope (ft/ft)     *0.000654  * Area (sq ft)           * 6859.17  * 3368.02  * 9782.07  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 3953.18  *32177.36  * 8369.46  *
* Top Width (ft)         * 2562.07  * Top Width (ft)         * 1623.48  *   89.93  *  848.66  *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)       *    1.83  *    9.55  *    2.16  *
* Max Chl Dpth (ft)      *   43.30  * Hydr. Depth (ft)       *    9.30  *   37.45  *   18.06  *
* Conv. Total (cfs)      *1740744.0  * Conv. (cfs)           *154639.8  *1258709.0  *327395.0  *
* Length Wtd. (ft)       *  166.31  * Wetted Per. (ft)       *  240.14  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.37  *    1.40  *    0.73  *
* Alpha                  *    3.01  * Stream Power (lb/ft s) *    0.67  *   13.38  *    1.56  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 3170.87  *12506.30  * 4449.49  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  466.41  *  529.43  *  683.65  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  795.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  794.21  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2802.94  * 3615.31  * 4473.48  *
* E.G. Slope (ft/ft)     *0.000673  * Area (sq ft)           *11740.20  * 3615.31  *12127.16  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 6178.56  *36753.69  *10757.75  *
* Top Width (ft)         * 2828.12  * Top Width (ft)         * 1881.27  *   89.93  *  856.92  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *    2.20  *   10.17  *    2.40  *
* Max Chl Dpth (ft)      *   46.05  * Hydr. Depth (ft)       *   12.05  *   40.20  *   20.81  *
* Conv. Total (cfs)      *2069201.0  * Conv. (cfs)           *238120.5  *1416479.0  *414601.4  *
* Length Wtd. (ft)       *  166.43  * Wetted Per. (ft)       *  240.14  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.49  *    1.55  *    0.86  *
* Alpha                  *    2.98  * Stream Power (lb/ft s) *    1.08  *   15.75  *    2.07  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 4687.88  *13927.31  * 6657.69  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  674.11  *  536.53  * 1047.34  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  797.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.18  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
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* W.S. Elev (ft)         *  796.59  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3355.11  * 3828.80  * 4983.71  *
* E.G. Slope (ft/ft)     *0.000681  * Area (sq ft)           *16390.61  * 3828.80  *14169.75  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 8383.76  *40665.50  *12950.75  *
* Top Width (ft)         * 2970.60  * Top Width (ft)         * 2016.82  *   89.93  *  863.86  *
* Vel Total (ft/s)       *    5.10  * Avg. Vel. (ft/s)       *    2.50  *   10.62  *    2.60  *
* Max Chl Dpth (ft)      *   48.43  * Hydr. Depth (ft)       *   14.42  *   42.58  *   23.19  *
* Conv. Total (cfs)      *2376324.0  * Conv. (cfs)            *321331.2  *1558619.0  *496373.6  *
* Length Wtd. (ft)       *  166.64  * Wetted Per. (ft)       *  240.14  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.59  *    1.66  *    0.97  *
* Alpha                  *    2.94  * Stream Power (lb/ft s) *    1.48  *   17.62  *    2.52  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 6050.46  *14840.54  * 8751.91  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  825.56  *  537.74  * 1403.43  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  801.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  799.87  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4120.03  * 4124.56  * 5690.51  *
* E.G. Slope (ft/ft)     *0.000694  * Area (sq ft)           *23090.85  * 4124.56  *17026.51  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *11921.50  *46485.67  *16312.83  *
* Top Width (ft)         * 3024.03  * Top Width (ft)         * 2060.64  *   89.93  *  873.47  *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)       *    2.89  *   11.27  *    2.87  *
* Max Chl Dpth (ft)      *   51.71  * Hydr. Depth (ft)       *   17.71  *   45.86  *   26.48  *
* Conv. Total (cfs)      *2836054.0  * Conv. (cfs)            *452489.6  *1764399.0  *619165.8  *
* Length Wtd. (ft)       *  166.99  * Wetted Per. (ft)       *  240.14  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.74  *    1.82  *    1.13  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    2.15  *   20.53  *    3.24  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 8551.91  *16243.45  *12777.65  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         * 1021.18  *  539.83  * 1761.31  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  789.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.             *   0.090  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  788.97  * Reach Len. (ft)        *  220.47  *  183.47  *   88.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1639.91  * 3143.88  * 3346.83  *
* E.G. Slope (ft/ft)     *0.000652  * Area (sq ft)           * 3435.27  * 3143.88  * 7676.31  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2829.05  *28645.76  * 6525.20  *
* Top Width (ft)         * 1970.60  * Top Width (ft)         * 1039.57  *   89.93  *  841.10  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    1.73  *    9.11  *    1.95  *
* Max Chl Dpth (ft)      *   40.81  * Hydr. Depth (ft)       *    8.61  *   34.96  *   15.57  *
* Conv. Total (cfs)      *1488678.0  * Conv. (cfs)            *110830.0  *1122219.0  *255629.5  *
* Length Wtd. (ft)       *  167.36  * Wetted Per. (ft)       *  198.01  *   98.10  *  218.47  *
* Min Ch El (ft)         *  748.16  * Shear (lb/sq ft)       *    0.34  *    1.30  *    0.62  *
* Alpha                  *    2.91  * Stream Power (lb/ft s) *    0.58  *   11.88  *    1.21  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 2215.61  *10919.58  * 2936.44  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  283.14  *  511.80  *  378.25  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 18.272

INPUT
Description: U/S of 71 Hwy SB Bridge.  Dodson XS 19.883
Station Elevation Data    num=     421
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  832.16    5.28  832.08    6.07  832.06   20.76  831.84   25.59  831.75
    25.9  831.75   25.96  831.75   45.52  831.39   46.09  831.38   73.95  830.86
   77.34  830.89   78.86   830.9   99.01  830.57  105.25  830.51  118.02  830.37
   130.5  830.23  136.87  830.17  155.96  829.96  167.33  829.76  177.84  829.65
  185.62  829.56  191.84  829.42  195.34  829.38  198.23   829.3  200.84  828.92
  204.58  828.06  206.81  827.41  208.99  826.38  216.91  821.96  219.61  820.97
  225.15  818.39  249.73  806.06  256.21  802.76   257.9  802.28  272.31  797.89
  276.06  796.83  281.69  796.83  288.94  796.78   301.3  796.65   302.9  796.24
  313.88  794.06  315.39  794.45  320.19   794.9  320.65  794.94  320.67  794.94
   320.9  794.96  322.15  795.07  322.82  795.06  332.03  795.09  336.79  795.03
```

348.88	794.88	355.76	794.8	360.28	794.65	372.91	794.08	381.22	793.93
381.83	793.96	383.31	794.06	393.63	794.65	405.06	795.21	421.18	795.07
427.23	795.02	438.38	794.8	444.65	794.71	449.43	794.65	456.9	794.37
457.55	794.34	458.02	794.34	497.95	794.88	501.55	794.86	512.01	795.48
514.27	795.62	515.03	795.62	519.92	795.62	523.16	795.57	525.56	795.54
526.87	795.57	531.27	795.67	534.86	795.68	537.4	795.68	550.99	795.15
552.1	795.11	552.47	795.11	553.78	795.12	569.31	795.26	576.58	795.43
580.35	794.36	582.02	793.98	587.27	794.12	599.45	794.42	622.39	795.01
630.64	795.13	638.03	797.35	638.93	797.66	649.9	800.97	663.05	804.91
666.64	806.13	678.78	810.32	689.75	814.07	693.26	815.09	703.94	817.72
709.61	818.71	715.39	819.72	719.29	820.32	722.44	820.87	722.99	820.95
724	820.99	725.52	820.66	736.48	821.03	747.32	821.23	758.32	820.93
761.71	820.78	773.1	820.46	797.17	819.79	801.08	819.54	809.26	819.43
812.07	819.26	837.22	818.96	839.3	818.91	869.03	818.56	870.51	818.53
900.32	818.19	901.3	818.18	914.97	818.32	929.27	818.25	931.2	818.24
933.55	818.22	960.01	818.08	964.13	818.04	967.9	818.02	975.55	817.99
994.95	817.89	1005.27	817.85	1013.83	817.83	1017.38	817.78	1036.02	817.53
1048.38	817.39	1065.25	817.18	1075.2	817.19	1086.56	817.24	1105.14	817.26
1116.81	817.3	1129.42	817.35	1146.47	817.37	1159.39	817.42	1180.15	817.51
1196.75	817.53	1203.78	817.56	1207.96	817.55	1224.42	817.21	1236.7	817.15
1253.84	816.99	1268.66	816.85	1278.09	816.8	1292.76	816.65	1309.4	816.48
1328.45	816.28	1328.97	816.28	1332.11	816.24	1340.65	816.22	1343.62	816.11
1361.05	815.9	1363.24	815.88	1379.13	815.69	1382.67	815.65	1384.94	815.6
1412.36	815.1	1421.15	814.99	1430.67	814.87	1441.01	814.74	1464.34	814.44
1486.32	814.16	1490.1	814.12	1495.9	814.05	1503.11	813.92	1513.95	813.81
1531.63	813.62	1543.35	813.5	1548.09	813.44	1554.06	813.35	1559.7	813.27
1567.38	813.15	1574.08	813.07	1581.86	812.99	1589.73	812.9	1600.74	812.78
1610.42	812.67	1616.69	812.6	1619.44	812.57	1625.92	812.49	1635.94	812.38
1650.46	812.21	1665.36	812.04	1674.98	811.93	1693.17	811.9	1711.33	811.87
1719.91	811.8	1735.56	811.78	1751.1	811.75	1759.26	811.69	1782.57	811.65
1805.44	811.68	1813.55	811.63	1818.49	811.71	1839.16	811.74	1849.94	811.75
1854.33	811.78	1865.01	811.8	1873.89	811.86	1884.47	811.88	1894.95	811.89
1903.73	811.96	1918.34	812.03	1929.23	812.09	1940.99	812.11	1951.73	812.16
1962.41	812.21	1973.02	812.26	1980.73	812.28	1992.16	812.33	2000.17	812.35
2011.46	812.4	2022.67	812.45	2031.09	812.47	2042.14	812.52	2050.9	812.54
2059.01	812.6	2067.06	812.66	2079.13	812.76	2096.64	813.03	2107.63	813.12
2118.38	813.2	2134.96	813.48	2144.55	813.55	2154.82	813.64	2172.67	813.96
2177.02	813.99	2181.35	814.03	2186.93	814.05	2192.99	814.1	2205.93	814.14
2210.81	814.16	2215.66	814.18	2235.88	814.25	2239.55	814.27	2243.2	814.28
2250.44	814.31	2272.41	814.38	2275.69	814.4	2278.95	814.41	2299.98	814.47
2302.91	814.49	2305.87	814.86	2311.01	814.52	2318.66	814.53	2329.79	814.54
2330.38	814.57	2350.22	814.58	2350.49	814.58	2351.24	814.57	2351.34	814.46
2358.36	806.14	2360.41	805.38	2377.17	800.32	2410.51	790.56	2414.65	788.89
2420.88	789.73	2424.75	790.27	2427.2	790.55	2433.84	791.33	2447.72	791.53
2448.51	791.54	2453.56	791.53	2457.74	791.52	2458.28	791.52	2466.43	791.34
2468.03	791.3	2478.12	790.91	2482.67	790.74	2492.24	789.48	2508.78	787.15
2512.55	786.69	2545.41	785.34	2550.55	785.25	2553.59	785.22	2567.24	785.06
2577.03	784.97	2621.39	784.63	2633.46	784.57	2638.11	784.59	2645.28	784.71
2647.06	784.16	2649.06	783.38	2654.11	774.72	2655.11	773.38	2655.7	773.06
2663.67	768.71	2668.96	765.81	2674.2	762.93	2679.62	760.89	2682.42	759.69
2684.29	759.38	2693.48	757.85	2696.17	756.68	2701.38	754.5	2715	749.03
2735	748.03	2755	749.03	2778.81	765.16	2782.82	766.9	2790.55	769.78
2795.77	769.78	2798.03	769.78	2805.53	769.79	2806.7	769.74	2810.83	769.57
2828.38	769.78	2839.43	769.86	2845.95	770.1	2856.69	770.46	2869.73	770.83
2878.27	771.07	2887.59	771.08	2895.44	771.06	2907.46	771.03	2915.67	770.88
2921.16	770.93	2934.53	771.07	2936.89	771.08	2946.88	771.1	2956.57	771.12
2966.58	770.99	2996.55	771.47	2998.14	771.49	2998.32	771.49	3023.97	771.28
3024.04	771.28	3042.24	771.23	3046.85	771.21	3049.76	771.21	3051.76	771.21
3053.4	771.51	3054.58	771.55	3056.28	771.42	3056.98	771.28	3067.58	771.44
3070.25	771.38	3075.47	771.42	3101.19	771.64	3101.55	771.65	3120.13	771.97
3126.91	772.2	3127.01	772.2	3133.69	772.46	3151.58	773.35	3152.63	773.39
3153.01	773.4	3157.59	773.36	3164.28	773.4	3178.34	774.01	3185.99	774.17
3186.17	774.18	3186.19	774.19	3192.9	774.67	3195.52	774.84	3197.87	775.1
3202.93	775.4	3204.07	775.47	3217.02	776.17	3224.8	776.44	3229.79	776.6
3244.8	777.07	3254.06	777.23	3255.5	777.29	3261.08	777.49	3271.92	777.88
3286.84	778.2	3308.04	778.89	3312.91	779.08	3325.55	779.56	3335.85	780.29
3361.09	781.32	3371.39	782.12	3382.35	782.74	3385.61	782.85	3402.29	783.48
3407.89	783.88	3411.51	785.4	3413.5	785.74	3415.43	785.28	3417.86	784.26
3422.36	784.26	3426.46	784.28	3446.13	784.79	3453.79	785.16	3454.88	785.2
3455.67	785.25	3456.21	785.26	3458.35	785.28	3463.15	785.34	3466.72	785.32
3468.12	785.32	3468.73	785.3	3473.09	785.19	3476.23	785.06	3478.46	784.98
3480.54	784.9	3489.6	784.09	3492.21	783.86	3493.06	783.81	3500.22	784.23
3527.44	785.96	3528.88	786.23	3534.48	788.24	3546.32	792.78	3575.59	803.17
3593.07	809.78	3606.02	811.59	3618.79	813.54	3626.44	814.48	3632.4	815.15
3639.34	815.09								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .075 2693.48    .042 2790.55     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2693.48 2790.55            52.81   57.02   53.09            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1200     820       F
 3040.37 3639.34     805       T

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  776.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  776.50  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  760.92  * Flow Area (sq ft)      *  483.02  * 2183.39  * 1429.33  *
* E.G. Slope (ft/ft)     *0.000368  * Area (sq ft)           *  483.02  * 2183.39  * 2087.51  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  886.17  *11227.80  * 1086.03  *
* Top Width (ft)         *  573.57  * Top Width (ft)         *   40.41  *   97.07  *  436.09  *
* Vel Total (ft/s)       *    3.22  * Avg. Vel. (ft/s)       *    1.83  *    5.14  *    0.76  *
* Max Chl Dpth (ft)      *   28.47  * Hydr. Depth (ft)       *   11.95  *   22.49  *    5.72  *
* Conv. Total (cfs)      *688089.0  * Conv. (cfs)            * 46194.2  *585282.4  * 56612.4  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *   45.54  *  104.69  *  249.85  *
* Min Ch El (ft)         *  748.03  * Shear (lb/sq ft)       *    0.24  *    0.48  *    0.13  *
* Alpha                  *    2.19  * Stream Power (lb/ft s) *    0.45  *    2.46  *    0.10  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  513.85  * 5321.64  *  531.50  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   84.47  *  410.65  *  108.89  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  781.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  781.05  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  764.25  * Flow Area (sq ft)      *  672.73  * 2624.65  * 2564.97  *
* E.G. Slope (ft/ft)     *0.000396  * Area (sq ft)           *  672.73  * 2624.65  * 4393.78  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1484.57  *15829.80  * 2985.63  *
* Top Width (ft)         *  703.93  * Top Width (ft)         *   43.06  *   97.07  *  563.80  *
* Vel Total (ft/s)       *    3.46  * Avg. Vel. (ft/s)       *    2.21  *    6.03  *    1.16  *
* Max Chl Dpth (ft)      *   33.01  * Hydr. Depth (ft)       *   15.62  *   27.04  *   10.27  *
* Conv. Total (cfs)      *1020049.0  * Conv. (cfs)            * 74597.5  *795427.1  *150024.2  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *   50.81  *  104.69  *  249.85  *
* Min Ch El (ft)         *  748.03  * Shear (lb/sq ft)       *    0.33  *    0.62  *    0.25  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.72  *    3.74  *    0.30  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  932.66  * 7110.78  * 1041.31  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  123.37  *  450.26  *  148.57  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  784.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  784.15  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  766.66  * Flow Area (sq ft)      *  810.01  * 2926.45  * 3341.68  *
* E.G. Slope (ft/ft)     *0.000421  * Area (sq ft)           *  810.01  * 2926.45  * 6236.11  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1963.68  *19571.43  * 4784.89  *
* Top Width (ft)         *  771.51  * Top Width (ft)         *   46.40  *   97.07  *  628.03  *
* Vel Total (ft/s)       *    3.72  * Avg. Vel. (ft/s)       *    2.42  *    6.69  *    1.43  *
* Max Chl Dpth (ft)      *   36.12  * Hydr. Depth (ft)       *   17.46  *   30.15  *   13.38  *
* Conv. Total (cfs)      *1282466.0  * Conv. (cfs)            * 95682.1  *953636.1  *233148.0  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *   55.64  *  104.69  *  249.85  *
* Min Ch El (ft)         *  748.03  * Shear (lb/sq ft)       *    0.38  *    0.74  *    0.35  *
* Alpha                  *    2.46  * Stream Power (lb/ft s) *    0.93  *    4.92  *    0.50  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1301.62  * 8573.64  * 1568.18  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  152.63  *  478.18  *  223.56  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	788.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	787.51	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	769.39	Flow Area (sq ft)	1288.54	3252.69	4181.28
E.G. Slope (ft/ft)	0.000472	Area (sq ft)	1288.54	3252.69	8636.33
Q Total (cfs)	34000.00	Flow (cfs)	1941.23	24701.56	7357.21
Top Width (ft)	1026.27	Top Width (ft)	187.29	97.07	741.91
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)	1.51	7.59	1.76
Max Chl Dpth (ft)	39.48	Hydr. Depth (ft)	6.88	33.51	16.74
Conv. Total (cfs)	1565450.0	Conv. (cfs)	89379.2	1137325.0	338745.3
Length Wtd. (ft)	8.00	Wetted Per. (ft)	196.70	104.69	249.85
Min Ch El (ft)	748.03	Shear (lb/sq ft)	0.19	0.91	0.49
Alpha	2.81	Stream Power (lb/ft s)	0.29	6.95	0.87
Frctn Loss (ft)		Cum Volume (acre-ft)	1837.63	10101.44	2391.25
C & E Loss (ft)		Cum SA (acres)	221.30	501.03	311.47

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	792.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	791.58	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	773.88	Flow Area (sq ft)	2155.10	3646.89	5195.81
E.G. Slope (ft/ft)	0.000484	Area (sq ft)	2155.10	3646.89	11671.24
Q Total (cfs)	44500.00	Flow (cfs)	3522.78	30274.32	10702.90
Top Width (ft)	1136.14	Top Width (ft)	286.44	97.07	752.63
Vel Total (ft/s)	4.05	Avg. Vel. (ft/s)	1.63	8.30	2.06
Max Chl Dpth (ft)	43.55	Hydr. Depth (ft)	7.52	37.57	20.80
Conv. Total (cfs)	2022886.0	Conv. (cfs)	160138.9	1376213.0	486533.5
Length Wtd. (ft)	8.00	Wetted Per. (ft)	296.71	104.69	249.85
Min Ch El (ft)	748.03	Shear (lb/sq ft)	0.22	1.05	0.63
Alpha	2.94	Stream Power (lb/ft s)	0.36	8.74	1.29
Frctn Loss (ft)		Cum Volume (acre-ft)	3148.06	12491.53	4427.59
C & E Loss (ft)		Cum SA (acres)	461.58	529.04	682.01

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	795.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	794.35	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	775.86	Flow Area (sq ft)	2961.51	3915.73	5887.70
E.G. Slope (ft/ft)	0.000494	Area (sq ft)	2969.82	3915.73	13765.93
Q Total (cfs)	53690.00	Flow (cfs)	5917.27	34449.41	13323.32
Top Width (ft)	1193.97	Top Width (ft)	336.72	97.07	760.18
Vel Total (ft/s)	4.21	Avg. Vel. (ft/s)	2.00	8.80	2.26
Max Chl Dpth (ft)	46.32	Hydr. Depth (ft)	10.01	40.34	23.57
Conv. Total (cfs)	2414796.0	Conv. (cfs)	266139.2	1549419.0	599238.1
Length Wtd. (ft)	8.00	Wetted Per. (ft)	306.56	104.69	249.85
Min Ch El (ft)	748.03	Shear (lb/sq ft)	0.30	1.15	0.73
Alpha	2.90	Stream Power (lb/ft s)	0.60	10.16	1.65
Frctn Loss (ft)		Cum Volume (acre-ft)	4650.65	13911.45	6631.26
C & E Loss (ft)		Cum SA (acres)	668.50	536.14	1045.69

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

```
* E.G. Elev (ft)         *  797.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.              *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.74  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  777.34  * Flow Area (sq ft)      * 3678.81  * 4147.83  * 6485.05  *
* E.G. Slope (ft/ft)     *0.000496  * Area (sq ft)           * 4296.63  * 4147.83  *15591.66  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 8352.26  *37973.78  *15673.97  *
* Top Width (ft)         * 1510.97  * Top Width (ft)         *  646.99  *   97.07  *  766.92  *
* Vel Total (ft/s)       *    4.33  * Avg. Vel. (ft/s)       *    2.27  *    9.16  *    2.42  *
* Max Chl Dpth (ft)      *   48.71  * Hydr. Depth (ft)       *   12.10  *   42.73  *   25.96  *
* Conv. Total (cfs)      *2784570.0  * Conv. (cfs)            *375120.2  *1705494.0  *703955.8  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  315.07  *  104.69  *  249.85  *
* Min Ch El (ft)         *  748.03  * Shear (lb/sq ft)       *    0.36  *    1.23  *    0.80  *
* Alpha                  *    2.85  * Stream Power (lb/ft s) *    0.82  *   11.23  *    1.94  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 5998.11  *14823.74  * 8721.53  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  818.82  *  537.34  * 1401.77  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  800.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.              *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  800.05  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  779.37  * Flow Area (sq ft)      * 4705.78  * 4469.69  * 7313.37  *
* E.G. Slope (ft/ft)     *0.000499  * Area (sq ft)           * 6551.58  * 4469.69  *18149.99  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *12329.89  *43168.91  *19221.21  *
* Top Width (ft)         * 1570.37  * Top Width (ft)         *  697.04  *   97.07  *  776.26  *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)       *    2.62  *    9.66  *    2.63  *
* Max Chl Dpth (ft)      *   52.02  * Hydr. Depth (ft)       *   14.92  *   46.05  *   29.27  *
* Conv. Total (cfs)      *3343558.0  * Conv. (cfs)            *551735.7  *1931715.0  *860107.3  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  326.88  *  104.69  *  249.85  *
* Min Ch El (ft)         *  748.03  * Shear (lb/sq ft)       *    0.45  *    1.33  *    0.91  *
* Alpha                  *    2.77  * Stream Power (lb/ft s) *    1.18  *   12.86  *    2.40  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 8476.90  *16225.36  *12741.75  *
* C & E Loss (ft)        *          * Cum SA (acres)         * 1014.20  *  539.43  * 1759.62  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  789.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.              *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  789.08  * Reach Len. (ft)        *    8.00  *    8.00  *    8.00  *
* Crit W.S. (ft)         *  770.80  * Flow Area (sq ft)      * 1591.19  * 3404.92  * 4573.08  *
* E.G. Slope (ft/ft)     *0.000475  * Area (sq ft)           * 1591.19  * 3404.92  * 9803.23  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2668.25  *26758.08  * 8573.67  *
* Top Width (ft)         * 1043.53  * Top Width (ft)         *  200.34  *   97.07  *  746.13  *
* Vel Total (ft/s)       *    3.97  * Avg. Vel. (ft/s)       *    1.68  *    7.86  *    1.87  *
* Max Chl Dpth (ft)      *   41.05  * Hydr. Depth (ft)       *    7.94  *   35.08  *   18.31  *
* Conv. Total (cfs)      *1743096.0  * Conv. (cfs)            *122395.1  *1227419.0  *393282.5  *
* Length Wtd. (ft)       *    8.00  * Wetted Per. (ft)       *  209.90  *  104.69  *  249.85  *
* Min Ch El (ft)         *  748.03  * Shear (lb/sq ft)       *    0.22  *    0.97  *    0.54  *
* Alpha                  *    2.82  * Stream Power (lb/ft s) *    0.38  *    7.58  *    1.02  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 2202.89  *10905.79  * 2918.60  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  280.00  *  511.40  *  376.63  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
```

REACH: Main RS: 18.266

INPUT
Description: 71 Hwy Bridge Southbound Lanes. Bridge geometry copied from
Dodson RAS Model.
Distance from Upstream XS = 8
Deck/Roadway Width = 39
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 22

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
200	829	824	723	820.8	815.8	725	800	795
2300	800	795	2350	813.61	807.83	2412	814.11	808.33
2494	814.77	808.99	2576	815.43	809.65	2658	816.1	810.32
2740	816.77	810.99	2822	817.43	811.65	2904	818.09	812.31
2986	818.76	812.98	3068	819.39	813.61	3131	819.67	813.89
3194	819.94	814.16	3257	820.11	814.33	3306	820.24	814.46
3394	820.46	814.68	3465	820.47	814.69	3536	820.33	814.55
3692	819.46	813.68						

Upstream Bridge Cross Section Data
Station Elevation Data num= 421

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	832.16	5.28	832.08	6.07	832.06	20.76	831.84	25.59	831.75
25.9	831.75	25.96	831.75	45.52	831.39	46.09	831.38	73.95	830.86
77.34	830.89	78.86	830.9	99.01	830.57	105.25	830.51	118.02	830.37
130.5	830.23	136.87	830.17	155.96	829.96	167.33	829.76	177.84	829.65
185.62	829.56	191.84	829.42	195.34	829.38	198.23	829.3	200.84	828.92
204.58	828.06	206.81	827.41	208.99	826.38	216.91	821.96	219.61	820.97
225.15	818.39	249.73	806.06	256.21	802.76	257.9	802.28	272.31	797.89
276.06	796.83	281.69	796.83	288.94	796.78	301.3	796.65	302.9	796.24
313.88	794.06	315.39	794.45	320.19	794.9	320.65	794.94	320.67	794.94
320.9	794.96	322.15	795.07	322.82	795.06	332.03	795.09	336.79	795.03
348.88	794.88	355.76	794.8	360.28	794.65	372.91	794.08	381.22	793.93
381.83	793.96	383.31	794.06	393.63	794.65	405.06	795.21	421.18	795.07
427.23	795.02	438.38	794.8	444.65	794.71	449.43	794.65	456.9	794.37
457.55	794.34	458.02	794.34	497.95	794.88	501.55	794.86	512.01	795.48
514.27	795.62	515.03	795.62	519.92	795.62	523.16	795.57	525.56	795.54
526.87	795.57	531.27	795.67	534.86	795.68	537.4	795.68	550.99	795.15
552.1	795.11	552.47	795.11	553.78	795.12	569.31	795.26	576.58	795.43
580.35	794.36	582.02	793.98	587.27	794.12	599.45	794.42	622.39	795.01
630.64	795.13	638.03	797.35	638.93	797.66	649.9	800.97	663.05	804.91
666.64	806.13	678.78	810.32	689.75	814.07	693.26	815.09	703.94	817.72
709.61	818.71	715.39	819.72	719.29	820.32	722.44	820.87	722.99	820.95
724	820.99	725.52	820.66	736.48	821.03	747.32	821.23	758.32	820.93
761.71	820.78	773.1	820.46	797.17	819.79	801.08	819.54	809.26	819.43
812.07	819.26	837.22	818.96	839.3	818.91	869.03	818.56	870.51	818.53
900.32	818.19	901.3	818.18	914.97	818.32	929.27	818.25	931.2	818.24
933.55	818.22	960.01	818.08	964.13	818.04	967.9	818.02	975.55	817.99
994.95	817.89	1005.27	817.85	1013.83	817.83	1017.38	817.78	1036.02	817.53
1048.38	817.39	1065.25	817.18	1075.2	817.19	1086.56	817.24	1105.14	817.26
1116.81	817.3	1129.42	817.35	1146.47	817.37	1159.39	817.42	1180.15	817.51
1196.75	817.53	1203.78	817.56	1207.96	817.55	1224.42	817.21	1236.7	817.15
1253.84	816.99	1268.66	816.85	1278.09	816.8	1292.76	816.65	1309.4	816.48
1328.45	816.28	1328.97	816.28	1332.11	816.24	1340.65	816.22	1343.62	816.11
1361.05	815.9	1363.24	815.88	1379.13	815.69	1382.67	815.65	1384.94	815.6
1412.36	815.1	1421.15	814.99	1430.67	814.87	1441.01	814.74	1464.34	814.44
1486.32	814.16	1490.1	814.12	1495.9	814.05	1503.11	813.92	1513.95	813.81
1531.63	813.62	1543.35	813.5	1548.09	813.44	1554.06	813.35	1559.7	813.27
1567.38	813.15	1574.08	813.07	1581.86	812.99	1589.73	812.9	1600.74	812.78
1610.42	812.67	1616.69	812.6	1619.44	812.57	1625.92	812.49	1635.94	812.38
1650.46	812.21	1665.36	812.04	1674.98	811.93	1693.17	811.9	1711.33	811.87
1719.91	811.8	1735.56	811.78	1751.1	811.75	1759.26	811.69	1782.57	811.65
1805.44	811.68	1813.55	811.63	1818.49	811.71	1839.16	811.74	1849.94	811.75
1854.33	811.78	1865.01	811.8	1873.89	811.86	1884.47	811.88	1894.95	811.89
1903.73	811.96	1918.34	812.03	1929.23	812.09	1940.99	812.11	1951.73	812.16
1962.41	812.21	1973.02	812.26	1980.73	812.28	1992.16	812.33	2000.17	812.35
2011.46	812.4	2022.67	812.45	2031.09	812.47	2042.14	812.52	2050.9	812.54
2059.01	812.6	2067.06	812.66	2079.13	812.76	2096.64	813.03	2107.63	813.12
2118.38	813.2	2134.96	813.48	2144.55	813.55	2154.82	813.64	2172.67	813.96
2177.02	813.99	2181.35	814.03	2186.93	814.05	2192.99	814.1	2205.93	814.14
2210.81	814.16	2215.66	814.18	2235.88	814.25	2239.55	814.27	2243.2	814.28
2250.44	814.31	2272.41	814.38	2275.69	814.4	2278.95	814.41	2299.98	814.47
2302.91	814.49	2305.87	814.86	2311.01	814.52	2318.66	814.53	2329.79	814.54

2330.38	814.57	2350.22	814.58	2350.49	814.58	2351.24	814.57	2351.34	814.46
2358.36	806.14	2360.41	805.38	2377.17	800.32	2410.51	790.56	2414.65	788.89
2420.88	789.73	2424.75	790.27	2427.2	790.55	2433.84	791.33	2447.72	791.53
2448.51	791.54	2453.56	791.53	2457.74	791.52	2458.28	791.52	2466.43	791.34
2468.03	791.3	2478.12	790.91	2482.67	790.74	2492.24	789.48	2508.78	787.15
2512.55	786.69	2545.41	785.34	2550.55	785.25	2553.59	785.22	2567.24	785.06
2577.03	784.97	2621.39	784.63	2633.46	784.57	2638.11	784.59	2645.28	784.71
2647.06	784.16	2649.06	783.38	2654.11	774.72	2655.11	773.38	2655.7	773.06
2663.67	768.71	2668.96	765.81	2674.2	762.93	2679.62	760.89	2682.42	759.69
2684.29	759.38	2693.48	757.85	2696.17	756.68	2701.38	754.5	2715	749.03
2735	748.03	2755	749.03	2778.81	765.16	2782.82	766.9	2790.55	769.78
2795.77	769.78	2798.03	769.78	2805.53	769.79	2806.7	769.74	2810.83	769.57
2828.38	769.78	2839.43	769.86	2845.95	770.1	2856.69	770.46	2869.73	770.83
2878.27	771.07	2887.59	771.08	2895.44	771.06	2907.46	771.03	2915.67	770.88
2921.16	770.93	2934.53	771.07	2936.89	771.08	2946.88	771.1	2956.57	771.12
2966.58	770.99	2996.55	771.47	2998.14	771.49	2998.32	771.49	3023.97	771.28
3024.04	771.28	3042.24	771.23	3046.85	771.21	3049.76	771.21	3051.76	771.21
3053.4	771.51	3054.58	771.55	3056.28	771.42	3056.98	771.28	3067.58	771.44
3070.25	771.38	3075.47	771.42	3101.19	771.64	3101.55	771.65	3120.13	771.97
3126.91	772.2	3127.01	772.2	3133.69	772.46	3151.58	773.35	3152.63	773.39
3153.01	773.4	3157.59	773.36	3164.28	773.4	3178.34	774.01	3185.99	774.17
3186.17	774.18	3186.19	774.19	3192.9	774.67	3195.52	774.84	3197.87	775.1
3202.93	775.4	3204.07	775.47	3217.02	776.17	3224.8	776.44	3229.79	776.6
3244.8	777.07	3254.06	777.23	3255.5	777.29	3261.08	777.49	3271.92	777.88
3286.84	778.2	3308.04	778.89	3312.91	779.08	3325.55	779.56	3335.85	780.29
3361.09	781.32	3371.39	782.12	3382.35	782.74	3385.61	782.85	3402.29	783.48
3407.89	783.88	3411.51	785.4	3413.5	785.74	3415.43	785.28	3417.86	784.26
3422.36	784.26	3426.46	784.28	3446.13	784.79	3453.79	785.16	3454.88	785.2
3455.67	785.25	3456.21	785.26	3458.35	785.28	3463.15	785.34	3466.72	785.32
3468.12	785.32	3468.73	785.3	3473.09	785.19	3476.23	785.06	3478.46	784.98
3480.54	784.9	3489.6	784.09	3492.21	783.86	3493.06	783.81	3500.22	784.23
3527.44	785.96	3528.88	786.23	3534.48	788.24	3546.32	792.78	3575.59	803.17
3593.07	809.78	3606.02	811.59	3618.79	813.54	3626.44	814.48	3632.4	815.15
3639.34	815.09								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	2693.48	.042	2790.55	.12

Bank Sta: Left Right Coeff Contr. Expan.

2693.48	2790.55	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1200	820	F
3040.37	3639.34	805	T

Downstream Deck/Roadway Coordinates
num= 22

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
195	831	826	692	824.8	819.8	700	800	795
2300	800	795	2340	813.61	807.83	2402	814.11	808.33
2484	814.77	808.99	2566	815.43	809.65	2648	816.1	810.32
2730	816.77	810.99	2812	817.43	811.65	2894	818.09	812.31
2976	818.76	812.98	3058	819.39	813.61	3121	819.67	813.89
3184	819.94	814.16	3247	820.11	814.33	3296	820.24	814.46
3384	820.46	814.68	3455	820.47	814.69	3526	820.33	814.55
3682	819.46	813.68						

Downstream Bridge Cross Section Data
Station Elevation Data num= 406

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	834.17	12.73	834	16.04	833.95	29.3	833.78	32.6	833.73
46.12	833.56	51.8	833.48	67.23	833.23	74.03	833.14	94.8	832.81
96.64	832.73	111.66	832.5	119.73	832.5	130.5	832.33	137.43	832.33
148.33	832.16	154.91	832.15	163.1	832.07	167.12	832.07	183.96	832.21
194.69	831.02	195.34	831	197.06	830.95	212.11	823.88	216.47	821.73
250.06	805.06	254.74	802.76	265.03	799.26	272.24	796.68	283.9	796.4
301.75	796.05	309.58	794.53	312.9	793.71	315.34	793.53	316.51	793.45
318.76	793.47	321.99	793.52	328.93	794.26	334.31	794.78	342.49	794.8
363.69	794.79	391.27	795.04	392.79	795.03	393.43	795.05	395.11	795.01
427.32	794.35	428.33	794.33	433.97	794.25	456.48	794.44	464.16	794.47
469.69	794.54	481.37	795.46	483.34	795.62	483.87	795.62	484.6	795.62
488.98	795.62	490.77	795.55	494.44	795.41	499.69	795.51	500.67	795.53

501.25	795.53	506.81	795.54	517.47	795.23	522.39	795.11	527.6	794.87
539.19	794.54	542.93	794.56	546.38	794.42	579.88	795.27	596.04	795.68
600.85	797.6	602.85	798.31	625.36	804.89	628.61	805.82	629.09	805.96
633.6	807.55	655.5	815.26	661.67	817.51	673.99	821	679.21	822.38
681.73	822.76	689.35	824.5	691.3	824.86	691.84	824.86	692.15	824.84
703.39	823.85	705.77	823.87	711.53	823.8	731.46	823.76	735.29	823.72
756.02	823.7	758.87	823.67	765.26	823.67	765.72	823.67	782.18	823.48
792.71	823.28	794.32	823.23	795.47	823.22	815.71	822.81	818.66	822.77
836.82	822.41	842.85	822.32	849.64	822.22	867.7	821.88	873.45	821.8
886.74	821.52	892.69	821.44	899.81	821.34	911.56	821.09	918.97	821
920.83	820.96	934.07	820.79	943.64	820.59	958.19	820.41	964.75	820.27
971.55	820.21	980.11	820.15	989.49	820.05	991.39	820.04	999.55	819.96
1007.8	819.91	1010.99	819.89	1020.82	819.81	1031.51	819.75	1042.99	819.65
1045.95	819.63	1058.43	819.51	1080.93	819.31	1095.83	819.16	1101.78	819.1
1116.55	818.96	1121.06	818.92	1133.2	818.8	1139.64	818.75	1151.44	818.64
1158.76	818.59	1170.2	818.48	1181.16	818.37	1189.68	818.32	1196.79	818.25
1203.69	818.18	1212.12	818.13	1228.48	817.8	1237.4	817.67	1246.83	817.56
1256.65	817.41	1265.4	817.3	1267.94	817.27	1277.17	817.16	1287.7	816.99
1294.37	816.91	1306.61	816.72	1312.68	816.64	1325.76	816.43	1330.85	816.37
1335.44	816.31	1346.96	816.12	1352.17	816.05	1365.08	815.84	1368.54	815.8
1381.95	815.58	1384.67	815.54	1400.49	815.28	1402.77	815.25	1422.15	814.92
1423.28	814.91	1424.3	814.89	1443.1	814.57	1446.79	814.5	1446.93	814.5
1451.67	814.42	1452.22	814.41	1478.23	813.97	1478.38	813.97	1502.75	813.57
1503.33	813.57	1504.94	813.57	1513.44	813.43	1515.48	813.41	1549.67	812.99
1551.71	812.96	1553.82	812.94	1554.24	812.94	1575.22	812.68	1576.74	812.61
1600.31	812.33	1604.56	812.2	1627.67	811.92	1631.25	811.81	1634.99	811.69
1654.47	811.47	1657.74	811.45	1673.28	811.28	1687.76	811.26	1690.8	811.24
1705.32	811.23	1708.31	811.21	1721.36	811.2	1734.64	811.18	1737.59	811.17
1752.16	811.15	1754.74	811.14	1769.36	811.12	1772.32	811.11	1790.62	811.09
1805.16	811.08	1807.44	811.09	1822.06	811.07	1824.44	811.08	1838.32	811.07
1852.49	811.05	1853.68	811.06	1871.91	811.18	1873.07	811.18	1891.34	811.31
1892.44	811.31	1893.53	811.31	1911.55	811.43	1912.39	811.44	1931.01	811.57
1932.69	811.58	1951.37	811.7	1952.35	811.71	1972.55	811.85	1982.67	811.91
1983.6	811.92	1993.74	811.99	1994.7	812	2007.49	812.08	2020.31	812.17
2021.22	812.18	2040.91	812.24	2042.15	812.23	2060.22	812.29	2061.06	812.29
2079.14	812.35	2079.97	812.34	2097.66	812.4	2098.55	812.42	2114.24	812.47
2130	812.52	2131.08	812.54	2152.07	812.6	2152.66	812.61	2173.74	812.68
2174.26	812.69	2184.28	812.72	2194.33	812.85	2194.54	812.85	2211.56	813.06
2213.01	813.07	2229.89	813.28	2231.17	813.29	2249.17	813.51	2250.84	813.52
2268.46	813.74	2291.77	814.02	2296.1	814.04	2311.12	814.22	2313.04	814.34
2320.7	814.32	2329.46	814.42	2330.58	814.29	2340.92	814.23	2341.71	814.22
2350.07	811.22	2354.36	809.68	2356.39	807.5	2356.51	807.36	2375.39	800.32
2387.21	796.68	2412.41	789.27	2413.9	789.49	2423.64	791.07	2424.24	791.17
2424.32	791.18	2431.38	791.72	2433.3	791.75	2444.19	791.91	2445.8	791.94
2446.04	791.94	2455.41	791.92	2461.13	791.8	2465.01	791.71	2466.25	791.66
2470.81	791.48	2479.54	791.14	2484.61	790.42	2506.32	787.39	2535.32	786.41
2550.4	785.79	2576.14	785.88	2580.48	785.9	2592.39	786.12	2633.88	786.11
2654.53	786.3	2661.88	778.71	2668.08	770.64	2672.18	765.29	2674.83	764.67
2683.37	762.95	2703.58	758.85	2710.65	758.3	2712.78	757.97	2721.47	755.22
2724.32	754.35	2738	748.92	2758	747.92	2778	748.92	2791.67	758.23
2802.78	764.91	2810.02	766.7	2818.39	770.24	2834.95	770.23	2841.73	770.22
2855.8	770.2	2857.49	770.21	2864.31	770.24	2868.84	770.15	2872.31	770.09
2873.12	770.11	2874.79	770.12	2894.56	770.38	2912.07	770.62	2920.28	770.48
2923.79	770.43	2928.42	770.45	2936.73	770.4	2945.99	770.38	2966.08	770.32
2971.71	770.34	2978.2	770.36	3006.83	770.66	3023.15	770.84	3035.74	770.96
3048.87	770.89	3062.8	770.8	3071.72	770.78	3074.59	770.8	3093.08	770.91
3100.31	770.85	3106.59	770.79	3110.8	770.73	3113.85	770.81	3117.05	770.87
3126.03	771.18	3151.74	772.05	3154.08	772.13	3157.87	772.26	3167.12	773.06
3170.66	773.47	3175.03	774.01	3176.08	774.11	3177.46	774.76	3179.04	775.48
3179.06	775.49	3179.1	775.49	3188.66	775.04	3193.02	775.66	3199.7	777.29
3202.71	777.61	3203.18	777.63	3209.74	777.84	3214.05	777.36	3216.65	777.57
3228.9	778.07	3236.71	778.39	3251.17	779.4	3254.62	779.48	3286.26	780.35
3293.91	780.46	3303.79	780.98	3309.68	781.27	3312.02	781.39	3326.24	782.14
3340.56	783.03	3351.95	784.01	3364.1	784.98	3375.28	785.94	3379.02	786.1
3409.36	786.15	3416.33	786.22	3417.69	786.2	3420.39	786.43	3424.86	786.84
3427.2	786.82	3437	786.69	3449.37	785.97	3452.74	785.76	3457.84	785.39
3462.5	785.05	3475.34	787.17	3480.26	787.98	3521.88	802.49	3522.36	802.63
3523.68	803.08	3525.59	803.72	3549.65	811.07	3552.8	811.82	3558.71	813.31
3577.41	814.37	3577.53	814.37	3577.77	814.36	3578.06	814.36	3589.26	814.83
3592.63	814.83								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	2710.65	.042	2818.39	.12

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
       2710.65 2818.39             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1200     820       F
 3031.14 3592.63     805       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  19

Pier Data
Pier Station     Upstream=    2437    Downstream=    2382
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810

Pier Data
Pier Station     Upstream=    2519    Downstream=    2464
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810

Pier Data
Pier Station     Upstream=    2601    Downstream=    2546
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     810

Pier Data
Pier Station     Upstream=    2683    Downstream=    2628
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812

Pier Data
Pier Station     Upstream=    2765    Downstream=    2710
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812

Pier Data
Pier Station     Upstream=    2847    Downstream=    2792
Upstream     num=       2
    Width   Elev    Width   Elev
```

```
*********************************
    3.67     740    3.67     812
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     812

Pier Data
Pier Station     Upstream=    2929    Downstream=    2874
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814

Pier Data
Pier Station     Upstream=    3011    Downstream=    2956
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814

Pier Data
Pier Station     Upstream=    3093    Downstream=    3038
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814

Pier Data
Pier Station     Upstream=    3156    Downstream=    3101
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3219    Downstream=    3164
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3282    Downstream=    3227
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3331    Downstream=    3276
Upstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3419    Downstream=    3364
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3490    Downstream=    3435
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3561    Downstream=    3506
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3717    Downstream=    3662
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3852    Downstream=    3797
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814

Pier Data
Pier Station     Upstream=    3987    Downstream=    3932
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     812
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     812

Number of Bridge Coefficient Sets =  1
```

```
Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     776.85  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     776.50  * E.G. Elev (ft)         *     776.85  *     776.07  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     776.46  *     775.73  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     761.00  *     760.73  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      28.43  *      27.81  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.41  *       3.45  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3867.27  *    3829.47  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   34449.57  *   34345.41  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      10.50  *      10.88  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *     488.35  *     455.96  *
* Delta EG (ft)          *       0.79  * Conv. Total (cfs)       *   523225.3  *   522908.0  *
* Delta WS (ft)          *       0.77  * Top Width (ft)         *     542.17  *     503.10  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.45  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.31  *       0.33  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.07  *       1.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     781.49  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     781.05  * E.G. Elev (ft)         *     781.49  *     780.76  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     781.00  *     780.33  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     764.42  *     764.16  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.97  *      32.41  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.66  *       3.72  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5546.02  *    5459.48  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   57169.34  *   57001.44  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      14.95  *      15.34  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *     539.03  *     498.84  *
* Delta EG (ft)          *       0.74  * Conv. Total (cfs)       *   747490.6  *   749767.6  *
* Delta WS (ft)          *       0.72  * Top Width (ft)         *     665.38  *     591.97  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.72  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.47  *       0.50  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.73  *       1.86  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     784.68  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     784.15  * E.G. Elev (ft)         *     784.68  *     783.99  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     784.11  *     783.50  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     766.97  *     766.73  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.08  *      35.58  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.93  *       3.99  *
```

```
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6702.48  *    6591.55  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   77497.09  *   77286.13  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      17.91  *      18.37  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *     574.88  *     528.59  *
* Delta EG (ft)          *       0.69  * Conv. Total (cfs)      *   916960.2  *   922810.3  *
* Delta WS (ft)          *       0.67  * Top Width (ft)         *     730.16  *     655.43  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.99  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.60  *       0.63  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.35  *       2.53  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     788.18  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     787.51  * E.G. Elev (ft)         *     788.15  *     787.55  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     787.48  *     786.97  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     769.90  *     769.13  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.45  *      39.05  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.11  *       4.28  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8270.80  *    7948.64  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  104371.50  *  104072.80  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      16.28  *      16.23  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *     750.26  *     692.02  *
* Delta EG (ft)          *       0.59  * Conv. Total (cfs)      *  1119386.0  *  1113611.0  *
* Delta WS (ft)          *       0.60  * Top Width (ft)         *     974.41  *     906.95  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.28  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.63  *       0.67  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.61  *       2.86  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     792.32  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     791.58  * E.G. Elev (ft)         *     792.28  *     791.82  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     791.56  *     791.19  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     774.57  *     773.16  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.53  *      43.27  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.26  *       4.39  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10445.46  *   10136.24  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  144617.10  *  144229.40  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      17.29  *      18.47  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *     904.67  *     802.57  *
* Delta EG (ft)          *       0.46  * Conv. Total (cfs)      *  1418967.0  *  1419741.0  *
* Delta WS (ft)          *       0.44  * Top Width (ft)         *    1081.32  *     981.47  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.39  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.71  *       0.77  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       3.02  *       3.40  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     795.14  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     794.35  * E.G. Elev (ft)         *     795.10  *     794.70  *
```

```
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     794.32  *     794.04  *
* Q Bridge (cfs)         *   53690.00  * Crit W.S. (ft)         *     776.48  *     775.07  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.29  *      46.12  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.43  *       4.54  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12128.10  *   11829.54  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  177890.40  *  177381.70  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      19.76  *      19.42  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *     958.71  *     902.03  *
* Delta EG (ft)          *       0.38  * Conv. Total (cfs)      *  1652997.0  *  1657954.0  *
* Delta WS (ft)          *       0.39  * Top Width (ft)         *    1135.74  *    1065.15  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.54  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.83  *       0.86  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       3.69  *       3.90  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     797.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     796.74  * E.G. Elev (ft)         *     797.52  *     797.18  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     796.71  *     796.49  *
* Q Bridge (cfs)         *   62000.00  * Crit W.S. (ft)         *     777.95  *     776.56  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      48.68  *      48.57  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.56  *       4.65  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   13602.94  *   13333.42  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  210473.30  *  209938.20  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      21.88  *      21.60  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *    1005.41  *     945.05  *
* Delta EG (ft)          *       0.32  * Conv. Total (cfs)      *  1871175.0  *  1883716.0  *
* Delta WS (ft)          *       0.33  * Top Width (ft)         *    1453.22  *    1382.62  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.65  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.93  *       0.95  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       4.23  *       4.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     800.93  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     800.05  * E.G. Elev (ft)         *     800.88  *     800.59  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     800.02  *     799.86  *
* Q Bridge (cfs)         *   74720.00  * Crit W.S. (ft)         *     779.96  *     778.55  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      51.99  *      51.94  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.77  *       4.84  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   15679.33  *   15430.30  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  261898.50  *  261187.70  *
* Min El Weir Flow (ft)  *     811.64  * Hydr Depth (ft)        *      24.76  *      24.68  *
* Min El Prs (ft)        *     823.79  * W.P. Total (ft)        *    1070.13  *    1003.62  *
* Delta EG (ft)          *       0.27  * Conv. Total (cfs)      *  2194023.0  *  2218380.0  *
* Delta WS (ft)          *       0.28  * Top Width (ft)         *    1511.53  *    1424.00  *
* BR Open Area (sq ft)   *   37864.16  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.84  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.06  *       1.09  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       5.06  *       5.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
```

0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	789.77	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	789.08	E.G. Elev (ft)	789.74	789.21
Q Total (cfs)	38000.00	W.S. Elev (ft)	789.05	788.60
Q Bridge (cfs)	38000.00	Crit W.S. (ft)	772.77	770.26
Q Weir (cfs)		Max Chl Dpth (ft)	41.02	40.68
Weir Sta Lft (ft)		Vel Total (ft/s)	4.19	4.33
Weir Sta Rgt (ft)		Flow Area (sq ft)	9075.75	8770.44
Weir Submerg		Froude # Chl	0.24	0.22
Weir Max Depth (ft)		Specif Force (cu ft)	118823.10	118510.00
Min El Weir Flow (ft)	811.64	Hydr Depth (ft)	17.43	17.17
Min El Prs (ft)	823.79	W.P. Total (ft)	785.04	732.84
Delta EG (ft)	0.53	Conv. Total (cfs)	1230041.0	1225939.0
Delta WS (ft)	0.54	Top Width (ft)	991.33	936.02
BR Open Area (sq ft)	37864.16	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.33	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.69	0.72
Br Sel Method	Momentum	Power Total (lb/ft s)	2.88	3.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.261

INPUT
Description: D/S of 71 Hwy SB Bridge. Dodson XS 19.88
Station Elevation Data num= 406

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	834.17	12.73	834	16.04	833.95	29.3	833.78	32.6	833.73
46.12	833.56	51.8	833.48	67.23	833.23	74.03	833.14	94.8	832.81
96.64	832.73	111.66	832.5	119.73	832.5	130.5	832.33	137.43	832.33
148.33	832.16	154.91	832.15	163.1	832.07	167.12	832.07	183.96	832.21
194.69	831.02	195.34	831	197.06	830.95	212.11	823.88	216.47	821.73
250.06	805.06	254.74	802.76	265.03	799.26	272.24	796.68	283.9	796.4
301.75	796.05	309.58	794.53	312.9	793.71	315.34	793.53	316.51	793.45
318.76	793.47	321.99	793.52	328.93	794.26	334.31	794.78	342.49	794.8
363.69	794.79	391.27	795.04	392.79	795.03	393.43	795.05	395.11	795.01
427.32	794.35	428.33	794.33	433.97	794.25	456.48	794.44	464.16	794.47
469.69	794.54	481.37	795.46	483.34	795.62	483.87	795.62	484.6	795.62
488.98	795.62	490.77	795.55	494.44	795.41	499.69	795.51	500.67	795.53
501.25	795.53	506.81	795.54	517.47	795.23	522.39	795.11	527.6	794.87
539.19	794.54	542.93	794.56	546.38	794.42	579.88	795.27	596.04	795.68
600.85	797.6	602.85	798.31	625.36	804.89	628.61	805.82	629.09	805.96
633.6	807.55	655.5	815.26	661.67	817.51	673.99	821	679.21	822.38
681.73	822.76	689.35	824.5	691.3	824.86	691.84	824.86	692.15	824.84
703.39	823.85	705.77	823.87	711.53	823.8	731.46	823.76	735.29	823.72
756.02	823.7	758.87	823.67	765.26	823.67	765.72	823.67	782.18	823.48
792.71	823.28	794.32	823.23	795.47	823.22	815.71	822.81	818.66	822.77
836.82	822.41	842.85	822.32	849.64	822.22	867.7	821.88	873.45	821.8
886.74	821.52	892.69	821.44	899.81	821.34	911.56	821.09	918.97	821
920.83	820.96	934.07	820.79	943.64	820.59	958.19	820.41	964.75	820.27
971.55	820.21	980.11	820.15	989.49	820.05	991.39	820.04	999.55	819.96
1007.8	819.91	1010.99	819.89	1020.82	819.81	1031.51	819.75	1042.99	819.65
1045.95	819.63	1058.43	819.51	1080.93	819.31	1095.83	819.16	1101.78	819.1
1116.55	818.96	1121.06	818.92	1133.2	818.8	1139.64	818.75	1151.44	818.64
1158.76	818.59	1170.2	818.48	1181.16	818.37	1189.68	818.32	1196.79	818.25
1203.69	818.18	1212.12	818.13	1228.48	817.8	1237.4	817.67	1246.83	817.56
1256.65	817.41	1265.4	817.3	1267.94	817.27	1277.17	817.16	1287.7	816.99
1294.37	816.91	1306.61	816.72	1312.68	816.64	1325.76	816.43	1330.85	816.37
1335.44	816.31	1346.96	816.12	1352.17	816.05	1365.08	815.84	1368.54	815.8
1381.95	815.58	1384.67	815.54	1400.49	815.28	1402.77	815.25	1422.15	814.92
1423.28	814.91	1424.3	814.89	1443.1	814.57	1446.79	814.5	1446.93	814.5
1451.67	814.42	1452.22	814.41	1478.23	813.97	1478.38	813.97	1502.75	813.57

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 1503.33  813.57 1504.94  813.57 1513.44  813.43 1515.48  813.41 1549.67  812.99
 1551.71  812.96 1553.82  812.94 1554.24  812.94 1575.22  812.68 1576.74  812.61
 1600.31  812.33 1604.56   812.2 1627.67  811.92 1631.25  811.81 1634.99  811.69
 1654.47  811.47 1657.74  811.45 1673.28  811.28 1687.76  811.26  1690.8  811.24
 1705.32  811.23 1708.31  811.21 1721.36   811.2 1734.64  811.18 1737.59  811.17
 1752.16  811.15 1754.74  811.14 1769.36  811.12 1772.32  811.11 1790.62  811.09
 1805.16  811.08 1807.44  811.09 1822.06  811.07 1824.44  811.08 1838.32  811.07
 1852.49  811.05 1853.68  811.06 1871.91  811.18 1873.07  811.18 1891.34  811.31
 1892.44  811.31 1893.53  811.31 1911.55  811.43 1912.39  811.44 1931.01  811.57
 1932.69  811.58 1951.37   811.7 1952.35  811.71 1972.55  811.85 1982.67  811.91
  1983.6  811.92 1993.74  811.99  1994.7     812 2007.49  812.08 2020.31  812.17
 2021.22  812.18 2040.91  812.24 2042.15  812.23 2060.22  812.29 2061.06  812.29
 2079.14  812.35 2079.97  812.34 2097.66   812.4 2098.55  812.42 2114.24  812.47
    2130  812.52 2131.08  812.54 2152.07   812.6 2152.66  812.61 2173.74  812.68
 2174.26  812.69 2184.28  812.72 2194.33  812.85 2194.54  812.85 2211.56  813.06
 2213.01  813.07 2229.89  813.28 2231.17  813.29 2249.17  813.51 2250.84  813.52
 2268.46  813.74 2291.77  814.02  2296.1  814.04 2311.12  814.22 2313.04  814.34
  2320.7  814.32 2329.46  814.42 2330.58  814.29 2340.92  814.23 2341.71  814.22
 2350.07  811.22 2354.36  809.68 2356.39   807.5 2356.51  807.36 2375.39  800.32
 2387.21  796.68 2412.41  789.27  2413.9  789.49 2423.64  791.07 2424.24  791.17
 2424.32  791.18 2431.38  791.72  2433.3  791.75 2444.19  791.91  2445.8  791.94
 2446.04  791.94 2455.41  791.92 2461.13   791.8 2465.01  791.71 2466.25  791.66
 2470.81  791.48 2479.54  791.14 2484.61  790.42 2506.32  787.39 2535.32  786.41
  2550.4  785.79 2576.14  785.88 2580.48   785.9 2592.39  786.12 2633.88  786.11
 2654.53   786.3 2661.88  778.71 2668.08  770.64 2672.18  765.29 2674.83  764.67
 2683.37  762.95 2703.58  758.85 2710.65   758.3 2712.78  757.97 2721.47  755.22
 2724.32  754.35    2738  748.92    2758  747.92    2778  748.92 2791.67  758.23
 2802.78  764.91 2810.02   766.7 2818.39  770.24 2834.95  770.23 2841.73  770.22
  2855.8   770.2 2857.49  770.21 2864.31  770.24 2868.84  770.15 2872.31  770.09
 2873.12  770.11 2874.79  770.12 2894.56  770.38 2912.07  770.62 2920.28  770.48
 2923.79  770.43 2928.42  770.45 2936.73   770.4 2945.99  770.38 2966.08  770.32
 2971.71  770.34  2978.2  770.36 3006.83  770.66 3023.15  770.84 3035.74  770.96
 3048.87  770.89  3062.8   770.8 3071.72  770.78 3074.59   770.8 3093.08  770.91
 3100.31  770.85 3106.59  770.79  3110.8  770.73 3113.85  770.81 3117.05  770.87
 3126.03  771.18 3151.74  772.05 3154.08  772.13 3157.87  772.26 3167.12  773.06
 3170.66  773.47 3175.03  774.01 3176.08  774.11 3177.46  774.76 3179.04  775.48
 3179.06  775.49  3179.1  775.49 3188.66  775.04 3193.02  775.66  3199.7  777.29
 3202.71  777.61 3203.18  777.63 3209.74  777.84 3214.05  777.36 3216.65  777.57
  3228.9  778.07 3236.71  778.39 3251.17   779.4 3254.62  779.48 3286.26  780.35
 3293.91  780.46 3303.79  780.98 3309.68  781.27 3312.02  781.39 3326.24  782.14
 3340.56  783.03 3351.95  784.01  3364.1  784.98 3375.28  785.94 3379.02   786.1
 3409.36  786.15 3416.33  786.22 3417.69   786.2 3420.39  786.43 3424.86  786.84
  3427.2  786.82    3437  786.69 3449.37  785.97 3452.74  785.76 3457.84  785.39
  3462.5  785.05 3475.34  787.17 3480.26  787.98 3521.88  802.49 3522.36  802.63
 3523.68  803.08 3525.59  803.72 3549.65  811.07  3552.8  811.82 3558.71  813.31
 3577.41  814.37 3577.53  814.37 3577.77  814.36 3578.06  814.36 3589.26  814.83
 3592.63  814.83

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .075 2710.65    .042 2818.39     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2710.65 2818.39            39.83   42.76   62.22             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1200     820       F
 3031.14 3592.63     805       T

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  776.06  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  775.73  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  760.79  * Flow Area (sq ft)      *  593.13  * 2278.41  * 1133.49  *
* E.G. Slope (ft/ft)     *0.000364  * Area (sq ft)           *  593.13  * 2278.41  * 1779.27  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1131.23  *11252.21  *  816.56  *
* Top Width (ft)         *  529.14  * Top Width (ft)         *   46.48  *  107.74  *  374.92  *
* Vel Total (ft/s)       *    3.30  * Avg. Vel. (ft/s)       *    1.91  *    4.94  *    0.72  *
* Max Chl Dpth (ft)      *   27.81  * Hydr. Depth (ft)       *   12.76  *   21.15  *    5.33  *
* Conv. Total (cfs)      *692100.1  * Conv. (cfs)            * 59312.3  *589973.8  * 42813.9  *
* Length Wtd. (ft)       *   44.36  * Wetted Per. (ft)       *   52.31  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.26  *    0.45  *    0.12  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    0.49  *    2.22  *    0.09  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  513.21  * 5318.81  *  529.08  *
```

```
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   84.41  *  410.52  *  108.39  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  780.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  780.33  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  764.01  * Flow Area (sq ft)      *  815.11  * 2773.54  * 2111.20  *
* E.G. Slope (ft/ft)     *0.000386  * Area (sq ft)           *  815.11  * 2773.54  * 3656.65  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1841.15  *16087.05  * 2371.80  *
* Top Width (ft)         *  625.10  * Top Width (ft)         *   50.34  *  107.74  *  467.03  *
* Vel Total (ft/s)       *    3.56  * Avg. Vel. (ft/s)       *    2.26  *    5.80  *    1.12  *
* Max Chl Dpth (ft)      *   32.41  * Hydr. Depth (ft)       *   16.19  *   25.74  *    9.92  *
* Conv. Total (cfs)      *1033211.0  * Conv. (cfs)           * 93709.4  *818784.4  *120717.5  *
* Length Wtd. (ft)       *   45.67  * Wetted Per. (ft)       *   58.31  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.34  *    0.58  *    0.24  *
* Alpha                  *    2.15  * Stream Power (lb/ft s) *    0.76  *    3.37  *    0.27  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  931.77  * 7107.36  * 1036.28  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  123.31  *  450.13  *  147.93  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  783.99  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  783.49  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  766.46  * Flow Area (sq ft)      *  979.12  * 3114.23  * 2783.94  *
* E.G. Slope (ft/ft)     *0.000406  * Area (sq ft)           *  979.12  * 3114.23  * 5244.71  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2442.47  *20019.16  * 3858.37  *
* Top Width (ft)         *  688.64  * Top Width (ft)         *   53.40  *  107.74  *  527.50  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    2.49  *    6.43  *    1.39  *
* Max Chl Dpth (ft)      *   35.57  * Hydr. Depth (ft)       *   18.34  *   28.91  *   13.09  *
* Conv. Total (cfs)      *1305777.0  * Conv. (cfs)           *121174.7  *993182.6  *191420.0  *
* Length Wtd. (ft)       *   46.33  * Wetted Per. (ft)       *   62.72  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.40  *    0.69  *    0.33  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.99  *    4.41  *    0.46  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1300.54  * 8569.82  * 1561.01  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  152.56  *  478.05  *  222.84  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  786.91  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  768.77  * Flow Area (sq ft)      * 1273.84  * 3482.97  * 3512.09  *
* E.G. Slope (ft/ft)     *0.000472  * Area (sq ft)           * 1273.84  * 3482.97  * 7188.55  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1879.22  *25996.56  * 6124.21  *
* Top Width (ft)         *  953.29  * Top Width (ft)         *  190.17  *  107.74  *  655.38  *
* Vel Total (ft/s)       *    4.11  * Avg. Vel. (ft/s)       *    1.48  *    7.46  *    1.74  *
* Max Chl Dpth (ft)      *   38.99  * Hydr. Depth (ft)       *    6.70  *   32.33  *   16.51  *
* Conv. Total (cfs)      *1565279.0  * Conv. (cfs)           * 86515.0  *1196820.0  *281944.1  *
* Length Wtd. (ft)       *   46.97  * Wetted Per. (ft)       *  200.70  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.19  *    0.89  *    0.49  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    0.28  *    6.65  *    0.85  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1836.06  *10097.17  * 2381.35  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  221.07  *  500.90  *  310.60  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  791.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
```

```
* W.S. Elev (ft)         *  791.13  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  772.49  * Flow Area (sq ft)      * 2199.62  * 3937.62  * 4409.86  *
* E.G. Slope (ft/ft)     *0.000463  * Area (sq ft)           * 2199.62  * 3937.62  * 9992.32  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4040.44  *31594.13  * 8865.44  *
* Top Width (ft)         * 1027.63  * Top Width (ft)         *  248.98  *  107.74  *  670.91  *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)       *    1.84  *    8.02  *    2.01  *
* Max Chl Dpth (ft)      *   43.21  * Hydr. Depth (ft)       *    8.83  *   36.55  *   20.73  *
* Conv. Total (cfs)      *2068181.0  * Conv. (cfs)           *187783.1  *1468368.0  *412029.9  *
* Length Wtd. (ft)       *   47.13  * Wetted Per. (ft)       *  260.20  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.24  *    0.99  *    0.60  *
* Alpha                  *    2.63  * Stream Power (lb/ft s) *    0.45  *    7.94  *    1.20  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 3145.36  *12486.73  * 4414.03  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  461.24  *  528.91  *  681.12  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  794.76  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  793.95  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  774.53  * Flow Area (sq ft)      * 3042.19  * 4241.78  * 5010.48  *
* E.G. Slope (ft/ft)     *0.000484  * Area (sq ft)           * 3047.16  * 4241.78  *11897.81  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 5882.39  *36587.59  *11220.03  *
* Top Width (ft)         * 1115.07  * Top Width (ft)         *  328.33  *  107.74  *  679.01  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    1.93  *    8.63  *    2.24  *
* Max Chl Dpth (ft)      *   46.03  * Hydr. Depth (ft)       *    9.68  *   39.37  *   23.55  *
* Conv. Total (cfs)      *2439227.0  * Conv. (cfs)           *267246.7  *1662236.0  *509744.7  *
* Length Wtd. (ft)       *   47.43  * Wetted Per. (ft)       *  325.84  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.28  *    1.11  *    0.71  *
* Alpha                  *    2.73  * Stream Power (lb/ft s) *    0.55  *    9.62  *    1.60  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 4646.91  *13906.28  * 6615.18  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  668.08  *  536.01  * 1044.79  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  797.25  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.41  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  776.04  * Flow Area (sq ft)      * 3822.54  * 4505.88  * 5531.99  *
* E.G. Slope (ft/ft)     *0.000482  * Area (sq ft)           * 4295.36  * 4505.88  *13570.87  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 8436.08  *40363.22  *13200.70  *
* Top Width (ft)         * 1430.48  * Top Width (ft)         *  636.70  *  107.74  *  686.04  *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *    2.21  *    8.96  *    2.39  *
* Max Chl Dpth (ft)      *   48.49  * Hydr. Depth (ft)       *   11.85  *   41.82  *   26.00  *
* Conv. Total (cfs)      *2823697.0  * Conv. (cfs)           *384208.6  *1838282.0  *601205.9  *
* Length Wtd. (ft)       *   47.56  * Wetted Per. (ft)       *  334.53  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.34  *    1.18  *    0.78  *
* Alpha                  *    2.70  * Stream Power (lb/ft s) *    0.76  *   10.56  *    1.87  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 5992.71  *14818.26  * 8703.26  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  817.99  *  537.21  * 1400.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  800.66  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  799.77  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  778.07  * Flow Area (sq ft)      * 4927.23  * 4868.73  * 6248.49  *
* E.G. Slope (ft/ft)     *0.000483  * Area (sq ft)           * 6524.08  * 4868.73  *15897.58  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *12597.98  *45943.70  *16178.32  *
* Top Width (ft)         * 1481.26  * Top Width (ft)         *  677.82  *  107.74  *  695.70  *
* Vel Total (ft/s)       *    4.66  * Avg. Vel. (ft/s)       *    2.56  *    9.44  *    2.59  *
* Max Chl Dpth (ft)      *   51.85  * Hydr. Depth (ft)       *   14.77  *   45.19  *   29.37  *
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* Conv. Total (cfs)      *3401595.0  * Conv. (cfs)            *573517.6  *2091567.0  *736510.8  *
* Length Wtd. (ft)       *   47.68  * Wetted Per. (ft)        *  346.01  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)        *    0.43  *    1.27  *    0.88  *
* Alpha                  *    2.64  * Stream Power (lb/ft s) *    1.10  *   12.03  *    2.29  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 8468.61  *16219.44  *12720.42  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         * 1013.31  *  539.30  * 1758.70  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  789.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  788.54  * Reach Len. (ft)        *   39.83  *   42.76  *   62.22  *
* Crit W.S. (ft)         *  769.89  * Flow Area (sq ft)      * 1607.89  * 3658.40  * 3858.50  *
* E.G. Slope (ft/ft)     *0.000473  * Area (sq ft)           * 1607.89  * 3658.40  * 8263.22  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2583.79  *28244.97  * 7171.25  *
* Top Width (ft)         *  983.78  * Top Width (ft)          *  212.57  *  107.74  *  663.48  *
* Vel Total (ft/s)       *    4.16  * Avg. Vel. (ft/s)       *    1.61  *    7.72  *    1.86  *
* Max Chl Dpth (ft)      *   40.62  * Hydr. Depth (ft)       *    7.56  *   33.96  *   18.14  *
* Conv. Total (cfs)      *1747590.0  * Conv. (cfs)            *118826.3  *1298964.0  *329799.9  *
* Length Wtd. (ft)       *   47.12  * Wetted Per. (ft)        *  223.19  *  115.07  *  212.76  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)        *    0.21  *    0.94  *    0.54  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    0.34  *    7.25  *    0.99  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2200.92  *10901.32  * 2907.30  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  279.74  *  511.27  *  375.75  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 18.253

INPUT
Description: U/S of 71 Hwy NB Bridge.  Dodson XS 19.873
Station Elevation Data    num=     406
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  834.49    5.92  834.36    14.4  834.19    21.4  834.03   22.71     834
   37.63  833.66   42.74  833.54    63.5  833.07   71.94  832.83   81.37  832.65
   83.83  832.61   91.72  832.51   97.38  832.41  107.01  832.28  111.42   832.2
  123.72  832.05  126.85  831.99  132.32     832  143.78  832.01  145.83  831.97
  148.87  831.96  153.84  832.17  154.63  831.99  160.49  831.49  172.27  831.11
   185.7  824.91  193.93   821.1  197.01  819.64  208.97  813.69  231.44  802.76
  234.37  801.71   248.4  796.43  256.67  795.57  274.38  795.07  282.14  795.31
  287.88  793.96  291.53  793.44   294.1  793.27  299.28  793.32  303.78  793.36
  307.52  793.76  313.85  794.56  328.26  794.56  350.87  794.85  369.32     795
  369.34     795  369.46     795  392.32  794.39  395.06  794.33  411.46   794.1
  418.19  794.15  433.58  794.32  446.55  795.57  446.58  795.57     450  795.57
  451.52  795.58  452.08  795.58  456.85  795.41  458.05  795.36  461.25  795.42
  464.03  795.48  465.07  795.48   470.2  795.48  471.51  795.45  486.14  795.07
  494.03  794.94  500.71  794.83  505.84  794.66  507.06  794.67  537.95  795.38
  557.67  795.95  560.14  796.62  565.85  798.31  583.07  803.04   593.4  805.97
   600.1  808.39  632.01  819.35  641.05  823.21  641.56  823.39  643.15  823.91
  645.23  824.06  651.38  824.47  656.26   824.8  662.75  824.46   673.7  824.37
  678.92  824.11  689.33  823.85  702.23  823.16  704.77  823.12  713.69  822.98
  724.36   822.9  735.91  822.72  749.53   822.6  763.62  822.38  775.69  822.27
  793.91   822.1   805.9  821.99   810.9  821.94  827.62  821.78  833.56  821.73
  843.94  821.62   864.5  821.42  868.13  821.39  876.58  821.39  881.63  821.38
  881.92  821.38  883.53  821.38  896.07  821.28  903.88  821.16  905.09  821.13
  906.43  821.11  933.37  820.69  935.83  820.65  936.03  820.64  955.24  820.22
  957.55  820.18  978.64  819.72  982.88  819.63  999.71  819.27 1005.73  819.15
 1021.06  818.82 1027.35  818.77 1030.95  818.76 1039.76  818.69 1052.61  818.65
 1061.93  818.58 1074.17  818.54 1080.75  818.49 1087.35  818.43 1099.42   818.4
 1108.23  818.33 1114.53  818.23 1120.42  818.19 1126.34  818.14 1139.95  817.94
 1144.91  817.95 1147.85  817.91  1152.1  817.85 1173.29  817.53 1177.09  817.48
 1181.86   817.4 1184.91  817.36 1210.21  816.97 1215.56   816.9 1220.52  816.84
 1247.05  816.42  1250.6  816.38 1258.99  816.26 1260.46  816.12 1278.74   815.9
 1280.16     816 1283.27  815.99 1283.89  815.94 1288.95  815.68 1304.41   815.5
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 1304.98  815.64 1308.12  815.61 1336.41  815.24 1371.04  814.77 1371.92  814.77
 1372.05  814.76 1372.44  814.76    1396  814.44 1402.24  814.35 1402.46  814.35
 1402.62  814.35 1429.94  814.13 1431.14  814.12 1458.82   813.9 1461.69  813.86
 1464.94  813.82 1490.34  813.61 1495.75  813.54 1528.23  813.27 1535.62  813.17
 1543.27  813.08  1564.6  812.82 1569.51  812.77 1578.97  812.66 1584.16  812.61
 1593.29   812.5 1598.78  812.45 1610.73  812.31 1616.47  812.26 1621.03  812.21
 1635.24  812.04 1639.85     812 1644.77  811.95 1650.03   811.9 1659.52  811.79
 1666.78  811.73 1674.06  811.74 1682.72  811.76 1689.15  811.78 1698.55   811.8
 1703.72  811.81 1713.88  811.84 1718.31  811.85 1729.22  811.87 1735.25  811.89
 1746.93  811.91 1759.56  811.94 1759.87  811.94 1764.06  811.93 1776.82   811.9
 1779.91  811.89 1791.69  811.86 1795.55  811.85 1803.57  811.83 1810.95  811.81
 1819.12  811.79 1825.32   811.8 1831.09  811.82 1844.51  811.78 1855.04  811.79
  1863.3  811.81 1874.21   811.8 1881.25  811.81 1891.48   811.8 1897.32   811.8
 1908.59  811.79 1910.98  811.79 1919.95  811.78 1921.96  811.78 1931.63  811.76
 1933.16  811.76 1934.59  811.77 1956.99  811.72  1958.2  811.72 1973.48  811.69
 1976.63  811.68 1976.96  811.68 1995.49  811.64 2010.15   811.6 2013.27  811.62
 2027.62  811.59 2029.09   811.6 2045.92  811.57 2053.28  811.55 2066.51  811.52
 2078.38   811.5 2089.25  811.46 2094.56  811.48 2097.77  811.47 2107.87  811.49
 2115.08  811.52 2132.94  811.53 2139.15  811.54 2141.97  811.54 2155.81  811.58
 2183.78  811.58 2185.81  811.59 2187.55  811.59 2221.99  811.71 2224.45  811.72
 2225.71  811.72  2252.4  811.82 2257.32  811.87 2257.45  811.87  2268.1  811.97
 2268.79  811.97 2293.96  812.66 2296.88  812.69 2296.91  812.69 2297.04   812.7
 2313.57  814.19 2314.52  813.99 2318.16  813.13 2319.29  812.86 2329.67  810.42
 2338.13  808.41 2339.95  807.95 2364.92  796.86 2366.67  796.26 2385.37  791.64
 2394.16  789.58 2396.45  790.01 2405.48  791.68 2411.08   791.9 2413.15  792.02
 2419.03  792.11 2427.53  792.24 2432.83  792.23 2437.11  792.22 2443.53  792.08
 2446.67  792.01 2450.46  791.86 2461.04  791.45 2463.88  791.05 2475.32  789.46
 2488.88  787.57 2513.66  786.37 2525.79  786.09 2531.23  786.22 2558.93  786.33
 2585.63   786.4 2589.92  786.39 2619.17  786.56  2630.7  786.64  2634.1  786.66
 2652.73  786.64 2659.12  786.59 2662.56  782.98 2687.77  764.53 2688.51  764.36
 2695.33  762.87 2706.72  758.92 2708.38  758.77 2714.38  758.05 2717.19  757.62
 2727.95  754.65 2731.17  753.81    2739  748.92    2759  747.92    2779  748.92
  2785.7  753.58 2789.71  756.12 2805.71  766.18 2810.76  768.35 2816.71  769.82
 2816.75  769.83 2820.45  771.09 2830.47  771.07 2839.51   770.9 2840.41  770.89
 2843.94  770.82 2849.22   770.8 2851.89  770.78 2852.16  770.78 2872.75  770.63
 2891.65  770.49 2893.62  770.45 2905.18  770.21 2914.49  770.07 2928.61  769.85
 2935.36  769.89 2952.06  769.98 2956.23  769.96 2958.08  769.95 2965.63  769.88
 2977.09  769.88 2986.65  769.87 2997.96  769.85 3018.83  769.82 3029.31  769.79
  3039.7  769.67  3051.5  769.53 3054.59   769.5 3059.91  769.49 3060.57  769.49
 3081.44  769.53  3102.3  769.56 3113.15  769.57 3123.17  769.27 3131.16  769.04
 3133.92  769.04 3135.58  769.05 3144.04  769.39 3146.44  769.49 3164.91  770.22
 3166.35  770.27 3178.31  774.18 3183.57  776.52 3185.78  777.95 3185.81  777.97
 3202.37  781.72  3202.4  781.73 3206.64  781.83  3211.5  781.93  3212.3     782
 3215.17  782.36 3219.47  782.94 3220.15  783.43 3222.42  785.28 3227.51  783.19
 3229.44   782.4 3230.16  782.04 3230.95  782.08  3240.6  782.63 3245.66  782.73
 3248.38  783.99 3250.49  784.96 3253.59  785.54 3269.11  786.56 3281.42  787.25
 3284.12  787.41 3301.64  788.79 3307.67  789.04 3312.17  789.12 3326.77  789.35
 3342.13  789.88 3345.87  789.98 3351.27  790.04 3379.22  789.66 3379.89  789.75
 3383.66  790.25 3385.49  790.24 3396.16  790.19 3412.79  789.11 3419.57  788.66
 3424.88  788.08 3433.59  787.13 3434.95  786.93 3449.55  791.98 3521.47  816.16
 3562.17  815.75

Manning's n Values         num=       3
     Sta   n Val      Sta   n Val     Sta   n Val
***********************************************
       0    .075 2659.12    .042 2820.45     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2659.12 2820.45            45.57    49.2   55.25              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1000     820       T

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  776.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  775.76  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  761.10  * Flow Area (sq ft)      *          * 2678.87  * 2053.37  *
* E.G. Slope (ft/ft)     *0.000356  * Area (sq ft)           *          * 2678.87  * 2053.37  *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *11675.64  * 1524.36  *
* Top Width (ft)         *  509.44  * Top Width (ft)          *          *  148.03  *  361.42  *
* Vel Total (ft/s)       *    2.79  * Avg. Vel. (ft/s)        *          *    4.36  *    0.74  *
* Max Chl Dpth (ft)      *   27.84  * Hydr. Depth (ft)        *          *   18.10  *    5.68  *
* Conv. Total (cfs)      *699742.3  * Conv. (cfs)             *          *618934.8  * 80807.6  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)        *          *  160.52  *  362.42  *
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* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *           *    0.37  *    0.13  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *           *    1.62  *    0.09  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  512.93  * 5316.38  *  526.34  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   84.39  *  410.39  *  107.86  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  780.70  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  780.40  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  764.20  * Flow Area (sq ft)      *          * 3380.23  * 3757.25  *
* E.G. Slope (ft/ft)     *0.000342  * Area (sq ft)           *          * 3380.23  * 3757.25  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *16324.89  * 3975.11  *
* Top Width (ft)         *  530.46  * Top Width (ft)         *          *  154.37  *  376.09  *
* Vel Total (ft/s)       *    2.84  * Avg. Vel. (ft/s)       *          *    4.83  *    1.06  *
* Max Chl Dpth (ft)      *   32.48  * Hydr. Depth (ft)       *          *   21.90  *    9.99  *
* Conv. Total (cfs)      *1098457.0  * Conv. (cfs)            *          *883359.3  *215097.9  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *          *  168.38  *  377.96  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *          *    0.43  *    0.21  *
* Alpha                  *    2.35  * Stream Power (lb/ft s) *          *    2.07  *    0.22  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  931.39  * 7104.34  * 1030.99  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  123.29  *  450.00  *  147.33  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  783.92  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  783.59  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  766.27  * Flow Area (sq ft)      *          * 3880.07  * 5020.16  *
* E.G. Slope (ft/ft)     *0.000343  * Area (sq ft)           *          * 3880.07  * 5020.16  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *20166.22  * 6153.78  *
* Top Width (ft)         *  579.37  * Top Width (ft)         *          *  158.47  *  420.90  *
* Vel Total (ft/s)       *    2.96  * Avg. Vel. (ft/s)       *          *    5.20  *    1.23  *
* Max Chl Dpth (ft)      *   35.67  * Hydr. Depth (ft)       *          *   24.48  *   11.93  *
* Conv. Total (cfs)      *1421637.0  * Conv. (cfs)            *          *1089250.0  *332387.5  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *          *  173.59  *  423.72  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *          *    0.48  *    0.25  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *          *    2.49  *    0.31  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1300.09  * 8566.39  * 1553.68  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  152.54  *  477.92  *  222.16  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.47  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  787.10  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  768.50  * Flow Area (sq ft)      *  103.94  * 4441.62  * 6545.99  *
* E.G. Slope (ft/ft)     *0.000349  * Area (sq ft)           *  103.94  * 4441.62  * 6545.99  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *   28.80  *25106.30  * 8864.90  *
* Top Width (ft)         *  781.86  * Top Width (ft)         *  160.56  *  161.33  *  459.97  *
* Vel Total (ft/s)       *    3.07  * Avg. Vel. (ft/s)       *    0.28  *    5.65  *    1.35  *
* Max Chl Dpth (ft)      *   39.18  * Hydr. Depth (ft)       *    0.65  *   27.53  *   14.23  *
* Conv. Total (cfs)      *1819023.0  * Conv. (cfs)            *  1540.8  *1343204.0  *474278.3  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  160.58  *  177.73  *  464.17  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.01  *    0.55  *    0.31  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    0.00  *    3.08  *    0.42  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1835.43  *10093.28  * 2371.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  220.91  *  500.76  *  309.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  791.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  791.32  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
```

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* Crit W.S. (ft)         *  773.01  * Flow Area (sq ft)      *  884.32  * 5121.77  * 8836.12  *
* E.G. Slope (ft/ft)     *0.000348  * Area (sq ft)           *  884.32  * 5121.77  * 8836.12  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  869.04  *31785.18  *11845.78  *
* Top Width (ft)         * 1002.42  * Top Width (ft)         *  213.91  *  161.33  *  627.18  *
* Vel Total (ft/s)       *    3.00  * Avg. Vel. (ft/s)       *    0.98  *    6.21  *    1.34  *
* Max Chl Dpth (ft)      *   43.40  * Hydr. Depth (ft)       *    4.13  *   31.75  *   14.09  *
* Conv. Total (cfs)      *2384558.0  * Conv. (cfs)           * 46567.9  *1703228.0  *634762.8  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  214.56  *  177.73  *  632.35  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.09  *    0.63  *    0.30  *
* Alpha                  *    3.12  * Stream Power (lb/ft s) *    0.09  *    3.89  *    0.41  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 3143.95  *12482.28  * 4400.58  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  461.03  *  528.78  *  680.20  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  794.64  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  794.19  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  774.57  * Flow Area (sq ft)      * 1645.66  * 5585.44  *10650.85  *
* E.G. Slope (ft/ft)     *0.000335  * Area (sq ft)           * 1662.10  * 5585.44  *10650.85  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 1921.42  *36044.24  *15724.34  *
* Top Width (ft)         * 1122.06  * Top Width (ft)         *  325.06  *  161.33  *  635.68  *
* Vel Total (ft/s)       *    3.00  * Avg. Vel. (ft/s)       *    1.17  *    6.45  *    1.48  *
* Max Chl Dpth (ft)      *   46.27  * Hydr. Depth (ft)       *    5.79  *   34.62  *   16.76  *
* Conv. Total (cfs)      *2931297.0  * Conv. (cfs)           *104903.2  *1967897.0  *858497.0  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  285.14  *  177.73  *  641.32  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.12  *    0.66  *    0.35  *
* Alpha                  *    3.18  * Stream Power (lb/ft s) *    0.14  *    4.25  *    0.51  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 4644.76  *13901.46  * 6599.08  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  667.78  *  535.88  * 1043.85  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  797.11  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.66  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  775.89  * Flow Area (sq ft)      * 2360.70  * 5984.54  *12232.50  *
* E.G. Slope (ft/ft)     *0.000320  * Area (sq ft)           * 2926.35  * 5984.54  *12232.50  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3345.54  *39474.97  *19179.50  *
* Top Width (ft)         * 1410.51  * Top Width (ft)         *  606.15  *  161.33  *  643.03  *
* Vel Total (ft/s)       *    3.01  * Avg. Vel. (ft/s)       *    1.42  *    6.60  *    1.57  *
* Max Chl Dpth (ft)      *   48.74  * Hydr. Depth (ft)       *    8.04  *   37.10  *   19.02  *
* Conv. Total (cfs)      *3467592.0  * Conv. (cfs)           *187112.1  *2207792.0  *1072688.0  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  295.02  *  177.73  *  649.08  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.16  *    0.67  *    0.38  *
* Alpha                  *    3.15  * Stream Power (lb/ft s) *    0.23  *    4.43  *    0.59  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 5989.41  *14813.11  * 8684.83  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  817.43  *  537.08  * 1399.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  800.51  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  800.06  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  777.57  * Flow Area (sq ft)      * 3372.39  * 6533.01  *14435.78  *
* E.G. Slope (ft/ft)     *0.000304  * Area (sq ft)           * 5035.77  * 6533.01  *14435.78  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 5799.57  *44543.29  *24377.14  *
* Top Width (ft)         * 1449.39  * Top Width (ft)         *  634.91  *  161.33  *  653.15  *
* Vel Total (ft/s)       *    3.07  * Avg. Vel. (ft/s)       *    1.72  *    6.82  *    1.69  *
* Max Chl Dpth (ft)      *   52.14  * Hydr. Depth (ft)       *   11.19  *   40.49  *   22.10  *
* Conv. Total (cfs)      *4286306.0  * Conv. (cfs)           *332691.6  *2555222.0  *1398392.0  *
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* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  303.52  *  177.73  *  659.75  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.21  *    0.70  *    0.42  *
* Alpha                  *    3.06  * Stream Power (lb/ft s) *    0.36  *    4.75  *    0.70  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 8463.33  *16213.85  *12698.76  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         * 1012.71  *  539.17  * 1757.74  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  789.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  788.74  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  771.40  * Flow Area (sq ft)      *  385.13  * 4705.61  * 7333.85  *
* E.G. Slope (ft/ft)     *0.000345  * Area (sq ft)           *  385.13  * 4705.61  * 7333.85  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  236.54  *27481.13  *10282.32  *
* Top Width (ft)         *  842.24  * Top Width (ft)         *  178.62  *  161.33  *  502.30  *
* Vel Total (ft/s)       *    3.06  * Avg. Vel. (ft/s)       *    0.61  *    5.84  *    1.40  *
* Max Chl Dpth (ft)      *   40.82  * Hydr. Depth (ft)       *    2.16  *   29.17  *   14.60  *
* Conv. Total (cfs)      *2044947.0  * Conv. (cfs)            * 12729.5  *1478881.0  *553336.9  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  178.73  *  177.73  *  506.92  *
* Min Ch El (ft)         *  747.92  * Shear (lb/sq ft)       *    0.05  *    0.57  *    0.31  *
* Alpha                  *    2.69  * Stream Power (lb/ft s) *    0.03  *    3.33  *    0.44  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2200.01  *10897.21  * 2896.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  279.56  *  511.14  *  374.92  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 18.248

INPUT
Description: 71 Hwy Bridge Northbound Lanes.  Bridge geometry copied from
             Dodson RAS Model.
Distance from Upstream XS =       7
Deck/Roadway Width        =      39
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      22
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
     170     831     826     650     824     819     650     800     795
    2300     800     795    2314  813.61  807.83    2376  814.11  808.33
    2458  814.77  808.99    2540  815.43  809.65    2622   816.1  810.32
    2704  816.77  810.99    2786  817.43  811.65    2868  818.09  812.31
    2950  818.76  812.98    3032  819.39  813.61    3095  819.67  813.89
    3158  819.94  814.16    3221  820.11  814.33    3270  820.24  814.46
    3358  820.46  814.68    3429  820.47  814.69    3500  820.33  814.55
    3656  819.46  813.68

Upstream Bridge Cross Section Data
Station Elevation Data    num=     406
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  834.49    5.92  834.36    14.4  834.19    21.4  834.03   22.71     834
   37.63  833.66   42.74  833.54    63.5  833.07   71.94  832.83   81.37  832.65
   83.83  832.61   91.72  832.51   97.38  832.41  107.01  832.28  111.42   832.2
  123.72  832.05  126.85  831.99  132.32     832  143.78  832.01  145.83  831.97
  148.87  831.96  153.84  832.17  154.63  831.99  160.49  831.49  172.27  831.11
   185.7  824.91  193.93   821.1  197.01  819.64  208.97  813.69  231.44  802.76
  234.37  801.71   248.4  796.43  256.67  795.57  274.38  795.07  282.14  795.31
  287.88  793.96  291.53  793.44   294.1  793.27  299.28  793.32  303.78  793.36
  307.52  793.76  313.85  794.56  328.26  794.56  350.87  794.85  369.32     795
  369.34     795  369.46     795  392.32  794.39  395.06  794.33  411.46   794.1
  418.19  794.15  433.58  794.32  446.55  795.57  446.58  795.57     450  795.57
  451.52  795.58  452.08  795.58  456.85  795.41  458.05  795.36  461.25  795.42
  464.03  795.48  465.07  795.48   470.2  795.48  471.51  795.45  486.14  795.07
```

494.03	794.94	500.71	794.83	505.84	794.66	507.06	794.67	537.95	795.38
557.67	795.95	560.14	796.62	565.85	798.31	583.07	803.04	593.4	805.97
600.1	808.39	632.01	819.35	641.05	823.21	641.56	823.39	643.15	823.91
645.23	824.06	651.38	824.47	656.26	824.8	662.75	824.46	673.7	824.37
678.92	824.11	689.33	823.85	702.23	823.16	704.77	823.12	713.69	822.98
724.36	822.9	735.91	822.72	749.53	822.6	763.62	822.38	775.69	822.27
793.91	822.1	805.9	821.99	810.9	821.94	827.62	821.78	833.56	821.73
843.94	821.62	864.5	821.42	868.13	821.39	876.58	821.39	881.63	821.38
881.92	821.38	883.53	821.38	896.07	821.28	903.88	821.16	905.09	821.13
906.43	821.11	933.37	820.69	935.83	820.65	936.03	820.64	955.24	820.22
957.55	820.18	978.64	819.72	982.88	819.63	999.71	819.27	1005.73	819.15
1021.06	818.82	1027.35	818.77	1030.95	818.76	1039.76	818.69	1052.61	818.65
1061.93	818.58	1074.17	818.54	1080.75	818.49	1087.35	818.43	1099.42	818.4
1108.23	818.33	1114.53	818.23	1120.42	818.19	1126.34	818.14	1139.95	817.94
1144.91	817.95	1147.85	817.91	1152.1	817.85	1173.29	817.53	1177.09	817.48
1181.86	817.4	1184.91	817.36	1210.21	816.97	1215.56	816.9	1220.52	816.84
1247.05	816.42	1250.6	816.38	1258.99	816.26	1260.46	816.12	1278.74	815.9
1280.16	816	1283.27	815.99	1283.89	815.94	1288.95	815.68	1304.41	815.5
1304.98	815.64	1308.12	815.61	1336.41	815.24	1371.04	814.77	1371.92	814.77
1372.05	814.76	1372.44	814.76	1396	814.44	1402.24	814.35	1402.46	814.35
1402.62	814.35	1429.94	814.13	1431.14	814.12	1458.82	813.9	1461.69	813.86
1464.94	813.82	1490.34	813.61	1495.75	813.54	1528.23	813.27	1535.62	813.17
1543.27	813.08	1564.6	812.82	1569.51	812.77	1578.97	812.66	1584.16	812.61
1593.29	812.5	1598.78	812.45	1610.73	812.31	1616.47	812.26	1621.03	812.21
1635.24	812.04	1639.85	812	1644.77	811.95	1650.03	811.9	1659.52	811.79
1666.78	811.73	1674.06	811.74	1682.72	811.76	1689.15	811.78	1698.55	811.8
1703.72	811.81	1713.88	811.84	1718.31	811.85	1729.22	811.87	1735.25	811.89
1746.93	811.91	1759.56	811.94	1759.87	811.94	1764.06	811.93	1776.82	811.9
1779.91	811.89	1791.69	811.86	1795.55	811.85	1803.57	811.83	1810.95	811.81
1819.12	811.79	1825.32	811.8	1831.09	811.82	1844.51	811.78	1855.04	811.79
1863.3	811.81	1874.21	811.8	1881.25	811.81	1891.48	811.8	1897.32	811.8
1908.59	811.79	1910.98	811.79	1919.95	811.78	1921.96	811.78	1931.63	811.76
1933.16	811.76	1934.59	811.77	1956.99	811.72	1958.2	811.72	1973.48	811.69
1976.63	811.68	1976.96	811.68	1995.49	811.64	2010.15	811.6	2013.27	811.62
2027.62	811.59	2029.09	811.6	2045.92	811.57	2053.28	811.55	2066.51	811.52
2078.38	811.5	2089.25	811.46	2094.56	811.48	2097.77	811.47	2107.87	811.49
2115.08	811.52	2132.94	811.53	2139.15	811.54	2141.97	811.54	2155.81	811.58
2183.78	811.58	2185.81	811.59	2187.55	811.59	2221.99	811.71	2224.45	811.72
2225.71	811.72	2252.4	811.82	2257.32	811.87	2257.45	811.87	2268.1	811.97
2268.79	811.97	2293.96	812.66	2296.88	812.69	2296.91	812.69	2297.04	812.7
2313.57	814.19	2314.52	813.99	2318.16	813.13	2319.29	812.86	2329.67	810.42
2338.13	808.41	2339.95	807.95	2364.92	796.86	2366.67	796.26	2385.37	791.64
2394.16	789.58	2396.45	790.01	2405.48	791.68	2411.08	791.9	2413.15	792.02
2419.03	792.11	2427.53	792.24	2432.83	792.23	2437.11	792.22	2443.53	792.08
2446.67	792.01	2450.46	791.86	2461.04	791.45	2463.88	791.05	2475.32	789.46
2488.88	787.57	2513.66	786.37	2525.79	786.09	2531.23	786.22	2558.93	786.33
2585.63	786.4	2589.92	786.39	2619.17	786.56	2630.7	786.64	2634.1	786.66
2652.73	786.64	2659.12	786.59	2662.56	782.98	2687.77	764.53	2688.51	764.36
2695.33	762.87	2706.72	758.92	2708.38	758.77	2714.38	758.05	2717.19	757.62
2727.95	754.65	2731.17	753.81	2739	748.92	2759	747.92	2779	748.92
2785.7	753.58	2789.71	756.12	2805.71	766.18	2810.76	768.35	2816.71	769.82
2816.75	769.83	2820.45	771.09	2830.47	771.07	2839.51	770.9	2840.41	770.89
2843.94	770.82	2849.22	770.8	2851.89	770.78	2852.16	770.78	2872.75	770.63
2891.65	770.49	2893.62	770.45	2905.18	770.21	2914.49	770.07	2928.61	769.85
2935.36	769.89	2952.06	769.98	2956.23	769.96	2958.08	769.95	2965.63	769.88
2977.09	769.88	2986.65	769.87	2997.96	769.85	3018.83	769.82	3029.31	769.79
3039.7	769.67	3051.5	769.53	3054.59	769.5	3059.91	769.49	3060.57	769.49
3081.44	769.53	3102.3	769.56	3113.15	769.57	3123.17	769.27	3131.16	769.04
3133.92	769.04	3135.58	769.05	3144.04	769.39	3146.44	769.49	3164.91	770.22
3166.35	770.27	3178.31	774.18	3183.57	776.52	3185.78	777.95	3185.81	777.97
3202.37	781.72	3202.4	781.73	3206.64	781.83	3211.5	781.93	3212.3	782
3215.17	782.36	3219.47	782.94	3220.15	783.43	3222.42	785.28	3227.51	783.19
3229.44	782.4	3230.16	782.04	3230.95	782.08	3240.6	782.63	3245.66	782.73
3248.38	783.99	3250.49	784.96	3253.59	785.54	3269.11	786.56	3281.42	787.25
3284.12	787.41	3301.64	788.79	3307.67	789.04	3312.17	789.12	3326.77	789.35
3342.13	789.88	3345.87	789.98	3351.27	790.04	3379.22	789.66	3379.89	789.75
3383.66	790.25	3385.49	790.24	3396.16	790.19	3412.79	789.11	3419.57	788.66
3424.88	788.08	3433.59	787.13	3434.95	786.93	3449.55	791.98	3521.47	816.16
3562.17	815.75								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	2659.12	.042	2820.45	.12

Bank Sta: Left Right Coeff Contr. Expan.

```
       2659.12 2820.45             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1000     820       T

Downstream  Deck/Roadway Coordinates
    num=      22
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
     174   833.4   828.4     644   826.5   821.5     650     800     795
    2300     800     795    2334  813.61  807.83    2396  814.11  808.33
    2478  814.77  808.99    2560  815.43  809.65    2642   816.1  810.32
    2724  816.77  810.99    2806  817.43  811.65    2888  818.09  812.31
    2970  818.76  812.98    3052  819.39  813.61    3115  819.67  813.89
    3178  819.94  814.16    3241  820.11  814.33    3290  820.24  814.46
    3378  820.46  814.68    3449  820.47  814.69    3520  820.33  814.55
    3676  819.46  813.68

Downstream Bridge Cross Section Data
Station Elevation Data    num=     420
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  837.06    4.79  836.95    7.95  836.87    15.8  836.68   26.07  836.44
   43.51  836.02   44.47     836   47.54  835.94   52.91  835.84   53.61  835.82
   65.66  835.58   67.85  835.54   78.66  835.32   82.49  835.25   89.47  835.11
   95.51  834.99  101.22  834.88  111.41  834.67  118.77  834.53  130.35   834.3
  147.74  833.95   151.4  833.82  167.56  833.47  174.02  833.43  178.69  829.15
  183.67  824.85  212.58  810.72  218.65  807.67  228.54  802.76  245.55  797.04
  247.86  796.23   251.5  795.85   276.9  794.02   285.4  793.99  295.56  793.32
  298.44  793.09  300.67  793.12  302.64  793.18  304.16  793.31  315.21  794.45
  359.54  794.95  363.15  794.98  365.65   794.9  391.22  794.28  397.44   794.2
  411.13  793.97  428.26  794.16  430.25   794.2  431.26   794.3  433.79  794.55
  440.38  795.22  443.71  795.53  448.03  795.54   449.4  795.54  451.45  795.47
   455.9  795.34  459.47  795.42  461.54  795.46  463.31  795.46   467.7  795.47
   476.4  795.21  480.07   795.1  483.48  795.01  489.56  794.91  503.81  794.76
  517.66  795.07  552.95  795.94  553.92  795.96  554.31  795.97  554.68  796.07
  564.24  798.26  577.85  801.97  599.53  808.36  635.09  820.47  640.52  825.34
  641.73  826.56  642.25  826.56   650.6  826.61  652.88  826.64  656.09  826.55
  662.96  826.56   665.8  826.46   673.9  826.23  677.48  826.14  685.49  825.92
  690.92  825.78  701.37  825.49  703.16  825.46  712.99  825.19  719.48  825.08
  729.22  824.81  738.26  824.57  746.82  824.42  758.36  824.11  768.12  823.94
  790.01  823.58  799.48  823.47   808.1  823.33  817.07  823.18  823.83  823.09
  832.96  822.94  842.46  822.78  845.83  822.74   858.9  822.52  864.13  822.46
  883.27   822.2  884.34   822.2  884.84  822.19     887  822.16  898.84  821.92
  902.04  821.88  915.63  821.61  931.36   821.3  938.92  821.19  951.41  821.02
  956.69  820.94  968.79  820.77  976.19  820.66  987.92   820.5  999.14  820.34
 1007.08  820.22 1015.97  820.09  1025.6  819.94 1034.22  819.82 1036.71  819.82
 1052.75  819.72 1061.17  819.72 1073.37  819.64 1081.26  819.64  1093.8  819.55
 1101.29  819.55 1117.09  819.43 1120.53  819.37 1131.81  819.29 1137.92  819.18
 1149.63  819.11 1150.45  819.09 1165.19     819 1169.93  818.92 1185.17  818.83
 1185.99  818.82 1202.07  818.72 1205.12  818.67  1221.5  818.59 1232.97  818.52
 1234.35   818.5 1249.23  818.32 1267.07  818.05 1269.82  818.01 1270.78     818
 1284.98  817.79 1286.62  817.76 1299.53  817.57 1301.79  817.53 1304.26   817.5
 1316.32  817.32 1320.79  817.25 1331.76  817.08 1337.25     817 1350.14  816.81
 1354.41  816.74 1359.39  816.67 1373.36  816.48 1382.05  816.36 1392.28  816.22
 1401.87  816.09 1415.85   815.9 1419.87  815.84  1431.7  815.68 1437.51  815.65
 1447.17  815.49 1463.39  815.23 1463.42  815.23 1463.44  815.23 1463.59  815.23
 1497.59  814.69 1499.33  814.66 1515.69   814.4  1519.6  814.33 1523.86  814.25
 1538.59  814.02 1543.64  813.93 1552.14  813.79 1556.19  813.72 1567.09  813.58
 1568.29  813.55 1578.28  813.42 1581.84  813.37 1582.93  813.36 1592.14  813.23
 1597.27  813.16 1605.53  813.05 1612.45  812.96 1619.29  812.87 1627.55  812.76
 1632.72  812.69 1636.96  812.63 1646.46   812.5 1647.33  812.49 1649.58  812.46
 1665.46  812.24 1666.54  812.23  1679.9  812.05 1679.91  812.05 1679.93  812.05
 1680.06  812.05 1694.63  812.01 1695.58  811.99 1710.11  811.94 1711.69  811.97
 1725.64  811.94 1727.34  811.94 1735.78  811.92 1742.36  811.91 1748.38   811.9
 1750.43   811.9  1752.5   811.9 1758.92  811.91  1766.4  811.91 1773.99  811.91
 1779.73  811.92 1788.95  811.93 1793.69  811.93 1803.03  811.93 1807.61  811.94
 1821.89  811.95 1827.32  811.95 1838.44  812.01 1843.67  812.02 1854.93  812.08
 1859.98  812.09 1870.01  812.14  1880.2   812.2    1885  812.21 1897.47  812.27
 1904.31  812.32 1914.67  812.38 1925.19  812.44 1930.85  812.48 1943.18  812.54
 1955.72  812.61 1960.99  812.65 1969.38  812.69 1982.65   812.7 1986.37  812.73
 1999.79  812.74  2003.3  812.76 2015.88  812.77 2022.08  812.81 2034.68  812.81
 2048.58  812.82 2051.39  812.83  2065.4  812.84 2067.99  812.85 2082.17  812.85
 2090.64  812.85 2093.43  812.86 2108.12  812.87 2110.62  812.88 2129.42  813.01
 2131.06  813.01  2150.4  813.15 2153.64  813.16    2193  813.44 2193.22  813.44
 2208.85  813.55 2213.36  813.59 2213.44  813.59 2229.52  813.71 2229.91  813.71
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 2245.34  813.83 2246.13  813.83 2246.89  813.84 2263.12  813.97 2264.02  813.98
 2264.63  813.99 2280.63  814.12 2281.33  814.13 2293.53  814.23 2295.08  814.24
 2307.14  814.34  2308.7  814.36 2315.88  814.42 2316.43  814.42 2317.85  814.41
 2322.33  814.34  2334.6  814.22 2338.63  807.94 2338.77  807.71 2339.55  807.46
 2379.39  792.73 2391.31  790.39 2393.37  789.97  2403.8  792.27 2404.06  792.33
 2404.65  792.34 2412.47   792.4 2422.59  792.55 2426.85  792.62  2428.9  792.62
 2436.43  792.61 2437.43  792.59 2445.99  792.39 2452.06  792.16 2452.25  792.15
  2460.4  791.83 2477.44  788.99 2489.69  787.28 2506.23  786.73 2532.66  786.23
 2556.31  786.48 2584.08  786.55 2637.97   786.4 2653.97  786.49 2667.14   786.5
 2675.33  787.17 2677.67  787.21 2689.85  787.14 2703.97  778.12 2714.97  771.01
 2715.58  770.75 2726.14  766.28 2734.89  762.47 2750.94  756.57 2751.29   756.4
  2751.4  756.35 2760.27  753.44    2767  748.86    2787  747.86    2807  748.86
 2814.56  753.04 2818.56  755.55 2822.09  757.07 2825.83  759.15 2836.87  765.27
  2837.4  765.59 2840.06   766.9 2842.42  768.06 2848.16  769.94 2852.26  770.48
 2852.29  770.48 2860.93   770.5 2863.45   770.5  2881.8  770.79 2885.09  770.84
 2887.79  770.88 2897.76  770.59 2902.67  770.27 2915.87  769.41 2923.54  769.43
 2936.55  769.45  2944.4  769.29    2949   769.2 2954.68  769.19 2965.27  769.12
  2968.2   769.1 2981.38  769.11 2986.14  769.18 3007.01  769.46 3007.98  769.47
  3012.8  769.52 3027.88  769.74 3029.22  769.76 3045.34  769.45 3048.74  769.37
 3053.34  769.27 3069.61  769.13 3078.54  769.05 3087.32  769.14 3090.48  769.07
 3099.02   768.9 3106.59  768.83 3111.35  768.87  3118.8  768.95 3132.22  769.29
 3135.34  769.37 3138.49  769.71 3151.97  770.98 3153.08  771.29 3155.68  772.03
 3156.58  772.42 3156.94  772.52 3163.15  773.99 3168.02  776.24 3169.37  776.89
 3173.95   777.1 3175.33  777.15 3189.59  778.01 3194.82  778.14 3195.91  778.16
 3213.85  778.86 3215.69  778.91  3221.3  779.03 3233.38  789.28  3234.3  790.03
 3235.55  790.29 3236.56  790.28 3258.85  789.99 3264.93  790.24  3269.6  790.31
 3278.92  790.47 3291.98  791.05 3298.02  791.15 3304.37  791.27 3329.23  791.74
 3348.68   792.3 3354.19  792.55 3356.58  792.66 3356.88  792.69 3361.85  793.19
 3363.28  793.12 3392.04  792.02 3402.01  791.41 3404.14  791.18 3419.45  788.83
  3444.3  797.44 3465.85  804.91 3503.12  816.38 3516.18  816.11 3537.47  815.72

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .075 2689.85    .042 2848.16     .12

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2689.85 2848.16             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1000     820       F
  3049.6 3537.47  789.19       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  19

Pier Data
Pier Station     Upstream=    2376    Downstream=    2396
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810

Pier Data
Pier Station     Upstream=    2458    Downstream=    2478
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.17     740    3.17     810

Pier Data
```

```
Pier Station     Upstream=    2540    Downstream=    2560
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     810

Pier Data
Pier Station     Upstream=    2622    Downstream=    2642
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812

Pier Data
Pier Station     Upstream=    2704    Downstream=    2724
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     740       4     812

Pier Data
Pier Station     Upstream=    2786    Downstream=    2806
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     812
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     812

Pier Data
Pier Station     Upstream=    2868    Downstream=    2888
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814

Pier Data
Pier Station     Upstream=    2950    Downstream=    2970
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814

Pier Data
Pier Station     Upstream=    3032    Downstream=    3052
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     814
```

```
Pier Data
Pier Station     Upstream=    3095    Downstream=    3115
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3158    Downstream=    3178
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3221    Downstream=    3241
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3270    Downstream=    3290
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3358    Downstream=    3378
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3429    Downstream=    3449
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3500    Downstream=    3520
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    3.67     740    3.67     816
```

```
Pier Data
Pier Station     Upstream=    3656    Downstream=    3676
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.67     740    3.67     816
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.67     740    3.67     816

Pier Data
Pier Station     Upstream=    3791    Downstream=    3811
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.67     740    3.67     814
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.67     740    3.67     814

Pier Data
Pier Station     Upstream=    3926    Downstream=    3946
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.67     740    3.67     812
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.67     740    3.67     812

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
       Yarnell                 KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     776.02  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     775.76  * E.G. Elev (ft)         *     776.02  *     775.98  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     775.74  *     775.63  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     761.25  *     761.46  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.82  *      27.77  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.95  *       3.71  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4473.06  *    3556.52  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   34711.35  *   31539.46  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *       9.25  *      10.88  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *     629.34  *     430.51  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *   515668.3  *   472015.8  *
* Delta WS (ft)          *       0.12  * Top Width (ft)         *     483.36  *     436.54  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       3.71  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.29  *       0.40  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.86  *       1.50  *
*********************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
```

```
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     780.70  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     780.40  * E.G. Elev (ft)         *     780.69  *     780.65  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     780.39  *     780.22  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     764.58  *     764.71  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.47  *      32.36  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.00  *       4.00  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6761.32  *    5073.31  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   61726.45  *   52608.51  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *      13.41  *      15.19  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *     717.81  *     475.74  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *   786466.0  *   688853.1  *
* Delta WS (ft)          *       0.17  * Top Width (ft)         *     504.38  *     496.01  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.00  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.39  *       0.58  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.18  *       2.31  *
*********************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     783.92  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     783.59  * E.G. Elev (ft)         *     783.92  *     783.87  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     783.59  *     783.38  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     766.72  *     766.96  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.67  *      35.52  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.12  *       4.29  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8443.10  *    6135.85  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   86886.66  *   71513.65  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *      15.29  *      18.11  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *     812.90  *     506.88  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  1000214.0  *   857314.7  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *     552.15  *     504.68  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.29  * C & E Loss (ft)        *       0.02  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.71  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.40  *       3.06  *
*********************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     787.47  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     787.10  * E.G. Elev (ft)         *     787.47  *     787.41  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     787.11  *     786.85  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     769.24  *     770.41  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.19  *      38.99  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.23  *       4.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10533.05  *    7380.00  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.23  *
```

```
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *  121289.50  *   96526.16  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *      14.21  *      14.60  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *    1062.50  *     703.77  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  1266501.0  *  1058770.0  *
* Delta WS (ft)          *       0.25  * Top Width (ft)         *     741.16  *     675.32  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.61  * C & E Loss (ft)        *       0.02  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.68  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.44  *       3.11  *
*******************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     791.75  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     791.32  * E.G. Elev (ft)         *     791.73  *     791.67  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     791.36  *     791.05  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     773.59  *     773.58  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.44  *      43.19  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.15  *       4.43  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   14127.25  *   10055.90  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  174784.20  *  134751.80  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *      14.79  *      12.40  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *    1381.61  *    1188.46  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  1672983.0  *  1366909.0  *
* Delta WS (ft)          *       0.42  * Top Width (ft)         *     954.87  *     810.98  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.43  * C & E Loss (ft)        *       0.02  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.56  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.42  *       2.48  *
*******************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*******************************************************************************************
* E.G. US. (ft)          *     794.64  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     794.19  * E.G. Elev (ft)         *     794.61  *     794.55  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     794.23  *     793.93  *
* Q Bridge (cfs)         *   53690.00  * Crit W.S. (ft)         *     775.12  *     775.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.31  *      46.07  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.15  *       4.21  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   17021.53  *   12740.36  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  220793.10  *  168971.10  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *      16.57  *      12.65  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *    1535.37  *    1463.14  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  2005225.0  *  1645811.0  *
* Delta WS (ft)          *       0.47  * Top Width (ft)         *    1075.35  *    1030.78  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.21  * C & E Loss (ft)        *       0.02  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.50  *       0.58  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.57  *       2.44  *
*******************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
```

```
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     797.11  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     796.66  * E.G. Elev (ft)         *     797.09  *     797.03  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     796.71  *     796.42  *
* Q Bridge (cfs)         *   62000.00  * Crit W.S. (ft)         *     776.32  *     776.76  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      48.78  *      48.56  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.17  *       4.06  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   19581.05  *   15268.80  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  267151.30  *  205131.00  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *      18.76  *      14.96  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *    1626.53  *    1547.81  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  2322732.0  *  1929967.0  *
* Delta WS (ft)          *       0.42  * Top Width (ft)         *    1356.28  *    1329.83  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.06  * C & E Loss (ft)        *       0.02  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.54  *       0.64  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.70  *       2.58  *
*********************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     800.51  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     800.06  * E.G. Elev (ft)         *     800.49  *     800.44  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     800.10  *     799.85  *
* Q Bridge (cfs)         *   74720.00  * Crit W.S. (ft)         *     777.94  *     778.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      52.18  *      51.99  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.23  *       3.97  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   23158.05  *   18798.64  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  341562.30  *  265434.70  *
* Min El Weir Flow (ft)  *     811.91  * Hydr Depth (ft)        *      21.82  *      18.14  *
* Min El Prs (ft)        *     825.80  * W.P. Total (ft)        *    1747.62  *    1661.85  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  2795306.0  *  2366380.0  *
* Delta WS (ft)          *       0.37  * Top Width (ft)         *    1395.13  *    1369.31  *
* BR Open Area (sq ft)   *   37683.40  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       3.97  * C & E Loss (ft)        *       0.02  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.59  *       0.70  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.91  *       2.80  *
*********************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     789.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     788.74  * E.G. Elev (ft)         *     789.12  *     789.06  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     788.75  *     788.47  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     772.22  *     772.03  *
```

* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 40.83	* 40.61 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 3.22	* 4.61 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 11799.37	* 8248.65 *
* Weir Submerg	*	* Froude # Chl	* 0.19	* 0.23 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 140204.80	* 110043.90 *
* Min El Weir Flow (ft)	* 811.91	* Hydr Depth (ft)	* 14.79	* 15.11 *
* Min El Prs (ft)	* 825.80	* W.P. Total (ft)	* 1158.18	* 763.80 *
* Delta EG (ft)	* 0.07	* Conv. Total (cfs)	* 1412661.0	* 1172918.0 *
* Delta WS (ft)	* 0.27	* Top Width (ft)	* 797.99	* 717.59 *
* BR Open Area (sq ft)	* 37683.40	* Frctn Loss (ft)	* 0.03	* 0.00 *
* BR Open Vel (ft/s)	* 4.61	* C & E Loss (ft)	* 0.02	* 0.00 *
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.46	* 0.71 *
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	* 1.48	* 3.26 *

Warning: The Yarnell method gave an invalid answer. The upstream energy was less than the downstream energy. The program defaulted to the next valid (user selected) method. If the Yarnell method was the only one selected, the program will default to an energy based solution.
Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This is not physically possible, the momentum answer has been disregarded.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.243

INPUT
Description: D/S of 71 Hwy NB Bridge. Dodson XS 19.860
Station Elevation Data num= 420

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	837.06	4.79	836.95	7.95	836.87	15.8	836.68	26.07	836.44
43.51	836.02	44.47	836	47.54	835.94	52.91	835.84	53.61	835.82
65.66	835.58	67.85	835.54	78.66	835.32	82.49	835.25	89.47	835.11
95.51	834.99	101.22	834.88	111.41	834.67	118.77	834.53	130.35	834.3
147.74	833.95	151.4	833.82	167.56	833.47	174.02	833.43	178.69	829.15
183.67	824.85	212.58	810.72	218.65	807.67	228.54	802.76	245.55	797.04
247.86	796.23	251.5	795.85	276.9	794.02	285.4	793.99	295.56	793.32
298.44	793.09	300.67	793.12	302.64	793.18	304.16	793.31	315.21	794.45
359.54	794.95	363.15	794.98	365.65	794.9	391.22	794.28	397.44	794.2
411.13	793.97	428.26	794.16	430.25	794.2	431.26	794.3	433.79	794.55
440.38	795.22	443.71	795.53	448.03	795.54	449.4	795.54	451.45	795.47
455.9	795.34	459.47	795.42	461.54	795.46	463.31	795.46	467.7	795.47
476.4	795.21	480.07	795.1	483.48	795.01	489.56	794.91	503.81	794.76
517.66	795.07	552.95	795.94	553.92	795.96	554.31	795.97	554.68	796.07
564.24	798.26	577.85	801.97	599.53	808.36	635.09	820.47	640.52	825.34
641.73	826.56	642.25	826.56	650.6	826.61	652.88	826.64	656.09	826.55
662.96	826.56	665.8	826.46	673.9	826.23	677.48	826.14	685.49	825.92
690.92	825.78	701.37	825.49	703.16	825.46	712.99	825.19	719.48	825.08
729.22	824.81	738.26	824.57	746.82	824.42	758.36	824.11	768.12	823.94
790.01	823.58	799.48	823.47	808.1	823.33	817.07	823.18	823.83	823.09
832.96	822.94	842.46	822.78	845.83	822.74	858.9	822.52	864.13	822.46
883.27	822.2	884.34	822.2	884.84	822.19	887	822.16	898.84	821.92
902.04	821.88	915.63	821.61	931.36	821.3	938.92	821.19	951.41	821.02
956.69	820.94	968.79	820.77	976.19	820.66	987.92	820.5	999.14	820.34
1007.08	820.22	1015.97	820.09	1025.6	819.94	1034.22	819.82	1036.71	819.82
1052.75	819.72	1061.17	819.72	1073.37	819.64	1081.26	819.64	1093.8	819.55
1101.29	819.55	1117.09	819.43	1120.53	819.37	1131.81	819.29	1137.92	819.18
1149.63	819.11	1150.45	819.09	1165.19	819	1169.93	818.92	1185.17	818.83
1185.99	818.82	1202.07	818.72	1205.12	818.67	1221.5	818.59	1232.97	818.52
1234.35	818.5	1249.23	818.32	1267.07	818.05	1269.82	818.01	1270.78	818
1284.98	817.79	1286.62	817.76	1299.53	817.57	1301.79	817.53	1304.26	817.5
1316.32	817.32	1320.79	817.25	1331.76	817.08	1337.25	817	1350.14	816.81
1354.41	816.74	1359.39	816.67	1373.36	816.48	1382.05	816.36	1392.28	816.22
1401.87	816.09	1415.85	815.9	1419.87	815.84	1431.7	815.68	1437.51	815.65
1447.17	815.49	1463.39	815.23	1463.42	815.23	1463.44	815.23	1463.59	815.23
1497.59	814.69	1499.33	814.66	1515.69	814.4	1519.6	814.33	1523.86	814.25
1538.59	814.02	1543.64	813.93	1552.14	813.79	1556.19	813.72	1567.09	813.58
1568.29	813.55	1578.28	813.42	1581.84	813.37	1582.93	813.36	1592.14	813.23
1597.27	813.16	1605.53	813.05	1612.45	812.96	1619.29	812.87	1627.55	812.76

1632.72	812.69	1636.96	812.63	1646.46	812.5	1647.33	812.49	1649.58	812.46
1665.46	812.24	1666.54	812.23	1679.9	812.05	1679.91	812.05	1679.93	812.05
1680.06	812.05	1694.63	812.01	1695.58	811.99	1710.11	811.94	1711.69	811.97
1725.64	811.94	1727.34	811.94	1735.78	811.92	1742.36	811.91	1748.38	811.9
1750.43	811.9	1752.5	811.9	1758.92	811.91	1766.4	811.91	1773.99	811.91
1779.73	811.92	1788.95	811.93	1793.69	811.93	1803.03	811.93	1807.61	811.94
1821.89	811.95	1827.32	811.95	1838.44	812.01	1843.67	812.02	1854.93	812.08
1859.98	812.09	1870.01	812.14	1880.2	812.2	1885	812.21	1897.47	812.27
1904.31	812.32	1914.67	812.38	1925.19	812.44	1930.85	812.48	1943.18	812.54
1955.72	812.61	1960.99	812.65	1969.38	812.69	1982.65	812.7	1986.37	812.73
1999.79	812.74	2003.3	812.76	2015.88	812.77	2022.08	812.81	2034.68	812.81
2048.58	812.82	2051.39	812.83	2065.4	812.84	2067.99	812.85	2082.17	812.85
2090.64	812.85	2093.43	812.86	2108.12	812.87	2110.62	812.88	2129.42	813.01
2131.06	813.01	2150.4	813.15	2153.64	813.16	2193	813.44	2193.22	813.44
2208.85	813.55	2213.36	813.59	2213.44	813.59	2229.52	813.71	2229.91	813.71
2245.34	813.83	2246.13	813.83	2246.89	813.84	2263.12	813.97	2264.02	813.98
2264.63	813.99	2280.63	814.12	2281.33	814.13	2293.53	814.23	2295.08	814.24
2307.14	814.34	2308.7	814.36	2315.88	814.42	2316.43	814.42	2317.85	814.41
2322.33	814.34	2334.6	814.22	2338.63	807.94	2338.77	807.71	2339.55	807.46
2379.39	792.73	2391.31	790.39	2393.37	789.97	2403.8	792.27	2404.06	792.33
2404.65	792.34	2412.47	792.4	2422.59	792.55	2426.85	792.62	2428.9	792.62
2436.43	792.61	2437.43	792.59	2445.99	792.39	2452.06	792.16	2452.25	792.15
2460.4	791.83	2477.44	788.99	2489.69	787.28	2506.23	786.73	2532.66	786.23
2556.31	786.48	2584.08	786.55	2637.97	786.4	2653.97	786.49	2667.14	786.5
2675.33	787.17	2677.67	787.21	2689.85	787.14	2703.97	778.12	2714.97	771.01
2715.58	770.75	2726.14	766.28	2734.89	762.47	2750.94	756.57	2751.29	756.4
2751.4	756.35	2760.27	753.44	2767	748.86	2787	747.86	2807	748.86
2814.56	753.04	2818.56	755.55	2822.09	757.07	2825.83	759.15	2836.87	765.27
2837.4	765.59	2840.06	766.9	2842.42	768.06	2848.16	769.94	2852.26	770.48
2852.29	770.48	2860.93	770.5	2863.45	770.5	2881.8	770.79	2885.09	770.84
2887.79	770.88	2897.76	770.59	2902.67	770.27	2915.87	769.41	2923.54	769.43
2936.55	769.45	2944.4	769.29	2949	769.2	2954.68	769.19	2965.27	769.12
2968.2	769.1	2981.38	769.11	2986.14	769.18	3007.01	769.46	3007.98	769.47
3012.8	769.52	3027.88	769.74	3029.22	769.76	3045.34	769.45	3048.74	769.37
3053.34	769.27	3069.61	769.13	3078.54	769.05	3087.32	769.14	3090.48	769.07
3099.02	768.9	3106.59	768.83	3111.35	768.87	3118.8	768.95	3132.22	769.29
3135.34	769.37	3138.49	769.71	3151.97	770.98	3153.08	771.29	3155.68	772.03
3156.58	772.42	3156.94	772.52	3163.15	773.99	3168.02	776.24	3169.37	776.89
3173.95	777.1	3175.33	777.15	3189.59	778.01	3194.82	778.14	3195.91	778.16
3213.85	778.86	3215.69	778.91	3221.3	779.03	3233.38	789.28	3234.3	790.03
3235.55	790.29	3236.56	790.28	3258.85	789.99	3264.93	790.24	3269.6	790.31
3278.92	790.47	3291.98	791.05	3298.02	791.15	3304.37	791.27	3329.23	791.74
3348.68	792.3	3354.19	792.55	3356.58	792.66	3356.88	792.69	3361.85	793.19
3363.28	793.12	3392.04	792.02	3402.01	791.41	3404.14	791.18	3419.45	788.83
3444.3	797.44	3465.85	804.91	3503.12	816.38	3516.18	816.11	3537.47	815.72

```
Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .075 2689.85    .042 2848.16     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2689.85 2848.16           225.03  369.51  265.46              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1000     820       F
  3049.6 3537.47  789.19       T

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  775.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.33  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)          *  775.64  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)          *  761.00  * Flow Area (sq ft)      *          * 2543.41  * 1190.67  *
* E.G. Slope (ft/ft)      *0.000429  * Area (sq ft)           *          * 2543.41  * 1881.95  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *          *12202.50  *  997.51  *
* Top Width (ft)          *  458.93  * Top Width (ft)          *          *  140.36  *  318.57  *
* Vel Total (ft/s)        *    3.54  * Avg. Vel. (ft/s)       *          *    4.80  *    0.84  *
* Max Chl Dpth (ft)       *   27.78  * Hydr. Depth (ft)        *          *   18.12  *    5.91  *
* Conv. Total (cfs)       *637616.3  * Conv. (cfs)             *          *589432.5  * 48183.8  *
* Length Wtd. (ft)        *  359.19  * Wetted Per. (ft)        *          *  151.71  *  201.53  *
* Min Ch El (ft)          *  747.86  * Shear (lb/sq ft)        *          *    0.45  *    0.16  *
* Alpha                   *    1.71  * Stream Power (lb/ft s) *          *    2.15  *    0.13  *
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)   *  512.93  * 5313.57  *  524.22  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   84.39  *  410.24  *  107.49  *
*****************************************************************************************
```

```
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  780.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  780.23  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  764.23  * Flow Area (sq ft)      *          * 3203.45  * 2114.52  *
* E.G. Slope (ft/ft)     *0.000447  * Area (sq ft)           *          * 3203.45  * 3465.20  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *17647.79  * 2652.21  *
* Top Width (ft)         *  522.05  * Top Width (ft)         *          *  147.49  *  374.56  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *          *    5.51  *    1.25  *
* Max Chl Dpth (ft)      *   32.37  * Hydr. Depth (ft)       *          *   21.72  *   10.50  *
* Conv. Total (cfs)      *960489.1  * Conv. (cfs)            *          *835000.8  *125488.4  *
* Length Wtd. (ft)       *  353.27  * Wetted Per. (ft)       *          *  160.19  *  201.53  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *          *    0.56  *    0.29  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *          *    3.07  *    0.37  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  931.39  * 7100.79  * 1027.08  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  123.29  *  449.84  *  146.92  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  783.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  783.39  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  766.49  * Flow Area (sq ft)      *          * 3676.75  * 2750.28  *
* E.G. Slope (ft/ft)     *0.000465  * Area (sq ft)           *          * 3676.75  * 4653.19  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *22124.95  * 4195.05  *
* Top Width (ft)         *  530.71  * Top Width (ft)         *          *  152.43  *  378.27  *
* Vel Total (ft/s)       *    4.10  * Avg. Vel. (ft/s)       *          *    6.02  *    1.53  *
* Max Chl Dpth (ft)      *   35.53  * Hydr. Depth (ft)       *          *   24.12  *   13.65  *
* Conv. Total (cfs)      *1220189.0  * Conv. (cfs)            *          *1025707.0  *194481.5  *
* Length Wtd. (ft)       *  350.09  * Wetted Per. (ft)       *          *  166.05  *  201.53  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *          *    0.64  *    0.40  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *          *    3.87  *    0.60  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 1300.09  * 8562.31  * 1548.44  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  152.54  *  477.75  *  221.73  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  787.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  786.85  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  769.06  * Flow Area (sq ft)      *   63.40  * 4214.28  * 3448.20  *
* E.G. Slope (ft/ft)     *0.000488  * Area (sq ft)           *   63.40  * 4214.28  * 5970.86  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *   14.44  *27724.42  * 6261.15  *
* Top Width (ft)         *  709.09  * Top Width (ft)         *  168.87  *  157.86  *  382.36  *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)       *    0.23  *    6.58  *    1.82  *
* Max Chl Dpth (ft)      *   38.99  * Hydr. Depth (ft)       *    0.38  *   26.70  *   17.12  *
* Conv. Total (cfs)      *1539559.0  * Conv. (cfs)            *   653.7  *1255393.0  *283511.8  *
* Length Wtd. (ft)       *  347.53  * Wetted Per. (ft)       *  168.89  *  172.49  *  201.53  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *    0.01  *    0.74  *    0.52  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.00  *    4.89  *    0.95  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 1835.34  *10088.61  * 2364.76  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  220.73  *  500.59  *  309.34  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  791.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  790.89  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  772.96  * Flow Area (sq ft)      *  913.20  * 4854.19  * 4625.71  *
* E.G. Slope (ft/ft)     *0.000547  * Area (sq ft)           *  913.20  * 4854.19  * 7578.66  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 1072.54  *37086.68  * 6340.77  *
* Top Width (ft)         *  850.69  * Top Width (ft)         *  232.66  *  158.31  *  459.72  *
* Vel Total (ft/s)       *    4.28  * Avg. Vel. (ft/s)       *    1.17  *    7.64  *    1.37  *
* Max Chl Dpth (ft)      *   43.03  * Hydr. Depth (ft)       *    3.93  *   30.66  *   10.06  *
* Conv. Total (cfs)      *1902600.0  * Conv. (cfs)           * 45856.6  *1585643.0  *271100.1  *
* Length Wtd. (ft)       *  346.26  * Wetted Per. (ft)       *  233.17  *  173.02  *  465.59  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *    0.13  *    0.96  *    0.34  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    0.16  *    7.32  *    0.47  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 3142.96  *12476.88  * 4391.63  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  460.78  *  528.61  *  679.60  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  794.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  793.72  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  774.82  * Flow Area (sq ft)      * 1690.27  * 5301.20  * 6140.78  *
* E.G. Slope (ft/ft)     *0.000544  * Area (sq ft)           * 1696.96  * 5301.20  * 9095.54  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 2398.85  *42850.76  * 8440.39  *
* Top Width (ft)         * 1075.43  * Top Width (ft)         *  331.72  *  158.31  *  585.40  *
* Vel Total (ft/s)       *    4.09  * Avg. Vel. (ft/s)       *    1.42  *    8.08  *    1.37  *
* Max Chl Dpth (ft)      *   45.86  * Hydr. Depth (ft)       *    5.40  *   33.49  *   10.49  *
* Conv. Total (cfs)      *2300923.0  * Conv. (cfs)           *102804.5  *1836400.0  *361718.7  *
* Length Wtd. (ft)       *  345.71  * Wetted Per. (ft)       *  314.25  *  173.02  *  591.87  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *    0.18  *    1.04  *    0.35  *
* Alpha                  *    3.14  * Stream Power (lb/ft s) *    0.26  *    8.42  *    0.48  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 4642.90  *13895.56  * 6588.29  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  667.41  *  535.71  * 1043.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  797.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.24  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  776.27  * Flow Area (sq ft)      * 2489.19  * 5700.75  * 7626.13  *
* E.G. Slope (ft/ft)     *0.000497  * Area (sq ft)           * 2948.55  * 5700.75  *10582.20  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 4303.68  *46222.37  *11473.95  *
* Top Width (ft)         * 1378.55  * Top Width (ft)         *  627.56  *  158.31  *  592.68  *
* Vel Total (ft/s)       *    3.92  * Avg. Vel. (ft/s)       *    1.73  *    8.11  *    1.50  *
* Max Chl Dpth (ft)      *   48.38  * Hydr. Depth (ft)       *    7.78  *   36.01  *   12.87  *
* Conv. Total (cfs)      *2780376.0  * Conv. (cfs)           *192997.7  *2072832.0  *514546.6  *
* Length Wtd. (ft)       *  342.08  * Wetted Per. (ft)       *  321.53  *  173.02  *  599.58  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *    0.24  *    1.02  *    0.39  *
* Alpha                  *    3.23  * Stream Power (lb/ft s) *    0.42  *    8.29  *    0.59  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 5986.13  *14806.79  * 8672.40  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  816.74  *  536.91  * 1399.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  800.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  799.69  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  778.24  * Flow Area (sq ft)      * 3609.31  * 6247.00  * 9687.73  *
```

```
* E.G. Slope (ft/ft)     *0.000450  * Area (sq ft)           * 5172.73  * 6247.00  *12644.42  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 7449.70  *51199.24  *16071.07  *
* Top Width (ft)         * 1422.07  * Top Width (ft)         *  661.12  *  158.31  *  602.64  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *    2.06  *    8.20  *    1.66  *
* Max Chl Dpth (ft)      *   51.83  * Hydr. Depth (ft)       *   10.96  *   39.46  *   16.08  *
* Conv. Total (cfs)      *3523463.0  * Conv. (cfs)            *351294.5  *2414328.0  *757840.1  *
* Length Wtd. (ft)       *  334.25  * Wetted Per. (ft)       *  331.48  *  173.02  *  610.11  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *    0.31  *    1.01  *    0.45  *
* Alpha                  *    3.22  * Stream Power (lb/ft s) *    0.63  *    8.31  *    0.74  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 8457.66  *16206.93  *12684.02  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1012.00  *  539.00  * 1757.06  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  789.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  788.47  * Reach Len. (ft)        *  225.03  *  369.51  *  265.46  *
* Crit W.S. (ft)         *  771.29  * Flow Area (sq ft)      *  384.41  * 4470.50  * 3774.31  *
* E.G. Slope (ft/ft)     *0.000486  * Area (sq ft)           *  384.41  * 4470.50  * 6591.40  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  252.25  *30480.12  * 7267.63  *
* Top Width (ft)         *  751.27  * Top Width (ft)         *  208.69  *  158.31  *  384.27  *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)       *    0.66  *    6.82  *    1.93  *
* Max Chl Dpth (ft)      *   40.61  * Hydr. Depth (ft)       *    1.84  *   28.24  *   18.74  *
* Conv. Total (cfs)      *1723338.0  * Conv. (cfs)            * 11439.8  *1382304.0  *329594.5  *
* Length Wtd. (ft)       *  345.95  * Wetted Per. (ft)       *  208.82  *  173.02  *  201.53  *
* Min Ch El (ft)         *  747.86  * Shear (lb/sq ft)       *    0.06  *    0.78  *    0.57  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    0.04  *    5.35  *    1.09  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 2199.59  *10892.26  * 2888.61  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  279.35  *  510.97  *  374.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 18.173

INPUT
Description: U/S of 87th St Bridge.  Dodson XS 19.793
Station Elevation Data    num=     453
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  837.85   10.32  837.66   16.46  837.54   27.72  837.33   39.03  837.12
   45.46     837   55.11  836.85   59.89  836.77    75.6  836.53    76.8  836.51
   82.92  836.42   92.73  836.26   93.71  836.24   95.61  836.21  112.57  835.92
  117.22  835.85   137.2  835.51  149.29  835.31  149.87   835.3  161.12  834.89
  168.82  834.63  172.21  831.81  180.34  824.81  205.29  812.62  225.98  802.76
  230.68  801.49  246.41  796.28  266.79  795.05  282.49  794.09  291.02  793.27
  296.19  792.87  298.97  792.97  298.99  792.97  306.63  793.98  311.86  794.52
  328.64  794.71  359.14  794.97  380.15  794.32  388.42  794.11  409.66  793.86
  415.37  794.02  429.24  794.28   440.1  795.39  441.09   795.5  441.63   795.5
  443.12   795.5  446.79   795.5  450.82  795.41  453.79  795.33  457.24  795.41
  459.11  795.45  462.84  795.45  465.29  795.45  471.13  795.25  480.93  794.96
  486.94  794.97  500.95  794.83  532.01  795.52  551.22  795.99  559.38  797.57
  563.95  798.15  569.91  799.81   576.4  802.07  611.54  812.42   636.4  820.87
  640.21  824.29  643.46  827.54  650.38  827.63  667.78  827.75  671.05  827.79
   680.9  827.55  688.75  827.35  695.46  827.19  700.35  827.07  707.33   826.9
  711.71  826.79  718.95  826.62  726.61  826.43  730.43  826.34  737.67  826.16
  740.05   826.1  747.53  825.92  749.63  825.87  764.56  825.51  766.33  825.46
  772.89  825.36  801.74   824.9  804.94  824.85  813.29  824.72  816.97  824.66
  824.36  824.55  828.48  824.48  833.01  824.41   839.5  824.31   844.1  824.23
  849.71  824.15  854.63  824.07  863.51  823.93  867.83  823.86  883.03  823.76
  886.06  823.73   887.1  823.72  898.55  823.53  901.56  823.48  905.43   823.4
  916.62  823.21  922.83  823.09   930.6  822.96  938.93   822.8  944.73   822.7
  950.74   822.6   962.6  822.42  967.33  822.35  980.52  822.14  992.31  821.96
  995.04  821.91  996.26  821.89 1008.39  821.71 1009.14  821.69 1024.27  821.46
 1024.44  821.46  1024.6  821.45 1028.42  821.39  1039.8  821.21 1040.26   821.2
 1060.24     821  1060.4     821 1064.78  820.95 1070.01   820.9 1070.12  820.89
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 1079.63  820.79 1079.94  820.79 1089.26  820.69  1098.2  820.59 1099.35  820.58
 1111.56  820.44 1112.93  820.43 1124.77   820.3 1126.53  820.27 1138.95  820.14
 1141.46   820.1 1153.46  819.97 1156.46  819.93 1170.03  819.78  1172.1  819.75
 1174.26  819.72 1187.22  819.57 1189.64  819.54 1192.16   819.5 1204.06  819.37
 1206.43  819.34 1208.88   819.3 1220.17  819.17 1225.44   819.1  1231.8  819.02
 1236.15  818.96 1242.32  818.89 1258.47  818.63 1278.47  818.32 1283.07  818.24
 1292.01   818.1 1296.05  818.04 1300.92  817.96 1306.17  817.88 1309.58  817.83
 1315.74  817.73 1318.65  817.68 1325.11  817.58 1328.48  817.53 1335.14  817.42
 1342.34  817.31 1344.56  817.27 1357.74  817.06 1358.54  817.05 1363.15  816.98
  1363.7  816.97 1381.21  816.68 1381.23  816.68 1381.62  816.67 1398.58  816.38
 1398.98  816.37 1416.09  816.08 1416.88  816.07 1440.11  815.67 1441.68  815.64
 1464.37  815.25 1469.86  815.16 1472.15  815.12  1504.1  814.58 1507.18  814.53
 1514.61  814.38 1531.13  814.07 1532.24  814.05 1540.52  813.89 1545.31   813.8
 1548.82  813.74 1549.72  813.72 1559.54  813.55 1561.48  813.52 1569.78  813.37
 1572.63  813.32 1585.95  813.09 1593.16  812.99 1594.82  812.96 1605.48  812.78
  1612.6  812.68 1618.85  812.59 1629.53  812.42 1629.92  812.41 1636.18  812.29
 1654.93  811.91 1661.03  811.79 1667.36  811.67 1683.88  811.38 1688.13   811.3
 1692.14  811.27 1709.74  810.96 1713.76  810.93 1717.99  810.99 1725.74  810.86
 1728.05  810.61 1730.42  810.58 1731.07  810.62 1744.11  810.36 1746.38  810.32
 1749.58  810.06 1753.48  809.97  1759.2  809.84 1762.74  809.77 1763.96  809.73
 1767.51  809.65 1771.36  809.53 1776.66  809.41 1781.96  809.29 1784.27  809.22
 1788.82  809.11 1790.93  809.05  1795.5  808.95 1797.58  808.88 1803.07  808.69
 1804.08  808.66 1809.08  808.49 1812.11  808.39 1816.91  808.23  1820.2  808.12
 1824.81  807.97  1829.2  807.83 1833.68  807.67  1838.3  807.53 1842.68  807.38
 1848.24  807.21 1856.55  806.93 1862.61  806.74 1870.33  806.48 1878.63  806.11
 1885.19  805.88 1894.16  805.48 1900.14  805.27 1914.06  804.64 1920.29  804.41
 1921.87  804.35 1926.46  804.18 1946.72  803.32 1950.07  803.19  1981.8  801.83
 1984.16  801.74  1985.9  801.67 2004.55  800.86 2008.68  800.74 2009.29  800.71
 2030.85  800.05 2033.32  799.94 2050.62  799.45 2054.72  799.25  2067.4  798.86
 2073.92  798.67  2081.2  798.45 2087.34  798.27 2101.56  797.85 2107.74  797.66
 2112.92  797.51  2128.5  797.05 2133.22  796.91 2137.19  796.79 2158.89  796.16
 2160.14  796.15 2163.89  796.12 2193.34  796.06 2195.11  796.05 2206.31  796.03
 2207.48  796.02 2208.18  796.02 2236.66  795.98 2250.47  795.93 2274.21  795.84
 2276.58   795.8 2323.73  794.94 2342.27  794.61 2343.23  794.56 2344.56  794.54
 2347.18  794.58 2358.93  794.27 2362.69   794.2  2378.9   792.6 2382.76   792.2
 2383.56  792.08 2383.98  792.16 2393.95  793.97 2398.02  794.17  2403.8  794.27
 2418.88  794.74 2426.14  794.73 2433.55  794.57 2444.95  794.13 2447.93  794.07
 2485.04  792.84 2492.04   792.2 2493.27  791.95 2501.74  791.51 2505.37  791.17
 2507.72  791.02 2524.66  790.51 2542.96  790.28 2545.76   790.3 2579.21  791.46
  2594.3  790.99 2616.27  790.95 2624.88  791.45 2644.53  792.11 2653.19  792.58
 2675.98  793.33 2684.57  793.44 2700.69  792.45 2703.96  792.73 2705.18   792.6
 2711.35  791.32 2722.52  789.99 2726.73  788.64 2728.72  787.99 2730.35  787.54
 2735.55  786.35 2737.75  785.55 2747.58   785.1 2755.24  784.76 2756.78  784.37
  2791.6  774.18 2802.08  772.15 2809.57  770.37 2818.62  769.24 2824.61  768.32
  2835.4  767.91 2856.56  767.09 2861.95  766.95 2875.41  766.27 2886.22  765.94
 2902.47  765.21 2912.79  764.74 2919.02  763.68 2934.07  761.64 2937.73  760.94
 2944.03  758.82 2947.99  757.85 2965.78  753.78 2970.47   752.6    2980  748.54
    3000  747.54    3025  748.54 3030.19  752.65 3037.66  755.65 3042.25  757.77
 3043.75  757.97 3050.48   759.3 3056.33  760.33  3067.2  764.06 3068.39   764.3
 3071.15  764.83 3073.67  765.07 3077.28  766.57 3079.52  767.48 3080.59  767.64
 3089.63  768.56 3116.49  770.62 3123.73  770.92 3127.19  771.56 3136.83  772.29
 3137.56  772.39 3138.62  772.59 3148.55  774.34 3150.59  775.11 3151.17  775.23
 3153.48  776.29 3155.89  777.25 3184.61  788.34 3197.17  792.67 3199.97  793.91
 3205.31  795.47 3214.98  798.52  3216.4  798.97 3220.84  799.87 3221.75  799.98
 3231.99  800.68 3247.89  801.85 3248.31   801.9 3254.95  802.03 3257.54   802.1
    3297  803.11 3311.25  803.19 3340.93  803.42 3349.05  803.45 3360.32  803.52
 3388.84  796.51  3393.2   795.4 3400.15  795.77 3403.61  795.97 3405.02  796.24
  3410.8  797.05 3432.91  797.86 3434.27  797.91 3434.61  797.91 3435.87  797.96
 3436.66  798.08 3454.96  799.42  3462.2  799.98 3462.69     800 3497.43   800.9
 3501.46   800.9 3504.27  801.02  3515.4  801.76 3520.47  802.05 3530.25  802.09
 3536.63  802.03 3539.34   805.7 3548.26  817.73 3550.35  817.81 3555.63  817.98
  3563.3  818.26 3565.53  818.33 3569.46  818.44 3579.23  820.17 3591.18  822.39
 3597.67  822.67 3602.93     823 3611.22  823.51 3617.44  823.86 3617.74  823.84
 3620.56  823.84 3621.26  823.98 3624.72  830.64  3633.5  843.16  3639.1  843.26
 3644.72  843.32  3656.6   843.5 3662.05  843.63

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .075 2912.79    .042 3079.52     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2912.79 3079.52            62.46   68.97   70.15              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1000     820       F
```

```
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3350    3540     801

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  775.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  775.64  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  759.87  * Flow Area (sq ft)      *  954.85  * 3309.48  *  355.52  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           *  954.85  * 3309.48  *  355.52  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1038.03  *11981.44  *  180.53  *
* Top Width (ft)         *  365.47  * Top Width (ft)         *  126.19  *  166.73  *   72.55  *
* Vel Total (ft/s)       *    2.86  * Avg. Vel. (ft/s)       *    1.09  *    3.62  *    0.51  *
* Max Chl Dpth (ft)      *   28.10  * Hydr. Depth (ft)       *    7.57  *   19.85  *    4.90  *
* Conv. Total (cfs)      *923160.3  * Conv. (cfs)            * 72596.3  *837938.6  * 12625.3  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  127.02  *  172.86  *   73.20  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.10  *    0.24  *    0.06  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.10  *    0.88  *    0.03  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  510.47  * 5288.74  *  517.40  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   84.07  *  408.94  *  106.30  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  780.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  780.24  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  762.76  * Flow Area (sq ft)      * 1570.69  * 4075.51  *  714.79  *
* E.G. Slope (ft/ft)     *0.000218  * Area (sq ft)           * 1570.69  * 4075.51  *  714.79  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 2265.42  *17497.09  *  537.49  *
* Top Width (ft)         *  392.73  * Top Width (ft)         *  141.89  *  166.73  *   84.11  *
* Vel Total (ft/s)       *    3.19  * Avg. Vel. (ft/s)       *    1.44  *    4.29  *    0.75  *
* Max Chl Dpth (ft)      *   32.70  * Hydr. Depth (ft)       *   11.07  *   24.44  *    8.50  *
* Conv. Total (cfs)      *1375453.0  * Conv. (cfs)           *153496.4  *1185538.0  * 36418.2  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  143.38  *  172.86  *   85.64  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.15  *    0.32  *    0.11  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *    0.21  *    1.38  *    0.09  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  927.34  * 7069.92  * 1014.35  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  122.92  *  448.51  *  145.52  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  783.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  783.40  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  764.76  * Flow Area (sq ft)      * 2036.25  * 4602.51  *  993.57  *
* E.G. Slope (ft/ft)     *0.000230  * Area (sq ft)           * 2036.25  * 4602.51  *  993.57  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 3410.90  *22013.32  *  895.77  *
* Top Width (ft)         *  411.71  * Top Width (ft)         *  152.69  *  166.73  *   92.29  *
* Vel Total (ft/s)       *    3.45  * Avg. Vel. (ft/s)       *    1.68  *    4.78  *    0.90  *
* Max Chl Dpth (ft)      *   35.86  * Hydr. Depth (ft)       *   13.34  *   27.60  *   10.77  *
* Conv. Total (cfs)      *1735953.0  * Conv. (cfs)           *224968.4  *1451903.0  * 59081.3  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  154.63  *  172.86  *   94.42  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.19  *    0.38  *    0.15  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    0.32  *    1.83  *    0.14  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1294.83  * 8527.19  * 1531.23  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  152.15  *  476.40  *  220.29  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.24  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  786.86  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  766.85  * Flow Area (sq ft)      * 2611.24  * 5180.19  * 1328.89  *
* E.G. Slope (ft/ft)     *0.000247  * Area (sq ft)           * 2611.24  * 5180.19  * 1328.89  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 4802.97  *27784.11  * 1412.92  *
* Top Width (ft)         *  447.48  * Top Width (ft)         *  179.48  *  166.73  *  101.27  *
* Vel Total (ft/s)       *    3.73  * Avg. Vel. (ft/s)       *    1.84  *    5.36  *    1.06  *
* Max Chl Dpth (ft)      *   39.32  * Hydr. Depth (ft)       *   14.55  *   31.07  *   13.12  *
* Conv. Total (cfs)      *2163743.0  * Conv. (cfs)           *305658.7  *1768166.0  * 89917.8  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  181.83  *  172.86  *  104.03  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.22  *    0.46  *    0.20  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *    0.41  *    2.48  *    0.21  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 1828.43  *10048.77  * 2342.51  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  219.83  *  499.22  *  307.87  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  791.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  790.98  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  769.37  * Flow Area (sq ft)      * 3406.57  * 5866.79  * 1768.96  *
* E.G. Slope (ft/ft)     *0.000262  * Area (sq ft)           * 3406.57  * 5866.79  * 1768.96  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 7116.94  *35206.44  * 2176.62  *
* Top Width (ft)         *  552.34  * Top Width (ft)         *  272.86  *  166.73  *  112.75  *
* Vel Total (ft/s)       *    4.03  * Avg. Vel. (ft/s)       *    2.09  *    6.00  *    1.23  *
* Max Chl Dpth (ft)      *   43.44  * Hydr. Depth (ft)       *   12.48  *   35.19  *   15.69  *
* Conv. Total (cfs)      *2750126.0  * Conv. (cfs)           *439831.2  *2175779.0  *134516.5  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  275.74  *  172.86  *  116.24  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.20  *    0.55  *    0.25  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.42  *    3.33  *    0.31  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 3131.80  *12431.41  * 4363.14  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  459.48  *  527.23  *  677.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  794.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  793.72  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  771.17  * Flow Area (sq ft)      * 4443.79  * 6323.94  * 2088.65  *
* E.G. Slope (ft/ft)     *0.000313  * Area (sq ft)           * 4452.63  * 6323.94  * 2088.65  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 7044.60  *43637.95  * 3007.45  *
* Top Width (ft)         *  784.62  * Top Width (ft)         *  497.86  *  166.73  *  120.03  *
* Vel Total (ft/s)       *    4.18  * Avg. Vel. (ft/s)       *    1.59  *    6.90  *    1.44  *
* Max Chl Dpth (ft)      *   46.18  * Hydr. Depth (ft)       *    9.27  *   37.93  *   17.40  *
* Conv. Total (cfs)      *3033577.0  * Conv. (cfs)           *398032.0  *2465619.0  *169926.2  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  482.95  *  172.86  *  124.02  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.18  *    0.72  *    0.33  *
* Alpha                  *    2.24  * Stream Power (lb/ft s) *    0.29  *    4.94  *    0.47  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 4627.01  *13846.26  * 6554.21  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  665.27  *  534.33  * 1041.04  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  796.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.16  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
```

```
* Crit W.S. (ft)         *  772.52  * Flow Area (sq ft)      * 5856.11  * 6729.44  * 2390.12  *
* E.G. Slope (ft/ft)     *0.000334  * Area (sq ft)           * 6278.32  * 6729.44  * 2390.12  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 8295.08  *49981.13  * 3723.79  *
* Top Width (ft)         * 1351.62  * Top Width (ft)         * 1056.92  *  166.73  *  127.96  *
* Vel Total (ft/s)       *    4.14  * Avg. Vel. (ft/s)       *    1.42  *    7.43  *    1.56  *
* Max Chl Dpth (ft)      *   48.62  * Hydr. Depth (ft)       *    7.77  *   40.36  *   18.68  *
* Conv. Total (cfs)      *3392319.0  * Conv. (cfs)           *453863.6  *2734709.0  *203746.3  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  756.90  *  172.86  *  132.32  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.16  *    0.81  *    0.38  *
* Alpha                  *    2.62  * Stream Power (lb/ft s) *    0.23  *    6.03  *    0.59  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 5962.30  *14754.07  * 8632.87  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  812.39  *  535.53  * 1397.04  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  800.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  799.59  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  774.57  * Flow Area (sq ft)      * 8645.88  * 7302.40  * 2848.92  *
* E.G. Slope (ft/ft)     *0.000319  * Area (sq ft)           *10166.50  * 7302.40  * 2848.92  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *14137.79  *55988.77  * 4593.44  *
* Top Width (ft)         * 1506.57  * Top Width (ft)         * 1199.89  *  166.73  *  139.95  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *    1.64  *    7.67  *    1.61  *
* Max Chl Dpth (ft)      *   52.05  * Hydr. Depth (ft)       *    9.97  *   43.80  *   20.36  *
* Conv. Total (cfs)      *4182074.0  * Conv. (cfs)           *791290.9  *3133688.0  *257094.6  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  870.80  *  172.86  *  144.80  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.20  *    0.84  *    0.39  *
* Alpha                  *    2.83  * Stream Power (lb/ft s) *    0.32  *    6.45  *    0.63  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 8418.04  *16149.46  *12636.82  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         * 1007.19  *  537.62  * 1754.80  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  788.89  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  788.48  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  767.85  * Flow Area (sq ft)      * 2907.08  * 5450.07  * 1496.21  *
* E.G. Slope (ft/ft)     *0.000253  * Area (sq ft)           * 2907.08  * 5450.07  * 1496.21  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 5685.50  *30619.97  * 1694.52  *
* Top Width (ft)         *  457.81  * Top Width (ft)         *  185.58  *  166.73  *  105.50  *
* Vel Total (ft/s)       *    3.86  * Avg. Vel. (ft/s)       *    1.96  *    5.62  *    1.13  *
* Max Chl Dpth (ft)      *   40.94  * Hydr. Depth (ft)       *   15.67  *   32.69  *   14.18  *
* Conv. Total (cfs)      *2388153.0  * Conv. (cfs)           *357311.7  *1924347.0  *106494.3  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *  188.14  *  172.86  *  108.57  *
* Min Ch El (ft)         *  747.54  * Shear (lb/sq ft)       *    0.24  *    0.50  *    0.22  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.48  *    2.80  *    0.25  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 2191.09  *10850.18  * 2863.96  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  278.33  *  509.59  *  372.94  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 18.166

INPUT
```

Description: 87th Street Bridge. Bridge geometry copied from Dodson RAS Model.

Distance from Upstream XS = 15
Deck/Roadway Width = 51
Weir Coefficient = 2.63
Upstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
165	834.65	829.65	650	827.5	822.5	700	790	780
2300	794.25	785	2400	795.4	785	2705	798.9	790
2705	798.9	793.4	3220	802.4	796.9	3305	803.2	790
3540	804	790						

Upstream Bridge Cross Section Data
Station Elevation Data num= 453

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	837.85	10.32	837.66	16.46	837.54	27.72	837.33	39.03	837.12
45.46	837	55.11	836.85	59.89	836.77	75.6	836.53	76.8	836.51
82.92	836.42	92.73	836.26	93.71	836.24	95.61	836.21	112.57	835.92
117.22	835.85	137.2	835.51	149.29	835.31	149.87	835.3	161.12	834.89
168.82	834.63	172.21	831.81	180.34	824.81	205.29	812.62	225.98	802.76
230.68	801.49	246.41	796.28	266.79	795.05	282.49	794.09	291.02	793.27
296.19	792.87	298.97	792.97	298.99	792.97	306.63	793.98	311.86	794.52
328.64	794.71	359.14	794.97	380.15	794.32	388.42	794.11	409.66	793.86
415.37	794.02	429.24	794.28	440.1	795.39	441.09	795.5	441.63	795.5
443.12	795.5	446.79	795.5	450.82	795.41	453.79	795.33	457.24	795.41
459.11	795.45	462.84	795.45	465.29	795.45	471.13	795.25	480.93	794.96
486.94	794.97	500.95	794.83	532.01	795.52	551.22	795.99	559.38	797.57
563.95	798.15	569.91	799.81	576.4	802.07	611.54	812.42	636.4	820.87
640.21	824.29	643.46	827.54	650.38	827.63	667.78	827.75	671.05	827.79
680.9	827.55	688.75	827.35	695.46	827.19	700.35	827.07	707.33	826.9
711.71	826.79	718.95	826.62	726.61	826.43	730.43	826.34	737.67	826.16
740.05	826.1	747.53	825.92	749.63	825.87	764.56	825.51	766.33	825.46
772.89	825.36	801.74	824.9	804.94	824.85	813.29	824.72	816.97	824.66
824.36	824.55	828.48	824.48	833.01	824.41	839.5	824.31	844.1	824.23
849.71	824.15	854.63	824.07	863.51	823.93	867.83	823.86	883.03	823.76
886.06	823.73	887.1	823.72	898.55	823.53	901.56	823.48	905.43	823.4
916.62	823.21	922.83	823.09	930.6	822.96	938.93	822.8	944.73	822.7
950.74	822.6	962.6	822.42	967.33	822.35	980.52	822.14	992.31	821.96
995.04	821.91	996.26	821.89	1008.39	821.71	1009.14	821.69	1024.27	821.46
1024.44	821.46	1024.6	821.45	1028.42	821.39	1039.8	821.21	1040.26	821.2
1060.24	821	1060.4	821	1064.78	820.95	1070.01	820.9	1070.12	820.89
1079.63	820.79	1079.94	820.79	1089.26	820.69	1098.2	820.59	1099.35	820.58
1111.56	820.44	1112.93	820.43	1124.77	820.3	1126.53	820.27	1138.95	820.14
1141.46	820.1	1153.46	819.97	1156.46	819.93	1170.03	819.78	1172.1	819.75
1174.26	819.72	1187.22	819.57	1189.64	819.54	1192.16	819.5	1204.06	819.37
1206.43	819.34	1208.88	819.3	1220.17	819.17	1225.44	819.1	1231.8	819.02
1236.15	818.96	1242.32	818.89	1258.47	818.63	1278.47	818.32	1283.07	818.24
1292.01	818.1	1296.05	818.04	1300.92	817.96	1306.17	817.88	1309.58	817.83
1315.74	817.73	1318.65	817.68	1325.11	817.58	1328.48	817.53	1335.14	817.42
1342.34	817.31	1344.56	817.27	1357.74	817.06	1358.54	817.05	1363.15	816.98
1363.7	816.97	1381.21	816.68	1381.23	816.68	1381.62	816.67	1398.58	816.38
1398.98	816.37	1416.09	816.08	1416.88	816.07	1440.11	815.67	1441.68	815.64
1464.37	815.25	1469.86	815.16	1472.15	815.12	1504.1	814.58	1507.18	814.53
1514.61	814.38	1531.13	814.07	1532.24	814.05	1540.52	813.89	1545.31	813.8
1548.82	813.74	1549.72	813.72	1559.54	813.55	1561.48	813.52	1569.78	813.37
1572.63	813.32	1585.95	813.09	1593.16	812.99	1594.82	812.96	1605.48	812.78
1612.6	812.68	1618.85	812.59	1629.53	812.42	1629.92	812.41	1636.18	812.29
1654.93	811.91	1661.03	811.79	1667.36	811.67	1683.88	811.38	1688.13	811.3
1692.14	811.27	1709.74	810.96	1713.76	810.93	1717.99	810.99	1725.74	810.86
1728.05	810.61	1730.42	810.58	1731.07	810.62	1744.11	810.36	1746.38	810.32
1749.58	810.06	1753.48	809.97	1759.2	809.84	1762.74	809.77	1763.96	809.73
1767.51	809.65	1771.36	809.53	1776.66	809.41	1781.96	809.29	1784.27	809.22
1788.82	809.11	1790.93	809.05	1795.5	808.95	1797.58	808.88	1803.07	808.69
1804.08	808.66	1809.08	808.49	1812.11	808.39	1816.91	808.23	1820.2	808.12
1824.81	807.97	1829.2	807.83	1833.68	807.67	1838.3	807.53	1842.68	807.38
1848.24	807.21	1856.55	806.93	1862.61	806.74	1870.33	806.48	1878.63	806.11
1885.19	805.88	1894.16	805.48	1900.14	805.27	1914.06	804.64	1920.29	804.41
1921.87	804.35	1926.46	804.18	1946.72	803.32	1950.07	803.19	1981.8	801.83
1984.16	801.74	1985.9	801.67	2004.55	800.86	2008.68	800.74	2009.29	800.71
2030.85	800.05	2033.32	799.94	2050.62	799.45	2054.72	799.25	2067.4	798.86
2073.92	798.67	2081.2	798.45	2087.34	798.27	2101.56	797.85	2107.74	797.66
2112.92	797.51	2128.5	797.05	2133.22	796.91	2137.19	796.79	2158.89	796.16
2160.14	796.15	2163.89	796.12	2193.34	796.06	2195.11	796.05	2206.31	796.03

2207.48	796.02	2208.18	796.02	2236.66	795.98	2250.47	795.93	2274.21	795.84
2276.58	795.8	2323.73	794.94	2342.27	794.61	2343.23	794.56	2344.56	794.54
2347.18	794.58	2358.93	794.27	2362.69	794.2	2378.9	792.6	2382.76	792.2
2383.56	792.08	2383.98	792.16	2393.95	793.97	2398.02	794.17	2403.8	794.27
2418.88	794.74	2426.14	794.73	2433.55	794.57	2444.95	794.13	2447.93	794.07
2485.04	792.84	2492.04	792.2	2493.27	791.95	2501.74	791.51	2505.37	791.17
2507.72	791.02	2524.66	790.51	2542.96	790.28	2545.76	790.3	2579.21	791.46
2594.3	790.99	2616.27	790.95	2624.88	791.45	2644.53	792.11	2653.19	792.58
2675.98	793.33	2684.57	793.44	2700.69	792.45	2703.96	792.73	2705.18	792.6
2711.35	791.32	2722.52	789.99	2726.73	788.64	2728.72	787.99	2730.35	787.54
2735.55	786.35	2737.75	785.55	2747.58	785.1	2755.24	784.76	2756.78	784.37
2791.6	774.18	2802.08	772.15	2809.57	770.37	2818.62	769.24	2824.61	768.32
2835.4	767.91	2856.56	767.09	2861.95	766.95	2875.41	766.27	2886.22	765.94
2902.47	765.21	2912.79	764.74	2919.02	763.68	2934.07	761.64	2937.73	760.94
2944.03	758.82	2947.99	757.85	2965.78	753.78	2970.47	752.6	2980	748.54
3000	747.54	3025	748.54	3030.19	752.65	3037.66	755.65	3042.25	757.77
3043.75	757.97	3050.48	759.3	3056.33	760.33	3067.2	764.06	3068.39	764.3
3071.15	764.83	3073.67	765.07	3077.28	766.57	3079.52	767.48	3080.59	767.64
3089.63	768.56	3116.49	770.62	3123.73	770.92	3127.19	771.56	3136.83	772.29
3137.56	772.39	3138.62	772.59	3148.55	774.34	3150.59	775.11	3151.17	775.23
3153.48	776.29	3155.89	777.25	3184.61	788.34	3197.17	792.67	3199.97	793.91
3205.31	795.47	3214.98	798.52	3216.4	798.97	3220.84	799.87	3221.75	799.98
3231.99	800.68	3247.89	801.85	3248.31	801.9	3254.95	802.03	3257.54	802.1
3297	803.11	3311.25	803.19	3340.93	803.42	3349.05	803.45	3360.32	803.52
3388.84	796.51	3393.2	795.4	3400.15	795.77	3403.61	795.97	3405.02	796.24
3410.8	797.05	3432.91	797.86	3434.27	797.91	3434.61	797.91	3435.87	797.96
3436.66	798.08	3454.96	799.42	3462.2	799.98	3462.69	800	3497.43	800.9
3501.46	800.9	3504.27	801.02	3515.4	801.76	3520.47	802.05	3530.25	802.09
3536.63	802.03	3539.34	805.7	3548.26	817.73	3550.35	817.81	3555.63	817.98
3563.3	818.26	3565.53	818.33	3569.46	818.44	3579.23	820.17	3591.18	822.39
3597.67	822.67	3602.93	823	3611.22	823.51	3617.44	823.86	3617.74	823.84
3620.56	823.84	3621.26	823.98	3624.72	830.64	3633.5	843.16	3639.1	843.26
3644.72	843.32	3656.6	843.5	3662.05	843.63				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	2912.79	.042	3079.52	.12

Bank Sta: Left Right Coeff Contr. Expan.

2912.79 3079.52 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1000	820	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
3350	3540	801

Downstream Deck/Roadway Coordinates

num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
170	835.8	830.8	660	829.2	824.2	700	790	780
2700	790	780	2725	798.9	793.4	3250	802.4	796.9

Downstream Bridge Cross Section Data

Station Elevation Data num= 402

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	838.53	1.4	838.51	3.62	838.47	23.13	838.16	28.99	838.05
37.77	837.9	45.74	837.75	56.53	837.56	70.54	837.35	78.95	837.21
96.63	836.93	106.49	836.77	126.48	836.47	127.76	836.45	130.33	836.42
146.9	836.16	150.91	836.1	160.39	835.96	171.13	835.79	172.43	835.75
175.69	833.02	185.57	824.77	187.34	823.91	190.47	822.46	231.43	802.76
243.63	799.45	252.94	796.34	278.23	794.8	285.48	794.38	291.31	793.6
295.46	793.18	300.74	792.65	302.51	792.76	302.98	792.78	303.36	792.85
315.58	794.61	330.55	794.69	361.47	794.95	378.64	794.41	392.02	793.89
402.7	793.84	409.76	793.77	414.97	793.72	426.45	794.22	434.93	794.41
439.82	794.96	444.41	795.45	446.59	795.45	450.08	795.45	455.54	795.36
457.76	795.31	459.34	795.35	462.61	795.42	465.23	795.42	468.76	795.42
472.89	795.26	484.12	794.88	503.31	794.93	503.49	794.93	503.55	794.93
504.24	794.94	553.15	796.02	558.73	796.53	570.13	797.98	596.69	805.41
626.07	815.64	637.11	818.9	644.82	821.53	645.99	822.58	652.53	829.14
652.62	829.14	661.56	829.21	665.23	829.16	675.69	829.07	682.82	828.81
685.89	828.74	686.05	828.73	688.47	828.67	710.87	828.15	747.35	827.3

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   750.3  827.24  765.71  826.88  766.98  826.85   782.4  826.48  782.61  826.48
  811.93  826.03  814.73  826.02  828.92  825.81  841.77  825.62  850.45  825.59
  861.56  825.45  871.71  825.31  875.75   825.3  882.17  825.22  890.77  825.25
  902.78  825.12  905.54  825.12  910.76  825.05  930.55  824.78  945.35  824.41
  960.38  824.25  965.42  824.16  981.73  823.93  999.73  823.67 1003.65   823.6
 1018.43   823.4 1034.44  823.17 1034.52  823.17 1036.76  823.14 1058.21  822.83
 1058.68  822.83 1071.98  822.56  1072.6  822.55  1086.2  822.27 1086.51  822.27
 1086.75  822.26 1100.35  821.98 1100.41  821.98 1114.08   821.7 1114.35  821.69
 1132.24  821.32 1133.98  821.29 1151.96  820.92 1169.13  820.57 1171.96  820.51
 1188.98  820.16 1201.16  819.91 1202.51  819.89 1214.43  819.64 1219.11  819.52
 1230.89  819.28 1242.25  819.04 1256.78  818.74  1264.8  818.54  1289.3  818.14
 1296.51  817.94 1313.77  817.65  1328.4  817.22  1338.7  817.03 1351.97  816.63
 1361.68  816.44 1373.48  816.22 1384.79  815.87 1399.79  815.64 1416.88  815.34
 1426.57  815.18  1442.3  814.91 1451.55  814.76 1474.34  814.36 1484.69   814.2
 1495.52  814.03  1513.3  813.72 1523.48  813.56 1536.23  813.39 1546.92  813.22
 1559.21  813.06 1570.56  812.88 1587.49  812.66 1599.66  812.47 1611.26  812.36
 1626.64  812.16 1634.46  812.09 1654.75  811.82 1658.88  811.78 1660.22  811.77
 1668.51  811.65  1680.7  811.36 1683.91  811.31 1699.06  811.01 1712.97  810.73
 1718.16  810.65 1737.36  810.28 1741.45  810.21 1745.92  810.14 1755.35  809.96
 1758.69  809.91 1767.64  809.74 1781.12  809.48 1791.06  809.21 1801.04  808.92
 1808.61  808.71 1818.75  808.41    1826  808.21  1836.3  807.91 1841.54  807.77
 1852.06  807.47 1857.06  807.33 1873.05  806.86 1883.72  806.55 1893.22  806.26
 1908.59  805.77 1913.04  805.64 1929.56  805.11 1930.91  805.07  1949.1  804.49
 1950.43  804.45 1950.47  804.44  1970.7  803.76 1971.35  803.74 1972.87  803.69
 1995.59  802.92 2018.44  802.07 2023.14   801.9 2044.28  801.12 2050.77  800.88
 2055.37  800.71 2075.46  799.96 2081.05  799.76    2099  799.09  2105.8  798.84
 2113.42  798.56 2119.24  798.35 2126.43  798.09 2132.81  797.86 2139.73  797.61
 2150.69  797.21 2158.22  796.94  2167.9  796.59 2177.47  796.24 2185.47  795.95
 2195.81  795.57 2202.76  795.32 2213.53  794.93 2224.01  794.89 2229.09  794.87
 2230.56  794.86 2240.16  794.83 2245.14  794.81 2256.15  794.76 2261.24  794.74
 2272.19   794.7 2283.03  794.66 2289.49  794.64 2302.05  794.59 2308.67  794.56
 2321.14  794.52 2329.98  794.48 2343.42  794.43 2356.69  794.38 2361.42  794.36
 2367.32  794.32 2375.81  794.42 2385.83  794.46 2423.16  795.29 2428.05  795.39
 2437.65  795.41 2444.18  795.28  2448.3  795.15 2483.57  794.26 2495.05  793.96
 2511.34  793.55 2514.25  793.74 2533.42  793.95 2539.67   794.1 2560.93  795.17
 2562.62  795.25 2568.07  795.47 2572.88  795.51 2575.21  795.65 2582.73  795.81
 2593.67  796.05 2608.64  796.37 2611.79  796.44 2624.17  796.71 2624.56  796.72
 2625.05  796.73 2632.73  796.87 2641.54  797.02 2643.42  797.05 2643.66  797.05
 2661.84  797.37 2663.93  797.42 2675.72  797.64 2686.02  797.83 2690.99  797.98
  2693.6  798.21 2706.98  798.51 2715.03  798.71 2716.57   798.7 2720.55  798.79
 2727.61  798.95 2730.07     799 2730.52  794.95 2731.07  792.33 2738.21  789.73
 2747.86  786.04 2750.65  785.19 2760.66  784.39 2766.11  783.88 2772.89   781.8
 2777.75  780.31 2797.02  774.68 2816.45  771.96 2828.03  770.75 2830.84  770.44
 2844.83  768.66  2847.4  768.36  2884.6  766.96 2930.51  764.47 2938.94  764.11
 2939.54  764.09 2941.42  763.88 2955.28  759.85 2970.86  755.41 2984.05  751.77
    2992  748.47    3017  747.47    3042  748.47 3050.31   752.5 3050.93  752.51
 3051.16  752.61 3061.22  756.93 3073.21  761.04 3073.48  761.14 3073.89  761.31
 3085.33  764.57 3090.14  765.94 3125.85   768.9 3132.58  769.52 3134.06  770.05
  3135.7  770.37 3136.45  770.56 3142.66   772.2 3149.11  773.91 3155.92  775.56
 3160.19  777.35  3185.5   786.9 3187.93   787.8 3191.05  789.04 3193.01   789.7
 3193.34  789.82 3196.59  790.86 3201.26  792.35 3210.72  795.34 3210.84  795.37
 3213.27  796.05 3220.36  798.13 3224.81  799.43 3228.19  800.22 3232.53  800.91
 3235.89   801.4 3237.06  801.47 3238.48   801.8 3239.93  802.13 3240.59  802.37
 3249.08  802.45 3257.75  802.35 3279.72   802.6 3284.89  802.54 3319.15  802.45
 3325.34  802.37 3344.55  802.12 3346.06  802.07    3352  802.04 3352.93  802.04
 3367.72  799.74 3380.12  797.87 3382.05  797.95  3384.5  797.98    3388  798.63
 3388.64  799.09 3389.12  799.63 3401.02   809.5 3401.84  810.17 3403.15  812.19
 3405.28  811.99 3411.83  812.51 3418.48  815.18 3420.88  816.13    3423  816.44
 3431.44  817.66 3432.19  817.79 3435.64  819.05 3442.02  820.49 3446.45  821.55
 3450.83  822.02  3453.4  822.11 3465.27  822.85 3471.69  823.29 3487.37  828.62
 3488.02  829.23 3490.49  831.15 3496.31  834.52 3497.95  835.68  3501.3  836.88
 3506.24  838.05 3507.26  838.52 3508.83   838.9 3512.48  839.08  3513.6     839
 3516.24  840.75 3517.53  840.87 3519.71  839.98 3520.79  840.14 3523.53  841.08
 3524.02  841.42 3524.31  841.43  3525.2  841.54 3531.49   842.1 3536.93  842.56
 3540.39  842.79 3545.63  843.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .075 2941.42    .042 3090.14     .12

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2941.42 3090.14             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1000     820       F
```

```
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3350    3400     801

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  5

Pier Data
Pier Station     Upstream=    2795    Downstream=    2815
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.17     760    3.17     795
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.17     760    3.17     795

Pier Data
Pier Station     Upstream=    2876    Downstream=    2896
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.17     760    3.17     796
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.17     760    3.17     796

Pier Data
Pier Station     Upstream=    2957    Downstream=    2977
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*********************************************************************
       5     745       5     763    4.17     763    4.17     797
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*********************************************************************
       5     745       5     763    4.17     763    4.17     797

Pier Data
Pier Station     Upstream=    3038    Downstream=    3058
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*********************************************************************
       5     745       5     763    4.17     763    4.17     797
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*********************************************************************
       5     745       5     763    4.17     763    4.17     797

Pier Data
Pier Station     Upstream=    3119    Downstream=    3139
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.17     760    3.17     798
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.17     760    3.17     798

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
       Yarnell                 KVal =    1.25
```

Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	775.83	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	775.64	E.G. Elev (ft)	775.82	775.42
Q Total (cfs)	13200.00	W.S. Elev (ft)	775.62	775.21
Q Bridge (cfs)	13200.00	Crit W.S. (ft)	760.04	759.18
Q Weir (cfs)		Max Chl Dpth (ft)	28.08	27.74
Weir Sta Lft (ft)		Vel Total (ft/s)	3.01	3.07
Weir Sta Rgt (ft)		Flow Area (sq ft)	4381.94	4300.26
Weir Submerg		Froude # Chl	0.15	0.15
Weir Max Depth (ft)		Specif Force (cu ft)	40409.95	40327.71
Min El Weir Flow (ft)	794.70	Hydr Depth (ft)	12.61	12.59
Min El Prs (ft)	829.50	W.P. Total (ft)	466.29	461.85
Delta EG (ft)	0.41	Conv. Total (cfs)	684535.3	658727.9
Delta WS (ft)	0.43	Top Width (ft)	347.48	341.43
BR Open Area (sq ft)	24711.11	Frctn Loss (ft)		
BR Open Vel (ft/s)	3.07	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.22	0.23
Br Sel Method	Momentum	Power Total (lb/ft s)	0.66	0.72

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	780.49	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	780.24	E.G. Elev (ft)	780.47	780.14
Q Total (cfs)	20300.00	W.S. Elev (ft)	780.21	779.87
Q Bridge (cfs)	20300.00	Crit W.S. (ft)	763.21	762.27
Q Weir (cfs)		Max Chl Dpth (ft)	32.67	32.40
Weir Sta Lft (ft)		Vel Total (ft/s)	3.36	3.41
Weir Sta Rgt (ft)		Flow Area (sq ft)	6039.71	5955.86
Weir Submerg		Froude # Chl	0.16	0.16
Weir Max Depth (ft)		Specif Force (cu ft)	65354.68	65210.77
Min El Weir Flow (ft)	794.70	Hydr Depth (ft)	16.12	16.11
Min El Prs (ft)	829.50	W.P. Total (ft)	540.99	538.23
Delta EG (ft)	0.35	Conv. Total (cfs)	982726.6	941632.9
Delta WS (ft)	0.37	Top Width (ft)	374.72	369.74
BR Open Area (sq ft)	24711.11	Frctn Loss (ft)		
BR Open Vel (ft/s)	3.41	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.30	0.32
Br Sel Method	Momentum	Power Total (lb/ft s)	1.00	1.09

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	783.70	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	783.40	E.G. Elev (ft)	783.68	783.38
Q Total (cfs)	26320.00	W.S. Elev (ft)	783.37	783.06
Q Bridge (cfs)	26320.00	Crit W.S. (ft)	765.25	764.42
Q Weir (cfs)		Max Chl Dpth (ft)	35.83	35.59
Weir Sta Lft (ft)		Vel Total (ft/s)	3.63	3.67
Weir Sta Rgt (ft)		Flow Area (sq ft)	7253.83	7167.24
Weir Submerg		Froude # Chl	0.16	0.16

```
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   87361.80  *   87168.88  *
* Min El Weir Flow (ft)  *     794.70  * Hydr Depth (ft)        *      18.42  *      18.44  *
* Min El Prs (ft)        *     829.50  * W.P. Total (ft)        *     592.62  *     590.18  *
* Delta EG (ft)          *       0.32  * Conv. Total (cfs)      *  1209669.0  *  1157639.0  *
* Delta WS (ft)          *       0.35  * Top Width (ft)         *     393.70  *     388.69  *
* BR Open Area (sq ft)   *   24711.11  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.67  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.36  *       0.39  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.31  *       1.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     787.24  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     786.86  * E.G. Elev (ft)         *     787.21  *     786.94  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     786.84  *     786.56  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     767.47  *     766.89  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.30  *      39.09  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.92  *       3.96  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8680.66  *    8586.56  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  116376.80  *  116122.00  *
* Min El Weir Flow (ft)  *     794.70  * Hydr Depth (ft)        *      20.21  *      20.43  *
* Min El Prs (ft)        *     829.50  * W.P. Total (ft)        *     664.12  *     657.80  *
* Delta EG (ft)          *       0.29  * Conv. Total (cfs)      *  1477214.0  *  1412541.0  *
* Delta WS (ft)          *       0.32  * Top Width (ft)         *     429.47  *     420.26  *
* BR Open Area (sq ft)   *   24711.11  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.96  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.43  *       0.47  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.69  *       1.87  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     791.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     790.98  * E.G. Elev (ft)         *     791.40  *     791.17  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     790.96  *     790.72  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     769.96  *     769.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.42  *      43.25  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.24  *       4.29  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10506.95  *   10381.94  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  157975.80  *  157640.00  *
* Min El Weir Flow (ft)  *     794.70  * Hydr Depth (ft)        *      22.84  *      23.44  *
* Min El Prs (ft)        *     829.50  * W.P. Total (ft)        *     737.12  *     723.50  *
* Delta EG (ft)          *       0.26  * Conv. Total (cfs)      *  1824216.0  *  1744962.0  *
* Delta WS (ft)          *       0.28  * Top Width (ft)         *     460.01  *     442.84  *
* BR Open Area (sq ft)   *   24711.11  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.29  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.53  *       0.58  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.24  *       2.50  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
```

```
* E.G. US. (ft)          *     794.33  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     793.72  * E.G. Elev (ft)         *     794.21  *     794.21  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     793.69  *     793.69  *
* Q Bridge (cfs)         *   53690.00  * Crit W.S. (ft)         *     771.79  *     771.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.15  *      46.22  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.56  *       4.58  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11786.49  *   11716.59  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  190592.70  *  192549.10  *
* Min El Weir Flow (ft)  *     794.70  * Hydr Depth (ft)        *      27.20  *      27.47  *
* Min El Prs (ft)        *     829.50  * W.P. Total (ft)        *     825.83  *     815.12  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  2059039.0  *  1981976.0  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     451.17  *     445.08  *
* BR Open Area (sq ft)   *   24711.11  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.58  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.61  *       0.66  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.76  *       3.02  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     796.85  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     796.16  * E.G. Elev (ft)         *     796.82  *     796.75  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     796.20  *     796.13  *
* Q Bridge (cfs)         *   61906.75  * Crit W.S. (ft)         *     773.17  *     773.17  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      48.66  *      48.66  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.91  *       4.81  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12622.67  *   12891.96  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  223560.30  *  224760.70  *
* Min El Weir Flow (ft)  *     794.70  * Hydr Depth (ft)        *      31.58  *      26.17  *
* Min El Prs (ft)        *     829.50  * W.P. Total (ft)        *    1515.62  *    1597.75  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *  1687936.0  *  1635720.0  *
* Delta WS (ft)          *       0.02  * Top Width (ft)         *     704.36  *     790.62  *
* BR Open Area (sq ft)   *   24711.11  * Frctn Loss (ft)        *       0.07  *       0.00  *
* BR Open Vel (ft/s)     *       5.03  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.70  *       0.72  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.45  *       3.48  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     800.29  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     799.59  * E.G. Elev (ft)         *     800.26  *     800.15  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     799.44  *     799.37  *
* Q Bridge (cfs)         *   71824.77  * Crit W.S. (ft)         *     775.07  *     775.09  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      51.90  *      51.90  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.22  *       5.09  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   14302.25  *   14667.93  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  271092.70  *  273060.20  *
* Min El Weir Flow (ft)  *     794.70  * Hydr Depth (ft)        *      19.51  *      20.84  *
* Min El Prs (ft)        *     829.50  * W.P. Total (ft)        *    2027.15  *    1963.74  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *  1725640.0  *  1704825.0  *
* Delta WS (ft)          *       0.31  * Top Width (ft)         *    1064.67  *    1034.99  *
* BR Open Area (sq ft)   *   24711.11  * Frctn Loss (ft)        *       0.10  *       0.00  *
```

```
* BR Open Vel (ft/s)     *       5.82  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.83  *       0.90  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.31  *       4.56  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     788.89  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     788.48  * E.G. Elev (ft)         *     788.86  *     788.60  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     788.46  *     788.20  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     768.55  *     768.06  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.92  *      40.73  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.05  *       4.09  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9385.63  *    9282.06  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  131798.80  *  131528.30  *
* Min El Weir Flow (ft)  *     794.70  * Hydr Depth (ft)        *      21.34  *      21.64  *
* Min El Prs (ft)        *     829.50  * W.P. Total (ft)        *     691.22  *     683.40  *
* Delta EG (ft)          *       0.27  * Conv. Total (cfs)      *  1610713.0  *  1540247.0  *
* Delta WS (ft)          *       0.30  * Top Width (ft)         *     439.84  *     428.87  *
* BR Open Area (sq ft)   *   24711.11  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.09  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.47  *       0.52  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.91  *       2.11  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 18.160

INPUT
Description: D/S of 87th St Bridge.  Dodson XS 19.781
Station Elevation Data    num=     402
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  838.53     1.4  838.51    3.62  838.47   23.13  838.16   28.99  838.05
   37.77   837.9   45.74  837.75   56.53  837.56   70.54  837.35   78.95  837.21
   96.63  836.93  106.49  836.77  126.48  836.47  127.76  836.45  130.33  836.42
   146.9  836.16  150.91   836.1  160.39  835.96  171.13  835.79  172.43  835.75
  175.69  833.02  185.57  824.77  187.34  823.91  190.47  822.46  231.43  802.76
  243.63  799.45  252.94  796.34  278.23   794.8  285.48  794.38  291.31   793.6
  295.46  793.18  300.74  792.65  302.51  792.76  302.98  792.78  303.36  792.85
  315.58  794.61  330.55  794.69  361.47  794.95  378.64  794.41  392.02  793.89
   402.7  793.84  409.76  793.77  414.97  793.72  426.45  794.22  434.93  794.41
  439.82  794.96  444.41  795.45  446.59  795.45  450.08  795.45  455.54  795.36
  457.76  795.31  459.34  795.35  462.61  795.42  465.23  795.42  468.76  795.42
  472.89  795.26  484.12  794.88  503.31  794.93  503.49  794.93  503.55  794.93
  504.24  794.94  553.15  796.02  558.73  796.53  570.13  797.98  596.69  805.41
  626.07  815.64  637.11   818.9  644.82  821.53  645.99  822.58  652.53  829.14
  652.62  829.14  661.56  829.21  665.23  829.16  675.69  829.07  682.82  828.81
  685.89  828.74  686.05  828.73  688.47  828.67  710.87  828.15  747.35   827.3
   750.3  827.24  765.71  826.88  766.98  826.85   782.4  826.48  782.61  826.48
  811.93  826.03  814.73  826.02  828.92  825.81  841.77  825.62  850.45  825.59
  861.56  825.45  871.71  825.31  875.75   825.3  882.17  825.22  890.77  825.25
  902.78  825.12  905.54  825.12  910.76  825.05  930.55  824.78  945.35  824.41
  960.38  824.25  965.42  824.16  981.73  823.93  999.73  823.67 1003.65   823.6
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 1018.43   823.4 1034.44  823.17 1034.52  823.17 1036.76  823.14 1058.21  822.83
 1058.68  822.83 1071.98  822.56  1072.6  822.55  1086.2  822.27 1086.51  822.27
 1086.75  822.26 1100.35  821.98 1100.41  821.98 1114.08   821.7 1114.35  821.69
 1132.24  821.32 1133.98  821.29 1151.96  820.92 1169.13  820.57 1171.96  820.51
 1188.98  820.16 1201.16  819.91 1202.51  819.89 1214.43  819.64 1219.11  819.52
 1230.89  819.28 1242.25  819.04 1256.78  818.74  1264.8  818.54  1289.3  818.14
 1296.51  817.94 1313.77  817.65  1328.4  817.22  1338.7  817.03 1351.97  816.63
 1361.68  816.44 1373.48  816.22 1384.79  815.87 1399.79  815.64 1416.88  815.34
 1426.57  815.18  1442.3  814.91 1451.55  814.76 1474.34  814.36 1484.69   814.2
 1495.52  814.03  1513.3  813.72 1523.48  813.56 1536.23  813.39 1546.92  813.22
 1559.21  813.06 1570.56  812.88 1587.49  812.66 1599.66  812.47 1611.26  812.36
 1626.64  812.16 1634.46  812.09 1654.75  811.82 1658.88  811.78 1660.22  811.77
 1668.51  811.65  1680.7  811.36 1683.91  811.31 1699.06  811.01 1712.97  810.73
 1718.16  810.65 1737.36  810.28 1741.45  810.21 1745.92  810.14 1755.35  809.96
 1758.69  809.91 1767.64  809.74 1781.12  809.48 1791.06  809.21 1801.04  808.92
 1808.61  808.71 1818.75  808.41    1826  808.21  1836.3  807.91 1841.54  807.77
 1852.06  807.47 1857.06  807.33 1873.05  806.86 1883.72  806.55 1893.22  806.26
 1908.59  805.77 1913.04  805.64 1929.56  805.11 1930.91  805.07  1949.1  804.49
 1950.43  804.45 1950.47  804.44  1970.7  803.76 1971.35  803.74 1972.87  803.69
 1995.59  802.92 2018.44  802.07 2023.14   801.9 2044.28  801.12 2050.77  800.88
 2055.37  800.71 2075.46  799.96 2081.05  799.76    2099  799.09  2105.8  798.84
 2113.42  798.56 2119.24  798.35 2126.43  798.09 2132.81  797.86 2139.73  797.61
 2150.69  797.21 2158.22  796.94  2167.9  796.59 2177.47  796.24 2185.47  795.95
 2195.81  795.57 2202.76  795.32 2213.53  794.93 2224.01  794.89 2229.09  794.87
 2230.56  794.86 2240.16  794.83 2245.14  794.81 2256.15  794.76 2261.24  794.74
 2272.19   794.7 2283.03  794.66 2289.49  794.64 2302.05  794.59 2308.67  794.56
 2321.14  794.52 2329.98  794.48 2343.42  794.43 2356.69  794.38 2361.42  794.36
 2367.32  794.32 2375.81  794.42 2385.83  794.46 2423.16  795.29 2428.05  795.39
 2437.65  795.41 2444.18  795.28  2448.3  795.15 2483.57  794.26 2495.05  793.96
 2511.34  793.55 2514.25  793.74 2533.42  793.95 2539.67   794.1 2560.93  795.17
 2562.62  795.25 2568.07  795.47 2572.88  795.51 2575.21  795.65 2582.73  795.81
 2593.67  796.05 2608.64  796.37 2611.79  796.44 2624.17  796.71 2624.56  796.72
 2625.05  796.73 2632.73  796.87 2641.54  797.02 2643.42  797.05 2643.66  797.05
 2661.84  797.37 2663.93  797.42 2675.72  797.64 2686.02  797.83 2690.99  797.98
  2693.6  798.21 2706.98  798.51 2715.03  798.71 2716.57   798.7 2720.55  798.79
 2727.61  798.95 2730.07     799 2730.52  794.95 2731.07  792.33 2738.21  789.73
 2747.86  786.04 2750.65  785.19 2760.66  784.39 2766.11  783.88 2772.89   781.8
 2777.75  780.31 2797.02  774.68 2816.45  771.96 2828.03  770.75 2830.84  770.44
 2844.83  768.66  2847.4  768.36  2884.6  766.96 2930.51  764.47 2938.94  764.11
 2939.54  764.09 2941.42  763.88 2955.28  759.85 2970.86  755.41 2984.05  751.77
    2992  748.47    3017  747.47    3042  748.47 3050.31   752.5 3050.93  752.51
 3051.16  752.61 3061.22  756.93 3073.21  761.04 3073.48  761.14 3073.89  761.31
 3085.33  764.57 3090.14  765.94 3125.85   768.9 3132.58  769.52 3134.06  770.05
  3135.7  770.37 3136.45  770.56 3142.66   772.2 3149.11  773.91 3155.92  775.56
 3160.19  777.35  3185.5   786.9 3187.93   787.8 3191.05  789.04 3193.01   789.7
 3193.34  789.82 3196.59  790.86 3201.26  792.35 3210.72  795.34 3210.84  795.37
 3213.27  796.05 3220.36  798.13 3224.81  799.43 3228.19  800.22 3232.53  800.91
 3235.89   801.4 3237.06  801.47 3238.48   801.8 3239.93  802.13 3240.59  802.37
 3249.08  802.45 3257.75  802.35 3279.72   802.6 3284.89  802.54 3319.15  802.45
 3325.34  802.37 3344.55  802.12 3346.06  802.07    3352  802.04 3352.93  802.04
 3367.72  799.74 3380.12  797.87 3382.05  797.95  3384.5  797.98    3388  798.63
 3388.64  799.09 3389.12  799.63 3401.02   809.5 3401.84  810.17 3403.15  812.19
 3405.28  811.99 3411.83  812.51 3418.48  815.18 3420.88  816.13    3423  816.44
 3431.44  817.66 3432.19  817.79 3435.64  819.05 3442.02  820.49 3446.45  821.55
 3450.83  822.02  3453.4  822.11 3465.27  822.85 3471.69  823.29 3487.37  828.62
 3488.02  829.23 3490.49  831.15 3496.31  834.52 3497.95  835.68  3501.3  836.88
 3506.24  838.05 3507.26  838.52 3508.83   838.9 3512.48  839.08  3513.6     839
 3516.24  840.75 3517.53  840.87 3519.71  839.98 3520.79  840.14 3523.53  841.08
 3524.02  841.42 3524.31  841.43  3525.2  841.54 3531.49   842.1 3536.93  842.56
 3540.39  842.79 3545.63  843.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .075 2941.42    .042 3090.14     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2941.42 3090.14             619.5  644.86  647.17             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1000     820       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3350    3400     801
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CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	775.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	775.22	Reach Len. (ft)	619.50	644.86	647.17
Crit W.S. (ft)	758.99	Flow Area (sq ft)	1028.67	3129.07	379.90
E.G. Slope (ft/ft)	0.000209	Area (sq ft)	1028.67	3129.07	379.90
Q Total (cfs)	13200.00	Flow (cfs)	1078.85	11901.04	220.11
Top Width (ft)	359.31	Top Width (ft)	146.23	148.72	64.36
Vel Total (ft/s)	2.91	Avg. Vel. (ft/s)	1.05	3.80	0.58
Max Chl Dpth (ft)	27.75	Hydr. Depth (ft)	7.03	21.04	5.90
Conv. Total (cfs)	913005.4	Conv. (cfs)	74620.7	823160.4	15224.3
Length Wtd. (ft)	642.50	Wetted Per. (ft)	146.82	154.32	65.25
Min Ch El (ft)	747.47	Shear (lb/sq ft)	0.09	0.26	0.08
Alpha	1.55	Stream Power (lb/ft s)	0.10	1.01	0.04
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	508.96	5283.87	516.84
C & E Loss (ft)	0.01	Cum SA (acres)	83.86	408.69	106.19

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	780.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	779.86	Reach Len. (ft)	619.50	644.86	647.17
Crit W.S. (ft)	761.85	Flow Area (sq ft)	1745.23	3820.22	708.28
E.G. Slope (ft/ft)	0.000225	Area (sq ft)	1745.23	3820.22	708.28
Q Total (cfs)	20300.00	Flow (cfs)	2514.75	17215.05	570.19
Top Width (ft)	387.57	Top Width (ft)	162.14	148.72	76.71
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)	1.44	4.51	0.81
Max Chl Dpth (ft)	32.39	Hydr. Depth (ft)	10.76	25.69	9.23
Conv. Total (cfs)	1353716.0	Conv. (cfs)	167697.4	1147994.0	38023.7
Length Wtd. (ft)	641.57	Wetted Per. (ft)	163.40	154.32	78.46
Min Ch El (ft)	747.47	Shear (lb/sq ft)	0.15	0.35	0.13
Alpha	1.67	Stream Power (lb/ft s)	0.22	1.57	0.10
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	924.83	7063.94	1013.26
C & E Loss (ft)	0.01	Cum SA (acres)	122.69	448.27	145.40

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	783.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	783.05	Reach Len. (ft)	619.50	644.86	647.17
Crit W.S. (ft)	763.88	Flow Area (sq ft)	2279.15	4294.54	966.41
E.G. Slope (ft/ft)	0.000238	Area (sq ft)	2279.15	4294.54	966.41
Q Total (cfs)	26320.00	Flow (cfs)	3867.81	21536.08	916.11
Top Width (ft)	406.50	Top Width (ft)	172.61	148.72	85.16
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)	1.70	5.01	0.95
Max Chl Dpth (ft)	35.58	Hydr. Depth (ft)	13.20	28.88	11.35
Conv. Total (cfs)	1705188.0	Conv. (cfs)	250583.2	1395254.0	59351.6
Length Wtd. (ft)	641.09	Wetted Per. (ft)	174.34	154.32	87.49
Min Ch El (ft)	747.47	Shear (lb/sq ft)	0.19	0.41	0.16
Alpha	1.73	Stream Power (lb/ft s)	0.33	2.08	0.16
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	1291.57	8520.45	1529.73
C & E Loss (ft)	0.01	Cum SA (acres)	151.90	476.16	220.16

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	786.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.075	0.042	0.120
W.S. Elev (ft)	786.54	Reach Len. (ft)	619.50	644.86	647.17
Crit W.S. (ft)	766.13	Flow Area (sq ft)	2923.89	4813.92	1279.99
E.G. Slope (ft/ft)	0.000256	Area (sq ft)	2923.89	4813.92	1279.99
Q Total (cfs)	34000.00	Flow (cfs)	5595.45	26992.72	1411.83
Top Width (ft)	438.02	Top Width (ft)	194.88	148.72	94.42
Vel Total (ft/s)	3.77	Avg. Vel. (ft/s)	1.91	5.61	1.10

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* Max Chl Dpth (ft)      *   39.07  * Hydr. Depth (ft)       *   15.00  *   32.37  *   13.56  *
* Conv. Total (cfs)      *2125797.0  * Conv. (cfs)            *349846.6  *1687678.0  * 88272.6  *
* Length Wtd. (ft)       *  640.71  * Wetted Per. (ft)       *  197.01  *  154.32  *   97.39  *
* Min Ch El (ft)         *  747.47  * Shear (lb/sq ft)       *    0.24  *    0.50  *    0.21  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.45  *    2.79  *    0.23  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 1824.24  *10041.18  * 2340.51  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  219.54  *  498.97  *  307.72  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  791.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.              *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  790.70  * Reach Len. (ft)        *  619.50  *  644.86  *  647.17  *
* Crit W.S. (ft)         *  769.00  * Flow Area (sq ft)      * 3756.70  * 5432.17  * 1695.65  *
* E.G. Slope (ft/ft)     *0.000271  * Area (sq ft)           * 3756.70  * 5432.17  * 1695.65  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 8406.17  *33950.34  * 2143.49  *
* Top Width (ft)         *  460.56  * Top Width (ft)         *  205.88  *  148.72  *  105.96  *
* Vel Total (ft/s)       *    4.09  * Avg. Vel. (ft/s)       *    2.24  *    6.25  *    1.26  *
* Max Chl Dpth (ft)      *   43.23  * Hydr. Depth (ft)       *   18.25  *   36.53  *   16.00  *
* Conv. Total (cfs)      *2705599.0  * Conv. (cfs)            *511095.2  *2064180.0  *130324.0  *
* Length Wtd. (ft)       *  640.13  * Wetted Per. (ft)       *  208.77  *  154.32  *  109.65  *
* Min Ch El (ft)         *  747.47  * Shear (lb/sq ft)       *    0.30  *    0.59  *    0.26  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    0.68  *    3.72  *    0.33  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 3126.38  *12422.83  * 4360.48  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  459.16  *  526.99  *  677.69  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  794.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.              *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  793.69  * Reach Len. (ft)        *  619.50  *  644.86  *  647.17  *
* Crit W.S. (ft)         *  770.86  * Flow Area (sq ft)      * 4383.32  * 5877.22  * 2026.79  *
* E.G. Slope (ft/ft)     *0.000287  * Area (sq ft)           * 4393.73  * 5877.22  * 2026.79  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *10986.16  *39896.16  * 2807.68  *
* Top Width (ft)         *  501.31  * Top Width (ft)         *  237.21  *  148.72  *  115.37  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    2.51  *    6.79  *    1.39  *
* Max Chl Dpth (ft)      *   46.22  * Hydr. Depth (ft)       *   20.05  *   39.52  *   17.57  *
* Conv. Total (cfs)      *3167435.0  * Conv. (cfs)            *648126.9  *2353669.0  *165638.8  *
* Length Wtd. (ft)       *  639.74  * Wetted Per. (ft)       *  222.88  *  154.32  *  119.54  *
* Min Ch El (ft)         *  747.47  * Shear (lb/sq ft)       *    0.35  *    0.68  *    0.30  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.88  *    4.64  *    0.42  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 4620.60  *13837.00  * 6551.05  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  664.93  *  534.09  * 1040.86  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  796.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.              *   0.075  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  796.14  * Reach Len. (ft)        *  619.50  *  644.86  *  647.17  *
* Crit W.S. (ft)         *  772.41  * Flow Area (sq ft)      * 5472.65  * 6240.42  * 2318.12  *
* E.G. Slope (ft/ft)     *0.000299  * Area (sq ft)           * 5887.25  * 6240.42  * 2318.12  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *13621.69  *44956.00  * 3422.30  *
* Top Width (ft)         * 1198.73  * Top Width (ft)         *  926.58  *  148.72  *  123.43  *
* Vel Total (ft/s)       *    4.42  * Avg. Vel. (ft/s)       *    2.49  *    7.20  *    1.48  *
* Max Chl Dpth (ft)      *   48.67  * Hydr. Depth (ft)       *    8.71  *   41.96  *   18.78  *
* Conv. Total (cfs)      *3587170.0  * Conv. (cfs)            *788117.9  *2601046.0  *198006.2  *
* Length Wtd. (ft)       *  639.40  * Wetted Per. (ft)       *  634.91  *  154.32  *  127.95  *
* Min Ch El (ft)         *  747.47  * Shear (lb/sq ft)       *    0.16  *    0.75  *    0.34  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    0.40  *    5.43  *    0.50  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 5954.33  *14744.38  * 8629.25  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  811.27  *  535.50  * 1396.90  *
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	800.14	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.86	Wt. n-Val.	0.075	0.042	0.120	
W.S. Elev (ft)	799.29	Reach Len. (ft)	619.50	644.86	647.17	
Crit W.S. (ft)	774.43	Flow Area (sq ft)	7823.57	6708.64	2723.61	
E.G. Slope (ft/ft)	0.000375	Area (sq ft)	9238.87	6708.64	2723.61	
Q Total (cfs)	74720.00	Flow (cfs)	13120.26	56853.94	4745.80	
Top Width (ft)	1461.21	Top Width (ft)	1178.31	148.72	134.17	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)	1.68	8.47	1.74	
Max Chl Dpth (ft)	51.82	Hydr. Depth (ft)	9.23	45.11	20.30	
Conv. Total (cfs)	3856485.0	Conv. (cfs)	677169.3	2934373.0	244942.6	
Length Wtd. (ft)	639.78	Wetted Per. (ft)	856.78	154.32	139.15	
Min Ch El (ft)	747.47	Shear (lb/sq ft)	0.21	1.02	0.46	
Alpha	2.95	Stream Power (lb/ft s)	0.36	8.63	0.80	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	8405.53	16139.66	12633.06	
C & E Loss (ft)	0.00	Cum SA (acres)	1005.50	537.59	1754.77	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	788.61	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.43	Wt. n-Val.	0.075	0.042	0.120	
W.S. Elev (ft)	788.18	Reach Len. (ft)	619.50	644.86	647.17	
Crit W.S. (ft)	767.14	Flow Area (sq ft)	3246.69	5057.58	1438.27	
E.G. Slope (ft/ft)	0.000262	Area (sq ft)	3246.69	5057.58	1438.27	
Q Total (cfs)	38000.00	Flow (cfs)	6642.92	29674.02	1683.06	
Top Width (ft)	446.64	Top Width (ft)	199.16	148.72	98.75	
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)	2.05	5.87	1.17	
Max Chl Dpth (ft)	40.71	Hydr. Depth (ft)	16.30	34.01	14.56	
Conv. Total (cfs)	2346585.0	Conv. (cfs)	410215.5	1832437.0	103932.7	
Length Wtd. (ft)	640.45	Wetted Per. (ft)	201.60	154.32	102.02	
Min Ch El (ft)	747.47	Shear (lb/sq ft)	0.26	0.54	0.23	
Alpha	1.82	Stream Power (lb/ft s)	0.54	3.15	0.27	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	2186.43	10842.21	2861.71	
C & E Loss (ft)	0.02	Cum SA (acres)	278.04	509.35	372.79	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 18.038

INPUT
Description: Dodson XS 19.66
Station Elevation Data num= 375

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	835.88	18.38	832.91	27.09	831.65	57.03	826.79	89.33	821.3
92.46	820.78	98.47	819.64	123.93	814.82	131.74	813.04	147.27	809.29
161.06	805.82	163.57	805.18	171.05	802.76	183.79	800.4	195.08	798.25
206.82	796.18	209.71	796.14	212.12	796.12	217.02	796.1	241.32	795.93
257.48	795.52	266.58	793.15	270.24	792.21	273.36	792.26	276.28	792.29
282.16	793.3	290.37	794.58	297.11	794.52	323.39	794.39	347.31	793.6
377.73	792.75	391.52	793.15	404.12	793.49	413.71	793.74	415.86	794.24
420.16	795.24	424.63	795.24	425.41	795.24	432.95	794.86	433.83	794.82
434.75	794.88	440.77	795.25	442.44	795.25	446.47	795.25	454.27	794.96
460.36	794.71	465.65	794.84	475.17	795.08	490.3	795.37	499.68	795.42
514.38	797.48	523.33	798.46	531.88	799.41	545.64	801.41	550.92	802.12
566.28	804.77	574.7	806.22	581.94	807.25	587.41	808.04	595.88	809.27
606.93	810.91	608.1	811.08	611.82	811.57	640.68	815.72	656.79	817.81
667.94	819.48	670.66	819.86	673.65	820.11	689.24	822.14	690.54	822.19
691.43	822.22	710.7	822.72	726.01	823.26	726.91	823.29	727.73	823.31
753.08	823.15	753.74	823.15	783.51	822.96	785.55	822.97	814.97	822.79

817.3	822.79	847.48	824.07	847.62	824.07	853.16	824.24	868.76	824.77
892.3	825.56	893.23	825.6	916.48	826.39	938.57	825.89	938.84	825.89
941.78	825.82	960.72	825.58	976.86	825.37	978.51	825.32	993.33	825.12
997.97	824.97	1000.04	825.34	1004.98	824.84	1011.49	825.37	1019.73	825.67
1025.06	825.95	1028.52	826.38	1033.06	826.95	1036.98	826.57	1040.48	826.42
1042.51	826.5	1048.87	827.23	1052.01	827.6	1056.63	828.05	1063.76	828.98
1066.61	829.26	1069.09	829.64	1071.08	829.83	1076.47	830.32	1083.16	830.96
1083.52	831	1087.18	831.34	1089.21	831.37	1092.5	831.49	1095	831.59
1099.46	831.67	1113.53	832.87	1118.39	833.2	1132.88	834.25	1141.08	834.59
1144.26	834.81	1153.8	835.83	1176.52	836.99	1183.38	837.42	1230.97	839.8
1233.82	839.95	1234.15	839.95	1250.16	840.97	1286.8	843.77	1289	843.92
1312.44	845.34	1315.37	845.5	1348.12	847.47	1352.87	847.9	1354.04	847.99
1383.36	850.09	1383.71	850.13	1396.32	851.01	1429.15	853.7	1432.23	853.91
1433.74	854.01	1456.52	855.13	1459.94	855.32	1461.62	855.46	1508.06	857.75
1513.5	858.06	1519.94	859.04	1529.81	859.4	1549.08	859.21	1572.6	859.24
1574.83	859.17	1576.62	859.16	1578.43	859.38	1599.42	860.8	1605.14	861.26
1633.07	861.64	1650.98	862.25	1666.99	862.41	1688.35	863.22	1698.78	864.07
1703.77	864.46	1718.95	865.63	1736.37	866.83	1744.88	867.33	1752.7	866.36
1758.22	865.67	1762.76	865.1	1765.56	865.51	1771.41	866.12	1781.3	866.17
1802.58	865.82	1807.39	865.86	1810.83	865.09	1823.76	862.9	1834.8	863.36
1835.44	863.39	1835.76	863.47	1837.79	863.92	1845.51	865.63	1846.99	865.94
1859.71	866.52	1887.62	867.39	1892.47	867.48	1901.41	867.75	1917.58	868.45
1925.61	868.8	1946.03	869.37	1956.28	869.69	1974.48	870.42	1987.21	870.5
1999.01	870.52	2002.61	870.66	2005.74	870.77	2037.77	871.84	2046.99	870.77
2051.88	870.17	2060.54	870.59	2084.46	871.2	2088.26	871.34	2095.82	871.65
2116.7	872.01	2127.18	871.84	2145.15	870.63	2148.55	870.43	2158.79	869.71
2173.59	868.75	2191.27	867.04	2202.04	865.51	2223.49	862.2	2233.59	860.7
2235.53	860.45	2243.99	858.84	2261.21	855.62	2271.97	853.08	2283.75	853.7
2286.24	853.82	2299.01	849.54	2315.82	844.08	2328.02	840.12	2343.85	834.49
2351.23	835.01	2351.4	835.01	2352.16	834.71	2358.06	832.45	2381.06	823.93
2388.64	821.45	2400.36	817.58	2409.1	814.8	2433.78	807.32	2438.94	805.8
2442.79	804.64	2469.33	797.22	2476.49	795.18	2477.94	794.8	2493.16	790.78
2498.41	790.24	2500.08	790.04	2501.15	789.9	2506.13	789.28	2508.48	789.08
2526.75	788.46	2544.03	787.91	2557.95	787.36	2578.86	786.63	2581.81	786.59
2610.29	785.9	2611.5	785.9	2611.76	785.8	2627.5	777.66	2628.32	777.22
2629.08	776.96	2642.82	770.34	2643.75	770.16	2662.56	766.3	2665.47	766.15
2674.33	765.5	2701.23	764.94	2704.76	764.88	2710.99	764.76	2731.22	764.39
2759.15	763.88	2759.45	763.88	2759.6	763.88	2759.77	763.89	2769.38	760.81
2789.53	752.49	2793.63	751.25	2800	748.04	2818	747.04	2835	748.04
2842	751.25	2864.93	759.78	2872.87	762.87	2876.22	764.17	2876.72	764.36
2877.36	764.47	2893.3	767.68	2913.11	768.92	2916.06	769.15	2921.87	769.28
2941.47	769.77	2945.6	770.82	2951.31	771.81	2959.64	773.43	2965.71	775.45
2978.04	776.32	2991.59	776.69	3013.02	780.64	3015.22	781.07	3028.92	783.7
3031.67	784.38	3040.1	785.74	3047	786.76	3048.15	786.74	3052.69	786.7
3060.23	786.62	3062.22	786.61	3063.09	786.6	3064.7	786.14	3073.58	783.82
3080.56	783.83	3080.82	783.83	3081.12	783.93	3088.03	786.24	3095.61	786.43
3096.31	786.46	3102.27	786.7	3107.06	786.17	3111.15	785.62	3113.74	786.12
3115.03	786.45	3119.33	787.58	3136.22	789.86	3143.39	791.06	3148.99	792.53
3151.47	793.25	3167.26	802.4	3167.93	802.79	3168.11	802.81	3187.79	804.52
3201.52	804.56	3210.3	804.58	3214.95	804.25	3219.89	803.96	3226.92	808.09
3228.68	809	3241.57	813.25	3241.7	813.3	3242.51	813.99	3244.35	814.99
3249.74	817.89	3250.4	818.31	3250.46	818.31	3251.46	819.22	3253.35	819.84
3259.43	823.86	3277.94	834.92	3281.64	836.48	3282.68	836.96	3284.66	840.76
3285.54	842.73	3286.21	842.8	3291.24	843.34	3293.98	843.56	3295.85	843.68
3295.96	843.68	3295.99	843.7	3301.64	847.44	3310.79	849.62	3315.54	850.76
3326.06	853	3350.55	855.86	3374.52	858.52	3379.94	859.66	3402.98	865.07
3405.91	865.74	3408.8	866.36	3415.94	867.67	3441.28	872.12	3446.31	872.84
3453.83	874.09	3473.76	876.99	3502.4	880.54	3504.7	880.76	3506.24	880.96
3513.98	881.86	3538.72	884.67	3543.63	885.31	3550.98	885.96	3561.84	886.62

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.09	446.47	.075	2610.29	.09	2759.6	.042	2877.36	.14

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2759.6	2877.36	563.67	616.43	669.71	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1500	820	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	775.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.090	0.042	0.140
W.S. Elev (ft)	774.96	Reach Len. (ft)	563.67	616.43	669.71

```
* Crit W.S. (ft)         *  760.26  * Flow Area (sq ft)      * 1137.36  * 2489.22  *  493.90  *
* E.G. Slope (ft/ft)     *0.000312  * Area (sq ft)           * 1137.36  * 2489.22  *  493.90  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1423.18  *11484.24  *  292.58  *
* Top Width (ft)         *  331.00  * Top Width (ft)         *  126.37  *  117.76  *   86.87  *
* Vel Total (ft/s)       *    3.20  * Avg. Vel. (ft/s)       *    1.25  *    4.61  *    0.59  *
* Max Chl Dpth (ft)      *   27.92  * Hydr. Depth (ft)       *    9.00  *   21.14  *    5.69  *
* Conv. Total (cfs)      *747670.9  * Conv. (cfs)            * 80611.4  *650487.4  * 16572.2  *
* Length Wtd. (ft)       *  612.08  * Wetted Per. (ft)       *  127.87  *  124.00  *   87.87  *
* Min Ch El (ft)         *  747.04  * Shear (lb/sq ft)       *    0.17  *    0.39  *    0.11  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.22  *    1.80  *    0.06  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *  493.56  * 5242.29  *  510.35  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   81.92  *  406.72  *  105.07  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  779.95  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  779.56  * Reach Len. (ft)        *  563.67  *  616.43  *  669.71  *
* Crit W.S. (ft)         *  763.41  * Flow Area (sq ft)      * 1740.30  * 3030.58  * 1008.56  *
* E.G. Slope (ft/ft)     *0.000341  * Area (sq ft)           * 1740.30  * 3030.58  * 1008.56  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 2867.82  *16662.59  *  769.59  *
* Top Width (ft)         *  383.30  * Top Width (ft)         *  135.77  *  117.76  *  129.78  *
* Vel Total (ft/s)       *    3.51  * Avg. Vel. (ft/s)       *    1.65  *    5.50  *    0.76  *
* Max Chl Dpth (ft)      *   32.52  * Hydr. Depth (ft)       *   12.82  *   25.74  *    7.77  *
* Conv. Total (cfs)      *1100091.0  * Conv. (cfs)           *155411.8  *902973.8  * 41705.6  *
* Length Wtd. (ft)       *  611.69  * Wetted Per. (ft)       *  138.34  *  124.00  *  131.15  *
* Min Ch El (ft)         *  747.04  * Shear (lb/sq ft)       *    0.27  *    0.52  *    0.16  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.44  *    2.86  *    0.12  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *  900.05  * 7013.23  * 1000.51  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  120.57  *  446.29  *  143.87  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  783.18  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  782.71  * Reach Len. (ft)        *  563.67  *  616.43  *  669.71  *
* Crit W.S. (ft)         *  765.91  * Flow Area (sq ft)      * 2177.92  * 3401.83  * 1444.12  *
* E.G. Slope (ft/ft)     *0.000362  * Area (sq ft)           * 2177.92  * 3401.83  * 1444.12  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 4160.65  *20828.16  * 1331.19  *
* Top Width (ft)         *  406.01  * Top Width (ft)         *  141.86  *  117.76  *  146.39  *
* Vel Total (ft/s)       *    3.75  * Avg. Vel. (ft/s)       *    1.91  *    6.12  *    0.92  *
* Max Chl Dpth (ft)      *   35.67  * Hydr. Depth (ft)       *   15.35  *   28.89  *    9.86  *
* Conv. Total (cfs)      *1383422.0  * Conv. (cfs)           *218690.5  *1094762.0  * 69969.4  *
* Length Wtd. (ft)       *  611.62  * Wetted Per. (ft)       *  145.21  *  124.00  *  148.06  *
* Min Ch El (ft)         *  747.04  * Shear (lb/sq ft)       *    0.34  *    0.62  *    0.22  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.65  *    3.80  *    0.20  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 1259.87  * 8463.48  * 1511.83  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  149.66  *  474.18  *  218.44  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  786.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  786.16  * Reach Len. (ft)        *  563.67  *  616.43  *  669.71  *
* Crit W.S. (ft)         *  768.24  * Flow Area (sq ft)      * 2680.72  * 3808.27  * 2017.68  *
* E.G. Slope (ft/ft)     *0.000387  * Area (sq ft)           * 2680.72  * 3808.27  * 2017.68  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 5856.59  *25988.63  * 2154.78  *
* Top Width (ft)         *  473.28  * Top Width (ft)         *  160.02  *  117.76  *  195.49  *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *    2.18  *    6.82  *    1.07  *
* Max Chl Dpth (ft)      *   39.12  * Hydr. Depth (ft)       *   16.75  *   32.34  *   10.32  *
* Conv. Total (cfs)      *1728650.0  * Conv. (cfs)           *297764.4  *1321330.0  *109554.8  *
* Length Wtd. (ft)       *  611.53  * Wetted Per. (ft)       *  164.14  *  124.00  *  198.25  *
* Min Ch El (ft)         *  747.04  * Shear (lb/sq ft)       *    0.39  *    0.74  *    0.25  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.86  *    5.06  *    0.26  *
```

```
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 1784.39  * 9977.36  * 2316.01  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  217.02  *  497.00  *  305.56  *
***************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
***************************************************************************************************
* E.G. Elev (ft)         *  790.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  790.28  * Reach Len. (ft)        *  563.67  *  616.43  *  669.71  *
* Crit W.S. (ft)         *  770.92  * Flow Area (sq ft)      * 3596.48  * 4293.62  * 3022.81  *
* E.G. Slope (ft/ft)     *0.000406  * Area (sq ft)           * 3596.48  * 4293.62  * 3022.81  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 8701.51  *32519.56  * 3278.93  *
* Top Width (ft)         *  640.73  * Top Width (ft)         *  261.59  *  117.76  *  261.38  *
* Vel Total (ft/s)       *    4.08  * Avg. Vel. (ft/s)       *    2.42  *    7.57  *    1.08  *
* Max Chl Dpth (ft)      *   43.24  * Hydr. Depth (ft)       *   13.75  *   36.46  *   11.56  *
* Conv. Total (cfs)      *2208277.0  * Conv. (cfs)            *431805.6  *1613757.0  *162714.2  *
* Length Wtd. (ft)       *  611.08  * Wetted Per. (ft)       *  265.83  *  124.00  *  264.66  *
* Min Ch El (ft)         *  747.04  * Shear (lb/sq ft)       *    0.34  *    0.88  *    0.29  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    0.83  *    6.65  *    0.31  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 3074.09  *12350.84  * 4325.43  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  455.83  *  525.01  *  674.96  *
***************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
***************************************************************************************************
* E.G. Elev (ft)         *  794.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.089  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.28  * Reach Len. (ft)        *  563.67  *  616.43  *  669.71  *
* Crit W.S. (ft)         *  772.75  * Flow Area (sq ft)      * 4405.62  * 4646.55  * 3827.57  *
* E.G. Slope (ft/ft)     *0.000416  * Area (sq ft)           * 4426.69  * 4646.55  * 3827.57  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *11400.38  *37529.68  * 4759.95  *
* Top Width (ft)         *  721.21  * Top Width (ft)         *  329.29  *  117.76  *  274.16  *
* Vel Total (ft/s)       *    4.17  * Avg. Vel. (ft/s)       *    2.59  *    8.08  *    1.24  *
* Max Chl Dpth (ft)      *   46.24  * Hydr. Depth (ft)       *   15.97  *   39.46  *   13.96  *
* Conv. Total (cfs)      *2633516.0  * Conv. (cfs)            *559193.0  *1840845.0  *233477.2  *
* Length Wtd. (ft)       *  610.87  * Wetted Per. (ft)       *  280.49  *  124.00  *  277.81  *
* Min Ch El (ft)         *  747.04  * Shear (lb/sq ft)       *    0.41  *    0.97  *    0.36  *
* Alpha                  *    2.71  * Stream Power (lb/ft s) *    1.05  *    7.85  *    0.44  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 4557.88  *13759.10  * 6507.56  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  660.90  *  532.11  * 1037.97  *
***************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
***************************************************************************************************
* E.G. Elev (ft)         *  796.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *   0.088  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  795.72  * Reach Len. (ft)        *  563.67  *  616.43  *  669.71  *
* Crit W.S. (ft)         *  774.25  * Flow Area (sq ft)      * 5090.37  * 4934.02  * 4501.96  *
* E.G. Slope (ft/ft)     *0.000422  * Area (sq ft)           * 5472.87  * 4934.02  * 4501.96  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *13964.74  *41818.30  * 6216.96  *
* Top Width (ft)         *  933.33  * Top Width (ft)         *  537.19  *  117.76  *  278.37  *
* Vel Total (ft/s)       *    4.27  * Avg. Vel. (ft/s)       *    2.74  *    8.48  *    1.38  *
* Max Chl Dpth (ft)      *   48.68  * Hydr. Depth (ft)       *   17.86  *   41.90  *   16.17  *
* Conv. Total (cfs)      *3016423.0  * Conv. (cfs)            *679412.4  *2034543.0  *302467.2  *
* Length Wtd. (ft)       *  610.69  * Wetted Per. (ft)       *  289.91  *  124.00  *  282.68  *
* Min Ch El (ft)         *  747.04  * Shear (lb/sq ft)       *    0.46  *    1.05  *    0.42  *
* Alpha                  *    2.76  * Stream Power (lb/ft s) *    1.27  *    8.89  *    0.58  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   * 5873.55  *14661.67  * 8578.58  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  800.86  *  533.52  * 1393.92  *
***************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	799.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.088	0.042	0.140
W.S. Elev (ft)	799.03	Reach Len. (ft)	563.67	616.43	669.71
Crit W.S. (ft)	776.11	Flow Area (sq ft)	6052.59	5323.61	5432.37
E.G. Slope (ft/ft)	0.000435	Area (sq ft)	7463.12	5323.61	5432.37
Q Total (cfs)	74720.00	Flow (cfs)	18038.69	48181.98	8499.33
Top Width (ft)	1036.02	Top Width (ft)	634.18	117.76	284.08
Vel Total (ft/s)	4.45	Avg. Vel. (ft/s)	2.98	9.05	1.56
Max Chl Dpth (ft)	51.99	Hydr. Depth (ft)	20.40	45.21	19.12
Conv. Total (cfs)	3581205.0	Conv. (cfs)	864564.4	2309282.0	407358.6
Length Wtd. (ft)	610.40	Wetted Per. (ft)	302.10	124.00	289.27
Min Ch El (ft)	747.04	Shear (lb/sq ft)	0.54	1.17	0.51
Alpha	2.80	Stream Power (lb/ft s)	1.62	10.56	0.80
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	8286.77	16050.60	12572.48
C & E Loss (ft)	0.04	Cum SA (acres)	992.61	535.61	1751.66

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	788.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.	0.090	0.042	0.140
W.S. Elev (ft)	787.76	Reach Len. (ft)	563.67	616.43	669.71
Crit W.S. (ft)	769.19	Flow Area (sq ft)	2983.33	3996.99	2386.54
E.G. Slope (ft/ft)	0.000403	Area (sq ft)	2983.33	3996.99	2386.54
Q Total (cfs)	38000.00	Flow (cfs)	6922.93	28765.67	2311.40
Top Width (ft)	572.91	Top Width (ft)	211.83	117.76	243.32
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	2.32	7.20	0.97
Max Chl Dpth (ft)	40.72	Hydr. Depth (ft)	14.08	33.94	9.81
Conv. Total (cfs)	1892043.0	Conv. (cfs)	344696.8	1432261.0	115086.1
Length Wtd. (ft)	611.19	Wetted Per. (ft)	215.98	124.00	246.43
Min Ch El (ft)	747.04	Shear (lb/sq ft)	0.35	0.81	0.24
Alpha	2.45	Stream Power (lb/ft s)	0.81	5.84	0.24
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	2142.13	10775.18	2833.30
C & E Loss (ft)	0.04	Cum SA (acres)	275.12	507.38	370.24

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 17.922

INPUT
Description:
Station Elevation Data num= 393

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	839.16	31.45	834.78	43.21	832.78	67.6	828.25	86.41	825.72
110.14	821.99	114.78	821.2	124.93	819.64	140.34	817.09	141.91	816.74
155.33	813.86	168.31	811.41	191.04	807.34	205.25	804.52	218.54	802.76
237.82	800.27	241.06	799.62	256.51	796.77	257.91	796.6	264.55	795.76
269.82	796.3	284.07	795.74	292.26	795.51	294.54	795.44	296.44	795.25
297.76	795.44	303	797.74	310.99	797.76	312	797.76	352.52	797.19
354.73	797.19	356.38	797.19	365.73	797.19	369.52	797.22	388.58	797.18
401.99	797.26	408.66	797.2	434.45	797.33	443.59	797.33	457.28	797.07
466.92	796.85	486.29	796.47	499.39	796.13	505.9	795.97	519.56	795.4
521.58	795.35	529.19	795.18	530.5	795.13	532.71	795.1	543.87	795.01
553.5	794.97	564.32	794.91	586.27	794.77	589.34	794.68	599.03	792.91
602.93	792.11	606.25	792.03	609.23	791.96	611.92	792.52	621.16	794.49
625.26	794.49	649.25	794.42	661.94	794.13	687.82	792.86	696.6	792.41
731.38	792.67	738.65	792.71	749.11	793.25	750.92	793.38	754.38	794.26
757.42	795.03	761.37	795.03	762.66	795.03	765.63	794.93	772.06	794.7
773.4	794.74	781.95	794.9	783.47	794.91	787.59	794.91	795.85	794.72
801.61	794.6	812.25	794.71	813.04	794.7	815.3	794.71	822.08	794.73
841.12	794.78	841.77	794.75	845.62	794.62	847.68	794.83	852.74	795.43
861.6	796.21	865.98	796.59	885.48	798.45	913.75	803.62	916.6	804.17
920.54	804.84	940.14	808.43	946.8	810.1	955.43	811.64	965.48	812.85

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  969.92  813.72  975.41  814.67  998.43  818.41 1001.38  818.92 1005.52  819.93
 1010.35  821.17 1013.62   821.5  1018.3  821.86 1021.04  822.15  1041.6  827.23
 1050.84  829.53  1054.1  830.57 1082.73  839.52 1083.25  839.48 1084.27  839.44
 1093.71  839.08 1098.47  840.29 1104.33  841.75 1107.49  842.45  1109.8  842.79
 1118.78  844.41 1128.57  845.42 1144.25  848.49 1155.93  849.98  1181.5  851.64
  1182.7   851.7 1183.29  851.79 1187.77  852.14 1216.19  853.98 1229.36  854.66
 1243.04  854.82 1277.96  855.85  1280.2  855.89 1284.43  855.95 1315.64   856.8
 1338.11  857.71  1348.9  857.83 1375.85  858.68 1379.93   858.7 1381.67  858.73
  1415.2  858.93 1424.22  859.11 1424.91  859.17 1428.78  857.99 1434.37   855.9
  1440.5  856.96 1444.96  857.57 1449.52  858.47 1456.85  859.97 1459.21  860.93
 1462.52  861.49 1465.69  862.15  1476.3  864.08  1483.8  865.44 1496.08  867.69
  1504.4  868.16 1508.88  868.13  1514.5  868.55 1527.83  869.06 1539.03  870.02
 1544.41  870.21 1555.13  870.53 1559.21     871 1559.96  871.13 1571.42  871.61
 1571.57  871.61 1572.34  871.61 1578.89  871.93 1581.16  871.82 1588.96  872.74
 1595.42  873.57 1618.49  877.02 1618.86  877.07 1618.88  877.07 1619.11  877.06
 1627.73  876.65 1629.78  876.76 1645.04  877.51 1658.64  879.09 1664.33  879.76
 1687.19  881.26  1687.8  881.36 1689.89  881.63 1694.77  882.25 1706.17  883.72
 1708.71  884.05 1711.09  884.28 1748.56   889.3 1781.99  894.12 1784.15  894.45
 1786.55   894.8 1798.05  896.04 1803.67  896.66 1804.57  896.66  1804.8  896.67
 1829.22  897.26    1867  898.41 1869.23  898.47 1870.81  898.53 1882.35   899.1
 1913.49  900.25 1926.53  900.75 1937.54  901.14 1943.67  901.36 1945.39  901.41
 1949.35  901.59 1985.68  903.15 2001.84   903.8 2009.38  904.77 2014.14  905.38
 2017.09  905.79 2021.16  905.44 2032.69  904.41 2049.53  904.15 2064.14  903.96
 2076.32  903.92 2090.82  903.53 2099.11  903.21 2115.17  902.59 2131.81  902.26
  2134.6  902.19 2138.68  902.02 2164.51  900.81 2173.45  900.26 2186.54  899.77
 2197.21  899.26 2212.31  898.36 2229.91  897.74 2231.73  897.69  2234.4  897.53
 2262.61  895.59 2282.26  894.34 2290.01  893.84 2295.31  893.42 2309.44     892
 2328.01  890.57 2330.12  890.43 2348.29  889.39 2360.72  888.03 2367.72  887.51
 2377.98  887.01 2393.42  885.81 2417.94  883.28 2422.98  882.53 2429.13  883.29
 2432.99  883.69 2435.93  884.05 2442.79  883.15 2445.35  882.74 2450.02  881.17
  2457.9  878.86 2477.56  875.64  2479.9  875.35 2486.03  874.31 2490.38  874.41
 2503.87     874 2511.88  871.97 2523.97  869.17 2527.86  868.39 2529.04  868.12
 2532.57  867.16 2537.89  865.59  2578.5  854.62 2585.48  854.78 2586.24  854.82
 2597.31  851.23 2640.24  837.59 2646.01  837.91 2647.24  837.97 2653.03  835.92
 2678.55  826.77 2687.72  823.86 2712.99  814.92 2717.41  813.27 2720.42   812.2
 2736.47  806.81 2753.13  801.03 2756.26  800.08 2758.79  799.26 2783.14  792.09
 2787.37  791.59 2799.04  790.33 2800.99  790.05 2807.48  789.14 2808.87  788.96
 2811.33  788.87 2811.99  788.85 2824.67  788.39 2834.18  785.14 2844.66  781.45
 2848.28  780.86 2856.94  779.17 2871.77  775.82 2890.42  769.43 2894.81  767.91
 2902.15  767.07 2918.28  765.33 2923.26  764.82 2960.04  764.69 2976.25  764.64
 2982.86  764.82 3003.11  765.07 3025.01  765.34 3029.67  763.55 3053.54  751.52
    3058  747.21    3078  746.21    3098  747.21 3103.56  751.49 3108.24  756.68
 3113.59  761.28 3121.95   762.6 3122.68  762.72 3124.93  763.16 3127.04  763.57
 3127.34  763.62 3131.76  765.01 3138.01  767.03  3139.9   767.1 3142.17   767.2
 3146.27  767.47 3151.73  767.83 3167.76  769.94 3173.43  770.65 3184.11  770.37
 3204.63  769.79  3210.7  769.68 3225.85  769.12 3242.09  765.82 3247.35  764.72
 3258.97  767.99 3259.65  768.18 3260.02  768.26 3291.12  768.94 3308.54  769.68
 3309.24  769.99 3310.11  770.34 3313.85  771.83 3326.54  776.94 3328.82  777.56
 3331.16  778.31  3332.3  778.84 3339.15   782.1  3345.2  783.68 3352.35  786.06
 3362.12  791.18 3363.81  792.09 3371.78  795.77 3373.66  796.66 3377.75  797.65
 3380.94  798.98 3385.86   800.1 3393.16  800.25 3394.03   800.2 3404.17  800.48
  3405.6  800.49  3417.4   800.5  3422.4  800.24 3430.65  799.74 3437.26  797.28
 3437.82  797.06 3438.38  797.53 3444.72  800.76 3447.03  801.88 3447.19  801.97
 3447.33  802.04 3447.67  802.22 3449.46  802.79  3458.8  805.56 3461.81  807.71
 3487.27  824.06 3489.46  825.25 3491.52  826.41 3496.59  829.49 3499.06  830.56
 3504.52  833.01 3506.05  837.66 3507.42  841.79 3511.34  844.48 3512.98  845.84
  3519.3  847.56 3532.27  851.29 3538.55   852.3 3555.28  855.28 3566.76  861.51
 3578.61  868.61 3586.92  871.49 3595.79  873.51 3605.66  875.23 3627.33  878.52
  3628.2  878.67 3628.89  878.73 3631.56  878.92

Manning's n Values        num=       6
      Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
        0     .14  310.99     .09  787.59    .075 2824.67     .09 3025.01    .042
 3138.01     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3025.01 3138.01           680.06  947.98  943.18             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1500     820       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  775.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
```

```
* W.S. Elev (ft)         *  774.76  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  759.98  * Flow Area (sq ft)      * 1313.32  * 2287.39  * 1064.43  *
* E.G. Slope (ft/ft)     *0.000364  * Area (sq ft)           * 1313.32  * 2287.39  * 1064.43  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1745.33  *10763.57  *  691.10  *
* Top Width (ft)         *  446.25  * Top Width (ft)         *  150.14  *  113.00  *  183.11  *
* Vel Total (ft/s)       *    2.83  * Avg. Vel. (ft/s)       *    1.33  *    4.71  *    0.65  *
* Max Chl Dpth (ft)      *   28.55  * Hydr. Depth (ft)       *    8.75  *   20.24  *    5.81  *
* Conv. Total (cfs)      *692172.5  * Conv. (cfs)            * 91520.5  *564412.8  * 36239.2  *
* Length Wtd. (ft)       *  920.32  * Wetted Per. (ft)       *  151.45  *  124.19  *  185.28  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.20  *    0.42  *    0.13  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    0.26  *    1.97  *    0.08  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   *  477.70  * 5208.49  *  498.37  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   80.13  *  405.09  *  103.00  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  779.72  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  779.37  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  763.97  * Flow Area (sq ft)      * 2047.09  * 2809.07  * 1938.31  *
* E.G. Slope (ft/ft)     *0.000363  * Area (sq ft)           * 2047.09  * 2809.07  * 1938.31  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 3368.92  *15140.53  * 1790.55  *
* Top Width (ft)         *  477.52  * Top Width (ft)         *  169.11  *  113.00  *  195.41  *
* Vel Total (ft/s)       *    2.99  * Avg. Vel. (ft/s)       *    1.65  *    5.39  *    0.92  *
* Max Chl Dpth (ft)      *   33.16  * Hydr. Depth (ft)       *   12.10  *   24.86  *    9.92  *
* Conv. Total (cfs)      *1065752.0  * Conv. (cfs)            *176868.7  *794878.9  * 94004.2  *
* Length Wtd. (ft)       *  912.06  * Wetted Per. (ft)       *  171.00  *  124.19  *  198.44  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.27  *    0.51  *    0.22  *
* Alpha                  *    2.49  * Stream Power (lb/ft s) *    0.45  *    2.76  *    0.20  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *  875.54  * 6971.91  *  977.85  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  118.60  *  444.66  *  141.37  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  782.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  782.54  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  767.25  * Flow Area (sq ft)      * 2607.11  * 3166.49  * 2567.07  *
* E.G. Slope (ft/ft)     *0.000371  * Area (sq ft)           * 2607.11  * 3166.49  * 2567.07  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 4822.40  *18683.01  * 2814.59  *
* Top Width (ft)         *  499.25  * Top Width (ft)         *  183.44  *  113.00  *  202.81  *
* Vel Total (ft/s)       *    3.16  * Avg. Vel. (ft/s)       *    1.85  *    5.90  *    1.10  *
* Max Chl Dpth (ft)      *   36.33  * Hydr. Depth (ft)       *   14.21  *   28.02  *   12.66  *
* Conv. Total (cfs)      *1367203.0  * Conv. (cfs)            *250501.4  *970496.3  *146205.0  *
* Length Wtd. (ft)       *  907.63  * Wetted Per. (ft)       *  185.70  *  124.19  *  206.52  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.32  *    0.59  *    0.29  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    0.60  *    3.48  *    0.32  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 1228.92  * 8417.01  * 1480.99  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  147.56  *  472.55  *  215.75  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  786.46  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  786.00  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  769.50  * Flow Area (sq ft)      * 3259.96  * 3558.13  * 3290.75  *
* E.G. Slope (ft/ft)     *0.000381  * Area (sq ft)           * 3259.96  * 3558.13  * 3290.75  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 6839.23  *23002.54  * 4158.23  *
* Top Width (ft)         *  520.52  * Top Width (ft)         *  193.35  *  113.00  *  214.17  *
* Vel Total (ft/s)       *    3.36  * Avg. Vel. (ft/s)       *    2.10  *    6.46  *    1.26  *
* Max Chl Dpth (ft)      *   39.79  * Hydr. Depth (ft)       *   16.86  *   31.49  *   15.37  *
* Conv. Total (cfs)      *1742219.0  * Conv. (cfs)            *350453.9  *1178690.0  *213075.0  *
* Length Wtd. (ft)       *  902.50  * Wetted Per. (ft)       *  196.21  *  124.19  *  218.39  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.40  *    0.68  *    0.36  *
```

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* Alpha                  *    2.60  * Stream Power (lb/ft s) *    0.83  *    4.40  *    0.45  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 1745.95  * 9925.24  * 2275.21  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  214.73  *  495.37  *  302.42  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  790.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  790.14  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  771.99  * Flow Area (sq ft)      * 4108.64  * 4025.62  * 4193.37  *
* E.G. Slope (ft/ft)     *0.000389  * Area (sq ft)           * 4108.64  * 4025.62  * 4193.37  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 9815.74  *28556.79  * 6127.47  *
* Top Width (ft)         *  559.77  * Top Width (ft)         *  224.64  *  113.00  *  222.12  *
* Vel Total (ft/s)       *    3.61  * Avg. Vel. (ft/s)       *    2.39  *    7.09  *    1.46  *
* Max Chl Dpth (ft)      *   43.93  * Hydr. Depth (ft)       *   18.29  *   35.62  *   18.88  *
* Conv. Total (cfs)      *2256327.0  * Conv. (cfs)            *497697.1  *1447943.0  *310687.3  *
* Length Wtd. (ft)       *  897.09  * Wetted Per. (ft)       *  227.98  *  124.19  *  227.36  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.44  *    0.79  *    0.45  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    1.05  *    5.58  *    0.65  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   * 3024.24  *12291.97  * 4269.95  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  452.69  *  523.38  *  671.24  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  793.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.13  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  773.63  * Flow Area (sq ft)      * 4816.81  * 4363.51  * 4866.16  *
* E.G. Slope (ft/ft)     *0.000402  * Area (sq ft)           * 4860.02  * 4363.51  * 4866.16  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *12640.78  *33215.84  * 7833.37  *
* Top Width (ft)         *  667.86  * Top Width (ft)         *  326.81  *  113.00  *  228.05  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *    2.62  *    7.61  *    1.61  *
* Max Chl Dpth (ft)      *   46.92  * Hydr. Depth (ft)       *   19.63  *   38.62  *   21.34  *
* Conv. Total (cfs)      *2676936.0  * Conv. (cfs)            *630258.3  *1656113.0  *390565.1  *
* Length Wtd. (ft)       *  892.71  * Wetted Per. (ft)       *  249.00  *  124.19  *  234.01  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.49  *    0.88  *    0.52  *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    1.27  *    6.72  *    0.84  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   * 4497.79  *13695.35  * 6440.73  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  656.65  *  530.48  * 1034.10  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  796.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  795.56  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  774.91  * Flow Area (sq ft)      * 5423.47  * 4638.24  * 5427.00  *
* E.G. Slope (ft/ft)     *0.000414  * Area (sq ft)           * 5909.45  * 4638.24  * 5427.00  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *15289.89  *37327.82  * 9382.29  *
* Top Width (ft)         *  946.08  * Top Width (ft)         *  599.76  *  113.00  *  233.32  *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *    2.82  *    8.05  *    1.73  *
* Max Chl Dpth (ft)      *   49.35  * Hydr. Depth (ft)       *   21.38  *   41.05  *   23.26  *
* Conv. Total (cfs)      *3045398.0  * Conv. (cfs)            *751029.1  *1833517.0  *460851.8  *
* Length Wtd. (ft)       *  889.27  * Wetted Per. (ft)       *  257.61  *  124.19  *  239.81  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.54  *    0.97  *    0.59  *
* Alpha                  *    2.58  * Stream Power (lb/ft s) *    1.54  *    7.78  *    1.01  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 5799.91  *14593.94  * 8502.26  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  793.50  *  531.89  * 1389.99  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
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         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  799.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.089  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  798.85  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  776.63  * Flow Area (sq ft)      * 6276.38  * 5010.00  * 6216.51  *
* E.G. Slope (ft/ft)     *0.000436  * Area (sq ft)           * 8457.01  * 5010.00  * 6216.51  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *19461.56  *43533.04  *11725.40  *
* Top Width (ft)         * 1270.83  * Top Width (ft)         *  907.27  *  113.00  *  250.55  *
* Vel Total (ft/s)       *    4.27  * Avg. Vel. (ft/s)       *    3.10  *    8.69  *    1.89  *
* Max Chl Dpth (ft)      *   52.64  * Hydr. Depth (ft)       *   23.70  *   44.34  *   24.81  *
* Conv. Total (cfs)      *3578585.0  * Conv. (cfs)            *932077.9  *2084940.0  *561567.5  *
* Length Wtd. (ft)       *  884.89  * Wetted Per. (ft)        *  269.26  *  124.19  *  258.46  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.63  *    1.10  *    0.65  *
* Alpha                  *    2.58  * Stream Power (lb/ft s) *    1.97  *    9.54  *    1.23  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   * 8183.76  *15977.48  *12482.93  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  982.63  *  533.98  * 1747.55  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  788.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  787.62  * Reach Len. (ft)        *  680.06  *  947.98  *  943.18  *
* Crit W.S. (ft)         *  770.54  * Flow Area (sq ft)      * 3576.16  * 3740.69  * 3639.35  *
* E.G. Slope (ft/ft)     *0.000387  * Area (sq ft)           * 3576.16  * 3740.69  * 3639.35  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 7906.62  *25191.18  * 4902.21  *
* Top Width (ft)         *  528.39  * Top Width (ft)         *  198.08  *  113.00  *  217.31  *
* Vel Total (ft/s)       *    3.47  * Avg. Vel. (ft/s)       *    2.21  *    6.73  *    1.35  *
* Max Chl Dpth (ft)      *   41.41  * Hydr. Depth (ft)       *   18.05  *   33.10  *   16.75  *
* Conv. Total (cfs)      *1932644.0  * Conv. (cfs)            *402123.2  *1281199.0  *249321.5  *
* Length Wtd. (ft)       *  900.44  * Wetted Per. (ft)        *  201.20  *  124.19  *  221.93  *
* Min Ch El (ft)         *  746.21  * Shear (lb/sq ft)       *    0.43  *    0.73  *    0.40  *
* Alpha                  *    2.60  * Stream Power (lb/ft s) *    0.95  *    4.90  *    0.53  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   * 2099.69  *10720.43  * 2786.97  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  272.46  *  505.74  *  366.70  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 17.742

INPUT
Description: Tributary basin on Left blocked out.
Station Elevation Data    num=     372
      Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
        0  840.31   13.37  840.31   32.45  840.43   34.46  840.41   44.63  840.14
    59.38  840.05   67.63  839.84   87.68  839.15  111.05  838.28  120.34  837.81
   127.97  837.43   144.9  835.59  154.41  834.53  162.13  833.91  193.64  831.32
   198.07  830.06  212.32  825.74  227.21  822.62  238.77  819.92  253.07  815.73
   262.82  812.97  281.23  807.48  291.44  804.44   319.9  799.01     320  798.99
   320.01  798.98  320.06  798.96  331.01  793.94  332.74  793.72  336.47  793.07
    346.3  788.35  361.48  780.31  367.15  776.16   369.5  774.35  382.04  768.51
   384.32  767.43   384.7  767.38  396.38  765.64  446.03  764.97   461.6  764.77
   463.87  764.74  468.08  764.73  473.32  764.83  476.59  764.89  531.15  766.13
   534.45  766.19  547.66  766.16     565  766.65  568.86   766.6  573.17  763.77
    573.5  763.54  575.31  763.48  584.15  763.39  584.74  763.67  591.41  765.36
   604.13  765.95  616.05  766.72  627.12  773.05  629.53  774.24  633.36  776.93
   646.34   784.8   652.1  788.09  658.88  792.28  661.47  793.44  662.66  793.76
   665.75  794.07  669.74  794.08  676.76  793.72  686.37  793.52  693.62  793.46
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  705.65  793.15  716.63  793.12  732.98  793.24  747.69  792.82  757.54  792.66
  768.09   792.1  770.01     792  772.83  791.84  776.99   791.1  781.73   790.2
  783.64  789.51  784.52  789.45  791.58  789.11  813.64  789.16  821.69   788.8
  823.49  788.36  826.84  788.37  827.87  788.31  829.87  788.76  829.99  788.76
  832.12  789.13  834.93  789.93  837.06  789.69  839.93  789.49  855.09  790.81
  856.16  790.94   856.5  790.97  872.23  793.17  888.13  793.22  896.17  793.25
  906.66  790.22  908.52   789.7   911.5  788.94  928.91  784.51  930.27  784.35
  932.69  784.01  935.35   784.3  936.52  784.41  948.64   784.8  974.26  786.36
  984.13  789.52  990.72  791.68  996.57  792.94  998.43   793.4  1000.6  793.57
 1006.98  794.03 1007.02  794.03 1011.25  794.03 1012.48  794.03  1022.9   793.4
 1026.74  793.16  1031.8  793.45 1033.99  793.57 1034.78  793.57 1037.92  793.58
 1039.06  793.58 1039.94  793.59 1042.69  793.21 1051.74  791.95 1056.97  792.47
 1064.68  793.19 1081.17  793.16 1093.48  793.14 1095.19  792.61 1099.74   791.3
 1103.79  792.44 1106.26  792.99 1108.56   793.4 1109.86  793.48 1131.46  796.25
  1147.7   798.3 1150.49  798.68  1158.3  799.96 1173.19  802.32 1177.18  802.96
 1201.62  808.22 1206.68  809.16 1225.72  812.85 1234.69  814.88 1240.17  815.81
 1253.07  818.41 1265.67  820.55 1285.69  824.78 1293.22  826.79 1298.04  826.28
 1305.63  825.53 1318.19  827.57 1326.75  829.05 1332.31  830.06 1348.13  833.13
  1366.8  837.02 1366.96  837.05  1377.2  839.71 1389.45  842.29 1407.74  848.57
 1407.95  848.65 1408.14  848.63 1418.05  847.53 1419.82  847.89 1426.77  849.31
 1443.23  854.57 1449.83  856.88 1458.52  859.63 1479.72  865.63 1484.55  867.19
 1507.12   874.7 1518.86  877.84 1526.22  879.72 1533.19  881.57 1545.32   884.7
 1558.14   887.3 1569.73   889.6 1579.55  890.15 1602.62  891.41 1607.54  891.74
 1636.69  893.62 1640.82  893.84 1644.72  893.99 1675.96  895.84 1679.01  896.09
  1681.9  896.34 1715.24  898.57 1717.21  898.64 1719.08  898.73 1754.51  899.71
 1755.41  899.71 1756.26  899.69 1787.27  900.13 1793.44  900.22 1793.79  900.22
 1812.71  899.82 1830.62  900.38 1833.06   900.4 1850.91  900.19  1867.8  900.61
    1870  900.61 1872.34  900.65 1904.98  899.94 1911.61  899.69  1927.3  899.58
 1942.16  898.85 1950.89  898.61  1965.5   898.5 1979.33  898.21  1984.6  898.17
 1990.16  898.04 2016.51  897.78 2029.44  897.65  2041.9  897.56 2053.69  897.45
    2061  897.43 2068.71  897.34 2082.16  896.86 2115.29  895.78 2128.05  895.24
 2147.26  894.45 2165.23  893.84 2175.59  893.68 2186.53  893.28 2202.41  892.92
 2225.81  892.04 2235.64  891.23 2237.45  891.14 2240.64  890.91 2256.25  889.54
 2265.14  888.92 2278.96  888.18 2287.11  887.49    2299  886.62 2299.14  886.61
 2308.59  886.12 2321.78  887.37 2322.34  887.45  2322.5  887.44  2327.6  887.05
 2334.77  885.65  2341.3  884.36 2345.26  884.35 2351.12  883.47 2359.95  882.99
 2382.91  880.95  2388.3  880.73 2422.18   878.5 2423.88  878.26 2425.48  877.91
 2461.46  869.82 2462.08  869.68 2462.66  869.55 2484.01  864.23 2499.84  860.28
 2500.73  860.06 2519.37  855.64 2537.02  851.77  2541.8  850.57 2548.95  848.53
 2551.55  848.61 2560.93  848.99 2563.05  849.08 2572.47  846.13 2577.11  844.62
 2579.28  843.99 2611.38  836.38 2614.87  835.58 2618.56  834.77 2636.49  831.07
 2640.85  830.19 2650.91  830.26 2655.96  830.36 2659.21  829.54 2668.94  827.14
 2685.73  823.02 2697.11  820.16 2710.36  816.65 2722.91  813.23 2729.46  811.42
 2736.38  809.37 2760.09  803.46 2767.66  801.76 2775.66  799.77  2797.7  795.32
 2810.41  792.78 2812.87  792.52 2821.15   791.8 2839.91   790.1 2844.81  789.73
 2862.68  789.45 2876.74  789.18  2878.2  789.13 2883.04  787.24 2891.57  783.89
 2898.62  781.25 2916.41  778.58 2923.53  777.65 2937.14   772.9 2943.35   770.7
 2946.99  769.88 2953.19  768.05 2961.27  767.16 2964.44  766.94 2976.31  766.19
 2988.43  764.42 2991.11  764.04 2996.28  764.14 3005.19  764.17 3028.54  764.25
 3042.89   757.5 3054.78  751.68    3064  746.59    3084  745.59    3109  746.59
 3113.86  751.49 3117.13  756.55  3117.7  757.71 3124.87  760.87 3127.08  761.77
 3128.64  762.78 3132.56  765.12 3141.36   767.1 3145.14  767.86  3145.5  768.08
 3147.04  768.13 3148.08  768.16 3150.89  768.18 3171.42  768.04 3186.62     770
 3191.27  772.33 3200.52  777.08 3213.79  784.49  3221.8  788.88 3224.04  788.87
 3230.86  788.74 3239.85  788.77 3254.36  788.82 3258.79  788.74 3261.22  788.72
  3269.7  795.76 3270.03  795.93 3270.61  796.48 3279.39  803.44 3285.57  808.07
 3299.63  815.24 3302.37  817.17 3307.73  821.56 3313.37  827.13 3316.11  829.18
 3322.39   834.4 3327.67  838.45 3328.18  840.37 3334.98  847.82 3337.36  848.25
 3342.14  848.55 3347.64   853.3 3353.11  856.63 3355.53   857.5 3359.69  859.24
 3367.04  861.09 3370.05  862.08 3394.82  874.84 3406.53  880.15 3413.32   880.7
 3416.15  880.86 3417.94   880.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .14 1033.99    .075 2876.74     .09 3028.54    .042 3141.36     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3028.54 3141.36          1086.38 1081.85  861.44             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 1900.33  880.12       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0  701.54     785
```

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	774.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.090	0.042	0.140
W.S. Elev (ft)	774.33	Reach Len. (ft)	1086.38	1081.85	861.44
Crit W.S. (ft)	758.47	Flow Area (sq ft)	752.21	2398.04	288.34
E.G. Slope (ft/ft)	0.000391	Area (sq ft)	752.21	2398.04	288.34
Q Total (cfs)	13200.00	Flow (cfs)	964.31	12053.25	182.45
Top Width (ft)	262.11	Top Width (ft)	95.49	112.82	53.80
Vel Total (ft/s)	3.84	Avg. Vel. (ft/s)	1.28	5.03	0.63
Max Chl Dpth (ft)	28.74	Hydr. Depth (ft)	7.88	21.26	5.36
Conv. Total (cfs)	667415.8	Conv. (cfs)	48757.1	609433.8	9224.9
Length Wtd. (ft)	1077.10	Wetted Per. (ft)	96.70	124.56	55.10
Min Ch El (ft)	745.59	Shear (lb/sq ft)	0.19	0.47	0.13
Alpha	1.57	Stream Power (lb/ft s)	0.24	2.36	0.08
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	461.58	5157.51	483.73
C & E Loss (ft)	0.01	Cum SA (acres)	78.22	402.63	100.43

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	779.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.090	0.042	0.140
W.S. Elev (ft)	778.82	Reach Len. (ft)	1086.38	1081.85	861.44
Crit W.S. (ft)	762.10	Flow Area (sq ft)	1213.82	2905.35	549.70
E.G. Slope (ft/ft)	0.000448	Area (sq ft)	1213.82	2905.35	549.70
Q Total (cfs)	20300.00	Flow (cfs)	2033.00	17753.06	513.95
Top Width (ft)	288.85	Top Width (ft)	113.75	112.82	62.28
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)	1.67	6.11	0.93
Max Chl Dpth (ft)	33.23	Hydr. Depth (ft)	10.67	25.75	8.83
Conv. Total (cfs)	959518.6	Conv. (cfs)	96093.5	839132.4	24292.7
Length Wtd. (ft)	1072.49	Wetted Per. (ft)	115.60	124.56	64.70
Min Ch El (ft)	745.59	Shear (lb/sq ft)	0.29	0.65	0.24
Alpha	1.74	Stream Power (lb/ft s)	0.49	3.98	0.22
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	850.09	6909.73	950.92
C & E Loss (ft)	0.00	Cum SA (acres)	116.39	442.20	138.58

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	782.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.	0.090	0.042	0.140
W.S. Elev (ft)	781.89	Reach Len. (ft)	1086.38	1081.85	861.44
Crit W.S. (ft)	764.74	Flow Area (sq ft)	1592.55	3250.80	748.80
E.G. Slope (ft/ft)	0.000491	Area (sq ft)	1592.55	3250.80	748.80
Q Total (cfs)	26320.00	Flow (cfs)	3039.16	22433.36	847.48
Top Width (ft)	312.20	Top Width (ft)	131.62	112.82	67.77
Vel Total (ft/s)	4.71	Avg. Vel. (ft/s)	1.91	6.90	1.13
Max Chl Dpth (ft)	36.30	Hydr. Depth (ft)	12.10	28.81	11.05
Conv. Total (cfs)	1187253.0	Conv. (cfs)	137091.8	1011933.0	38228.5
Length Wtd. (ft)	1069.94	Wetted Per. (ft)	133.77	124.56	70.98
Min Ch El (ft)	745.59	Shear (lb/sq ft)	0.37	0.80	0.32
Alpha	1.85	Stream Power (lb/ft s)	0.70	5.53	0.37
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	1196.13	8347.18	1445.09
C & E Loss (ft)	0.00	Cum SA (acres)	145.10	470.09	212.82

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	786.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.090	0.042	0.140
W.S. Elev (ft)	785.24	Reach Len. (ft)	1086.38	1081.85	861.44
Crit W.S. (ft)	767.69	Flow Area (sq ft)	2049.41	3629.61	986.44
E.G. Slope (ft/ft)	0.000533	Area (sq ft)	2138.90	3629.61	986.44
Q Total (cfs)	34000.00	Flow (cfs)	4606.15	28080.25	1313.60
Top Width (ft)	651.87	Top Width (ft)	465.24	112.82	73.80

```
* Vel Total (ft/s)       *    5.10  * Avg. Vel. (ft/s)       *    2.25  *    7.74  *    1.33  *
* Max Chl Dpth (ft)      *   39.65  * Hydr. Depth (ft)       *   14.60  *   32.17  *   13.37  *
* Conv. Total (cfs)      *1472351.0  * Conv. (cfs)           *199466.7  *1216000.0  * 56884.7  *
* Length Wtd. (ft)       * 1067.65  * Wetted Per. (ft)       *  143.18  *  124.56  *   77.89  *
* Min Ch El (ft)         *  745.59  * Shear (lb/sq ft)       *    0.48  *    0.97  *    0.42  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    1.07  *    7.51  *    0.56  *
* Frctn Loss (ft)        *    0.60  * Cum Volume (acre-ft)   * 1703.81  * 9847.03  * 2228.90  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  209.59  *  492.91  *  299.30  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  790.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  789.20  * Reach Len. (ft)        * 1086.38  * 1081.85  *  861.44  *
* Crit W.S. (ft)         *  770.66  * Flow Area (sq ft)      * 2625.07  * 4076.05  * 1309.11  *
* E.G. Slope (ft/ft)     *0.000593  * Area (sq ft)           * 4144.16  * 4076.05  * 1309.11  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 6952.27  *35933.27  * 1614.46  *
* Top Width (ft)         *  810.76  * Top Width (ft)         *  577.50  *  112.82  *  120.44  *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *    2.65  *    8.82  *    1.23  *
* Max Chl Dpth (ft)      *   43.61  * Hydr. Depth (ft)       *   17.18  *   36.13  *   10.87  *
* Conv. Total (cfs)      *1827102.0  * Conv. (cfs)           *285449.6  *1475365.0  * 66287.1  *
* Length Wtd. (ft)       * 1066.51  * Wetted Per. (ft)       *  156.34  *  124.56  *  125.63  *
* Min Ch El (ft)         *  745.59  * Shear (lb/sq ft)       *    0.62  *    1.21  *    0.39  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    1.65  *   10.68  *    0.48  *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)   * 2959.82  *12203.82  * 4210.38  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  446.42  *  520.92  *  667.53  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  793.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  792.10  * Reach Len. (ft)        * 1086.38  * 1081.85  *  861.44  *
* Crit W.S. (ft)         *  772.73  * Flow Area (sq ft)      * 3181.08  * 4402.69  * 1662.86  *
* E.G. Slope (ft/ft)     *0.000625  * Area (sq ft)           * 6061.09  * 4402.69  * 1662.86  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 9329.28  *41949.03  * 2411.70  *
* Top Width (ft)         *  964.54  * Top Width (ft)         *  727.79  *  112.82  *  123.93  *
* Vel Total (ft/s)       *    5.81  * Avg. Vel. (ft/s)       *    2.93  *    9.53  *    1.45  *
* Max Chl Dpth (ft)      *   46.51  * Hydr. Depth (ft)       *   15.09  *   39.02  *   13.42  *
* Conv. Total (cfs)      *2147184.0  * Conv. (cfs)           *373098.8  *1677636.0  * 96449.3  *
* Length Wtd. (ft)       * 1064.80  * Wetted Per. (ft)       *  214.40  *  124.56  *  130.16  *
* Min Ch El (ft)         *  745.59  * Shear (lb/sq ft)       *    0.58  *    1.38  *    0.50  *
* Alpha                  *    2.15  * Stream Power (lb/ft s) *    1.70  *   13.15  *    0.72  *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   * 4412.54  *13599.96  * 6370.04  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  648.42  *  528.02  * 1030.29  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  795.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  794.45  * Reach Len. (ft)        * 1086.38  * 1081.85  *  861.44  *
* Crit W.S. (ft)         *  774.36  * Flow Area (sq ft)      * 3699.66  * 4668.53  * 1958.21  *
* E.G. Slope (ft/ft)     *0.000650  * Area (sq ft)           * 8134.64  * 4668.53  * 1958.21  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *11659.62  *47170.21  * 3170.16  *
* Top Width (ft)         * 1253.62  * Top Width (ft)         * 1014.03  *  112.82  *  126.76  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *    3.15  *   10.10  *    1.62  *
* Max Chl Dpth (ft)      *   48.86  * Hydr. Depth (ft)       *   16.33  *   41.38  *   15.45  *
* Conv. Total (cfs)      *2431411.0  * Conv. (cfs)           *457247.3  *1849841.0  *124321.9  *
* Length Wtd. (ft)       * 1063.64  * Wetted Per. (ft)       *  230.30  *  124.56  *  133.85  *
* Min Ch El (ft)         *  745.59  * Shear (lb/sq ft)       *    0.65  *    1.52  *    0.59  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    2.06  *   15.37  *    0.96  *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   * 5690.28  *14492.67  * 8422.30  *
```

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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  780.91  *  529.43  * 1386.09  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  799.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *   0.089  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  797.63  * Reach Len. (ft)        * 1086.38  * 1081.85  *  861.44  *
* Crit W.S. (ft)         *  776.65  * Flow Area (sq ft)      * 4445.29  * 5027.40  * 2367.67  *
* E.G. Slope (ft/ft)     *0.000688  * Area (sq ft)           *11435.97  * 5027.40  * 2367.67  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *15439.61  *54913.69  * 4366.69  *
* Top Width (ft)         * 1305.27  * Top Width (ft)         * 1061.75  *  112.82  *  130.70  *
* Vel Total (ft/s)       *    6.31  * Avg. Vel. (ft/s)       *    3.47  *   10.92  *    1.84  *
* Max Chl Dpth (ft)      *   52.04  * Hydr. Depth (ft)       *   18.35  *   44.56  *   18.11  *
* Conv. Total (cfs)      *2847713.0  * Conv. (cfs)           *588431.3  *2092859.0  *166422.5  *
* Length Wtd. (ft)       * 1062.32  * Wetted Per. (ft)       *  246.42  *  124.56  *  138.93  *
* Min Ch El (ft)         *  745.59  * Shear (lb/sq ft)       *    0.78  *    1.73  *    0.73  *
* Alpha                  *    2.27  * Stream Power (lb/ft s) *    2.69  *   18.95  *    1.35  *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)   * 8028.48  *15868.26  *12389.99  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  967.26  *  531.52  * 1743.43  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  787.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.090  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  786.80  * Reach Len. (ft)        * 1086.38  * 1081.85  *  861.44  *
* Crit W.S. (ft)         *  768.99  * Flow Area (sq ft)      * 2271.51  * 3805.57  * 1103.77  *
* E.G. Slope (ft/ft)     *0.000554  * Area (sq ft)           * 2895.51  * 3805.57  * 1103.77  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 5464.04  *30964.89  * 1571.06  *
* Top Width (ft)         *  690.22  * Top Width (ft)         *  500.75  *  112.82  *   76.65  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *    2.41  *    8.14  *    1.42  *
* Max Chl Dpth (ft)      *   41.21  * Hydr. Depth (ft)       *   15.73  *   33.73  *   14.40  *
* Conv. Total (cfs)      *1614785.0  * Conv. (cfs)           *232190.9  *1315833.0  * 66761.2  *
* Length Wtd. (ft)       * 1066.74  * Wetted Per. (ft)       *  147.45  *  124.56  *   81.13  *
* Min Ch El (ft)         *  745.59  * Shear (lb/sq ft)       *    0.53  *    1.06  *    0.47  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    1.28  *    8.59  *    0.67  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   * 2049.17  *10638.32  * 2735.62  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  267.01  *  503.29  *  363.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 17.537

INPUT
Description:
Station Elevation Data    num=     337
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  852.67   23.01  849.93   57.22   845.6   58.26  845.47   58.97  845.39
   74.24  843.18   82.58  841.97  113.41  838.42  113.42  838.42  146.51  834.98
  167.42   832.6  181.21  831.28  187.11  830.57  200.54   829.2  229.54  826.16
  247.47  822.64  250.34  822.13   268.8  819.04  272.31  818.41  292.51  815.34
  297.36  814.65  298.39   814.6  309.24  814.29  321.72  813.78  338.27  812.68
  346.42   812.3  354.67  812.04   368.8  811.89  372.88  811.81  376.99  811.53
  385.02  810.92  399.86  809.85  408.52  808.96  412.92  808.69  414.28  808.47
  419.12  808.48  431.68  808.54  447.27  809.59  448.03  809.64  479.05  808.69
  482.54  808.83  495.81  809.02  519.23  808.34  523.25  808.07  528.93  806.97
  553.36  802.05  576.14  799.94  603.59  796.93  625.76  795.84  640.79  795.05
  641.66  795.01  670.89  794.17   675.2  794.02  690.33  793.54  709.52  792.93
  711.96  792.38  714.69  791.26  721.63  789.33   723.3  788.86  724.34  788.59
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  725.39  788.33  726.81  787.96  733.37  786.34  736.73  785.86   739.1  785.59
  746.55     785  757.43  783.64  772.58  784.79  776.01  785.09  782.59  784.98
  797.31  784.12  806.06  787.94  813.47  791.23  822.54  791.37  826.12  791.38
  827.33  791.18  836.43  787.61  841.45  785.55  845.03  784.16  864.09   778.3
  864.23  778.27  864.36  778.29  874.21  780.03  876.03  779.99  880.71  780.56
  886.83  782.73   890.8  783.23  894.09  784.05  902.76  787.83  911.64  791.54
  916.42  791.84  917.36  791.91  918.68  792.03  924.64  792.59  928.74  792.59
  929.79  792.59  931.23  792.42  938.24  791.58  943.26  792.19  946.01  792.52
  950.37  792.52  951.61  792.52  953.23  792.21  958.72  791.11  960.79  791.06
  971.29  790.61 1004.03   789.1 1009.81   788.8 1011.39  788.62 1015.81  788.12
 1024.51   787.1 1035.94  785.39 1042.43  784.43 1052.84  781.08 1068.23  774.42
 1076.46  771.26 1079.14  770.26 1083.11  769.18 1093.55  765.59 1107.26  760.45
 1111.87  758.68 1114.09  757.34  1114.9  756.88 1116.47  756.71 1119.09  756.57
 1123.43  757.71 1124.22  757.95 1124.89  758.23 1125.98  758.81 1139.28  765.52
 1141.64  766.87 1149.04  770.29  1155.8  771.09 1160.86  771.94 1177.46  781.29
 1185.17  785.47 1188.88  787.51 1193.54  791.12 1196.83  793.17 1201.14  793.64
 1207.22  794.41 1210.75  794.48 1227.42  794.44 1238.93  794.45 1240.39  794.45
 1241.45  794.56 1250.93  795.39 1263.55  798.59 1287.11  804.77 1303.94  808.09
 1309.16   809.2 1338.91  815.62 1344.66  816.77 1351.64  818.14 1391.58  827.06
 1403.53  829.62 1408.03  830.78 1410.98  830.47 1418.39  829.47 1448.32  838.49
 1448.83  838.64 1449.28  838.76  1449.5  838.82 1449.73  838.89 1450.55  839.11
 1460.87  842.16 1481.73  848.35 1490.29  848.49 1492.37  848.49 1493.06   848.7
 1513.76  854.46 1521.59  856.73 1536.47  861.18 1548.73  864.59 1564.07   869.5
  1583.7  875.47 1594.02  878.68  1609.3  882.44  1621.2   885.6 1623.86  885.73
  1651.6  885.92 1653.75  885.86  1673.3  884.48 1680.45  883.97 1687.53   882.3
 1691.53  881.34 1709.11  877.39 1723.58   872.8 1734.01  869.36 1758.55  861.16
 1775.19  855.78 1780.79  854.03 1796.65  852.94 1796.93  852.92 1817.28  845.99
  1824.2  843.67 1828.49  842.23 1843.38  837.03 1861.47   830.4 1863.46  829.77
 1883.41  825.83 1886.63  825.44 1894.56  825.89 1898.51  826.05 1912.41  822.35
  1920.1  819.86  1933.4   816.6 1946.44   813.3 1958.47  810.31 1968.37  807.27
 1988.93  801.18 1996.83  799.09 2003.34  797.27 2021.56  792.74 2029.54  791.16
 2046.68   789.9 2062.66  788.51 2065.06     788 2068.78  787.29 2068.95  787.28
 2082.81  786.57 2090.36  786.19 2095.62  783.84 2103.09  781.11 2114.85  776.29
 2116.15     776 2126.32   773.5  2128.2  773.11 2134.79  771.14 2137.05   770.5
 2140.03  769.82 2144.02  769.63 2146.08  769.17 2165.98  766.96 2166.85  766.89
  2168.3  766.81 2173.62  766.74  2175.1  766.72 2184.32  766.59 2190.31  766.26
 2191.45  766.21 2195.87  765.59 2199.49  765.31 2201.02  764.28 2211.02  758.58
 2214.58  755.98 2219.85  753.11 2221.94  751.79    2228  745.89    2248  744.89
    2268  745.89 2274.64  751.49 2280.41  754.37 2284.32  757.45 2290.22  760.16
 2290.41  760.27 2290.71  760.39 2299.34  763.73 2301.52  765.86 2304.73  766.84
    2305  766.96 2309.33  768.15 2314.22  768.29 2320.68  768.49 2330.97  768.81
 2334.34  768.89 2360.88  769.11 2364.85  769.15 2367.13  769.24 2370.17  769.11
  2394.6  768.97 2407.89  769.38 2426.18  769.15 2455.19  768.44 2462.75  768.36
 2467.19  768.23 2488.43  767.78 2501.72  767.59 2506.62   768.4 2512.03  769.31
 2516.42  770.04 2526.22  771.23  2528.8   771.5 2532.22  771.94 2539.46  772.79
 2547.42  772.78 2553.89  772.69 2579.13  772.47 2586.62  772.41  2599.9  772.63
 2615.84  772.74 2618.72   772.8 2636.68  773.31  2639.5   773.4  2665.6  774.08
 2705.97  774.97 2718.63  775.16 2731.13  775.56 2756.22  776.47  2762.9  777.16
 2775.83  778.33 2781.91  778.94 2785.89  779.69 2795.79  781.64    2814  782.44
 2817.16   782.6 2823.59  782.14 2842.73  780.79  2846.9  780.27 2848.57  780.07
 2850.63  780.87 2856.85  783.12 2867.98  787.83 2879.94   793.3 2899.38  801.33
 2903.98  803.26 2931.99  812.87 2933.48  813.39 2934.21  813.82 2949.64   823.1
 2955.68  831.52 2966.96  842.48 2971.64  844.03 2975.15  845.09 2977.41   843.8
 2979.08  841.84  2983.5  835.72 2985.55  838.28 2997.17  850.94 3001.49  851.91
 3007.15   852.9 3007.82     853 3008.26  853.06 3008.35  853.08 3014.87  853.69
  3017.7  853.96 3033.41  853.67

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .09  346.42     .14  950.37    .075 2090.36     .09 2191.45    .042
 2309.33     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2191.45 2309.33          992.42   993.3  1050.7             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1649.78  865.55       F
 2446.37 3033.41     805       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0    1250     785

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
```

```
* E.G. Elev (ft)         *  774.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.090  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  773.79  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  758.71  * Flow Area (sq ft)      *  351.31  * 2320.34  *  661.04  *
* E.G. Slope (ft/ft)     *0.000491  * Area (sq ft)           *  351.31  * 2320.34  * 1215.07  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  387.77  *12397.98  *  414.24  *
* Top Width (ft)         *  529.46  * Top Width (ft)         *   66.32  *  117.88  *  345.26  *
* Vel Total (ft/s)       *    3.96  * Avg. Vel. (ft/s)       *    1.10  *    5.34  *    0.63  *
* Max Chl Dpth (ft)      *   28.90  * Hydr. Depth (ft)       *    5.30  *   19.68  *    4.82  *
* Conv. Total (cfs)      *595624.3  * Conv. (cfs)            * 17497.6  *559434.8  * 18692.0  *
* Length Wtd. (ft)       *  997.29  * Wetted Per. (ft)       *   67.05  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.16  *    0.55  *    0.15  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    0.18  *    2.91  *    0.09  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *  447.82  * 5098.91  *  468.86  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   76.20  *  399.77  *   96.48  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  778.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.090  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  778.26  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  762.42  * Flow Area (sq ft)      *  685.50  * 2847.27  * 1273.62  *
* E.G. Slope (ft/ft)     *0.000522  * Area (sq ft)           *  685.50  * 2847.27  * 3106.53  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1057.54  *17969.00  * 1273.46  *
* Top Width (ft)         *  665.06  * Top Width (ft)         *   81.41  *  117.88  *  465.76  *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)       *    1.54  *    6.31  *    1.00  *
* Max Chl Dpth (ft)      *   33.37  * Hydr. Depth (ft)       *    8.42  *   24.15  *    9.29  *
* Conv. Total (cfs)      *888892.6  * Conv. (cfs)            * 46307.5  *786823.3  * 55761.8  *
* Length Wtd. (ft)       *  999.58  * Wetted Per. (ft)       *   82.83  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.27  *    0.71  *    0.30  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    0.42  *    4.49  *    0.30  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *  826.40  * 6838.30  *  914.76  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  113.96  *  439.34  *  133.35  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  781.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.090  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  781.31  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  764.89  * Flow Area (sq ft)      *  944.63  * 3206.10  * 1690.77  *
* E.G. Slope (ft/ft)     *0.000550  * Area (sq ft)           *  944.63  * 3206.10  * 4566.38  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1741.19  *22482.45  * 2096.36  *
* Top Width (ft)         *  707.99  * Top Width (ft)         *   88.90  *  117.88  *  501.21  *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)       *    1.84  *    7.01  *    1.24  *
* Max Chl Dpth (ft)      *   36.42  * Hydr. Depth (ft)       *   10.63  *   27.20  *   12.34  *
* Conv. Total (cfs)      *1122620.0  * Conv. (cfs)            * 74266.5  *958938.2  * 89415.4  *
* Length Wtd. (ft)       * 1000.72  * Wetted Per. (ft)       *   90.91  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.36  *    0.84  *    0.42  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    0.66  *    5.92  *    0.52  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   * 1164.49  * 8267.00  * 1392.54  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  142.35  *  467.23  *  207.20  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  785.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.090  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  784.64  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  768.05  * Flow Area (sq ft)      * 1255.50  * 3598.43  * 2146.86  *
* E.G. Slope (ft/ft)     *0.000584  * Area (sq ft)           * 1255.50  * 3598.43  * 6357.59  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2700.99  *28082.63  * 3216.38  *
* Top Width (ft)         *  766.59  * Top Width (ft)         *   97.61  *  117.88  *  551.10  *
* Vel Total (ft/s)       *    4.86  * Avg. Vel. (ft/s)       *    2.15  *    7.80  *    1.50  *
* Max Chl Dpth (ft)      *   39.75  * Hydr. Depth (ft)       *   12.86  *   30.53  *   15.67  *
```

```
* Conv. Total (cfs)      *1407315.0  * Conv. (cfs)            *111798.5  *1162385.0  *133131.2  *
* Length Wtd. (ft)       * 1001.68  * Wetted Per. (ft)       *  100.24  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.46  *    1.01  *    0.57  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *    0.98  *    7.85  *    0.86  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 1661.48  * 9757.27  * 2156.28  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  202.57  *  490.05  *  293.12  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  789.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *   0.090  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  788.58  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  771.66  * Flow Area (sq ft)      * 1696.07  * 4063.83  * 2687.91  *
* E.G. Slope (ft/ft)     *0.000618  * Area (sq ft)           * 2750.18  * 4063.83  * 8551.77  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4310.41  *35377.79  * 4811.80  *
* Top Width (ft)         * 1140.13  * Top Width (ft)         *  461.95  *  117.88  *  560.30  *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)       *    2.54  *    8.71  *    1.79  *
* Max Chl Dpth (ft)      *   43.69  * Hydr. Depth (ft)       *   13.08  *   34.47  *   19.61  *
* Conv. Total (cfs)      *1790679.0  * Conv. (cfs)            *173450.8  *1423602.0  *193626.6  *
* Length Wtd. (ft)       * 1002.53  * Wetted Per. (ft)       *  132.74  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.49  *    1.20  *    0.76  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    1.25  *   10.46  *    1.35  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   * 2873.85  *12102.74  * 4112.88  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  433.46  *  518.06  *  660.80  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.09  * Wt. n-Val.             *   0.090  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  791.44  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  773.70  * Flow Area (sq ft)      * 2115.17  * 4400.36  * 3079.14  *
* E.G. Slope (ft/ft)     *0.000653  * Area (sq ft)           * 4247.69  * 4400.36  *10160.25  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 5934.76  *41548.03  * 6207.22  *
* Top Width (ft)         * 1281.85  * Top Width (ft)         *  597.43  *  117.88  *  566.54  *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)       *    2.81  *    9.44  *    2.02  *
* Max Chl Dpth (ft)      *   46.55  * Hydr. Depth (ft)       *   12.95  *   37.33  *   22.47  *
* Conv. Total (cfs)      *2100484.0  * Conv. (cfs)            *232182.3  *1625460.0  *242841.4  *
* Length Wtd. (ft)       * 1002.97  * Wetted Per. (ft)       *  166.56  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.52  *    1.38  *    0.92  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    1.45  *   12.99  *    1.85  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   * 4283.99  *13490.65  * 6253.14  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  631.89  *  525.16  * 1023.47  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  794.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.089  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  793.76  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  775.32  * Flow Area (sq ft)      * 2507.47  * 4674.08  * 3397.34  *
* E.G. Slope (ft/ft)     *0.000682  * Area (sq ft)           * 5744.75  * 4674.08  *11481.65  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 7587.90  *46940.73  * 7471.37  *
* Top Width (ft)         * 1382.31  * Top Width (ft)         *  692.70  *  117.88  *  571.72  *
* Vel Total (ft/s)       *    5.86  * Avg. Vel. (ft/s)       *    3.03  *   10.04  *    2.20  *
* Max Chl Dpth (ft)      *   48.87  * Hydr. Depth (ft)       *   14.41  *   39.65  *   24.79  *
* Conv. Total (cfs)      *2374089.0  * Conv. (cfs)            *290554.1  *1797443.0  *286092.0  *
* Length Wtd. (ft)       * 1003.24  * Wetted Per. (ft)       *  177.49  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.60  *    1.53  *    1.06  *
* Alpha                  *    2.27  * Stream Power (lb/ft s) *    1.82  *   15.32  *    2.32  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   * 5517.20  *14376.65  * 8289.41  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *  759.62  *  526.57  * 1379.18  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  798.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *   0.088  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  796.89  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  777.57  * Flow Area (sq ft)      * 3070.96  * 5042.53  * 3825.68  *
* E.G. Slope (ft/ft)     *0.000727  * Area (sq ft)           * 8187.74  * 5042.53  *13280.50  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *10315.32  *55001.89  * 9402.79  *
* Top Width (ft)         * 1536.08  * Top Width (ft)         *  838.91  *  117.88  *  579.29  *
* Vel Total (ft/s)       *    6.26  * Avg. Vel. (ft/s)       *    3.36  *   10.91  *    2.46  *
* Max Chl Dpth (ft)      *   52.00  * Hydr. Depth (ft)       *   16.46  *   42.78  *   27.92  *
* Conv. Total (cfs)      *2770995.0  * Conv. (cfs)            *382544.0  *2039748.0  *348702.8  *
* Length Wtd. (ft)       * 1003.52  * Wetted Per. (ft)       *  190.44  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.73  *    1.75  *    1.27  *
* Alpha                  *    2.30  * Stream Power (lb/ft s) *    2.46  *   19.14  *    3.11  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   * 7783.77  *15743.21  *12235.27  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *  943.56  *  528.66  * 1736.41  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  787.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.090  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  786.18  * Reach Len. (ft)        *  992.42  *  993.30  * 1050.70  *
* Crit W.S. (ft)         *  769.63  * Flow Area (sq ft)      * 1409.00  * 3780.57  * 2358.61  *
* E.G. Slope (ft/ft)     *0.000601  * Area (sq ft)           * 1725.08  * 3780.57  * 7211.96  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 3240.66  *30941.50  * 3817.84  *
* Top Width (ft)         * 1056.12  * Top Width (ft)         *  383.48  *  117.88  *  554.75  *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *    2.30  *    8.18  *    1.62  *
* Max Chl Dpth (ft)      *   41.29  * Hydr. Depth (ft)       *   13.94  *   32.07  *   17.21  *
* Conv. Total (cfs)      *1550006.0  * Conv. (cfs)            *132185.4  *1262092.0  *155728.1  *
* Length Wtd. (ft)       * 1002.06  * Wetted Per. (ft)       *  104.02  *  130.43  *  137.07  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.51  *    1.09  *    0.65  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    1.17  *    8.90  *    1.05  *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)   * 1991.55  *10544.12  * 2653.40  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  255.98  *  500.42  *  357.28  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 17.349

INPUT
Description:
Station Elevation Data    num=     270
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  849.93    6.92  849.46   22.17  848.32   24.93  848.12   27.62  847.91
   45.95  845.78   60.08  843.49    69.6  842.46   75.26  841.84   83.93  840.89
   91.34  840.15  107.79  838.49  109.46   838.2  122.49  836.31  149.43  835.36
  153.52  835.09  157.89  833.87  164.25  830.65  173.61  829.92  188.85  829.21
  199.74  828.04  225.74  827.14  226.36  827.14  226.79  826.87  240.94  818.94
  244.11  818.43  259.05  816.69  263.11  816.28  277.21  814.66  287.19  813.51
  308.67  811.81   318.1  810.94  348.21  809.95  353.94  808.73  362.11  806.92
   383.5  806.38  391.78  806.06  397.75  805.97   413.1  804.81  444.65     803
  448.79  802.77  450.02   802.6  452.31  802.26  463.55  800.64  471.62  799.41
```

```
  477.89  799.34  483.03  799.33  494.74  800.17  495.24   800.2  495.49  800.22
  496.42  800.19  543.44  798.84  558.15   798.4  582.83  797.15   589.8  796.79
  610.72  796.65  611.97  796.64  615.29  796.64  634.87  796.66  651.99  796.67
  659.92  796.65  703.57  796.38  738.94  796.29  749.09  796.11  778.09  796.09
  786.42  795.87  803.63  795.41   814.1  795.03  818.39  795.01  825.81  794.86
  848.39  792.44   850.6  792.14  851.44  792.01  854.62  791.47   856.3  791.18
  862.45  791.31  868.13  791.42  869.05  791.44  869.87  791.43  891.37  790.97
  895.02  790.96  903.63     791  919.81     788  924.97  787.01  932.96  787.21
  951.32  787.63     960  790.03  967.56  792.11  972.09  792.64  977.46  793.29
  981.68  793.29  982.71  793.29   984.3  793.17  988.19  792.89  991.72  793.38
  993.45  793.67  995.46  793.67  998.71  793.67 1006.09     792 1009.17  791.32
 1010.84  791.23  1025.9  790.67  1041.1  790.01 1073.27  789.14 1081.22  788.92
 1095.67  788.82 1140.38  788.22 1178.27  789.02 1182.37  789.09 1184.36  789.58
 1189.66  790.76  1196.7  791.11 1203.95  791.46 1209.51  791.67 1210.16  791.91
  1211.6  791.97 1217.92  793.76 1221.36  794.96 1224.05  795.77 1226.11   796.4
 1231.08  798.18 1233.69  798.97 1240.15  800.95    1241   801.2 1241.44  801.34
 1246.17  803.33 1249.28  804.64  1256.2  807.45 1261.68  809.15 1266.43  809.95
 1267.77  809.76 1270.99  809.76 1277.87  810.65 1305.37  820.16 1320.69   825.5
 1330.57  828.43 1363.84  838.18 1365.83  838.76 1366.29  838.88  1378.9  842.17
 1405.23  843.38  1410.4  843.58 1415.36  844.75 1420.61  845.99  1422.9  846.23
 1442.83  848.89 1456.46  850.71 1461.06  852.07 1464.79  852.95 1498.28   861.1
 1506.78  863.34 1519.39  866.62 1541.19  870.68 1573.52  876.85 1598.41  877.36
 1612.21  877.69 1624.45  876.44  1646.6  874.33 1656.55   873.3 1659.75  872.92
 1672.91  869.67 1685.48  866.57 1699.78  862.24 1730.03  851.81 1731.15  852.23
 1732.35  852.58 1733.85  853.01 1737.03  852.03  1780.1  838.76 1802.55  831.61
 1817.69  827.15 1827.57  826.87 1832.37  826.78 1851.78  820.48 1869.29  814.52
 1879.51  811.68 1887.35   809.6 1898.94  806.16 1906.94  803.89 1920.51   800.6
 1942.69  795.67 1956.06  791.03 1974.13  789.61 1983.45  789.15 2010.75  788.24
  2023.2  787.75 2024.73  787.71 2037.29  787.33 2041.72  787.12  2043.6  786.22
 2056.68  778.84 2077.58  770.47 2078.71  770.08 2081.96  768.89 2094.44  767.65
 2095.54   767.6 2108.97  765.47 2114.89  764.75 2139.03  763.59 2153.87  762.87
 2156.54   762.8 2177.73  762.48 2179.89  762.45 2184.94  762.49 2210.93  762.58
 2225.13  756.74 2229.11  755.04 2232.06  751.23 2232.29  750.99    2238  745.24
    2253  744.24    2268  745.24 2274.84  750.99 2275.14  751.13 2275.81  751.39
 2281.36  753.55 2299.12  759.09 2313.07  765.12 2315.96  767.57 2317.79  767.61
 2320.68  767.67 2340.49  767.26 2340.71  767.26 2371.98  766.99  2410.2  766.72
 2425.61  766.55 2469.59  765.42 2484.22  765.27  2522.3  765.45 2557.93  765.85
 2613.57  766.77 2617.32   766.8 2618.47  766.86 2638.07  768.42 2641.11  769.33
 2656.62  771.65 2660.64  772.32 2666.14  773.32 2672.94   776.8 2686.99   783.3
 2691.48  785.38 2692.57  785.89 2694.28  785.85 2706.75  785.61 2709.28  785.95
 2713.28  786.48 2728.37  786.28 2737.92  786.15 2739.33  785.73 2741.67  785.19
 2748.94  789.29 2761.22  797.75 2771.87  805.33  2777.2   809.6 2790.79   823.3
 2798.77  828.52 2807.65  833.25 2816.57  840.33 2822.68  843.41 2832.96   849.7
 2836.46  851.62 2837.89  852.06 2842.27   853.8    2868  863.35 2883.53   871.8
 2886.29  873.25 2888.75  874.37 2914.27  885.71 2933.08  886.93 2938.74  887.32

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  981.68    .065  2043.6    .085 2210.93    .042 2315.96    .114

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2210.93 2315.96           912.33  918.81  915.65              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1602.42  869.86       F
 2536.33 2938.74     802       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     660     750     820

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  773.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.            *   0.085  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  773.48  * Reach Len. (ft)       *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  759.92  * Flow Area (sq ft)     * 1241.34  * 2134.47  * 1575.50  *
* E.G. Slope (ft/ft)     *0.000363  * Area (sq ft)          * 1241.34  * 2134.47  * 2359.41  *
* Q Total (cfs)          *13200.00  * Flow (cfs)            * 1753.66  * 9994.78  * 1451.56  *
* Top Width (ft)         *  596.40  * Top Width (ft)        *  140.87  *  105.03  *  350.50  *
* Vel Total (ft/s)       *    2.67  * Avg. Vel. (ft/s)      *    1.41  *    4.68  *    0.92  *
* Max Chl Dpth (ft)      *   29.24  * Hydr. Depth (ft)      *    8.81  *   20.32  *    7.15  *
* Conv. Total (cfs)      *692988.1  * Conv. (cfs)           * 92065.7  *524717.1  * 76205.4  *
* Length Wtd. (ft)       *  917.91  * Wetted Per. (ft)      *  142.05  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)      *    0.20  *    0.41  *    0.16  *
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* Alpha                  *    2.39  * Stream Power (lb/ft s) *    0.28  *    1.94  *    0.15  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *  429.68  * 5048.12  *  425.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   73.84  *  397.23  *   88.09  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  778.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.085  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  778.01  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  763.86  * Flow Area (sq ft)      * 1905.31  * 2610.39  * 2574.06  *
* E.G. Slope (ft/ft)     *0.000350  * Area (sq ft)           * 1905.31  * 2610.39  * 3967.84  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 3331.40  *13735.94  * 3232.66  *
* Top Width (ft)         *  616.82  * Top Width (ft)         *  152.19  *  105.03  *  359.60  *
* Vel Total (ft/s)       *    2.86  * Avg. Vel. (ft/s)       *    1.75  *    5.26  *    1.26  *
* Max Chl Dpth (ft)      *   33.77  * Hydr. Depth (ft)       *   12.52  *   24.85  *   11.68  *
* Conv. Total (cfs)      *1084568.0  * Conv. (cfs)            *177986.7  *733869.5  *172711.4  *
* Length Wtd. (ft)       *  917.51  * Wetted Per. (ft)       *  154.24  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.27  *    0.49  *    0.26  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *    0.47  *    2.58  *    0.32  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  796.89  * 6776.07  *  829.44  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  111.30  *  436.80  *  123.40  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  781.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.085  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  781.09  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  766.56  * Flow Area (sq ft)      * 2383.82  * 2933.73  * 3252.48  *
* E.G. Slope (ft/ft)     *0.000355  * Area (sq ft)           * 2383.82  * 2933.73  * 5085.14  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 4730.37  *16787.02  * 4802.62  *
* Top Width (ft)         *  629.53  * Top Width (ft)         *  158.24  *  105.03  *  366.26  *
* Vel Total (ft/s)       *    3.07  * Avg. Vel. (ft/s)       *    1.98  *    5.72  *    1.48  *
* Max Chl Dpth (ft)      *   36.85  * Hydr. Depth (ft)       *   15.06  *   27.93  *   14.76  *
* Conv. Total (cfs)      *1397835.0  * Conv. (cfs)            *251226.1  *891545.4  *255063.1  *
* Length Wtd. (ft)       *  917.30  * Wetted Per. (ft)       *  161.05  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.33  *    0.56  *    0.33  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.65  *    3.19  *    0.48  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 1126.58  * 8196.99  * 1276.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  139.53  *  464.69  *  196.73  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  784.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.085  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  784.46  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  769.20  * Flow Area (sq ft)      * 2926.50  * 3287.26  * 3994.24  *
* E.G. Slope (ft/ft)     *0.000365  * Area (sq ft)           * 2926.50  * 3287.26  * 6330.19  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 6566.25  *20575.69  * 6858.06  *
* Top Width (ft)         *  642.77  * Top Width (ft)         *  164.21  *  105.03  *  373.53  *
* Vel Total (ft/s)       *    3.33  * Avg. Vel. (ft/s)       *    2.24  *    6.26  *    1.72  *
* Max Chl Dpth (ft)      *   40.22  * Hydr. Depth (ft)       *   17.82  *   31.30  *   18.13  *
* Conv. Total (cfs)      *1780836.0  * Conv. (cfs)            *343923.8  *1077704.0  *359208.4  *
* Length Wtd. (ft)       *  917.12  * Wetted Per. (ft)       *  167.90  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.40  *    0.64  *    0.41  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.89  *    4.02  *    0.71  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 1613.84  * 9678.77  * 2003.27  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  199.59  *  487.51  *  281.97  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
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* E.G. Elev (ft)         *  788.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.085  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  788.45  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  771.12  * Flow Area (sq ft)      * 3620.28  * 3706.88  * 4874.67  *
* E.G. Slope (ft/ft)     *0.000376  * Area (sq ft)           * 3659.97  * 3706.88  * 7959.38  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 9263.11  *25529.26  * 9707.62  *
* Top Width (ft)         *  808.48  * Top Width (ft)         *  271.95  *  105.03  *  431.50  *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)       *    2.56  *    6.89  *    1.99  *
* Max Chl Dpth (ft)      *   44.21  * Hydr. Depth (ft)       *   17.52  *   35.29  *   22.12  *
* Conv. Total (cfs)      *2294980.0  * Conv. (cfs)           *477722.6  *1316610.0  *500647.2  *
* Length Wtd. (ft)       *  916.95  * Wetted Per. (ft)       *  210.96  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.40  *    0.75  *    0.52  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    1.03  *    5.14  *    1.03  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 2800.83  *12014.14  * 3913.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  425.10  *  515.52  *  648.84  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  791.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.085  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  791.34  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  772.57  * Flow Area (sq ft)      * 4307.66  * 4010.54  * 5511.82  *
* E.G. Slope (ft/ft)     *0.000391  * Area (sq ft)           * 4881.69  * 4010.54  * 9213.67  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *11848.56  *29690.38  *12151.05  *
* Top Width (ft)         * 1089.07  * Top Width (ft)         *  548.08  *  105.03  *  435.96  *
* Vel Total (ft/s)       *    3.88  * Avg. Vel. (ft/s)       *    2.75  *    7.40  *    2.20  *
* Max Chl Dpth (ft)      *   47.10  * Hydr. Depth (ft)       *   16.84  *   38.18  *   25.01  *
* Conv. Total (cfs)      *2714729.0  * Conv. (cfs)           *599098.9  *1501236.0  *614393.9  *
* Length Wtd. (ft)       *  916.83  * Wetted Per. (ft)       *  260.29  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.40  *    0.84  *    0.61  *
* Alpha                  *    2.19  * Stream Power (lb/ft s) *    1.11  *    6.22  *    1.35  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   * 4180.00  *13394.75  * 6019.48  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  618.85  *  522.62  * 1011.38  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  794.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.084  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  793.70  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  773.71  * Flow Area (sq ft)      * 4917.86  * 4257.83  * 6030.66  *
* E.G. Slope (ft/ft)     *0.000403  * Area (sq ft)           * 6284.23  * 4257.83  *10244.14  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *14366.97  *33302.00  *14331.03  *
* Top Width (ft)         * 1188.03  * Top Width (ft)         *  643.62  *  105.03  *  439.38  *
* Vel Total (ft/s)       *    4.08  * Avg. Vel. (ft/s)       *    2.92  *    7.82  *    2.38  *
* Max Chl Dpth (ft)      *   49.46  * Hydr. Depth (ft)       *   18.73  *   40.54  *   27.37  *
* Conv. Total (cfs)      *3088009.0  * Conv. (cfs)           *715570.0  *1658659.0  *713779.5  *
* Length Wtd. (ft)       *  916.74  * Wetted Per. (ft)       *  267.47  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.46  *    0.92  *    0.69  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    1.35  *    7.19  *    1.64  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 5380.18  *14274.82  * 8027.39  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  744.40  *  524.03  * 1366.99  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  797.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.084  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  796.87  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  775.33  * Flow Area (sq ft)      * 5766.48  * 4591.03  * 6729.77  *
* E.G. Slope (ft/ft)     *0.000424  * Area (sq ft)           * 8488.85  * 4591.03  *11645.34  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *18379.50  *38703.83  *17636.67  *
* Top Width (ft)         * 1371.86  * Top Width (ft)         *  822.85  *  105.03  *  443.98  *
```

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* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    3.19  *    8.43  *    2.62  *
* Max Chl Dpth (ft)      *   52.63  * Hydr. Depth (ft)       *   21.07  *   43.71  *   30.54  *
* Conv. Total (cfs)      *3630584.0  * Conv. (cfs)            *893044.8  *1880587.0  *856951.3  *
* Length Wtd. (ft)       *  916.62  * Wetted Per. (ft)       *  279.02  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.55  *    1.04  *    0.81  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    1.74  *    8.78  *    2.12  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   * 7593.80  *15633.38  *11934.65  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  924.63  *  526.12  * 1724.07  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  786.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *   0.085  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  786.02  * Reach Len. (ft)        *  912.33  *  918.81  *  915.65  *
* Crit W.S. (ft)         *  769.98  * Flow Area (sq ft)      * 3185.26  * 3451.39  * 4338.61  *
* E.G. Slope (ft/ft)     *0.000371  * Area (sq ft)           * 3185.26  * 3451.39  * 6923.09  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 7536.39  *22520.11  * 7943.50  *
* Top Width (ft)         *  670.65  * Top Width (ft)          *  166.98  *  105.03  *  398.64  *
* Vel Total (ft/s)       *    3.46  * Avg. Vel. (ft/s)       *    2.37  *    6.52  *    1.83  *
* Max Chl Dpth (ft)      *   41.78  * Hydr. Depth (ft)       *   19.08  *   32.86  *   19.69  *
* Conv. Total (cfs)      *1972328.0  * Conv. (cfs)            *391164.0  *1168869.0  *412294.0  *
* Length Wtd. (ft)       *  917.05  * Wetted Per. (ft)       *  171.08  *  116.53  *  220.40  *
* Min Ch El (ft)         *  744.24  * Shear (lb/sq ft)       *    0.43  *    0.69  *    0.46  *
* Alpha                  *    2.26  * Stream Power (lb/ft s) *    1.02  *    4.48  *    0.84  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   * 1935.62  *10461.66  * 2482.93  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  249.71  *  497.88  *  345.78  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 17.175

INPUT
Description:
Station Elevation Data    num=     359
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
        0  860.62     .01  860.61     .88  860.59    8.48  860.26   16.12  860.24
    31.91   860.3   58.27  859.78   63.99  859.92   78.36  860.34   85.39  860.15
    97.89  860.18  104.74  859.81  116.19  860.79  120.77  861.13  129.41   861.2
   143.02  856.97   149.3  855.01  151.67  854.12  193.78  852.42  200.05  851.91
   209.78  850.71  210.85   850.3  213.43  849.85  231.53  845.12  248.16  842.05
   258.68  840.93  277.83  839.71  292.79   838.8  311.84  837.66  317.84  837.39
   320.14  837.31  330.47  836.97  338.44  836.71  340.62  836.17  345.39  834.69
   350.89   834.7  376.63  834.41  389.27  834.31  391.44  834.28   391.7  834.56
    399.9   836.7  400.51  836.84  400.61  836.86  409.61  835.06   409.7  835.04
   409.95     835  434.65  834.35  443.86  833.99     450  834.17  461.61  834.23
   466.48  834.39     492  831.93   493.4   831.9  494.49  831.85  508.21  830.84
   520.48  830.32  521.33  830.21  521.89  830.26  523.76  830.49  526.02  830.75
   526.29  830.68  533.54  828.83  537.34  828.44  543.67  828.11  546.86  827.96
   547.67  827.87  549.31  826.28   556.7  821.31  557.98  820.41  558.59  820.34
   567.29   818.9   577.6  818.04  585.22  818.17  598.36   818.4  604.44  818.63
   607.44  818.58  612.52  818.57  619.08  818.54   626.1  818.49  628.16  818.48
   638.26     822  638.43  822.06  638.47  822.06  638.48  822.06  638.54  822.06
   652.34  821.91  663.43  821.75  665.49  820.78  673.76  819.24  674.46  819.27
   675.94  819.34  676.91  819.36   678.4  819.39  689.26  819.34  693.49  819.39
   713.84  819.18  727.85  818.51  730.43  818.49  734.03  818.92  737.12  818.93
   739.52  818.96  742.68  818.88  774.06  816.96  778.09  816.95  796.28  817.21
   798.89  817.32  801.75  818.86  803.41  819.19  806.38  817.57  808.02  817.32
   813.72   819.6  815.22  820.26  819.67  818.34   821.9  817.09  823.33  817.27
   826.57  819.52  828.49  819.79  828.65  819.68  828.82  819.64  832.34  817.77
   835.69  817.26  839.24  817.16  840.15  817.17  876.54  815.43  888.87  815.15
   890.15  815.14  891.21  815.12  894.78  815.02  897.35  815.03  906.37  813.99
   908.26  813.86  914.19  811.13  933.49  799.32  938.08  798.32  942.61   797.4
   953.33   794.2  961.07  793.55  979.84  792.04  991.78  791.74   995.8  791.64
```

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 1031.35  790.67 1032.37  790.66 1033.14  790.64 1037.88  790.46 1045.35   789.7
 1047.09  789.71 1067.31  790.44 1073.61  790.65 1091.03  787.02 1094.36  786.28
 1099.61  785.09 1111.33  782.13 1115.03  779.82 1119.74  778.31  1123.3  778.24
 1126.36  780.62 1135.25  782.14 1142.72  783.45  1146.9  785.27 1157.63  789.61
 1166.14   790.6 1167.78  790.82 1168.87  790.82 1173.01  790.82 1174.93  790.69
 1178.05  790.46 1179.72  790.72 1183.25  791.33 1186.68  791.33 1188.48  791.33
 1190.68   790.9 1198.66  789.38 1209.54  788.77 1224.19  788.05 1226.39  787.92
 1227.38  787.91 1229.12  788.48 1232.53  789.38 1236.31  789.62 1237.98  789.52
 1241.47  789.51 1247.99  789.63 1251.47  789.62 1251.87  789.74 1253.41  789.71
 1257.64   790.9 1263.09  790.26 1264.55  790.24  1266.5  790.36 1269.82  790.46
 1272.14   790.4 1286.02  789.67 1288.94  789.68 1291.74  789.67 1297.75  788.94
 1302.32  787.71 1308.59  786.75 1310.99  786.16 1316.51  785.06 1346.05  782.78
 1351.04  782.47 1355.82  782.52 1377.23  782.55 1377.88  782.71 1384.46  784.28
 1420.28  795.67 1424.25  796.84 1425.22  797.21 1425.73  797.25 1426.01  797.28
 1440.95  798.26 1465.15  805.19 1485.07  810.79  1497.7  814.98 1515.47  820.61
 1522.62  820.87 1529.75     821 1535.89  822.47 1548.24   825.5 1588.06  838.13
 1590.18  838.76 1593.58  839.75 1637.63  852.41 1641.17  851.83 1645.97  850.76
 1649.27  851.05 1656.53   851.7 1658.46     852 1672.11  855.38 1694.88  860.31
 1709.63  863.42 1715.98  864.86 1725.27  865.71 1747.15  866.66 1752.14  866.69
 1773.75  866.64 1808.35  866.96  1818.3  866.58 1839.67  866.91 1852.34  867.01
 1868.99   867.4 1891.56  867.12 1895.87  866.91 1908.68  866.54 1921.66  866.11
 1923.43  866.09 1924.38  865.92 1941.01  861.89 1972.92  853.86 1982.15  855.95
 1982.75  856.01 1992.13  853.65 1995.06  852.95 2004.51  850.04 2041.32  838.76
 2051.53  835.93  2068.5  830.87 2069.64  830.52 2069.78  830.54 2076.34   831.2
  2089.3  826.96 2100.58  823.41 2123.89  815.58 2130.36  813.35  2134.6  812.06
  2162.8  803.37 2164.84  802.95 2173.59  801.27 2199.16   799.4 2206.73  798.85
 2206.94  798.76 2219.31  793.36 2232.51  788.28 2244.29  783.35 2272.45  774.39
 2275.86  773.38 2276.95  772.94  2280.9   771.4  2287.4  768.83 2319.87  768.23
 2322.95  768.18 2329.42  768.62 2335.89  769.03 2337.43   769.1 2400.23  767.25
 2415.58  766.79 2427.33  766.62 2428.09  766.52 2443.25  764.46 2444.49  763.83
 2446.37  763.32 2449.04   762.3 2463.75  756.41 2467.39   751.4 2468.15  750.46
    2472  744.64    2492  743.64    2512  744.64 2516.65  750.46 2519.54  752.45
 2521.89  753.38 2533.56  755.39 2539.87  756.41 2545.94  758.77 2551.12  760.78
 2562.08  766.05 2568.17  765.89 2576.19  765.67 2602.14  765.14 2612.35  764.86
 2622.49  764.58 2629.07  764.02 2630.45  763.87 2651.55  764.07 2659.03  764.24
 2693.78  771.91 2702.72  773.38  2728.9  779.84 2736.53  781.89 2738.68  782.32
 2743.78  783.69  2755.5  784.72 2789.02   787.3 2812.19  787.96 2826.36  788.16
 2832.09   789.7 2838.66  791.26 2850.59  791.97  2850.8  791.98 2851.37  791.95
 2874.45  790.61 2874.68  790.65    2890  793.34 2899.31  799.89 2904.55  803.37
 2921.74  810.84 2928.42  813.35 2936.43     817 2954.13   823.4 2964.93  827.57
 2983.15  833.31 2984.97  834.12 3002.81  845.76 3012.29  848.11 3015.43  848.97
  3018.5  849.72 3031.68   853.4 3036.08  855.24 3054.59  863.31 3071.89  872.42
 3073.61  873.34 3078.25  875.95 3078.74  876.23 3078.78  876.26 3079.29  876.38
 3107.42  883.35 3116.87  884.61 3128.21  885.91 3130.19  886.21

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1 1183.25    .065 2272.45    .085 2443.25    .042 2562.08     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2443.25 2562.08          964.62  982.49  619.92             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 1803.96  859.92       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     600     680     835

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  773.40  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.085  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  773.09  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  758.21  * Flow Area (sq ft)      *  846.47  * 2425.45  *  976.44  *
* E.G. Slope (ft/ft)     *0.000379  * Area (sq ft)           *  846.47  * 2425.45  *  976.44  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  848.20  *11614.28  *  737.52  *
* Top Width (ft)         *  424.34  * Top Width (ft)         *  166.66  *  118.83  *  138.85  *
* Vel Total (ft/s)       *    3.11  * Avg. Vel. (ft/s)       *    1.00  *    4.79  *    0.76  *
* Max Chl Dpth (ft)      *   29.45  * Hydr. Depth (ft)       *    5.08  *   20.41  *    7.03  *
* Conv. Total (cfs)      *677652.6  * Conv. (cfs)            * 43544.5  *596246.0  * 37862.1  *
* Length Wtd. (ft)       *  951.15  * Wetted Per. (ft)       *  167.68  *  132.42  *  139.83  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.12  *    0.43  *    0.17  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    0.12  *    2.08  *    0.12  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   *  407.81  * 5000.03  *  390.69  *
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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   70.62  *  394.86  *   82.95  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  777.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.              *   0.085  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  777.60  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  761.63  * Flow Area (sq ft)      * 1630.21  * 2961.45  * 1646.57  *
* E.G. Slope (ft/ft)     *0.000381  * Area (sq ft)           * 1630.21  * 2961.45  * 1646.57  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 2458.14  *16223.81  * 1618.05  *
* Top Width (ft)         *  457.43  * Top Width (ft)         *  180.88  *  118.83  *  157.72  *
* Vel Total (ft/s)       *    3.25  * Avg. Vel. (ft/s)       *    1.51  *    5.48  *    0.98  *
* Max Chl Dpth (ft)      *   33.96  * Hydr. Depth (ft)       *    9.01  *   24.92  *   10.44  *
* Conv. Total (cfs)      *1040615.0  * Conv. (cfs)           *126008.5  *831662.3  * 82944.4  *
* Length Wtd. (ft)       *  937.18  * Wetted Per. (ft)       *  182.60  *  132.42  *  159.25  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.21  *    0.53  *    0.25  *
* Alpha                  *    2.30  * Stream Power (lb/ft s) *    0.32  *    2.91  *    0.24  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *  759.86  * 6717.31  *  770.44  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  107.81  *  434.44  *  117.96  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  781.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.              *   0.085  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  780.65  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  763.98  * Flow Area (sq ft)      * 2198.18  * 3324.93  * 2147.88  *
* E.G. Slope (ft/ft)     *0.000389  * Area (sq ft)           * 2218.45  * 3324.93  * 2147.88  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 4007.53  *19890.46  * 2422.02  *
* Top Width (ft)         *  492.04  * Top Width (ft)         *  203.36  *  118.83  *  169.85  *
* Vel Total (ft/s)       *    3.43  * Avg. Vel. (ft/s)       *    1.82  *    5.98  *    1.13  *
* Max Chl Dpth (ft)      *   37.01  * Hydr. Depth (ft)       *   11.54  *   27.98  *   12.65  *
* Conv. Total (cfs)      *1334705.0  * Conv. (cfs)           *203224.3  *1008659.0  *122822.2  *
* Length Wtd. (ft)       *  930.37  * Wetted Per. (ft)       *  192.69  *  132.42  *  171.75  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.28  *    0.61  *    0.30  *
* Alpha                  *    2.35  * Stream Power (lb/ft s) *    0.50  *    3.65  *    0.34  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   * 1078.38  * 8130.99  * 1200.12  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  135.75  *  462.33  *  191.10  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  784.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.              *   0.084  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  784.00  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  767.01  * Flow Area (sq ft)      * 2852.12  * 3722.02  * 2737.65  *
* E.G. Slope (ft/ft)     *0.000401  * Area (sq ft)           * 3019.59  * 3722.02  * 2737.65  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 6138.06  *24384.77  * 3477.18  *
* Top Width (ft)         *  597.53  * Top Width (ft)         *  293.52  *  118.83  *  185.19  *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)       *    2.15  *    6.55  *    1.27  *
* Max Chl Dpth (ft)      *   40.36  * Hydr. Depth (ft)       *   14.22  *   31.32  *   14.78  *
* Conv. Total (cfs)      *1697326.0  * Conv. (cfs)           *306420.0  *1217320.0  *173585.5  *
* Length Wtd. (ft)       *  924.76  * Wetted Per. (ft)       *  203.25  *  132.42  *  187.49  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.35  *    0.70  *    0.37  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *    0.76  *    4.61  *    0.46  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   * 1551.57  * 9604.84  * 1907.96  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  194.80  *  485.15  *  276.10  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
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```
* E.G. Elev (ft)         *  788.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.              *   0.084  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  787.94  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  770.52  * Flow Area (sq ft)      * 3661.13  * 4190.48  * 3568.98  *
* E.G. Slope (ft/ft)     *0.000425  * Area (sq ft)           * 4340.15  * 4190.48  * 3568.98  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 9345.93  *30580.07  * 4574.00  *
* Top Width (ft)         *  740.88  * Top Width (ft)         *  372.69  *  118.83  *  249.36  *
* Vel Total (ft/s)       *    3.90  * Avg. Vel. (ft/s)       *    2.55  *    7.30  *    1.28  *
* Max Chl Dpth (ft)      *   44.30  * Hydr. Depth (ft)       *   17.44  *   35.26  *   14.31  *
* Conv. Total (cfs)      *2158414.0  * Conv. (cfs)           *453312.2  *1483246.0  *221855.9  *
* Length Wtd. (ft)       *  921.29  * Wetted Per. (ft)       *  213.46  *  132.42  *  251.80  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.46  *    0.84  *    0.38  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    1.16  *    6.13  *    0.48  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 2717.05  *11930.85  * 3792.58  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  418.35  *  513.16  *  641.69  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  791.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.              *   0.084  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  790.80  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  772.30  * Flow Area (sq ft)      * 4272.07  * 4530.40  * 4336.90  *
* E.G. Slope (ft/ft)     *0.000442  * Area (sq ft)           * 5632.65  * 4530.40  * 4336.90  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *12118.61  *35520.43  * 6050.95  *
* Top Width (ft)         *  975.49  * Top Width (ft)         *  577.69  *  118.83  *  278.98  *
* Vel Total (ft/s)       *    4.09  * Avg. Vel. (ft/s)       *    2.84  *    7.84  *    1.40  *
* Max Chl Dpth (ft)      *   47.16  * Hydr. Depth (ft)       *   19.66  *   38.13  *   15.55  *
* Conv. Total (cfs)      *2553187.0  * Conv. (cfs)           *576291.3  *1689147.0  *287748.3  *
* Length Wtd. (ft)       *  917.81  * Wetted Per. (ft)       *  221.36  *  132.42  *  281.77  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.53  *    0.94  *    0.42  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    1.51  *    7.41  *    0.59  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   * 4069.89  *13304.67  * 5877.06  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  607.06  *  520.26  * 1003.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  793.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.              *   0.083  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  793.11  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  773.72  * Flow Area (sq ft)      * 4780.53  * 4804.69  * 5053.09  *
* E.G. Slope (ft/ft)     *0.000464  * Area (sq ft)           * 7103.81  * 4804.69  * 5053.09  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *14763.87  *40111.44  * 7124.69  *
* Top Width (ft)         * 1114.36  * Top Width (ft)         *  668.93  *  118.83  *  326.59  *
* Vel Total (ft/s)       *    4.24  * Avg. Vel. (ft/s)       *    3.09  *    8.35  *    1.41  *
* Max Chl Dpth (ft)      *   49.47  * Hydr. Depth (ft)       *   21.41  *   40.43  *   15.47  *
* Conv. Total (cfs)      *2879641.0  * Conv. (cfs)           *685720.0  *1863009.0  *330912.2  *
* Length Wtd. (ft)       *  916.28  * Wetted Per. (ft)       *  227.79  *  132.42  *  329.70  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.61  *    1.05  *    0.44  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *    1.88  *    8.77  *    0.63  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   * 5239.98  *14179.24  * 7866.61  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  730.65  *  521.67  * 1358.94  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  797.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.              *   0.083  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  796.26  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  775.70  * Flow Area (sq ft)      * 5495.43  * 5178.98  * 6091.86  *
* E.G. Slope (ft/ft)     *0.000481  * Area (sq ft)           * 9279.68  * 5178.98  * 6091.86  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *18644.84  *46292.57  * 9782.58  *
* Top Width (ft)         * 1157.31  * Top Width (ft)         *  706.41  *  118.83  *  332.07  *
```

```
* Vel Total (ft/s)       *    4.46  * Avg. Vel. (ft/s)       *    3.39  *    8.94  *    1.61  *
* Max Chl Dpth (ft)      *   52.62  * Hydr. Depth (ft)       *   23.83  *   43.58  *   18.35  *
* Conv. Total (cfs)      *3407520.0  * Conv. (cfs)            *850276.7  *2111120.0  *446123.5  *
* Length Wtd. (ft)       *  912.15  * Wetted Per. (ft)       *  235.73  *  132.42  *  336.12  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.70  *    1.17  *    0.54  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *    2.37  *   10.49  *    0.87  *
* Frctn Loss (ft)        *    0.53  * Cum Volume (acre-ft)   * 7407.73  *15530.34  *11748.23  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  908.62  *  523.76  * 1715.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  786.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.084  *   0.042  *   0.140  *
* W.S. Elev (ft)         *  785.54  * Reach Len. (ft)        *  964.62  *  982.49  *  619.92  *
* Crit W.S. (ft)         *  768.35  * Flow Area (sq ft)      * 3164.39  * 3905.40  * 3037.52  *
* E.G. Slope (ft/ft)     *0.000411  * Area (sq ft)           * 3501.57  * 3905.40  * 3037.52  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 7318.23  *26754.75  * 3927.02  *
* Top Width (ft)         *  651.35  * Top Width (ft)         *  328.45  *  118.83  *  204.07  *
* Vel Total (ft/s)       *    3.76  * Avg. Vel. (ft/s)       *    2.31  *    6.85  *    1.29  *
* Max Chl Dpth (ft)      *   41.90  * Hydr. Depth (ft)       *   15.50  *   32.87  *   14.88  *
* Conv. Total (cfs)      *1873264.0  * Conv. (cfs)            *360762.2  *1318913.0  *193588.0  *
* Length Wtd. (ft)       *  923.15  * Wetted Per. (ft)       *  207.25  *  132.42  *  206.43  *
* Min Ch El (ft)         *  743.64  * Shear (lb/sq ft)       *    0.39  *    0.76  *    0.38  *
* Alpha                  *    2.42  * Stream Power (lb/ft s) *    0.91  *    5.19  *    0.49  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   * 1865.59  *10384.07  * 2378.24  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  244.52  *  495.52  *  339.44  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 16.989

INPUT
Description: Swope Park Industrial Area on Left.
Station Elevation Data    num=     280
      Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
        0   851.82    2.78   851.72    5.14    851.9    5.37   852.08    9.87   850.58
    22.93   844.47   27.06   842.96    30.9   840.13    41.3   839.21   55.44      838
     73.5   836.88    73.9   836.86   74.09   836.85   88.47   835.32   91.74   835.12
    94.57   834.94  109.52   834.29  130.55   833.45  131.55    833.4  144.64   832.72
   159.91   832.52   198.5   829.82  217.02   829.19  234.01   828.04  275.23   824.15
   284.43   823.23  302.28   818.47  311.42   815.83  317.42    814.7   319.4    814.5
   322.25   814.01   325.7   813.01  334.64   810.69  338.29   809.22  360.41   802.22
   372.04    798.8  379.44   796.86  393.47   790.35  395.44   789.34  398.54   790.31
   411.74   793.32  426.29   793.27  442.24   793.08  459.45   792.89  463.74   792.84
   478.11   792.73  510.64   792.36  530.81   791.95  560.49   791.35  582.97   791.13
   607.01   791.24  625.68   790.95  648.51   790.94  674.02   791.03  685.11   791.04
   696.39   790.73  700.26   790.73  711.52   790.31  715.68   790.26  721.26   790.39
   721.27   790.39  721.31   790.39  735.91   790.28  738.96   790.26  739.31   790.25
   739.34   790.26  740.24   790.25  740.26   790.25  742.25   790.23  742.38   790.23
   745.28   790.21  748.83   790.18  781.18   789.94  787.87   790.25  811.24   791.36
   813.22   791.45  821.65   791.86  825.31   792.02  826.74   792.03  832.76   791.32
   835.64   791.18  840.05   792.31  840.11    792.3  844.87    792.3  845.36   792.27
   846.16   792.07  850.31   791.09  854.56   791.25   855.6   791.29  860.25   791.29
   860.82   791.29  861.84   791.13  870.35   789.85   880.1    789.9  880.62   789.92
   881.44   789.88  894.46   789.45  902.36   788.87  903.88   788.72  904.88   788.69
   907.45   788.58  919.48   788.05  944.78   786.84  966.31   786.62  992.86   786.24
  1056.85   786.27 1075.13   786.23 1078.84   786.31 1084.01   786.25 1117.47   785.26
  1134.44   784.67 1135.09   784.67 1136.04   784.71 1148.58   782.95 1156.93   781.82
  1169.79   781.85 1184.86   781.88 1190.98   782.36 1202.04   782.69 1221.88   782.27
  1229.55   782.39 1239.75   782.92 1243.41   782.93  1259.8   782.97 1291.26   784.06
  1343.99   784.03 1345.94      784 1345.95   783.99 1347.73   783.96 1347.82   783.96
   1367.3   783.52 1406.66   783.23 1475.11   782.48 1484.27   782.37 1489.09   782.31
  1527.75   781.67 1545.52   781.34 1583.25   781.62 1589.23   779.69 1599.01   777.49
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 1609.46  774.93 1615.98  773.88 1617.39  773.68 1625.83  772.04 1634.62  770.34
 1648.79   770.2 1653.22   770.2 1659.05     772 1660.81  773.14 1663.66  774.01
 1678.14   778.1 1684.87  782.02 1687.77  783.77 1690.47  784.87  1693.2     786
 1697.78  786.12 1699.21  786.12 1704.71  785.99 1708.34  784.23 1719.65  778.04
 1721.16  777.24 1721.79     777  1722.9  776.62 1730.68  773.41 1730.79  773.38
 1730.94  773.38 1742.11  772.35 1748.34  773.38  1751.4  773.79 1751.81  773.81
 1755.53  774.46 1770.94  773.57 1782.75  773.09  1783.2  773.01 1793.64  773.33
 1794.83  773.35 1795.15   773.3 1807.33   772.2 1809.23  772.03 1815.88     771
 1820.57  770.35 1826.53  770.27 1833.26  771.28 1834.71  771.43 1839.58  771.62
 1841.91  771.72 1842.06  770.16 1850.33  758.08 1856.93  752.87 1859.06  752.31
 1861.81  750.94 1863.21  749.61    1871  743.99    1891  742.99    1911  743.99
 1918.59  749.61 1925.65  754.48 1930.23  757.65 1949.56  762.54 1951.35  762.95
 1952.94  763.31 1964.03  765.39 1966.78  765.91 1967.69  765.96  1989.8  767.14
 1999.96  766.19 2007.59  765.73 2020.27  765.27 2054.81  764.92 2095.29  764.71
 2105.09  764.45 2117.68  764.18    2120   763.5 2127.37  763.17 2130.78  762.92
 2133.49  762.97 2139.74   764.2 2144.13  764.99 2171.28  765.23 2176.39  765.22
 2178.09  765.56 2179.94  765.84 2188.69  767.18 2197.81  767.32 2200.27  767.35
 2201.51  767.28 2201.91  767.26 2202.18  767.24    2203   767.2 2221.79   765.4
 2242.52  764.75 2274.23  763.78 2287.95  764.85 2312.56  765.54 2313.13  765.54
  2314.1  765.53 2348.38  764.63 2359.31   764.7 2371.37  763.83 2376.15  764.07
 2388.85  765.93 2395.12  766.66 2404.62  768.23 2410.47  769.22 2421.56  769.67
 2437.54  770.13 2467.72   770.7  2501.9  771.77 2532.32  772.45 2567.81  773.38
 2602.99  773.73 2609.65   773.8 2613.59     774 2617.33  774.71 2634.34  777.65
  2656.1  781.46 2661.05  781.65 2679.12  782.16  2700.8  780.99 2703.15  780.86
 2704.08  780.72 2710.36  779.74 2714.86  781.93 2717.57   783.3 2738.27  789.58
 2750.59  793.34 2752.78  793.99 2779.98  800.14 2788.63  802.13 2793.02  803.37
 2804.18  806.41 2815.73   810.1 2826.86  813.36 2836.33  818.88 2843.29   823.4
  2846.9  825.18 2863.38  833.32 2873.47  842.34  2881.3  849.07 2887.93  850.77

Manning's n Values         num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .15  826.74    .072 1841.91    .042 1930.23     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1841.91 1930.23           704.99  607.38  382.48             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1696     800       F
 2152.25 2887.93  799.76       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     935    1125     805    1255    1500     805

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  772.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  772.56  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)         *  756.50  * Flow Area (sq ft)      *   52.21  * 2093.90  * 1775.61  *
* E.G. Slope (ft/ft)     *0.000459  * Area (sq ft)           *  116.78  * 2093.90  * 3841.75  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *   27.81  *11670.65  * 1501.54  *
* Top Width (ft)         *  773.82  * Top Width (ft)         *   79.04  *   88.32  *  606.47  *
* Vel Total (ft/s)       *    3.37  * Avg. Vel. (ft/s)       *    0.53  *    5.57  *    0.85  *
* Max Chl Dpth (ft)      *   29.57  * Hydr. Depth (ft)       *    1.24  *   23.71  *    8.00  *
* Conv. Total (cfs)      *615890.6  * Conv. (cfs)            *  1297.5  *544533.6  * 70059.4  *
* Length Wtd. (ft)       *  587.01  * Wetted Per. (ft)       *   42.51  *  105.07  *  223.37  *
* Min Ch El (ft)         *  742.99  * Shear (lb/sq ft)       *    0.04  *    0.57  *    0.23  *
* Alpha                  *    2.43  * Stream Power (lb/ft s) *    0.02  *    3.19  *    0.19  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *  397.15  * 4949.06  *  356.41  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   67.90  *  392.53  *   77.65  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  777.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  777.00  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)         *  759.95  * Flow Area (sq ft)      *  503.31  * 2485.25  * 2759.40  *
* E.G. Slope (ft/ft)     *0.000512  * Area (sq ft)           *  812.49  * 2485.25  * 6834.00  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  606.56  *16389.11  * 3304.33  *
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* Top Width (ft)          *  981.96  * Top Width (ft)          *  193.31  *   88.32  *  700.33  *
* Vel Total (ft/s)        *    3.53  * Avg. Vel. (ft/s)        *    1.21  *    6.59  *    1.20  *
* Max Chl Dpth (ft)       *   34.01  * Hydr. Depth (ft)        *    4.19  *   28.14  *   12.43  *
* Conv. Total (cfs)       *897408.8  * Conv. (cfs)             * 26814.4  *724518.7  *146075.7  *
* Length Wtd. (ft)        *  580.81  * Wetted Per. (ft)        *  121.35  *  105.07  *  223.37  *
* Min Ch El (ft)          *  742.99  * Shear (lb/sq ft)        *    0.13  *    0.76  *    0.39  *
* Alpha                   *    2.84  * Stream Power (lb/ft s) *    0.16  *    4.98  *    0.47  *
* Frctn Loss (ft)         *    0.25  * Cum Volume (acre-ft)    *  732.82  * 6655.88  *  710.09  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)          *  103.66  *  432.10  *  111.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  780.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.63  * Wt. n-Val.              *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  780.02  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)          *  762.46  * Flow Area (sq ft)       *  875.06  * 2751.98  * 3429.92  *
* E.G. Slope (ft/ft)      *0.000539  * Area (sq ft)            * 1437.82  * 2751.98  * 8975.53  *
* Q Total (cfs)           *26320.00  * Flow (cfs)              * 1511.32  *19935.52  * 4873.17  *
* Top Width (ft)          * 1027.36  * Top Width (ft)          *  219.08  *   88.32  *  719.96  *
* Vel Total (ft/s)        *    3.73  * Avg. Vel. (ft/s)        *    1.73  *    7.24  *    1.42  *
* Max Chl Dpth (ft)       *   37.03  * Hydr. Depth (ft)        *    6.95  *   31.16  *   15.45  *
* Conv. Total (cfs)       *1133707.0  * Conv. (cfs)             * 65098.4  *858702.1  *209906.8  *
* Length Wtd. (ft)        *  578.67  * Wetted Per. (ft)        *  127.86  *  105.07  *  223.37  *
* Min Ch El (ft)          *  742.99  * Shear (lb/sq ft)        *    0.23  *    0.88  *    0.52  *
* Alpha                   *    2.90  * Stream Power (lb/ft s) *    0.40  *    6.38  *    0.73  *
* Frctn Loss (ft)         *    0.27  * Cum Volume (acre-ft)    * 1037.90  * 8062.46  * 1120.97  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)          *  131.07  *  459.99  *  184.77  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  784.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.71  * Wt. n-Val.              *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  783.32  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)          *  766.09  * Flow Area (sq ft)       * 1300.45  * 3043.49  * 4162.71  *
* E.G. Slope (ft/ft)      *0.000568  * Area (sq ft)            * 2435.27  * 3043.49  *11477.41  *
* Q Total (cfs)           *34000.00  * Flow (cfs)              * 2898.60  *24195.81  * 6905.59  *
* Top Width (ft)          * 1303.66  * Top Width (ft)          *  427.95  *   88.32  *  787.39  *
* Vel Total (ft/s)        *    4.00  * Avg. Vel. (ft/s)        *    2.23  *    7.95  *    1.66  *
* Max Chl Dpth (ft)       *   40.33  * Hydr. Depth (ft)        *    9.86  *   34.46  *   18.75  *
* Conv. Total (cfs)       *1427110.0  * Conv. (cfs)             *121665.4  *1015590.0  *289853.9  *
* Length Wtd. (ft)        *  576.98  * Wetted Per. (ft)        *  134.74  *  105.07  *  223.37  *
* Min Ch El (ft)          *  742.99  * Shear (lb/sq ft)        *    0.34  *    1.03  *    0.66  *
* Alpha                   *    2.88  * Stream Power (lb/ft s) *    0.76  *    8.16  *    1.10  *
* Frctn Loss (ft)         *    0.30  * Cum Volume (acre-ft)    * 1491.17  * 9528.55  * 1806.81  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  186.81  *  482.81  *  269.17  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  788.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.83  * Wt. n-Val.              *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  787.21  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)          *  770.15  * Flow Area (sq ft)       * 1837.99  * 3387.80  * 5028.25  *
* E.G. Slope (ft/ft)      *0.000602  * Area (sq ft)            * 4204.01  * 3387.80  *14572.12  *
* Q Total (cfs)           *44500.00  * Flow (cfs)              * 4960.70  *29794.81  * 9744.49  *
* Top Width (ft)          * 1360.47  * Top Width (ft)          *  471.91  *   88.32  *  800.24  *
* Vel Total (ft/s)        *    4.34  * Avg. Vel. (ft/s)        *    2.70  *    8.79  *    1.94  *
* Max Chl Dpth (ft)       *   44.22  * Hydr. Depth (ft)        *   12.60  *   38.36  *   22.65  *
* Conv. Total (cfs)       *1813492.0  * Conv. (cfs)             *202161.5  *1214217.0  *397113.4  *
* Length Wtd. (ft)        *  576.10  * Wetted Per. (ft)        *  149.38  *  105.07  *  223.37  *
* Min Ch El (ft)          *  742.99  * Shear (lb/sq ft)        *    0.46  *    1.21  *    0.85  *
* Alpha                   *    2.84  * Stream Power (lb/ft s) *    1.25  *   10.66  *    1.64  *
```

```
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   * 2622.45  *11845.39  * 3663.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  409.00  *  510.82  *  634.22  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  790.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.93  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  790.03  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)         *  772.39  * Flow Area (sq ft)      * 2248.04  * 3636.01  * 5652.20  *
* E.G. Slope (ft/ft)     *0.000635  * Area (sq ft)           * 5609.00  * 3636.01  *16834.06  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 7123.33  *34410.47  *12156.20  *
* Top Width (ft)         * 1452.39  * Top Width (ft)         *  554.58  *   88.32  *  809.50  *
* Vel Total (ft/s)       *    4.65  * Avg. Vel. (ft/s)       *    3.17  *    9.46  *    2.15  *
* Max Chl Dpth (ft)      *   47.04  * Hydr. Depth (ft)       *   15.41  *   41.17  *   25.46  *
* Conv. Total (cfs)      *2131459.0  * Conv. (cfs)            *282791.8  *1366074.0  *482593.3  *
* Length Wtd. (ft)       *  576.12  * Wetted Per. (ft)       *  149.38  *  105.07  *  223.37  *
* Min Ch El (ft)         *  742.99  * Shear (lb/sq ft)       *    0.60  *    1.37  *    1.00  *
* Alpha                  *    2.76  * Stream Power (lb/ft s) *    1.89  *   12.97  *    2.16  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 3945.42  *13212.58  * 5726.42  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  594.52  *  517.92  *  996.12  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  793.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  792.29  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)         *  774.70  * Flow Area (sq ft)      * 2579.17  * 3836.44  * 6156.05  *
* E.G. Slope (ft/ft)     *0.000664  * Area (sq ft)           * 7310.10  * 3836.44  *18679.58  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 9163.26  *38497.93  *14338.81  *
* Top Width (ft)         * 1811.31  * Top Width (ft)         *  906.05  *   88.32  *  816.93  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *    3.55  *   10.03  *    2.33  *
* Max Chl Dpth (ft)      *   49.30  * Hydr. Depth (ft)       *   17.68  *   43.44  *   27.73  *
* Conv. Total (cfs)      *2405848.0  * Conv. (cfs)            *355571.3  *1493874.0  *556403.1  *
* Length Wtd. (ft)       *  576.21  * Wetted Per. (ft)       *  149.38  *  105.07  *  223.37  *
* Min Ch El (ft)         *  742.99  * Shear (lb/sq ft)       *    0.72  *    1.51  *    1.14  *
* Alpha                  *    2.70  * Stream Power (lb/ft s) *    2.54  *   15.19  *    2.66  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 5080.38  *14081.79  * 7697.74  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  713.22  *  519.33  * 1350.80  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  796.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  795.35  * Reach Len. (ft)        *  704.99  *  607.38  *  382.48  *
* Crit W.S. (ft)         *  777.00  * Flow Area (sq ft)      * 3024.42  * 4105.95  * 6833.55  *
* E.G. Slope (ft/ft)     *0.000713  * Area (sq ft)           *10364.89  * 4105.95  *21188.88  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *12378.91  *44662.43  *17678.66  *
* Top Width (ft)         * 1941.08  * Top Width (ft)         * 1024.21  *   88.32  *  828.55  *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *    4.09  *   10.88  *    2.59  *
* Max Chl Dpth (ft)      *   52.36  * Hydr. Depth (ft)       *   20.73  *   46.49  *   30.78  *
* Conv. Total (cfs)      *2798662.0  * Conv. (cfs)            *463655.9  *1672846.0  *662160.1  *
* Length Wtd. (ft)       *  576.37  * Wetted Per. (ft)       *  149.38  *  105.07  *  223.37  *
* Min Ch El (ft)         *  742.99  * Shear (lb/sq ft)       *    0.90  *    1.74  *    1.36  *
* Alpha                  *    2.62  * Stream Power (lb/ft s) *    3.69  *   18.92  *    3.52  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 7190.22  *15425.63  *11554.11  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  889.46  *  521.42  * 1707.65  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	785.60	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.76	Wt. n-Val.	0.072	0.042	0.150	
W.S. Elev (ft)	784.84	Reach Len. (ft)	704.99	607.38	382.48	
Crit W.S. (ft)	768.34	Flow Area (sq ft)	1503.67	3178.11	4501.12	
E.G. Slope (ft/ft)	0.000583	Area (sq ft)	3101.00	3178.11	12681.41	
Q Total (cfs)	38000.00	Flow (cfs)	3680.99	26348.84	7970.17	
Top Width (ft)	1331.43	Top Width (ft)	450.70	88.32	792.42	
Vel Total (ft/s)	4.14	Avg. Vel. (ft/s)	2.45	8.29	1.77	
Max Chl Dpth (ft)	41.85	Hydr. Depth (ft)	11.15	35.98	20.27	
Conv. Total (cfs)	1574234.0	Conv. (cfs)	152493.2	1091559.0	330181.8	
Length Wtd. (ft)	576.63	Wetted Per. (ft)	138.04	105.07	223.37	
Min Ch El (ft)	742.99	Shear (lb/sq ft)	0.40	1.10	0.73	
Alpha	2.86	Stream Power (lb/ft s)	0.97	9.12	1.30	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	1792.49	10304.19	2266.39	
C & E Loss (ft)	0.00	Cum SA (acres)	235.90	493.18	332.35	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 16.874

INPUT
Description: Swope Park Industrial Area on Left.
Station Elevation Data num= 256

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	841	25.04	840.34	47.59	839.81	58.37	838.97	71.26	837.93
83.76	835.82	101.74	833.56	105.68	832.37	107	831.99	118.02	828.34
123.8	826.46	125.59	825.6	126.94	825.53	137.32	824.24	140.95	823.8
141.58	823.71	151.4	824.59	156.06	824.99	170.66	825.86	199.7	827.57
225.83	826.38	228.09	826.26	239.23	824.37	256.78	821.53	256.98	821.47
281.52	814.79	292.85	811.85	303.33	809.84	327.48	804.11	332.42	802.68
346.02	798.09	350.47	796.59	351.66	796.11	367.85	793.09	374.73	791.41
415.31	789.42	425.35	788.96	477.61	788.63	487.03	788.52	551.36	787.46
551.5	787.46	608.27	785.84	642.78	785.51	667.38	785.05	690.96	784.91
691.49	784.86	692.37	784.79	704.41	783.72	713.85	782.99	714.95	782.98
728.51	782.84	747.55	783.61	751.28	783.66	754.89	783.71	765.05	784.23
766.8	784.23	768.06	784.23	769.44	784.25	814.74	783.34	817.76	783.39
820.28	783.34	824.99	783.95	837.81	784.1	854.58	783.8	858.68	783.71
859.77	783.58	863.37	783.45	872.41	783.19	885.17	784.2	885.18	784.2
886.03	784.27	897.53	785.52	897.66	785.53	898.62	785.51	910.56	785.17
911.71	785.15	913.8	784.95	929.97	783.54	931.17	782.48	936.02	778.17
936.28	778.07	942.24	776.39	949.58	779.69	961.25	785.41	962.56	785.63
962.87	785.68	966.28	786.3	971.57	787.17	973.75	787.11	979.49	786.96
984.26	786.96	986.29	786.96	992.23	786.17	996.18	785.63	999.21	785.26
1005.36	784.01	1010.49	781.17	1013.8	777.97	1024.02	780.4	1028.88	782.05
1033.87	782.04	1051.06	781.97	1062.13	781.84	1088.13	781.35	1100.79	781.12
1103.92	781.19	1110.01	780.96	1147.9	778.53	1153.1	778.12	1153.93	778
1154.79	777.86	1155.45	777.76	1175.34	774.2	1179.71	773.38	1179.98	773.35
1180.42	773.24	1192	770.26	1192.49	770.1	1192.54	770.08	1199.86	767.53
1205.47	764.8	1207.4	764.23	1209.09	763.92	1211.64	762.96	1213.92	763.43
1218.7	764.3	1218.97	764.3	1219.14	764.3	1231.35	764.33	1240.84	764.42
1246.58	769.36	1251.63	773.35	1256.08	775.31	1257.05	775.67	1258.31	776.12
1260.15	776.72	1268.62	779.59	1273.09	780.82	1284.62	781.16	1299.86	780.98
1302.49	781.41	1306.26	781.8	1314.05	781.79	1368.45	782.1	1385.04	782.06
1425.19	782.77	1431.93	782.82	1461.49	782.7	1469.08	782.9	1565.46	782.61
1600.72	782.39	1607.79	782.35	1616.09	782.35	1648.66	782.23	1656.17	782.07
1660.08	781.99	1678.46	781.73	1685.17	781.49	1690.46	781.41	1695.55	781.33
1698.39	781.26	1698.4	781.26	1711.35	780.97	1731.19	782.01	1737.76	782.3
1744.92	782.41	1769.84	782.37	1780.93	782.45	1808.88	782.65	1839.86	783.43
1856.5	783.71	1890.2	784.47	1927.55	784.89	1937.77	784.68	1958.9	784.56
2085.84	782.77	2098.3	782.05	2122.88	781.2	2126.81	780.95	2126.91	780.96
2129.12	781.15	2132.55	781.16	2134.78	781.17	2155.08	782.49	2159.66	779.74
2165.6	773.36	2171.08	771.92	2181.46	769.21	2198.68	764.87	2202.62	761.63
2204.82	760.22	2215.49	757.18	2229.17	753.35	2231.74	752.95	2235.14	752.55
2236.89	751.18	2238.84	749.61	2243	743.6	2263	742.6	2283	743.6
2286.36	749.61	2294.16	750.85	2302.92	753.38	2308.64	756.99	2310.96	758.17

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 2311.22  758.25 2319.84  760.81 2328.62  763.17 2336.81  763.17 2362.05   763.2
 2368.05  763.21 2374.32  763.12 2383.47  763.03  2425.9  762.47 2452.95  763.03
 2473.47  763.57 2475.26  763.59 2505.48  763.91 2508.96  763.81 2529.75   764.7
  2538.8  765.74 2551.97  765.61 2580.32  766.26 2595.58  766.47 2600.97  766.63
 2610.22  767.05 2648.87  770.06 2679.87  771.54 2703.57  773.37 2731.28  779.62
 2732.74  779.97 2733.87  779.99  2750.2  779.68 2756.03  779.36 2774.87  778.31
 2775.34  778.26 2779.58  777.91 2780.01  778.07 2793.45  783.29 2800.06   785.2
 2829.82  792.27 2833.55  793.19 2834.19  793.34 2843.28  796.59 2862.45  803.37
 2880.92  807.52 2888.94  809.72  2900.3  813.14 2906.16  817.07 2916.09   823.4
 2918.24  824.67 2921.27  826.59 2934.29  834.51 2936.75   836.2 2955.81  845.63
 2964.01   850.2

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15 1100.79     .15 1299.86    .072 2198.68    .042 2328.62     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2198.68 2328.62          668.99  789.86  725.09             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2140.97  801.12       F
 2453.29 2964.01   802.2       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    1350    1650     805    1775    2125     805

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  772.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  772.44  * Reach Len. (ft)        *  668.99  *  789.86  *  725.09  *
* Crit W.S. (ft)         *  756.79  * Flow Area (sq ft)      *  112.85  * 2697.20  * 1184.76  *
* E.G. Slope (ft/ft)     *0.000322  * Area (sq ft)           *  516.50  * 2697.20  * 2568.05  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  100.00  *12154.62  *  945.38  *
* Top Width (ft)         *  589.29  * Top Width (ft)          *   96.49  *  129.94  *  362.86  *
* Vel Total (ft/s)       *    3.30  * Avg. Vel. (ft/s)        *    0.89  *    4.51  *    0.80  *
* Max Chl Dpth (ft)      *   29.84  * Hydr. Depth (ft)        *    3.82  *   20.76  *    9.50  *
* Conv. Total (cfs)      *735168.0  * Conv. (cfs)             *  5569.5  *676945.8  * 52652.7  *
* Length Wtd. (ft)       *  776.91  * Wetted Per. (ft)        *   30.52  *  142.75  *  124.68  *
* Min Ch El (ft)         *  742.60  * Shear (lb/sq ft)        *    0.07  *    0.38  *    0.19  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    0.07  *    1.71  *    0.15  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)    *  392.02  * 4915.66  *  328.27  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *   66.48  *  391.01  *   73.39  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  777.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  776.83  * Reach Len. (ft)        *  668.99  *  789.86  *  725.09  *
* Crit W.S. (ft)         *  760.13  * Flow Area (sq ft)      *  262.32  * 3268.63  * 1733.01  *
* E.G. Slope (ft/ft)     *0.000373  * Area (sq ft)           * 1027.49  * 3268.63  * 4237.88  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  373.22  *18009.98  * 1916.80  *
* Top Width (ft)         *  658.98  * Top Width (ft)          *  138.74  *  129.94  *  390.31  *
* Vel Total (ft/s)       *    3.86  * Avg. Vel. (ft/s)        *    1.42  *    5.51  *    1.11  *
* Max Chl Dpth (ft)      *   34.23  * Hydr. Depth (ft)        *    7.22  *   25.15  *   13.90  *
* Conv. Total (cfs)      *1051048.0  * Conv. (cfs)             * 19323.5  *932480.7  * 99244.0  *
* Length Wtd. (ft)       *  772.03  * Wetted Per. (ft)        *   38.90  *  142.75  *  124.68  *
* Min Ch El (ft)         *  742.60  * Shear (lb/sq ft)        *    0.16  *    0.53  *    0.32  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.22  *    2.94  *    0.36  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)    *  717.93  * 6615.77  *  661.48  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)          *  100.98  *  430.58  *  107.07  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	780.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.072	0.042	0.150
W.S. Elev (ft)	779.81	Reach Len. (ft)	668.99	789.86	725.09
Crit W.S. (ft)	762.32	Flow Area (sq ft)	374.49	3655.26	2103.96
E.G. Slope (ft/ft)	0.000414	Area (sq ft)	1526.36	3655.26	5452.03
Q Total (cfs)	26320.00	Flow (cfs)	665.75	22863.73	2790.52
Top Width (ft)	780.37	Top Width (ft)	205.88	129.94	444.55
Vel Total (ft/s)	4.29	Avg. Vel. (ft/s)	1.78	6.26	1.33
Max Chl Dpth (ft)	37.21	Hydr. Depth (ft)	9.57	28.13	16.88
Conv. Total (cfs)	1293302.0	Conv. (cfs)	32713.6	1123470.0	137119.3
Length Wtd. (ft)	769.33	Wetted Per. (ft)	43.00	142.75	124.68
Min Ch El (ft)	742.60	Shear (lb/sq ft)	0.23	0.66	0.44
Alpha	1.86	Stream Power (lb/ft s)	0.40	4.14	0.58
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	1013.91	8017.79	1057.62
C & E Loss (ft)	0.06	Cum SA (acres)	127.63	458.47	179.65

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	783.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.	0.072	0.042	0.150
W.S. Elev (ft)	783.04	Reach Len. (ft)	668.99	789.86	725.09
Crit W.S. (ft)	765.07	Flow Area (sq ft)	523.77	4075.43	2507.09
E.G. Slope (ft/ft)	0.000466	Area (sq ft)	2721.64	4075.43	6938.47
Q Total (cfs)	34000.00	Flow (cfs)	964.15	29071.81	3964.04
Top Width (ft)	1181.95	Top Width (ft)	587.82	129.94	464.19
Vel Total (ft/s)	4.78	Avg. Vel. (ft/s)	1.84	7.13	1.58
Max Chl Dpth (ft)	40.44	Hydr. Depth (ft)	9.08	31.36	20.11
Conv. Total (cfs)	1575170.0	Conv. (cfs)	44667.7	1346854.0	183648.1
Length Wtd. (ft)	766.80	Wetted Per. (ft)	62.35	142.75	124.68
Min Ch El (ft)	742.60	Shear (lb/sq ft)	0.24	0.83	0.58
Alpha	1.92	Stream Power (lb/ft s)	0.45	5.92	0.92
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	1449.44	9478.91	1725.96
C & E Loss (ft)	0.05	Cum SA (acres)	178.59	481.29	263.68

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	787.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.072	0.042	0.150
W.S. Elev (ft)	786.86	Reach Len. (ft)	668.99	789.86	725.09
Crit W.S. (ft)	767.57	Flow Area (sq ft)	743.87	4571.01	2982.57
E.G. Slope (ft/ft)	0.000517	Area (sq ft)	5785.04	4571.01	8734.25
Q Total (cfs)	44500.00	Flow (cfs)	1823.36	37096.60	5580.04
Top Width (ft)	1566.99	Top Width (ft)	958.64	129.94	478.41
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)	2.45	8.12	1.87
Max Chl Dpth (ft)	44.26	Hydr. Depth (ft)	12.89	35.18	23.92
Conv. Total (cfs)	1956189.0	Conv. (cfs)	80153.6	1630740.0	245294.4
Length Wtd. (ft)	763.94	Wetted Per. (ft)	62.35	142.75	124.68
Min Ch El (ft)	742.60	Shear (lb/sq ft)	0.39	1.03	0.77
Alpha	1.93	Stream Power (lb/ft s)	0.94	8.40	1.45
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	2541.61	11789.90	3561.18
C & E Loss (ft)	0.05	Cum SA (acres)	397.42	509.30	628.60

Warning: Divided flow computed for this cross-section.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	790.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.	0.072	0.042	0.150
W.S. Elev (ft)	789.56	Reach Len. (ft)	668.99	789.86	725.09
Crit W.S. (ft)	769.48	Flow Area (sq ft)	899.86	4922.24	3319.55
E.G. Slope (ft/ft)	0.000570	Area (sq ft)	8625.79	4922.24	10042.78
Q Total (cfs)	53690.00	Flow (cfs)	2628.96	44058.85	7002.19
Top Width (ft)	1755.95	Top Width (ft)	1136.22	129.94	489.79
Vel Total (ft/s)	5.87	Avg. Vel. (ft/s)	2.92	8.95	2.11
Max Chl Dpth (ft)	46.96	Hydr. Depth (ft)	15.59	37.88	26.63
Conv. Total (cfs)	2248171.0	Conv. (cfs)	110083.0	1844884.0	293203.7
Length Wtd. (ft)	762.27	Wetted Per. (ft)	62.35	142.75	124.68
Min Ch El (ft)	742.60	Shear (lb/sq ft)	0.51	1.23	0.95
Alpha	1.94	Stream Power (lb/ft s)	1.50	10.99	2.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	3830.23	13152.91	5608.42
C & E Loss (ft)	0.06	Cum SA (acres)	580.84	516.40	990.41

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	792.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.	0.072	0.042	0.150
W.S. Elev (ft)	791.73	Reach Len. (ft)	668.99	789.86	725.09
Crit W.S. (ft)	771.05	Flow Area (sq ft)	1025.11	5204.25	3590.13
E.G. Slope (ft/ft)	0.000617	Area (sq ft)	11138.98	5204.25	11115.71
Q Total (cfs)	62000.00	Flow (cfs)	3398.74	50299.75	8301.52
Top Width (ft)	1804.13	Top Width (ft)	1175.26	129.94	498.93
Vel Total (ft/s)	6.31	Avg. Vel. (ft/s)	3.32	9.67	2.31
Max Chl Dpth (ft)	49.13	Hydr. Depth (ft)	17.76	40.05	28.80
Conv. Total (cfs)	2495292.0	Conv. (cfs)	136787.7	2024396.0	334108.3
Length Wtd. (ft)	761.09	Wetted Per. (ft)	62.35	142.75	124.68
Min Ch El (ft)	742.60	Shear (lb/sq ft)	0.63	1.41	1.11
Alpha	1.93	Stream Power (lb/ft s)	2.10	13.58	2.57
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	4931.09	14018.76	7566.93
C & E Loss (ft)	0.06	Cum SA (acres)	696.37	517.81	1345.02

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	796.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.	0.072	0.042	0.150
W.S. Elev (ft)	794.62	Reach Len. (ft)	668.99	789.86	725.09
Crit W.S. (ft)	773.25	Flow Area (sq ft)	1192.05	5580.14	3950.77
E.G. Slope (ft/ft)	0.000691	Area (sq ft)	14557.35	5580.14	12575.18
Q Total (cfs)	74720.00	Flow (cfs)	4625.01	59790.38	10304.61
Top Width (ft)	1828.15	Top Width (ft)	1189.05	129.94	509.16
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	3.88	10.71	2.61
Max Chl Dpth (ft)	52.02	Hydr. Depth (ft)	20.66	42.94	31.69
Conv. Total (cfs)	2841703.0	Conv. (cfs)	175895.5	2273909.0	391898.3
Length Wtd. (ft)	759.71	Wetted Per. (ft)	62.35	142.75	124.68
Min Ch El (ft)	742.60	Shear (lb/sq ft)	0.83	1.69	1.37
Alpha	1.93	Stream Power (lb/ft s)	3.20	18.08	3.57
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	6988.54	15358.10	11405.87
C & E Loss (ft)	0.06	Cum SA (acres)	871.55	519.90	1701.78

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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  785.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.072  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  784.54  * Reach Len. (ft)        *  668.99  *  789.86  *  725.09  *
* Crit W.S. (ft)         *  766.09  * Flow Area (sq ft)      *  610.07  * 4269.75  * 2693.52  *
* E.G. Slope (ft/ft)     *0.000488  * Area (sq ft)           * 3747.34  * 4269.75  * 7636.20  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 1272.37  *32155.44  * 4572.19  *
* Top Width (ft)         * 1379.25  * Top Width (ft)         *  780.16  *  129.94  *  469.15  *
* Vel Total (ft/s)       *    5.02  * Avg. Vel. (ft/s)       *    2.09  *    7.53  *    1.70  *
* Max Chl Dpth (ft)      *   41.94  * Hydr. Depth (ft)       *   10.57  *   32.86  *   21.61  *
* Conv. Total (cfs)      *1720140.0  * Conv. (cfs)            * 57596.2  *1455575.0  *206968.8  *
* Length Wtd. (ft)       *  765.60  * Wetted Per. (ft)       *   62.35  *  142.75  *  124.68  *
* Min Ch El (ft)         *  742.60  * Shear (lb/sq ft)       *    0.30  *    0.91  *    0.66  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.62  *    6.86  *    1.12  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 1737.07  *10252.27  * 2177.19  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  225.94  *  491.66  *  326.81  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 16.724

INPUT
Description: Swope Park Industrial Area on Left.
Station Elevation Data    num=     259
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  848.14    5.96  847.84   11.58  846.25   25.56  842.33   33.65   840.3
   47.84  838.55   66.19  836.65   90.41  834.03  108.13  832.13  114.31  831.59
  123.66  830.75  160.37  827.54  185.29  824.96  207.67  821.91  247.66   817.2
  255.45  816.56  264.21  814.96  287.84  806.97  296.76  804.11  323.88  797.89
  327.21  797.03  331.56  796.11  336.71  794.91  341.13  794.22  399.72  790.53
  406.28  790.12  425.04  788.74  442.81  787.45  486.92  786.02  528.37  785.87
  541.66  785.77  557.23  785.64   568.7  785.54  574.46   785.6  607.93  785.54
  666.74  786.57  669.39   786.6  718.99  785.83  728.84  785.56   733.6  785.46
  742.63  785.26  753.15  782.38  756.08  781.57  765.46  781.45   776.1  781.33
  777.88  781.33  783.91  781.34  789.56  782.24  790.74  782.43  792.38  782.52
  801.44   783.1  803.04  783.21   806.7  783.21  809.84  783.21  814.17  782.95
  817.17   782.7  822.83  781.87  833.72  780.39  840.97  783.25  843.16  784.08
  873.74  782.94  876.75  782.86  880.13  782.83  914.44  782.51  938.09  782.14
  947.79  782.02  955.48  781.96   988.2  781.77  997.93  781.74 1041.37  781.57
 1071.82  781.59 1072.06  781.59 1099.28   782.1  1117.8  782.08 1130.19  781.64
 1136.84  781.24 1147.97  780.75 1148.31  780.64 1149.21  780.35  1151.6  779.68
 1169.08  774.19 1172.99  773.34 1175.64   771.9 1179.09  770.35 1196.58  765.55
 1204.96  764.16 1206.65  763.75 1210.53  763.34 1214.75  762.81 1226.62  761.04
 1246.52  760.84 1278.35  760.81 1292.85  760.62 1296.12  760.67 1298.54  760.23
 1300.57  759.81 1305.33  760.33 1305.76  760.39 1306.48  760.42 1315.16  760.76
 1320.72  762.83 1321.71   763.2 1322.21  763.34  1325.5  764.99 1339.19  771.67
 1343.42  773.35 1352.54  776.14 1362.68  778.64 1377.27  778.15 1387.23  779.48
 1389.99  779.46 1393.69  779.91    1405  780.98 1411.81  781.92 1421.83  782.37
 1442.12  781.99  1461.6  781.85 1483.77  781.02 1489.63  781.41 1505.34  781.38
 1522.99  781.12 1547.76  780.33 1558.07  779.92 1558.44  779.83 1558.54  779.81
 1559.08  779.69 1560.98  779.76  1579.4  780.34 1620.99  781.36 1622.91  781.51
 1640.64  782.82 1657.58  783.74 1662.93  783.76 1691.33  783.54 1719.03  783.72
 1759.68  784.77 1774.38  784.85 1834.62  784.28 1841.28  784.26 1866.55  784.14
 1872.46  784.05 1883.12  783.89 1893.83  783.72 1921.69  783.96 1922.75  783.97
 1947.27  784.41 1965.15  784.34 1991.77  783.76 2077.52  783.21 2082.26  783.25
 2084.46  783.22 2089.45  783.02 2122.91  782.66 2128.59   782.6 2149.85  782.25
 2153.96  782.05  2160.9  774.35 2164.63  773.35 2170.12  770.93 2170.67  770.71
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 2171.12  770.62 2172.92  770.45 2191.45   768.8 2206.34  767.47 2213.75  766.79
  2263.4  765.04 2264.74     765 2265.62  764.99 2268.27  764.98 2335.86  764.59
 2349.33   764.6  2359.2  764.17 2370.68  763.61 2375.05  764.14 2378.62   764.1
 2387.69     764 2392.65  763.54 2403.45  763.06 2405.91  761.47 2414.58  756.26
 2427.62  754.26 2430.01  753.89 2433.77  751.34 2435.49  749.97 2436.04  749.61
    2443  743.08    2458  742.08    2473  743.08 2479.51  749.61 2480.63  750.14
 2482.34   750.9 2489.53  751.86 2501.82  753.36 2507.17  754.07 2508.93  754.25
 2513.97  756.91  2519.2  760.39 2522.43  762.54 2528.66  762.34 2540.87  762.17
 2553.07  761.99 2555.66  762.03 2559.58  763.15 2560.17  763.31 2560.72  763.52
 2567.46  765.79 2577.49  766.81 2586.41  767.07 2592.79  767.97 2596.77  768.39
 2608.83  769.93 2611.88  770.34 2614.32  770.67 2616.03   770.9  2616.4  770.95
 2616.76     771 2616.95  771.02 2617.15  771.05 2617.48  771.09 2617.81  771.14
 2618.13  771.18 2618.29   771.2 2618.44  771.22 2618.58  771.24 2618.72  771.26
 2618.98   771.3 2619.24  771.33 2635.79  773.38 2641.72  774.28 2658.19  775.32
 2670.74  776.24 2691.02  776.24 2696.03  776.24  2699.3  775.88 2713.17  774.46
 2729.09  779.99 2734.74  781.83 2736.01  782.21 2739.87  783.28 2762.63   788.9
 2781.03  793.34 2810.49  802.01 2815.11  803.37 2815.94  803.51 2841.76  807.83
 2863.83  813.07    2865  813.34 2868.71     815 2884.34  821.85 2886.95  822.25
 2892.23   823.4 2895.16  824.72 2916.71   833.3 2937.29  846.78 2938.93  848.03
 2940.39  848.33 2945.22  849.54 2960.47  853.39 2961.99  853.61

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15 1130.19     .15 1362.68     .09 2153.96     .15 2430.01    .042
 2482.34     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2430.01 2482.34           354.14  764.98  912.92             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2259.52  804.88       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    1410    1600     805    1940    2140     805

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  772.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.67  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  771.67  * Reach Len. (ft)        *  354.14  *  764.98  *  912.92  *
* Crit W.S. (ft)          *  757.79  * Flow Area (sq ft)      * 1430.13  * 1394.35  * 1274.33  *
* E.G. Slope (ft/ft)      *0.000652  * Area (sq ft)           * 3246.25  * 1394.35  * 1274.33  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             * 1480.94  *10334.62  * 1384.44  *
* Top Width (ft)          *  616.62  * Top Width (ft)         *  424.62  *   52.33  *  139.66  *
* Vel Total (ft/s)        *    3.22  * Avg. Vel. (ft/s)       *    1.04  *    7.41  *    1.09  *
* Max Chl Dpth (ft)       *   29.59  * Hydr. Depth (ft)       *    8.39  *   26.65  *    9.12  *
* Conv. Total (cfs)       *516904.7  * Conv. (cfs)            * 57992.9  *404698.0  * 54213.8  *
* Length Wtd. (ft)        *  722.62  * Wetted Per. (ft)       *  172.68  *   59.34  *  143.18  *
* Min Ch El (ft)          *  742.08  * Shear (lb/sq ft)       *    0.34  *    0.96  *    0.36  *
* Alpha                   *    4.17  * Stream Power (lb/ft s) *    0.35  *    7.09  *    0.39  *
* Frctn Loss (ft)         *    0.40  * Cum Volume (acre-ft)   *  363.13  * 4878.57  *  296.29  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         *   62.48  *  389.35  *   69.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  776.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.91  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  775.90  * Reach Len. (ft)        *  354.14  *  764.98  *  912.92  *
* Crit W.S. (ft)          *  761.56  * Flow Area (sq ft)      * 2150.26  * 1615.39  * 1956.32  *
* E.G. Slope (ft/ft)      *0.000788  * Area (sq ft)           * 5110.02  * 1615.39  * 1956.32  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 3212.04  *14516.21  * 2571.75  *
* Top Width (ft)          *  712.79  * Top Width (ft)         *  458.60  *   52.33  *  201.86  *
* Vel Total (ft/s)        *    3.55  * Avg. Vel. (ft/s)       *    1.49  *    8.99  *    1.31  *
* Max Chl Dpth (ft)       *   33.82  * Hydr. Depth (ft)       *   12.61  *   30.87  *    9.69  *
* Conv. Total (cfs)       *723237.9  * Conv. (cfs)            *114436.9  *517176.0  * 91624.9  *
* Length Wtd. (ft)        *  702.92  * Wetted Per. (ft)       *  172.68  *   59.34  *  205.92  *
* Min Ch El (ft)          *  742.08  * Shear (lb/sq ft)       *    0.61  *    1.34  *    0.47  *
* Alpha                   *    4.63  * Stream Power (lb/ft s) *    0.91  *   12.03  *    0.61  *
* Frctn Loss (ft)         *    0.47  * Cum Volume (acre-ft)   *  670.80  * 6571.49  *  609.93  *
```

```
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   96.39  *  428.93  *  102.14  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  779.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  778.75  * Reach Len. (ft)        *  354.14  *  764.98  *  912.92  *
* Crit W.S. (ft)         *  766.28  * Flow Area (sq ft)      * 2637.58  * 1764.97  * 2629.65  *
* E.G. Slope (ft/ft)     *0.000882  * Area (sq ft)           * 6460.18  * 1764.97  * 2629.65  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 4777.87  *17805.23  * 3736.90  *
* Top Width (ft)         *  795.85  * Top Width (ft)         *  500.33  *   52.33  *  243.19  *
* Vel Total (ft/s)       *    3.74  * Avg. Vel. (ft/s)       *    1.81  *   10.09  *    1.42  *
* Max Chl Dpth (ft)      *   36.67  * Hydr. Depth (ft)       *   15.47  *   33.73  *   10.81  *
* Conv. Total (cfs)      *886085.0  * Conv. (cfs)            *160850.9  *599428.2  *125805.9  *
* Length Wtd. (ft)       *  693.23  * Wetted Per. (ft)       *  172.68  *   59.34  *  247.77  *
* Min Ch El (ft)         *  742.08  * Shear (lb/sq ft)       *    0.84  *    1.64  *    0.58  *
* Alpha                  *    4.98  * Stream Power (lb/ft s) *    1.52  *   16.53  *    0.83  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   *  952.58  * 7968.64  *  990.36  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  122.21  *  456.82  *  173.93  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  783.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  781.96  * Reach Len. (ft)        *  354.14  *  764.98  *  912.92  *
* Crit W.S. (ft)         *  769.38  * Flow Area (sq ft)      * 3183.52  * 1932.54  * 3423.54  *
* E.G. Slope (ft/ft)     *0.000943  * Area (sq ft)           * 8230.11  * 1932.54  * 3423.54  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 6756.84  *21406.17  * 5836.99  *
* Top Width (ft)         * 1082.94  * Top Width (ft)         *  777.79  *   52.33  *  252.82  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *    2.12  *   11.08  *    1.70  *
* Max Chl Dpth (ft)      *   39.88  * Hydr. Depth (ft)       *   18.67  *   36.93  *   13.54  *
* Conv. Total (cfs)      *1107465.0  * Conv. (cfs)            *220087.0  *697252.3  *190125.2  *
* Length Wtd. (ft)       *  686.63  * Wetted Per. (ft)       *  172.68  *   59.34  *  257.92  *
* Min Ch El (ft)         *  742.08  * Shear (lb/sq ft)       *    1.08  *    1.92  *    0.78  *
* Alpha                  *    4.96  * Stream Power (lb/ft s) *    2.30  *   21.23  *    1.33  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   * 1365.35  * 9424.44  * 1639.72  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  168.10  *  479.63  *  257.71  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  787.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  785.73  * Reach Len. (ft)        *  354.14  *  764.98  *  912.92  *
* Crit W.S. (ft)         *  772.26  * Flow Area (sq ft)      * 3826.05  * 2129.75  * 4403.05  *
* E.G. Slope (ft/ft)     *0.001014  * Area (sq ft)           *12341.30  * 2129.75  * 4403.05  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 9522.47  *26110.22  * 8867.31  *
* Top Width (ft)         * 1708.48  * Top Width (ft)         * 1388.72  *   52.33  *  267.43  *
* Vel Total (ft/s)       *    4.30  * Avg. Vel. (ft/s)       *    2.49  *   12.26  *    2.01  *
* Max Chl Dpth (ft)      *   43.65  * Hydr. Depth (ft)       *   22.44  *   40.70  *   16.46  *
* Conv. Total (cfs)      *1397252.0  * Conv. (cfs)            *298995.3  *819832.9  *278424.2  *
* Length Wtd. (ft)       *  680.63  * Wetted Per. (ft)       *  172.68  *   59.34  *  273.01  *
* Min Ch El (ft)         *  742.08  * Shear (lb/sq ft)       *    1.40  *    2.27  *    1.02  *
* Alpha                  *    4.89  * Stream Power (lb/ft s) *    3.49  *   27.86  *    2.06  *
* Frctn Loss (ft)        *    0.60  * Cum Volume (acre-ft)   * 2402.42  *11729.15  * 3451.84  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  379.40  *  507.65  *  622.40  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	789.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	788.36	Reach Len. (ft)	354.14	764.98	912.92
Crit W.S. (ft)	774.28	Flow Area (sq ft)	4275.61	2267.74	5122.32
E.G. Slope (ft/ft)	0.001100	Area (sq ft)	16456.55	2267.74	5122.32
Q Total (cfs)	53690.00	Flow (cfs)	11931.94	30185.57	11572.49
Top Width (ft)	1940.21	Top Width (ft)	1609.77	52.33	278.11
Vel Total (ft/s)	4.60	Avg. Vel. (ft/s)	2.79	13.31	2.26
Max Chl Dpth (ft)	46.28	Hydr. Depth (ft)	25.08	43.34	18.42
Conv. Total (cfs)	1619049.0	Conv. (cfs)	359813.8	910261.2	348974.2
Length Wtd. (ft)	678.07	Wetted Per. (ft)	172.68	59.34	284.01
Min Ch El (ft)	742.08	Shear (lb/sq ft)	1.70	2.62	1.24
Alpha	4.84	Stream Power (lb/ft s)	4.74	34.92	2.80
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	3637.62	13087.72	5482.20
C & E Loss (ft)	0.12	Cum SA (acres)	559.75	514.75	984.02

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	792.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.76	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	790.48	Reach Len. (ft)	354.14	764.98	912.92
Crit W.S. (ft)	777.40	Flow Area (sq ft)	4635.97	2378.35	5719.32
E.G. Slope (ft/ft)	0.001176	Area (sq ft)	19889.68	2378.35	5719.32
Q Total (cfs)	62000.00	Flow (cfs)	14120.35	33793.53	14086.13
Top Width (ft)	1978.58	Top Width (ft)	1639.43	52.33	286.82
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	3.05	14.21	2.46
Max Chl Dpth (ft)	48.40	Hydr. Depth (ft)	27.19	45.45	19.94
Conv. Total (cfs)	1807983.0	Conv. (cfs)	411763.6	985453.5	410765.8
Length Wtd. (ft)	676.41	Wetted Per. (ft)	172.68	59.34	292.97
Min Ch El (ft)	742.08	Shear (lb/sq ft)	1.97	2.94	1.43
Alpha	4.79	Stream Power (lb/ft s)	6.00	41.81	3.53
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	4692.82	13950.01	7426.81
C & E Loss (ft)	0.13	Cum SA (acres)	674.76	516.16	1338.48

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	795.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	793.28	Reach Len. (ft)	354.14	764.98	912.92
Crit W.S. (ft)	779.54	Flow Area (sq ft)	5113.89	2525.04	6539.62
E.G. Slope (ft/ft)	0.001298	Area (sq ft)	24547.76	2525.04	6539.62
Q Total (cfs)	74720.00	Flow (cfs)	17471.64	39230.62	18017.74
Top Width (ft)	2034.71	Top Width (ft)	1683.94	52.33	298.44
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)	3.42	15.54	2.76
Max Chl Dpth (ft)	51.20	Hydr. Depth (ft)	30.00	48.25	21.91
Conv. Total (cfs)	2073813.0	Conv. (cfs)	484915.7	1088824.0	500072.5
Length Wtd. (ft)	674.64	Wetted Per. (ft)	172.68	59.34	304.92
Min Ch El (ft)	742.08	Shear (lb/sq ft)	2.40	3.45	1.74
Alpha	4.73	Stream Power (lb/ft s)	8.20	53.58	4.79
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	6688.25	15284.62	11246.78
C & E Loss (ft)	0.14	Cum SA (acres)	849.48	518.25	1695.06

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	784.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.30	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	783.43	Reach Len. (ft)	354.14	764.98	912.92
Crit W.S. (ft)	770.57	Flow Area (sq ft)	3434.45	2009.56	3799.47
E.G. Slope (ft/ft)	0.000975	Area (sq ft)	9559.19	2009.56	3799.47

```
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 7798.70  *23237.51  * 6963.79  *
* Top Width (ft)         * 1293.80  * Top Width (ft)         *  983.34  *   52.33  *  258.13  *
* Vel Total (ft/s)       *    4.11  * Avg. Vel. (ft/s)       *    2.27  *   11.56  *    1.83  *
* Max Chl Dpth (ft)      *   41.35  * Hydr. Depth (ft)       *   20.14  *   38.40  *   14.72  *
* Conv. Total (cfs)      *1216946.0  * Conv. (cfs)            *249752.5  *744178.7  *223014.7  *
* Length Wtd. (ft)       *  684.13  * Wetted Per. (ft)       *  172.68  *   59.34  *  263.43  *
* Min Ch El (ft)         *  742.08  * Shear (lb/sq ft)       *    1.21  *    2.06  *    0.88  *
* Alpha                  *    4.94  * Stream Power (lb/ft s) *    2.75  *   23.84  *    1.61  *
* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)   * 1634.89  *10195.33  * 2082.01  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  212.39  *  490.01  *  320.76  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 16.579

INPUT
Description: Swope Park Industrial Area on Left.
Station Elevation Data    num=     304
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
        0  838.24   34.13  837.66   34.16  837.66   39.29  837.55   84.97  836.46
   106.08  836.42  116.03  836.34  116.38  836.33  121.21  834.78   174.6  834.72
   180.32  834.49  223.14  832.93  238.56  832.24  240.87  832.14  242.42  832.08
   276.06  830.46  279.22   830.4  285.19  830.16  329.41  828.72  334.34  828.51
   359.02  827.98  365.52  827.79  370.88  827.45  386.78  826.76  395.84  826.37
   405.58  826.47  413.74  826.18  436.92  825.17  440.13  825.01  449.95  824.45
   455.17  824.14  457.34  823.48  460.39  824.16  462.15  824.16  471.38  823.42
   473.51   821.8  478.45  819.57  499.71  814.14  501.68  813.57  502.84   813.2
   503.73  812.82  513.63  808.61   522.8  804.68  523.93  804.11  525.67  803.38
   536.59  798.83  544.75  795.37  545.98  795.16  562.38  790.24  591.42  781.85
   598.92  779.44   601.1  779.43  602.12  779.42  614.41  779.36  622.07  780.41
    624.1   780.7  625.27   780.7  630.94   780.7  635.98  780.49  640.44  780.31
   643.72  779.84  645.53  779.58  646.04  779.51  658.79  784.99  662.09  786.21
   666.45  785.16  681.83     782  702.53  781.89  716.89  781.94  732.39  781.91
   766.15  781.86  776.34  781.62  791.55  780.93  843.77   781.1  847.58  781.15
   850.81  781.12  882.49  781.08  905.23  780.96  928.36  781.18  957.85  781.48
   970.91  781.54  985.06  781.55 1023.41  781.56 1063.57  781.58 1073.87  781.59
  1077.78  781.51 1078.33  781.44 1113.93  781.42 1121.55  781.68 1144.78  782.08
  1183.98   782.3 1197.14  782.44 1232.64  782.42 1248.21  782.39 1256.07  782.61
  1263.91  783.09 1270.55  783.89 1278.82  784.57 1281.08  784.69 1290.16  782.09
  1293.98     781 1294.75  780.97 1295.64  780.94 1296.47  780.93 1303.34  780.78
  1314.52  779.86 1318.48  780.48 1324.12  781.54 1325.42  781.26 1340.02  777.83
  1340.25  777.68 1346.68  773.34 1353.71  769.08 1361.45  764.93 1368.39  763.86
  1382.33  762.04 1384.55  761.76 1384.82   761.5 1388.49  758.47 1393.22  761.93
  1395.96  764.02 1413.77  763.55  1418.3  763.42 1419.49  763.37 1423.72  763.26
  1441.84  762.66 1445.65   762.7 1459.41  762.38 1467.67  762.51 1471.89  762.45
  1477.88  762.45 1497.44  763.18 1508.08  763.44 1515.22  763.87 1525.02  769.11
  1527.24  770.02  1527.4  770.08 1527.43  770.08 1530.05     770 1530.09     770
  1539.35  769.57 1543.34  769.38 1559.72  767.66 1560.89   767.6 1562.04  767.46
  1578.49  764.73 1595.75  764.24 1599.94  763.99 1602.32  763.88 1621.51  761.91
  1623.03  761.71 1623.97  761.54 1628.64  760.57 1638.55  762.16  1648.2  763.89
  1652.93  765.66 1658.03  767.83 1667.08   767.7 1676.71  766.82 1691.59  772.28
  1692.05   772.4 1695.06  772.58 1708.62  773.35 1710.43  773.43 1713.81  773.45
   1720.4  775.24  1725.9  776.72 1726.91  776.98 1728.87  776.99 1756.63  776.27
  1764.71  776.87 1792.64  777.16 1808.72  778.19 1817.07  778.53 1837.39   778.5
   1867.7  778.29 1870.34  778.31 1878.45  777.97 1910.75   776.6 1915.17  776.25
   1928.3  775.18 1929.87  775.05 1932.38  774.84 1950.61  773.35 1953.93  772.88
  1965.99  771.26  1991.2   767.9 2011.66  765.24 2034.24  764.68 2053.96  764.09
  2056.08  763.01 2057.36  762.45 2087.43  762.45 2089.34  762.45 2095.18  765.59
  2095.22  765.61 2114.74  764.25 2126.39  763.86  2148.9  763.95 2200.42  764.35
  2212.39   764.5 2219.18  764.52 2250.86  765.65 2267.09  764.95 2300.37  763.75
   2308.9  763.58 2326.88  764.64 2336.26  765.09 2338.01  764.16 2346.37  761.76
  2359.72  757.94 2360.71  757.67 2360.98  757.65 2362.05  757.56 2379.07  756.08
  2383.04  749.75 2383.14  749.61    2388  742.58    2413  741.58    2438  742.58
  2443.33  749.61 2448.38  760.26 2448.97     762  2449.9  763.36 2472.14  767.14
  2484.24  769.13 2485.51  769.85 2490.83  773.38 2492.35  774.28 2503.86   781.1
  2507.48   783.2  2513.6  783.22 2515.55  783.23 2528.46  783.29 2536.94  780.12
  2536.99   780.1 2537.16   780.1 2552.01  780.02 2565.34  779.98 2578.03  779.94
  2583.84  779.77  2585.3  779.72 2592.42  780.42 2592.68  780.44 2592.89  780.46
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 2598.72  780.94 2619.26  782.61 2622.63  782.72 2630.75  782.89 2631.98  782.99
  2640.1  784.17 2643.63  784.76 2647.15  784.98 2657.92  784.65 2680.49  784.01
 2689.91  784.22 2699.68   784.5 2712.96  784.88 2719.34  784.85 2726.64  784.82
 2742.81  784.99  2795.7  785.44 2797.31  785.58 2802.91  786.09 2807.63   785.8
 2808.25  785.78 2811.16  785.76 2863.73  785.44 2873.99  785.48 2885.99  786.16
  2900.1  786.72 2900.16  787.06 2902.57  786.81 2904.87  786.89 2922.19  787.46
 2925.92  787.53 2938.08  788.18 2948.79   788.7 2955.38  789.39  2968.6  791.01
 2971.82  791.21 2983.65  792.23 3009.03  793.23 3016.76  793.34 3030.37  794.08
 3033.84  794.31 3034.77  794.36 3036.56  794.44 3047.84  794.86 3061.88  802.16
 3064.51  803.59 3069.14  804.66 3104.89  813.34 3119.62  820.05 3127.19  823.39
  3129.1  824.11  3135.8  826.06 3148.34  830.68 3157.98  833.34 3162.16  834.92
 3179.41  841.67 3180.09  842.84 3184.97  847.62 3188.78  848.41

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15 1303.34     .15  1725.9     .15 2379.07    .042  2449.9    .072
 3047.84     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2379.07  2449.9          182.47  911.79  437.98             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2103.23   793.9       F
 2517.07 3188.78     795       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
    1368    1395     764    1595    1650     764    2890    2930     805

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  771.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  771.42  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  754.31  * Flow Area (sq ft)      * 2151.22  * 1898.46  *  181.45  *
* E.G. Slope (ft/ft)     *0.000475  * Area (sq ft)           * 5171.92  * 1898.46  *  181.45  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1821.09  *11151.90  *  227.01  *
* Top Width (ft)         *  862.53  * Top Width (ft)         *  753.72  *   70.83  *   37.98  *
* Vel Total (ft/s)       *    3.12  * Avg. Vel. (ft/s)       *    0.85  *    5.87  *    1.25  *
* Max Chl Dpth (ft)      *   29.84  * Hydr. Depth (ft)       *    7.80  *   26.80  *    4.78  *
* Conv. Total (cfs)      *605487.8  * Conv. (cfs)            * 83534.0  *511540.7  * 10413.1  *
* Length Wtd. (ft)       *  801.02  * Wetted Per. (ft)       *  277.19  *   90.32  *   39.13  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    0.23  *    0.62  *    0.14  *
* Alpha                  *    3.01  * Stream Power (lb/ft s) *    0.19  *    3.66  *    0.17  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   *  328.91  * 4849.65  *  281.03  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   57.69  *  388.27  *   67.35  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  776.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  775.64  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  758.19  * Flow Area (sq ft)      * 3314.79  * 2197.24  *  355.54  *
* E.G. Slope (ft/ft)     *0.000567  * Area (sq ft)           * 8520.40  * 2197.24  *  355.54  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 4088.56  *15539.21  *  672.23  *
* Top Width (ft)         *  950.66  * Top Width (ft)         *  835.08  *   70.83  *   44.75  *
* Vel Total (ft/s)       *    3.46  * Avg. Vel. (ft/s)       *    1.23  *    7.07  *    1.89  *
* Max Chl Dpth (ft)      *   34.06  * Hydr. Depth (ft)       *   12.02  *   31.02  *    7.95  *
* Conv. Total (cfs)      *852589.9  * Conv. (cfs)            *171717.4  *652639.1  * 28233.4  *
* Length Wtd. (ft)       *  754.79  * Wetted Per. (ft)       *  277.19  *   90.32  *   47.11  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    0.42  *    0.86  *    0.27  *
* Alpha                  *    3.23  * Stream Power (lb/ft s) *    0.52  *    6.09  *    0.51  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *  615.39  * 6538.01  *  585.70  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   91.13  *  427.85  *   99.56  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

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CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  779.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  778.50  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  761.02  * Flow Area (sq ft)      * 4101.58  * 2399.27  *  490.05  *
* E.G. Slope (ft/ft)     *0.000634  * Area (sq ft)           *11119.52  * 2399.27  *  490.05  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 6166.20  *19027.74  * 1126.05  *
* Top Width (ft)         * 1140.38  * Top Width (ft)         * 1019.99  *   70.83  *   49.56  *
* Vel Total (ft/s)       *    3.76  * Avg. Vel. (ft/s)       *    1.50  *    7.93  *    2.30  *
* Max Chl Dpth (ft)      *   36.92  * Hydr. Depth (ft)       *   14.87  *   33.87  *    9.89  *
* Conv. Total (cfs)      *1045302.0  * Conv. (cfs)           *244891.4  *755689.0  * 44721.3  *
* Length Wtd. (ft)       *  723.56  * Wetted Per. (ft)       *  277.19  *   90.32  *   52.70  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    0.59  *    1.05  *    0.37  *
* Alpha                  *    3.26  * Stream Power (lb/ft s) *    0.88  *    8.34  *    0.85  *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)   *  881.12  * 7932.08  *  957.67  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  116.03  *  455.73  *  170.86  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  782.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  781.66  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  764.92  * Flow Area (sq ft)      * 4973.92  * 2623.27  *  655.24  *
* E.G. Slope (ft/ft)     *0.000703  * Area (sq ft)           *14678.63  * 2623.27  *  759.99  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 8956.71  *23256.52  * 1786.78  *
* Top Width (ft)         * 1693.03  * Top Width (ft)         * 1492.56  *   70.83  *  129.64  *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *    1.80  *    8.87  *    2.73  *
* Max Chl Dpth (ft)      *   40.08  * Hydr. Depth (ft)       *   18.03  *   37.04  *   11.93  *
* Conv. Total (cfs)      *1281986.0  * Conv. (cfs)           *337716.7  *876897.6  * 67371.2  *
* Length Wtd. (ft)       *  695.08  * Wetted Per. (ft)       *  277.19  *   90.32  *   58.92  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    0.79  *    1.28  *    0.49  *
* Alpha                  *    3.24  * Stream Power (lb/ft s) *    1.42  *   11.31  *    1.33  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 1272.22  * 9384.44  * 1595.88  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  158.87  *  478.55  *  253.70  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  786.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.03  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  785.38  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  770.00  * Flow Area (sq ft)      * 6000.80  * 2886.95  *  888.29  *
* E.G. Slope (ft/ft)     *0.000785  * Area (sq ft)           *21115.35  * 2886.95  * 1483.49  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *12933.85  *28813.86  * 2752.28  *
* Top Width (ft)         * 2203.79  * Top Width (ft)         * 1794.18  *   70.83  *  338.78  *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *    2.16  *    9.98  *    3.10  *
* Max Chl Dpth (ft)      *   43.80  * Hydr. Depth (ft)       *   21.75  *   40.76  *   13.22  *
* Conv. Total (cfs)      *1588673.0  * Conv. (cfs)           *461745.2  *1028670.0  * 98257.9  *
* Length Wtd. (ft)       *  668.98  * Wetted Per. (ft)       *  277.19  *   90.32  *   71.59  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    1.06  *    1.57  *    0.61  *
* Alpha                  *    3.21  * Stream Power (lb/ft s) *    2.29  *   15.63  *    1.88  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   * 2266.42  *11685.10  * 3390.15  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  366.46  *  506.56  *  616.04  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  789.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  787.99  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  772.08  * Flow Area (sq ft)      * 6719.44  * 3071.48  * 1063.29  *
* E.G. Slope (ft/ft)     *0.000860  * Area (sq ft)           *25813.91  * 3071.48  * 2602.49  *
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* Q Total (cfs)          *53690.00  * Flow (cfs)             *16351.21  *33450.13  * 3888.67  *
* Top Width (ft)         * 2324.26  * Top Width (ft)         * 1808.89  *   70.83  *  444.54  *
* Vel Total (ft/s)       *    4.95  * Avg. Vel. (ft/s)       *    2.43  *   10.89  *    3.66  *
* Max Chl Dpth (ft)      *   46.41  * Hydr. Depth (ft)       *   24.36  *   43.36  *   15.83  *
* Conv. Total (cfs)      *1830710.0  * Conv. (cfs)            *557539.8  *1140575.0  *132595.0  *
* Length Wtd. (ft)       *  652.50  * Wetted Per. (ft)       *  277.19  *   90.32  *   71.59  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    1.30  *    1.83  *    0.80  *
* Alpha                  *    3.13  * Stream Power (lb/ft s) *    3.17  *   19.89  *    2.92  *
* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)   * 3465.80  *13040.84  * 5401.25  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  545.85  *  513.67  *  976.45  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  791.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.34  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  790.07  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  773.66  * Flow Area (sq ft)      * 7294.42  * 3219.12  * 1203.30  *
* E.G. Slope (ft/ft)     *0.000928  * Area (sq ft)           *29592.00  * 3219.12  * 3562.46  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *19471.13  *37565.79  * 4963.09  *
* Top Width (ft)         * 2357.96  * Top Width (ft)         * 1816.10  *   70.83  *  471.03  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *    2.67  *   11.67  *    4.12  *
* Max Chl Dpth (ft)      *   48.49  * Hydr. Depth (ft)       *   26.44  *   45.45  *   17.91  *
* Conv. Total (cfs)      *2035664.0  * Conv. (cfs)            *639301.1  *1233408.0  *162954.7  *
* Length Wtd. (ft)       *  641.05  * Wetted Per. (ft)       *  277.19  *   90.32  *   71.59  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    1.52  *    2.06  *    0.97  *
* Alpha                  *    3.08  * Stream Power (lb/ft s) *    4.07  *   24.09  *    4.01  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   * 4491.68  *13900.86  * 7329.55  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  660.71  *  515.08  * 1330.54  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  794.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  792.82  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  775.85  * Flow Area (sq ft)      * 8054.09  * 3414.19  * 1388.29  *
* E.G. Slope (ft/ft)     *0.001036  * Area (sq ft)           *34606.30  * 3414.19  * 4900.26  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *24272.19  *43790.94  * 6656.87  *
* Top Width (ft)         * 2404.96  * Top Width (ft)         * 1825.30  *   70.83  *  508.83  *
* Vel Total (ft/s)       *    5.81  * Avg. Vel. (ft/s)       *    3.01  *   12.83  *    4.80  *
* Max Chl Dpth (ft)      *   51.24  * Hydr. Depth (ft)       *   29.20  *   48.20  *   20.67  *
* Conv. Total (cfs)      *2321363.0  * Conv. (cfs)            *754075.9  *1360475.0  *206812.3  *
* Length Wtd. (ft)       *  627.91  * Wetted Per. (ft)       *  277.19  *   90.32  *   71.59  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    1.88  *    2.44  *    1.25  *
* Alpha                  *    3.00  * Stream Power (lb/ft s) *    5.66  *   31.36  *    6.01  *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   * 6447.79  *15232.46  *11126.91  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  835.22  *  517.17  * 1686.60  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  784.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.             *   0.150  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  783.11  * Reach Len. (ft)        *  182.47  *  911.79  *  437.98  *
* Crit W.S. (ft)         *  768.13  * Flow Area (sq ft)      * 5374.68  * 2726.18  *  736.85  *
* E.G. Slope (ft/ft)     *0.000738  * Area (sq ft)           *17089.84  * 2726.18  *  968.67  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *10440.75  *25403.28  * 2155.98  *
* Top Width (ft)         * 1979.61  * Top Width (ft)         * 1747.49  *   70.83  *  161.29  *
* Vel Total (ft/s)       *    4.30  * Avg. Vel. (ft/s)       *    1.94  *    9.32  *    2.93  *
* Max Chl Dpth (ft)      *   41.53  * Hydr. Depth (ft)       *   19.48  *   38.49  *   12.83  *
* Conv. Total (cfs)      *1398603.0  * Conv. (cfs)            *384275.3  *934976.6  * 79351.5  *
* Length Wtd. (ft)       *  683.82  * Wetted Per. (ft)       *  277.19  *   90.32  *   61.82  *
* Min Ch El (ft)         *  741.58  * Shear (lb/sq ft)       *    0.89  *    1.39  *    0.55  *
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* Alpha                  *    3.22  * Stream Power (lb/ft s) *    1.74  *   12.96  *    1.61  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   * 1526.56  *10153.75  * 2032.04  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  201.29  *  488.93  *  316.37  *
*****************************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 16.407

INPUT
Description: Swope Park Industrial Area on Left.
Station Elevation Data num= 402

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	835.27	4.28	835.24	18.32	835.02	41.01	834.47	62.58	833.96
75.62	833.93	95.43	833.52	121.24	833.19	135.4	832.86	170.25	832.31
173.5	832.2	176.85	832.13	200.86	830.81	206.71	830.72	224.88	829.69
242.24	828.69	253.18	828.61	284.16	827.98	295.51	827.9	307.26	827.76
326.83	827.46	343.37	827.25	356.85	827.1	386.02	826.92	396.04	827.02
400.58	827.08	402.03	827.09	404.6	827.02	410.15	826.2	416.68	825.12
424.86	824.64	430.68	824.02	457.91	821.97	459.38	822.32	464.43	822.53
468.59	820.9	487.38	813.57	495.23	810.71	498.53	809.78	506.15	805.75
508.02	804.76	509.37	804.11	511.34	803.61	532.99	797.51	538.82	796.11
560.15	787.57	577.82	779.01	592.28	779.06	593.88	779.08	595.07	779.28
602.99	780.46	604.24	780.46	609.83	780.46	614.54	780.23	619.62	780
623.39	779.61	626.26	779.28	629.36	780.4	646.93	786.71	655.91	784.36
667.78	781.14	687.12	781.33	695.11	781.46	739.51	781.45	749.79	781.48
774.17	781.07	803.87	781.6	807.84	781.66	812.93	781.62	855.03	780.95
872.98	780.91	891.38	780.76	906.18	780.33	929.68	781.06	944.38	781.2
990.62	781.66	1002.44	781.65	1020.32	781.64	1034.81	781.39	1049.41	780.92
1055.12	780.89	1070.33	780.68	1071.54	779.85	1075.23	778.25	1076.87	778.54
1084.47	780.33	1092.27	780.46	1107.95	780.71	1115.83	780.74	1119.56	780.71
1134.68	777.44	1150.53	773.34	1157.21	771.63	1180.92	767.35	1192.38	765.17
1197.19	764.32	1201.17	763.77	1220.59	763.38	1256.12	762.82	1256.24	762.81
1256.3	762.81	1256.43	762.81	1305.09	763.77	1323.72	764.33	1331.96	764.55
1336.58	760.4	1342.91	756.31	1344.34	758.18	1349.43	765.13	1351.45	765.25
1356.81	765.42	1368.07	765.78	1373.46	765.96	1375.92	765.79	1399.61	764.73
1403.92	764.55	1404.22	764.55	1405.18	764.53	1417.79	763.82	1431.45	763.38
1443.26	764.07	1452.08	764.23	1454.07	764.28	1466.66	764.5	1475.76	762.91
1482.2	761.92	1486.18	761.25	1491.16	760	1497.18	760.19	1499.71	760.32
1504.37	761.38	1509	762.7	1518.76	762.66	1519.05	762.67	1519.29	762.61
1528.59	761.03	1536.25	761.02	1545.53	761.02	1551.05	762.49	1551.59	762.6
1554.1	762.84	1568.12	764.2	1572.47	764.38	1574.1	764.41	1577.24	764.69
1585.05	765.23	1602.06	766.9	1608.27	767.06	1608.39	767.07	1608.85	767.08
1609.46	767.1	1610.35	767.12	1621.46	766.85	1626.47	767.38	1640.39	768.07
1655.21	771.42	1674.87	773.01	1681.99	773.3	1682.96	773.35	1685.44	773.52
1687.81	773.73	1705.19	774.54	1715.99	774.73	1746.69	774.09	1750.98	773.75
1753.83	773.73	1773.73	773.21	1777.1	772.83	1779.28	772.29	1786.25	768.96
1794.24	768.51	1815.77	769.08	1821.34	768.09	1833.47	766.34	1846.77	765.94
1854.9	765.49	1868.3	765.72	1881.54	766.63	1887.64	765.87	1894.96	765.41
1896.66	764.5	1900.79	762.43	1906.18	762.43	1915.12	762.43	1925.32	762.45
1928.01	762.45	1928.74	762.68	1932.44	763.81	1934.28	763.8	1967.48	763.63
1975.29	763.58	1989.82	763.49	2011.18	763.35	2013.64	762.94	2028.8	761.74
2030.51	761.6	2032.4	761.45	2035.21	759.25	2038.67	757	2045.33	754.93
2053.83	753.36	2056.47	753.07	2070.45	751.54	2072.65	751.29	2074.34	751.1
2076.72	750.05	2077.3	749.8	2077.36	749.77	2077.77	749.61	2085	741.98
2105	740.98	2125	741.98	2132.67	749.61	2134.52	750.64	2135.52	751.04
2135.8	751.24	2137.18	751.58	2145.01	753.34	2152.79	757.86	2161.2	763.3
2168.91	776.43	2171.82	781.37	2172.5	782.87	2172.73	782.88	2173.78	782.89
2199.14	783.72	2213.15	783.57	2231.18	783.42	2259.26	783.61	2278.9	783.44
2289.8	783.05	2291.77	780.24	2301.15	773.77	2306.52	774.39	2311.92	774.78
2314.78	773.67	2315.34	773.38	2315.83	773.08	2323.89	768.17	2327.76	770.56
2331.81	773.38	2337.89	779.19	2342.3	783.65	2346.61	783.7	2361.69	783.73
2369.13	783.76	2385	783.53	2392.28	783.35	2406.68	783.78	2422.86	784.68
2423.55	784.67	2431.19	784.4	2449.84	784.28	2459.4	784.7	2470.53	785.89
2483.81	786.27	2494.32	786.21	2494.85	786.18	2495.1	786.17	2497.5	786.03
2509.49	785.33	2517.88	785.21	2527.89	785.46	2539.16	785.73	2545.65	785.93
2551.33	785.9	2557.89	785.56	2567.13	785.32	2591.03	785.08	2631.39	784.49
2631.93	784.49	2661.5	783.86	2666.66	783.86	2671.78	783.97	2690.98	784.38
2699.09	784.27	2749.99	784.55	2754.07	784.54	2757.16	784.6	2759.71	784.62

```
 2805.48  784.64 2818.79  784.68 2835.77  784.71 2841.33  784.75 2857.41  785.01
 2857.86  785.03 2868.36  785.16 2870.84  785.18 2871.32  785.19 2871.56  785.19
 2871.79   785.2 2873.68  785.23 2875.45  785.27 2875.46  785.27 2877.84  785.61
 2894.32  786.35 2897.85  786.42 2910.11  786.64 2910.19  786.64 2912.24  786.57
 2916.32  785.88 2926.44  785.68 2930.82  785.65 2932.68  785.66 2938.63  785.46
 2939.81  785.45 2941.16  785.44 2950.36  785.46 2958.28  785.41 2969.63  785.11
 2985.69  784.37  2991.4  784.46  2999.3  784.45 3010.07  784.42 3025.28  784.39
 3042.51  784.04 3049.08  783.93 3052.57  784.37 3061.13  785.99 3073.26  786.66
 3077.89  786.54 3090.23  785.77 3102.29  784.28 3102.68  784.27 3103.03  784.27
  3135.3  783.99 3150.61  784.24  3220.5  784.89 3230.16  784.87 3237.37  784.92
 3273.52  784.98 3287.99  784.66 3314.38  785.09 3320.14  785.09 3330.54  785.37
 3351.91  785.86  3358.6  787.84 3368.02   789.6 3373.31  789.58 3378.09  789.53
  3384.4  790.12 3394.29  791.05 3400.78   791.1 3410.32  791.07  3422.7  790.36
 3435.73  790.91  3441.4  790.89 3443.24   790.8 3446.95  790.62 3472.84  789.34
  3482.9  788.89 3484.93  788.82 3488.75  788.71 3490.24  788.72 3496.22  788.14
  3501.8  787.55 3507.37  787.12 3508.58  787.03 3518.58  786.96 3540.56  786.85
  3542.1  786.61 3545.36  786.11 3547.62  786.46 3549.12   786.7 3549.33  786.74
  3552.9  787.58 3560.83  789.39 3562.86   789.4 3563.74  789.39 3564.48  789.39
 3570.56  789.34 3571.59  789.36 3575.74   791.2 3580.64  793.33 3588.32  795.18
 3590.36  795.61 3597.56   789.5 3598.29  788.86 3598.59  788.64 3598.72  788.73
 3599.22  789.07 3603.23   791.8    3604  792.32 3611.31   795.9 3613.32  796.88
  3627.2  801.32  3633.5  803.36 3644.62  806.28 3658.22  811.35 3664.56  813.34
 3679.17  819.21 3689.26  823.39  3700.5  830.02 3706.46  833.35 3731.16  847.56
 3740.62  853.28 3742.12  854.09 3748.86  858.22 3766.69  861.34 3777.65  863.31
 3786.63  866.49 3800.31  872.32

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15 1107.95     .15 1715.99     .15 2074.34    .042 2137.18     .15
  2497.5     .09  2999.3    .072 3545.36     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2074.34 2137.18           878.35  996.15   86.29             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1713.66     800       F
 2198.24 3800.31     795       F
Blocked Obstructions      num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
    1330    1350   764.5    1465    1580   764.5    2285    2350     783
    3370    3500     810

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  771.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.54  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  770.96  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)          *  755.02  * Flow Area (sq ft)      * 2208.43  * 1715.85  *  368.78  *
* E.G. Slope (ft/ft)      *0.000464  * Area (sq ft)           * 5191.82  * 1715.85  *  368.78  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             * 1799.43  *11028.73  *  371.84  *
* Top Width (ft)          *  875.85  * Top Width (ft)         *  784.49  *   62.84  *   28.52  *
* Vel Total (ft/s)        *    3.07  * Avg. Vel. (ft/s)       *    0.81  *    6.43  *    1.01  *
* Max Chl Dpth (ft)       *   29.98  * Hydr. Depth (ft)       *    7.56  *   27.31  *   12.93  *
* Conv. Total (cfs)       *612627.3  * Conv. (cfs)            * 83513.5  *511856.2  * 17257.6  *
* Length Wtd. (ft)        *  931.45  * Wetted Per. (ft)       *  296.09  *   70.08  *   35.92  *
* Min Ch El (ft)          *  740.98  * Shear (lb/sq ft)       *    0.22  *    0.71  *    0.30  *
* Alpha                   *    3.66  * Stream Power (lb/ft s) *    0.18  *    4.56  *    0.30  *
* Frctn Loss (ft)         *    0.50  * Cum Volume (acre-ft)   *  307.20  * 4811.83  *  278.27  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   54.46  *  386.87  *   67.01  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  775.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.79  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  774.99  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)          *  758.66  * Flow Area (sq ft)      * 3465.43  * 1969.30  *  488.58  *
* E.G. Slope (ft/ft)      *0.000607  * Area (sq ft)           * 8572.05  * 1969.30  *  488.58  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 3807.92  *15865.86  *  626.22  *
* Top Width (ft)          * 1023.91  * Top Width (ft)         *  930.19  *   62.84  *   30.88  *
```

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* Vel Total (ft/s)       *    3.43  * Avg. Vel. (ft/s)       *    1.10  *    8.06  *    1.28  *
* Max Chl Dpth (ft)      *   34.01  * Hydr. Depth (ft)       *    9.61  *   31.34  *   15.82  *
* Conv. Total (cfs)      *823953.6  * Conv. (cfs)            *154558.9  *643977.0  * 25417.7  *
* Length Wtd. (ft)       *  893.91  * Wetted Per. (ft)       *  364.92  *   70.08  *   40.60  *
* Min Ch El (ft)         *  740.98  * Shear (lb/sq ft)       *    0.36  *    1.06  *    0.46  *
* Alpha                  *    4.34  * Stream Power (lb/ft s) *    0.40  *    8.58  *    0.58  *
* Frctn Loss (ft)        *    0.59  * Cum Volume (acre-ft)   *  579.59  * 6494.40  *  581.46  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   87.44  *  426.45  *   99.18  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  778.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.              *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  777.78  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)         *  761.23  * Flow Area (sq ft)      * 4471.94  * 2144.66  *  577.05  *
* E.G. Slope (ft/ft)     *0.000679  * Area (sq ft)           *11182.92  * 2144.66  *  577.05  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 6148.53  *19341.13  *  830.34  *
* Top Width (ft)         * 1036.60  * Top Width (ft)         *  941.23  *   62.84  *   32.53  *
* Vel Total (ft/s)       *    3.66  * Avg. Vel. (ft/s)       *    1.37  *    9.02  *    1.44  *
* Max Chl Dpth (ft)      *   36.80  * Hydr. Depth (ft)       *   12.40  *   34.13  *   17.74  *
* Conv. Total (cfs)      *1010226.0  * Conv. (cfs)            *235995.5  *742360.1  * 31870.6  *
* Length Wtd. (ft)       *  870.79  * Wetted Per. (ft)       *  364.92  *   70.08  *   43.83  *
* Min Ch El (ft)         *  740.98  * Shear (lb/sq ft)       *    0.52  *    1.30  *    0.56  *
* Alpha                  *    4.50  * Stream Power (lb/ft s) *    0.71  *   11.70  *    0.80  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   *  834.41  * 7884.52  *  952.31  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  111.92  *  454.33  *  170.45  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  781.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.10  * Wt. n-Val.              *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  780.88  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)         *  765.73  * Flow Area (sq ft)      * 5590.37  * 2339.52  *  680.74  *
* E.G. Slope (ft/ft)     *0.000752  * Area (sq ft)           *14233.12  * 2339.52  *  680.74  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 9378.88  *23529.17  * 1091.95  *
* Top Width (ft)         * 1219.99  * Top Width (ft)         * 1122.80  *   62.84  *   34.35  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *    1.68  *   10.06  *    1.60  *
* Max Chl Dpth (ft)      *   39.90  * Hydr. Depth (ft)       *   15.50  *   37.23  *   19.82  *
* Conv. Total (cfs)      *1240035.0  * Conv. (cfs)            *342062.8  *858147.0  * 39825.3  *
* Length Wtd. (ft)       *  849.94  * Wetted Per. (ft)       *  364.92  *   70.08  *   47.43  *
* Min Ch El (ft)         *  740.98  * Shear (lb/sq ft)       *    0.72  *    1.57  *    0.67  *
* Alpha                  *    4.54  * Stream Power (lb/ft s) *    1.21  *   15.76  *    1.08  *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   * 1211.67  * 9332.50  * 1588.64  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  153.40  *  477.15  *  252.88  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  785.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.34  * Wt. n-Val.              *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  784.50  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)         *  770.08  * Flow Area (sq ft)      * 6895.66  * 2566.94  *  839.32  *
* E.G. Slope (ft/ft)     *0.000848  * Area (sq ft)           *19425.47  * 2566.94  * 1136.42  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *14124.78  *29168.13  * 1207.09  *
* Top Width (ft)         * 2123.87  * Top Width (ft)         * 1493.26  *   62.84  *  567.77  *
* Vel Total (ft/s)       *    4.32  * Avg. Vel. (ft/s)       *    2.05  *   11.36  *    1.44  *
* Max Chl Dpth (ft)      *   43.52  * Hydr. Depth (ft)       *   19.12  *   40.85  *   13.75  *
* Conv. Total (cfs)      *1528128.0  * Conv. (cfs)            *485044.2  *1001632.0  * 41451.4  *
* Length Wtd. (ft)       *  833.67  * Wetted Per. (ft)       *  364.92  *   70.08  *   75.40  *
* Min Ch El (ft)         *  740.98  * Shear (lb/sq ft)       *    1.00  *    1.94  *    0.59  *
* Alpha                  *    4.61  * Stream Power (lb/ft s) *    2.05  *   22.03  *    0.85  *
* Frctn Loss (ft)        *    0.70  * Cum Volume (acre-ft)   * 2181.51  *11628.02  * 3376.98  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  359.57  *  505.17  *  611.49  *
**********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  788.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  787.02  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)         *  772.21  * Flow Area (sq ft)      * 7805.66  * 2725.48  *  993.38  *
* E.G. Slope (ft/ft)     *0.000933  * Area (sq ft)           *23220.25  * 2725.48  * 3750.74  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *18209.43  *33804.10  * 1676.47  *
* Top Width (ft)         * 2835.58  * Top Width (ft)         * 1513.06  *   62.84  * 1259.67  *
* Vel Total (ft/s)       *    4.66  * Avg. Vel. (ft/s)       *    2.33  *   12.40  *    1.69  *
* Max Chl Dpth (ft)      *   46.04  * Hydr. Depth (ft)       *   21.64  *   43.37  *   16.27  *
* Conv. Total (cfs)      *1757975.0  * Conv. (cfs)           *596232.6  *1106850.0  * 54892.7  *
* Length Wtd. (ft)       *  820.00  * Wetted Per. (ft)       *  364.92  *   70.08  *   75.40  *
* Min Ch El (ft)         *  740.98  * Shear (lb/sq ft)       *    1.25  *    2.26  *    0.77  *
* Alpha                  *    4.55  * Stream Power (lb/ft s) *    2.91  *   28.09  *    1.29  *
* Frctn Loss (ft)        *    0.74  * Cum Volume (acre-ft)   * 3363.09  *12980.17  * 5369.31  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  538.90  *  512.27  *  967.88  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  790.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.72  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  789.03  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)         *  773.21  * Flow Area (sq ft)      * 8529.70  * 2851.63  * 1115.95  *
* E.G. Slope (ft/ft)     *0.001010  * Area (sq ft)           *26262.26  * 2851.63  * 6312.79  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *21960.01  *37922.63  * 2117.36  *
* Top Width (ft)         * 2868.80  * Top Width (ft)         * 1517.84  *   62.84  * 1288.12  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    2.57  *   13.30  *    1.90  *
* Max Chl Dpth (ft)      *   48.05  * Hydr. Depth (ft)       *   23.65  *   45.38  *   18.28  *
* Conv. Total (cfs)      *1951334.0  * Conv. (cfs)           *691150.5  *1193544.0  * 66639.8  *
* Length Wtd. (ft)       *  810.71  * Wetted Per. (ft)       *  364.92  *   70.08  *   75.40  *
* Min Ch El (ft)         *  740.98  * Shear (lb/sq ft)       *    1.47  *    2.56  *    0.93  *
* Alpha                  *    4.50  * Stream Power (lb/ft s) *    3.79  *   34.11  *    1.77  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   * 4374.69  *13837.33  * 7279.90  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  653.73  *  513.68  * 1321.70  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*************************************************************************************************
* E.G. Elev (ft)         *  793.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.02  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  791.65  * Reach Len. (ft)        *  878.35  *  996.15  *   86.29  *
* Crit W.S. (ft)         *  777.16  * Flow Area (sq ft)      * 9475.76  * 3016.46  * 1276.11  *
* E.G. Slope (ft/ft)     *0.001135  * Area (sq ft)           *30252.13  * 3016.46  * 9746.08  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *27747.37  *44164.80  * 2807.83  *
* Top Width (ft)         * 2904.83  * Top Width (ft)         * 1524.39  *   62.84  * 1317.60  *
* Vel Total (ft/s)       *    5.43  * Avg. Vel. (ft/s)       *    2.93  *   14.64  *    2.20  *
* Max Chl Dpth (ft)      *   50.67  * Hydr. Depth (ft)       *   26.27  *   48.00  *   20.90  *
* Conv. Total (cfs)      *2217546.0  * Conv. (cfs)           *823488.6  *1310726.0  * 83330.9  *
* Length Wtd. (ft)       *  800.24  * Wetted Per. (ft)       *  364.92  *   70.08  *   75.40  *
* Min Ch El (ft)         *  740.98  * Shear (lb/sq ft)       *    1.84  *    3.05  *    1.20  *
* Alpha                  *    4.42  * Stream Power (lb/ft s) *    5.39  *   44.67  *    2.64  *
* Frctn Loss (ft)        *    0.85  * Cum Volume (acre-ft)   * 6311.95  *15165.16  *11053.27  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  828.20  *  515.77  * 1677.41  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	783.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	782.30	Reach Len. (ft)	878.35	996.15	86.29
Crit W.S. (ft)	767.81	Flow Area (sq ft)	6102.55	2428.76	730.06
E.G. Slope (ft/ft)	0.000789	Area (sq ft)	16162.60	2428.76	730.06
Q Total (cfs)	38000.00	Flow (cfs)	11116.23	25654.24	1229.53
Top Width (ft)	1572.37	Top Width (ft)	1474.47	62.84	35.06
Vel Total (ft/s)	4.10	Avg. Vel. (ft/s)	1.82	10.56	1.68
Max Chl Dpth (ft)	41.32	Hydr. Depth (ft)	16.92	38.65	20.82
Conv. Total (cfs)	1352948.0	Conv. (cfs)	395781.0	913390.8	43776.2
Length Wtd. (ft)	841.92	Wetted Per. (ft)	364.92	70.08	49.02
Min Ch El (ft)	740.98	Shear (lb/sq ft)	0.82	1.71	0.73
Alpha	4.54	Stream Power (lb/ft s)	1.50	18.03	1.24
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)	1456.92	10099.80	2023.50
C & E Loss (ft)	0.06	Cum SA (acres)	194.55	487.53	315.38

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 16.218

INPUT
Description: Blocked obstuctions are buildings.
Station Elevation Data num= 291

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830.67	19.03	829.93	28.28	829.69	39.7	829.51	63.73	828.45
78.98	828.06	102.19	826.94	112.64	826.55	132.68	825.32	134.24	825.27
138.17	825	188.87	820.15	191.76	819.9	193.66	819.77	194.7	819.73
230.95	817.63	245.77	817.15	253.75	816.86	267.17	816.05	300.43	813.93
301.38	813.89	307	813.57	323.96	812.48	325.43	812.34	350.42	811.48
353.44	811.28	357.71	811.09	375.44	810.24	381.62	809.9	386.85	809.62
404.49	808.91	410.37	808.68	416.29	808.48	441.2	808.59	445.83	808.49
447.52	808.38	456.13	807.18	459.24	806.87	467.08	806.98	473.62	806.82
480.66	806.59	491.17	805.9	511.27	804.62	519.93	803.29	523.4	802.19
547.29	796.11	552.24	794.05	555.62	792.22	557.91	792.34	569.13	790.4
575.47	786.73	593.31	778.2	610.18	777.74	618	777.56	624.73	779.36
626.2	779.74	627.87	779.74	633.23	779.73	642.13	778.67	643.21	778.54
645.15	778	650.18	776.54	651.79	776.08	653.79	775.6	657.8	776.27
671.22	779.27	684.66	776.62	686.79	776.14	689.54	775.47	693.76	774.29
704.48	771.7	711.53	768.4	716.04	766.29	719.15	764.31	727.24	761.7
734.22	758.86	738.46	756.49	746.89	749.66	755	741.33	773	740.33
790	741.33	799.04	749.66	799.33	750	801.44	752.55	804.54	755.99
805.5	756.19	811.52	756.91	820.08	757.93	832	762.28	833.77	762.96
840.74	763.21	871.33	764.33	874.78	764.4	882.3	764.54	883.74	764.57
929.01	765.33	964.03	765.72	977.09	765.9	992.31	765.89	1030.87	765.99
1059.08	766.4	1073.24	766.65	1084.25	767.28	1091.39	767.7	1099.23	768.03
1113.96	768.33	1132.54	770.15	1153.34	771.84	1164.18	772.69	1170.4	773.38
1179.92	775.66	1181.36	776.14	1208.5	783.09	1210.01	783.43	1243.22	783.07
1253.4	783.03	1292.31	782.59	1296.23	782.59	1300.88	782.59	1374.68	782.49
1405.34	782.34	1432.38	782.4	1465.72	782.69	1479.66	782.91	1511.18	783.15
1520.4	783.26	1531.48	783.24	1556.86	783.25	1573.24	783.3	1587.98	783.36
1615.15	783.23	1619.78	783.15	1621.42	782.42	1624.03	781.27	1626.95	781.68
1628.28	781.83	1628.96	781.96	1633.63	782.85	1639.79	783.54	1646.78	783.52
1650.98	783.7	1667.79	783.12	1674.84	783.08	1684.84	782.76	1685.39	782.67
1685.5	782.72	1685.63	782.76	1685.68	782.78	1688.12	783.35	1693.68	783.52
1711.34	784.67	1730.03	784.67	1737.82	784.75	1750.33	784.58	1752.81	784.45
1753.45	784.41	1758.18	784.15	1777.03	782.81	1813	783.11	1839.79	782.92
1842.34	782.92	1857.03	783.3	1886.18	783.03	1892.08	783.03	1895.5	783.11
1897.91	783.08	1921.53	782.68	1950.46	782.34	1954.48	782.47	1958.57	782.61
1989.65	782.95	2000.27	783.44	2010.94	783.8	2026.82	783.88	2029.04	783.9
2036.23	783.89	2066.23	783.22	2069.03	782.95	2071.33	782.97	2074.61	782.96
2086.49	783.18	2118.95	784.29	2142.6	784.76	2146.03	784.68	2155.18	784.59
2164.18	784.38	2170.94	784.34	2193.31	784.43	2210.34	784.26	2223.85	784.64
2226.99	785.52	2232.47	786.25	2232.49	786.25	2235.01	786.2	2246.2	786.16
2266.52	786.18	2272.71	785.75	2282.42	784.95	2295.79	784.85	2332.22	784.41

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 2337.39  784.57 2347.55  784.85 2354.28  784.85 2373.42  784.85 2377.29  784.78
 2387.03  784.58 2391.74  784.49 2397.35  784.81 2400.17  785.04  2403.6  784.95
 2409.41  784.72 2412.54  784.94 2417.53   785.1 2420.38   785.2 2424.85   785.9
 2428.16  786.44  2429.8  786.46 2449.97  786.48 2450.14  786.48 2459.54  785.12
 2459.81  785.05 2475.34  784.92 2517.38  784.47 2526.28  784.37 2535.44  784.39
 2564.86  784.83 2585.31  784.65 2618.67  784.13  2623.6   784.1 2625.44  784.07
 2675.32  785.86 2690.25  786.13 2709.09  788.13 2715.91  788.81 2715.92  788.81
 2715.93  788.81 2723.02  789.01 2733.82  789.84 2742.46  790.07 2753.85  790.97
 2753.93  790.97 2771.11  790.91 2774.81   790.9 2806.38  791.34  2814.5  791.27
 2818.96  791.27  2824.5  791.32 2824.71  791.31 2824.76  791.31 2853.72  791.02
 2873.04  790.95 2874.74  790.86 2879.15  790.86 2882.82  790.41 2888.77  789.51
 2898.57  788.54 2902.42  788.17 2915.34  788.05 2929.35  788.06 2931.93  788.06
 2933.38  788.07 2935.43  787.81 2939.19  787.34 2942.49  787.98 2942.82  788.05
 2943.36  788.21 2952.25  790.43 2953.25  790.43 2961.71  790.49 2967.67  790.94
 2979.46  792.93 2981.57  793.33 2982.64  793.85 2990.47  796.44 3005.59  802.32
 3009.12  803.36 3022.09  808.47 3035.15  813.34 3043.99  816.64  3061.2  823.39
 3065.79  825.44 3081.67  833.35 3104.89  844.78 3123.16  853.28 3133.25  857.47
 3136.89  859.42 3141.89  860.43 3156.22  863.31 3159.98  864.46 3186.75  873.37
 3187.57  873.83

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  716.04    .042  804.54     .15 1556.86     .09 2354.28    .072
 2967.67     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         716.04  804.54           772.85  731.46  283.38             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1214.21 3187.57     795       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
    2225    2310     805    2715    2880     805

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  770.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  770.44  * Reach Len. (ft)        *  772.85  *  731.46  *  283.38  *
* Crit W.S. (ft)         *  755.21  * Flow Area (sq ft)      *   18.43  * 1908.54  * 1711.18  *
* E.G. Slope (ft/ft)     *0.000634  * Area (sq ft)           *   18.43  * 1908.54  * 1711.18  *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *    7.01  *11921.48  * 1271.52  *
* Top Width (ft)         *  428.98  * Top Width (ft)         *    8.87  *   88.50  *  331.61  *
* Vel Total (ft/s)       *    3.63  * Avg. Vel. (ft/s)       *    0.38  *    6.25  *    0.74  *
* Max Chl Dpth (ft)      *   30.11  * Hydr. Depth (ft)       *    2.08  *   21.57  *    5.16  *
* Conv. Total (cfs)      *524223.1  * Conv. (cfs)             *   278.2  *473448.1  * 50496.8  *
* Length Wtd. (ft)       *  691.86  * Wetted Per. (ft)       *    9.80  *  102.79  *  332.81  *
* Min Ch El (ft)         *  740.33  * Shear (lb/sq ft)       *    0.07  *    0.73  *    0.20  *
* Alpha                  *    2.68  * Stream Power (lb/ft s) *    0.03  *    4.59  *    0.15  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   *  254.67  * 4770.38  *  276.21  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   46.46  *  385.14  *   66.66  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  775.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  774.46  * Reach Len. (ft)        *  772.85  *  731.46  *  283.38  *
* Crit W.S. (ft)         *  759.37  * Flow Area (sq ft)      *   78.88  * 2263.83  * 3134.48  *
* E.G. Slope (ft/ft)     *0.000714  * Area (sq ft)           *   78.88  * 2263.83  * 3134.48  *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *   45.64  *16817.17  * 3437.19  *
* Top Width (ft)         *  481.74  * Top Width (ft)         *   22.88  *   88.50  *  370.36  *
* Vel Total (ft/s)       *    3.71  * Avg. Vel. (ft/s)       *    0.58  *    7.43  *    1.10  *
* Max Chl Dpth (ft)      *   34.13  * Hydr. Depth (ft)       *    3.45  *   25.58  *    8.46  *
* Conv. Total (cfs)      *759600.1  * Conv. (cfs)             *  1707.8  *629276.9  *128615.3  *
* Length Wtd. (ft)       *  659.81  * Wetted Per. (ft)       *   24.41  *  102.79  *  371.82  *
* Min Ch El (ft)         *  740.33  * Shear (lb/sq ft)       *    0.14  *    0.98  *    0.38  *
* Alpha                  *    3.34  * Stream Power (lb/ft s) *    0.08  *    7.29  *    0.41  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *  492.37  * 6446.00  *  577.87  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   77.83  *  424.72  *   98.78  *
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	778.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	777.23	Reach Len. (ft)	772.85	731.46	283.38
Crit W.S. (ft)	762.36	Flow Area (sq ft)	169.73	2509.55	4177.96
E.G. Slope (ft/ft)	0.000760	Area (sq ft)	169.73	2509.55	4177.96
Q Total (cfs)	26320.00	Flow (cfs)	117.07	20591.83	5611.09
Top Width (ft)	518.41	Top Width (ft)	48.82	88.50	381.09
Vel Total (ft/s)	3.84	Avg. Vel. (ft/s)	0.69	8.21	1.34
Max Chl Dpth (ft)	36.90	Hydr. Depth (ft)	3.48	28.36	10.96
Conv. Total (cfs)	955034.9	Conv. (cfs)	4248.0	747185.4	203601.5
Length Wtd. (ft)	640.41	Wetted Per. (ft)	51.07	102.79	382.91
Min Ch El (ft)	740.33	Shear (lb/sq ft)	0.16	1.16	0.52
Alpha	3.60	Stream Power (lb/ft s)	0.11	9.50	0.69
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	719.95	7831.31	947.60
C & E Loss (ft)	0.06	Cum SA (acres)	101.94	452.60	170.04

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	781.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	780.33	Reach Len. (ft)	772.85	731.46	283.38
Crit W.S. (ft)	767.25	Flow Area (sq ft)	468.07	2783.75	5377.48
E.G. Slope (ft/ft)	0.000799	Area (sq ft)	468.07	2783.75	5377.48
Q Total (cfs)	34000.00	Flow (cfs)	306.57	25111.82	8581.61
Top Width (ft)	608.88	Top Width (ft)	127.19	88.50	393.19
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)	0.65	9.02	1.60
Max Chl Dpth (ft)	40.00	Hydr. Depth (ft)	3.68	31.45	13.68
Conv. Total (cfs)	1202510.0	Conv. (cfs)	10842.7	888153.1	303513.7
Length Wtd. (ft)	622.94	Wetted Per. (ft)	130.89	102.79	395.40
Min Ch El (ft)	740.33	Shear (lb/sq ft)	0.18	1.35	0.68
Alpha	3.91	Stream Power (lb/ft s)	0.12	12.19	1.08
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	1063.45	9273.92	1582.64
C & E Loss (ft)	0.08	Cum SA (acres)	140.79	475.42	252.46

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	785.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.07	Wt. n-Val.	0.150	0.042	0.150
W.S. Elev (ft)	783.98	Reach Len. (ft)	772.85	731.46	283.38
Crit W.S. (ft)	770.34	Flow Area (sq ft)	946.47	3106.93	6841.28
E.G. Slope (ft/ft)	0.000834	Area (sq ft)	946.47	3106.93	7669.93
Q Total (cfs)	44500.00	Flow (cfs)	970.93	30797.59	12731.49
Top Width (ft)	1469.09	Top Width (ft)	134.83	88.50	1245.77
Vel Total (ft/s)	4.08	Avg. Vel. (ft/s)	1.03	9.91	1.86
Max Chl Dpth (ft)	43.65	Hydr. Depth (ft)	7.02	35.11	16.70
Conv. Total (cfs)	1541103.0	Conv. (cfs)	33624.7	1066567.0	440910.7
Length Wtd. (ft)	608.15	Wetted Per. (ft)	139.36	102.79	412.26
Min Ch El (ft)	740.33	Shear (lb/sq ft)	0.35	1.57	0.86
Alpha	4.14	Stream Power (lb/ft s)	0.36	15.60	1.61
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	1976.12	11563.14	3368.26
C & E Loss (ft)	0.09	Cum SA (acres)	343.16	503.44	609.69

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	787.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.	0.150	0.042	0.150

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* W.S. Elev (ft)         *  786.52  * Reach Len. (ft)        *  772.85  *  731.46  *  283.38  *
* Crit W.S. (ft)         *  772.36  * Flow Area (sq ft)      * 1295.53  * 3331.62  * 7881.41  *
* E.G. Slope (ft/ft)     *0.000878  * Area (sq ft)           * 1295.53  * 3331.62  *11807.10  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 1635.86  *35510.74  *16543.40  *
* Top Width (ft)         * 2033.05  * Top Width (ft)         *  140.14  *   88.50  * 1804.41  *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *    1.26  *   10.66  *    2.10  *
* Max Chl Dpth (ft)      *   46.19  * Hydr. Depth (ft)       *    9.24  *   37.65  *   19.24  *
* Conv. Total (cfs)      *1811604.0  * Conv. (cfs)           * 55197.0  *1198201.0  *558206.2  *
* Length Wtd. (ft)       *  600.05  * Wetted Per. (ft)       *  145.24  *  102.79  *  412.26  *
* Min Ch El (ft)         *  740.33  * Shear (lb/sq ft)       *    0.49  *    1.78  *    1.05  *
* Alpha                  *    4.15  * Stream Power (lb/ft s) *    0.62  *   18.94  *    2.20  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   * 3115.93  *12910.91  * 5353.91  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  522.23  *  510.54  *  964.85  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  789.84  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  788.54  * Reach Len. (ft)        *  772.85  *  731.46  *  283.38  *
* Crit W.S. (ft)         *  774.18  * Flow Area (sq ft)      * 1582.25  * 3510.38  * 8708.87  *
* E.G. Slope (ft/ft)     *0.000922  * Area (sq ft)           * 1582.25  * 3510.38  *15494.49  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 2295.53  *39688.90  *20015.57  *
* Top Width (ft)         * 2102.05  * Top Width (ft)         *  143.70  *   88.50  * 1869.85  *
* Vel Total (ft/s)       *    4.49  * Avg. Vel. (ft/s)       *    1.45  *   11.31  *    2.30  *
* Max Chl Dpth (ft)      *   48.21  * Hydr. Depth (ft)       *   11.01  *   39.67  *   21.26  *
* Conv. Total (cfs)      *2042125.0  * Conv. (cfs)           * 75609.0  *1307253.0  *659262.8  *
* Length Wtd. (ft)       *  594.66  * Wetted Per. (ft)       *  149.34  *  102.79  *  412.26  *
* Min Ch El (ft)         *  740.33  * Shear (lb/sq ft)       *    0.61  *    1.97  *    1.22  *
* Alpha                  *    4.14  * Stream Power (lb/ft s) *    0.88  *   22.22  *    2.79  *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   * 4093.96  *13764.58  * 7258.30  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  636.98  *  511.95  * 1318.57  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  792.66  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.49  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  791.18  * Reach Len. (ft)        *  772.85  *  731.46  *  283.38  *
* Crit W.S. (ft)         *  776.28  * Flow Area (sq ft)      * 1967.68  * 3743.31  * 9787.13  *
* E.G. Slope (ft/ft)     *0.001002  * Area (sq ft)           * 1967.68  * 3743.31  *20472.80  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 3320.32  *46052.20  *25347.48  *
* Top Width (ft)         * 2154.42  * Top Width (ft)         *  151.39  *   88.50  * 1914.52  *
* Vel Total (ft/s)       *    4.82  * Avg. Vel. (ft/s)       *    1.69  *   12.30  *    2.59  *
* Max Chl Dpth (ft)      *   50.85  * Hydr. Depth (ft)       *   13.00  *   42.30  *   23.89  *
* Conv. Total (cfs)      *2360749.0  * Conv. (cfs)           *104904.3  *1455001.0  *800843.4  *
* Length Wtd. (ft)       *  588.69  * Wetted Per. (ft)       *  157.60  *  102.79  *  412.26  *
* Min Ch El (ft)         *  740.33  * Shear (lb/sq ft)       *    0.78  *    2.28  *    1.48  *
* Alpha                  *    4.12  * Stream Power (lb/ft s) *    1.32  *   28.02  *    3.85  *
* Frctn Loss (ft)        *    0.53  * Cum Volume (acre-ft)   * 5987.11  *15087.87  *11023.34  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  811.31  *  514.04  * 1674.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  782.76  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  781.76  * Reach Len. (ft)        *  772.85  *  731.46  *  283.38  *
* Crit W.S. (ft)         *  768.68  * Flow Area (sq ft)      *  651.52  * 2909.92  * 5942.00  *
* E.G. Slope (ft/ft)     *0.000817  * Area (sq ft)           *  651.52  * 2909.92  * 5943.13  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  528.80  *27325.99  *10145.21  *
* Top Width (ft)         *  622.15  * Top Width (ft)         *  130.17  *   88.50  *  403.48  *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *    0.81  *    9.39  *    1.71  *
* Max Chl Dpth (ft)      *   41.43  * Hydr. Depth (ft)       *    5.01  *   32.88  *   14.90  *
```

```
* Conv. Total (cfs)      *1329782.0  * Conv. (cfs)            * 18505.0  *956252.6  *355023.9  *
* Length Wtd. (ft)       *  615.87  * Wetted Per. (ft)        *  134.20  *  102.79  *  401.15  *
* Min Ch El (ft)         *  740.33  * Shear (lb/sq ft)        *    0.25  *    1.44  *    0.76  *
* Alpha                  *    4.02  * Stream Power (lb/ft s) *    0.20  *   13.55  *    1.29  *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)    * 1287.39  *10038.76  * 2016.89  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *  178.37  *  485.80  *  314.95  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 16.080

INPUT
Description: Ineffective areas for local depressions and drainage ditch
Station Elevation Data    num=     318
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  832.19    8.44  831.87    9.64  831.77   12.95  831.63   27.61  830.59
   35.95  830.11   41.56  829.97   41.79  829.98   42.01  829.99   42.47     830
   47.63  829.94   71.76  829.15   72.14  829.17    80.1  828.89   80.46  828.91
   84.68  829.05   97.73  827.75   99.16  827.71  106.13  826.31  107.29  826.03
  107.34  826.01  108.81  826.25  129.75   826.1  130.41  826.03  132.37  822.55
  135.11  816.88  139.66  816.29  149.79  814.21  152.55  816.04  155.11  818.32
  164.47  813.56  167.15     812   169.2   810.9  171.82  803.95  175.69  802.81
  181.43  788.96  190.19  780.02  208.23  777.68  216.29  776.51  228.68   769.5
  230.45  768.27  233.97  765.32   236.1  763.79  243.38  760.11  255.48  759.94
  262.86  759.75  270.61  755.49  272.69  754.83  281.71  757.27  285.73   758.3
  300.66  758.41  310.43  758.34  319.86  758.78  335.48  757.96  340.46  757.66
  353.85  759.69  361.33  760.08  364.46  761.54  368.97   763.7   388.4  772.71
  391.43  773.65  398.24  775.83   399.2  775.83  405.96  775.85  407.39  775.74
   408.3  775.68  419.19  774.82  426.06  773.22  435.27  771.21  445.52  769.35
  450.81  768.52  468.92  760.74  470.29  760.18  470.47  760.06  474.51  757.23
  486.71  757.25   496.4  757.26  500.36  758.59  507.41  761.77   513.1  764.26
     520  768.66  529.72  774.63  532.06  776.14  535.16  777.91  538.04  779.59
  540.73   779.7  548.54  779.98  559.63  780.34  582.16  780.03  602.23  779.86
   611.8  779.93  612.39  779.94  623.88  779.89  635.53  779.36  647.83  778.93
  651.26   777.5  653.64  776.14  661.73  767.11  661.95  766.86  666.84  761.65
  670.99  757.97  674.61  754.08  678.92  749.66     688     741     710  740.02
     732     741  740.72  749.67   741.6  750.52   743.4   752.1  747.08   755.4
  761.66   758.4  762.65  758.58  764.64  758.94  771.81  761.63  773.59  762.54
  785.37   763.9  788.49  764.01  798.69   764.4  827.58     765  851.56  763.67
  860.94  763.32   868.3  763.89  877.13   764.7  905.21  764.61  911.49  764.51
  919.49  764.48  943.02  765.03   984.8  765.89 1003.08  766.74 1034.88  767.77
  1051.7  768.03 1078.58  769.57 1082.34  769.59 1083.17  769.74 1103.25  774.75
 1108.73  776.14 1110.44  776.58 1121.17  779.47 1124.47  779.39  1127.6  779.47
  1141.4  780.17 1142.57  780.24 1143.72  780.26 1144.13  780.47 1150.24  782.33
 1154.81  781.49 1159.46  780.49 1195.82  780.64 1200.18  780.61 1200.98   780.6
 1208.29  780.56 1217.44  780.56 1219.72  780.58 1221.04     780  1226.9  779.78
 1232.67  779.28 1238.68  780.05 1249.15  779.45 1256.66  779.11 1265.47  778.66
 1269.46  778.46  1270.2  778.48 1271.42  778.45 1278.82  778.47 1291.31  778.32
 1303.12  778.45 1312.44   778.8 1329.62  778.95 1345.16  779.48 1361.38  779.93
 1379.34  780.16 1386.68   778.9 1400.79  775.39 1402.79  774.96 1414.45  771.64
 1416.87  771.64 1518.03  771.64 1584.58  771.64 1588.87  771.64 1597.48  771.64
 1614.09  771.62 1619.62  772.13 1622.87   772.2 1632.19  771.61 1651.61  771.61
  1658.9  771.61 1675.02  771.61 1678.71  771.61  1684.1  772.99 1686.47  773.77
 1691.48   775.2 1700.12   777.8 1701.03  778.11 1702.53  778.22    1723  779.99
 1730.64  780.18 1733.02  780.07 1734.16  780.02 1734.21  780.01 1745.35  779.49
 1753.33  778.86 1767.24  778.55 1775.47  778.46 1802.73  777.16 1814.52  777.29
 1830.94  778.86 1848.72  778.89 1888.24  780.33 1899.82  780.98 1907.05  781.95
 1914.12  781.92 1914.92  781.91 1940.45   783.3 1949.53  783.44 1963.44  783.75
 1990.46   783.6 2004.34  783.28 2008.01  783.28 2032.52  783.29 2052.24  783.42
 2057.87  783.42 2082.53   783.4 2099.61  783.36  2104.6  781.65 2104.78   781.6
 2119.53  774.22 2121.23  773.38 2121.86   773.1  2140.8  764.92 2142.31  764.44
 2144.18  763.78 2159.84  770.41 2167.44  773.38 2184.09  779.41 2189.29  781.98
 2193.21  782.11 2216.73  782.54 2218.13  782.56  2218.6  782.57 2219.39  782.59
 2243.99  783.35 2253.82   784.4  2255.8  784.64 2260.42  784.62 2282.15  784.69
 2296.28  784.27 2303.12  784.01 2318.64  784.88 2322.83  785.21 2325.35  785.11
 2331.47  785.07 2350.85  784.75    2370  784.47 2379.16  784.35 2425.36  784.12
 2470.87  784.97 2477.01  785.27 2499.16  785.85 2501.11   786.2 2504.01  786.64
 2515.74  787.63 2522.99   787.8 2550.64  788.28 2559.96  788.46 2571.71  788.66
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 2598.06  789.58 2619.26  789.77 2626.42  789.76 2655.52  789.67 2660.02  789.66
 2676.03  789.81 2704.87  790.14 2724.61  790.33  2743.9   790.5 2773.93  790.73
 2790.35  790.75 2813.29  790.26 2844.67  787.16  2849.5  786.55 2878.67  786.27
 2887.22  786.28 2894.98  786.56  2909.3   786.8 2938.45  787.47 2956.98  787.79
 2960.55  787.92 2970.93  788.27 2988.24  789.77 3013.97  791.61 3021.83  790.17
 3022.72  790.03 3024.02  790.54 3026.17  791.43 3032.65  793.06 3038.57  794.74
 3048.67  796.77 3051.31  796.67 3058.84  796.58 3067.31  798.57 3072.73  799.85
 3077.38   800.9 3096.83  806.32 3118.33  813.34 3139.84  820.12 3151.12  823.39
 3169.37  830.83 3176.07  833.36 3179.68  835.33  3221.2  857.49 3225.09  858.22
 3227.03  858.84 3232.51   860.4 3239.64  862.42 3245.09  863.24 3245.79  863.34
 3249.36  864.19 3259.56  866.56 3261.83  866.99

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  647.83    .042  747.08     .15 1103.25    .072 2099.61     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        647.83  747.08          262.68  1047.4  354.09             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    65.1  400.07  795.58       T
 1132.14 3124.21  797.97       T

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  770.15  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  638.54  * 2064.10  * 1729.15  *
* E.G. Slope (ft/ft)     *0.000479  * Area (sq ft)           * 2212.30  * 2064.10  * 1828.22  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  522.13  *11567.13  * 1110.74  *
* Top Width (ft)         *  692.95  * Top Width (ft)         *  236.64  *   88.07  *  368.25  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)       *    0.82  *    5.60  *    0.64  *
* Max Chl Dpth (ft)      *   30.13  * Hydr. Depth (ft)       *    7.85  *   23.44  *    5.12  *
* Conv. Total (cfs)      *603020.9  * Conv. (cfs)            * 23852.9  *528425.8  * 50742.3  *
* Length Wtd. (ft)       *  931.55  * Wetted Per. (ft)       *   87.20  *  106.04  *  339.14  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.22  *    0.58  *    0.15  *
* Alpha                  *    3.11  * Stream Power (lb/ft s) *    0.18  *    3.26  *    0.10  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  234.88  * 4737.03  *  264.69  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   44.29  *  383.66  *   64.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  774.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  774.15  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1017.00  * 2423.80  * 3113.08  *
* E.G. Slope (ft/ft)     *0.000581  * Area (sq ft)           * 3245.07  * 2423.80  * 4055.70  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1042.17  *16101.99  * 3155.84  *
* Top Width (ft)         * 1056.89  * Top Width (ft)         *  279.41  *   91.66  *  685.83  *
* Vel Total (ft/s)       *    3.10  * Avg. Vel. (ft/s)       *    1.02  *    6.64  *    1.01  *
* Max Chl Dpth (ft)      *   34.13  * Hydr. Depth (ft)       *    9.52  *   26.44  *    8.80  *
* Conv. Total (cfs)      *842489.8  * Conv. (cfs)            * 43252.2  *668264.1  *130973.4  *
* Length Wtd. (ft)       *  884.45  * Wetted Per. (ft)       *  114.33  *  111.41  *  355.68  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.32  *    0.79  *    0.32  *
* Alpha                  *    3.67  * Stream Power (lb/ft s) *    0.33  *    5.24  *    0.32  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   *  462.89  * 6406.64  *  554.48  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   75.14  *  423.20  *   95.34  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  777.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  776.93  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1354.88  * 2682.45  * 4112.27  *
* E.G. Slope (ft/ft)     *0.000642  * Area (sq ft)           * 4082.28  * 2682.45  * 6025.13  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1531.53  *19550.77  * 5237.70  *
* Top Width (ft)         * 1145.32  * Top Width (ft)         *  320.06  *   94.82  *  730.44  *
* Vel Total (ft/s)       *    3.23  * Avg. Vel. (ft/s)       *    1.13  *    7.29  *    1.27  *
```

```
* Max Chl Dpth (ft)      *   36.91  * Hydr. Depth (ft)       *   10.16  *   28.29  *   11.28  *
* Conv. Total (cfs)      *1038913.0  * Conv. (cfs)            * 60453.2  *771715.6  *206744.4  *
* Length Wtd. (ft)       *  848.78  * Wetted Per. (ft)       *  141.74  *  115.68  *  366.93  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.38  *    0.93  *    0.45  *
* Alpha                  *    3.82  * Stream Power (lb/ft s) *    0.43  *    6.77  *    0.57  *
* Frctn Loss (ft)        *    0.54  * Cum Volume (acre-ft)   *  682.23  * 7787.71  *  914.41  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   98.67  *  451.06  *  166.42  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  780.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  780.06  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1804.56  * 2987.91  * 5275.45  *
* E.G. Slope (ft/ft)     *0.000687  * Area (sq ft)           * 5151.27  * 2987.91  * 8757.54  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2313.24  *23557.81  * 8128.96  *
* Top Width (ft)         * 1640.62  * Top Width (ft)         *  428.31  *   99.25  * 1113.06  *
* Vel Total (ft/s)       *    3.38  * Avg. Vel. (ft/s)       *    1.28  *    7.88  *    1.54  *
* Max Chl Dpth (ft)      *   40.04  * Hydr. Depth (ft)       *    8.26  *   30.10  *   13.70  *
* Conv. Total (cfs)      *1297001.0  * Conv. (cfs)            * 88243.1  *898661.6  *310096.0  *
* Length Wtd. (ft)       *  816.04  * Wetted Per. (ft)       *  227.50  *  120.54  *  387.66  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.34  *    1.06  *    0.58  *
* Alpha                  *    3.84  * Stream Power (lb/ft s) *    0.44  *    8.38  *    0.90  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   * 1013.60  * 9225.46  * 1536.66  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  135.87  *  473.85  *  247.56  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  784.50  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.150  *   0.042  *   0.148  *
* W.S. Elev (ft)         *  783.73  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2711.44  * 3352.86  * 6691.37  *
* E.G. Slope (ft/ft)     *0.000704  * Area (sq ft)           * 6836.66  * 3352.86  *13414.05  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 3430.47  *28902.59  *12166.93  *
* Top Width (ft)         * 2057.29  * Top Width (ft)         *  461.28  *   99.25  * 1496.76  *
* Vel Total (ft/s)       *    3.49  * Avg. Vel. (ft/s)       *    1.27  *    8.62  *    1.82  *
* Max Chl Dpth (ft)      *   43.71  * Hydr. Depth (ft)       *   10.94  *   33.78  *   17.38  *
* Conv. Total (cfs)      *1676617.0  * Conv. (cfs)            *129249.2  *1088957.0  *458410.9  *
* Length Wtd. (ft)       *  781.30  * Wetted Per. (ft)       *  256.87  *  120.54  *  387.66  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.46  *    1.22  *    0.76  *
* Alpha                  *    4.05  * Stream Power (lb/ft s) *    0.59  *   10.54  *    1.38  *
* Frctn Loss (ft)        *    0.53  * Cum Volume (acre-ft)   * 1907.07  *11508.91  * 3299.68  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  337.87  *  501.86  *  600.77  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.13  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.150  *   0.042  *   0.147  *
* W.S. Elev (ft)         *  786.29  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3345.54  * 3606.87  * 7676.86  *
* E.G. Slope (ft/ft)     *0.000728  * Area (sq ft)           * 8020.43  * 3606.87  *17674.46  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 4949.85  *33183.61  *15556.54  *
* Top Width (ft)         * 2328.95  * Top Width (ft)         *  463.79  *   99.25  * 1765.91  *
* Vel Total (ft/s)       *    3.67  * Avg. Vel. (ft/s)       *    1.48  *    9.20  *    2.03  *
* Max Chl Dpth (ft)      *   46.27  * Hydr. Depth (ft)       *   13.50  *   36.34  *   19.94  *
* Conv. Total (cfs)      *1989937.0  * Conv. (cfs)            *183458.5  *1229900.0  *576579.3  *
* Length Wtd. (ft)       *  759.58  * Wetted Per. (ft)       *  256.87  *  120.54  *  387.66  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.59  *    1.36  *    0.90  *
* Alpha                  *    3.99  * Stream Power (lb/ft s) *    0.88  *   12.51  *    1.82  *
* Frctn Loss (ft)        *    0.54  * Cum Volume (acre-ft)   * 3033.28  *12852.66  * 5258.01  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  516.87  *  508.96  *  953.23  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
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```
* E.G. Elev (ft)         *  789.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.150  *   0.042  *   0.147  *
* W.S. Elev (ft)         *  788.33  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3849.42  * 3808.72  * 8459.98  *
* E.G. Slope (ft/ft)     *0.000754  * Area (sq ft)           * 8965.68  * 3808.72  *21450.98  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 6366.68  *36992.20  *18641.12  *
* Top Width (ft)         * 2509.71  * Top Width (ft)         *  465.78  *   99.25  * 1944.68  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    1.65  *    9.71  *    2.20  *
* Max Chl Dpth (ft)      *   48.31  * Hydr. Depth (ft)       *   15.54  *   38.38  *   21.97  *
* Conv. Total (cfs)      *2257176.0  * Conv. (cfs)           *231785.8  *1346740.0  *678649.8  *
* Length Wtd. (ft)       *  743.78  * Wetted Per. (ft)       *  256.87  *  120.54  *  387.66  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.71  *    1.49  *    1.03  *
* Alpha                  *    3.92  * Stream Power (lb/ft s) *    1.17  *   14.45  *    2.26  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   * 4000.39  *13703.13  * 7138.13  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  631.57  *  510.37  * 1306.16  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  791.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.150  *   0.042  *   0.146  *
* W.S. Elev (ft)         *  790.97  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4505.43  * 4071.51  * 9479.53  *
* E.G. Slope (ft/ft)     *0.000808  * Area (sq ft)           *10201.24  * 4071.51  *26952.09  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 8565.38  *42789.38  *23365.24  *
* Top Width (ft)         * 2832.11  * Top Width (ft)         *  467.23  *   99.25  * 2265.63  *
* Vel Total (ft/s)       *    4.14  * Avg. Vel. (ft/s)       *    1.90  *   10.51  *    2.46  *
* Max Chl Dpth (ft)      *   50.95  * Hydr. Depth (ft)       *   18.18  *   41.02  *   24.62  *
* Conv. Total (cfs)      *2628324.0  * Conv. (cfs)           *301292.7  *1505144.0  *821887.1  *
* Length Wtd. (ft)       *  723.61  * Wetted Per. (ft)       *  256.87  *  120.54  *  387.66  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.88  *    1.70  *    1.23  *
* Alpha                  *    3.83  * Stream Power (lb/ft s) *    1.68  *   17.91  *    3.04  *
* Frctn Loss (ft)        *    0.57  * Cum Volume (acre-ft)   * 5879.16  *15022.25  *10869.08  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  805.82  *  512.46  * 1660.62  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  782.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.150  *   0.042  *   0.149  *
* W.S. Elev (ft)         *  781.47  * Reach Len. (ft)        *  262.68  * 1047.40  *  354.09  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2150.21  * 3128.04  * 5819.13  *
* E.G. Slope (ft/ft)     *0.000714  * Area (sq ft)           * 5794.28  * 3128.04  *10440.83  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2347.11  *25926.37  * 9726.52  *
* Top Width (ft)         * 1790.40  * Top Width (ft)         *  459.06  *   99.25  * 1232.09  *
* Vel Total (ft/s)       *    3.42  * Avg. Vel. (ft/s)       *    1.09  *    8.29  *    1.67  *
* Max Chl Dpth (ft)      *   41.45  * Hydr. Depth (ft)       *    8.68  *   31.52  *   15.11  *
* Conv. Total (cfs)      *1421719.0  * Conv. (cfs)           * 87814.0  *970000.1  *363904.8  *
* Length Wtd. (ft)       *  804.55  * Wetted Per. (ft)       *  256.87  *  120.54  *  387.66  *
* Min Ch El (ft)         *  740.02  * Shear (lb/sq ft)       *    0.37  *    1.16  *    0.67  *
* Alpha                  *    4.06  * Stream Power (lb/ft s) *    0.41  *    9.59  *    1.12  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   * 1230.21  * 9988.06  * 1963.60  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  173.14  *  484.22  *  309.63  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 15.882

INPUT
Description: U/S of Golf Bridge 2.  Ineffective areas for local drainage
             ditches.
Station Elevation Data    num=     495
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  833.53    7.92  833.17   11.76  832.83   15.82  832.66   18.86  832.56
   22.64  832.54   31.9  832.76   44.02  832.13   58.01  832.13   61.42  832.13
   67.98  832.13   79.22  831.29   84.95  830.55    88.7   830.3   92.66   830.2
```

101.68	829.56	104.25	829.3	114.29	827.8	117.92	827.22	119.18	826.83
123.88	825.28	127.21	823.66	129.54	825.24	132.01	827.13	135.09	827
142.88	826.22	151.83	825.72	157.5	824.9	160.67	819.43	162.66	815.26
176.5	809.34	176.58	809.31	176.62	809.29	176.67	809.27	184.64	804.11
194.22	797.99	197.5	796.1	203.51	791.22	210.88	785.55	218.13	783.15
224.72	781.26	228.35	778.86	235.54	773.55	248.76	766.05	251.55	764.26
262.46	760.86	269.93	758.09	271.22	758.98	275.27	760.56	285.95	765.9
301.75	772.31	310.51	775.05	310.83	775.15	312.33	775.15	317.3	775.15
317.77	775.15	320.74	774.79	330.12	773.67	350.78	768.36	351.04	768.3
351.3	768.22	364.63	764.26	376.65	762.7	388.31	760.91	395.28	760.31
397.19	760.31	402.88	760.03	412.05	759.73	419	759.38	428.05	759.32
433.99	758.78	438.32	758.28	443.8	756.68	453.83	754.54	455.39	754.38
458.77	755.88	464.48	755.16	480.47	753.85	480.51	753.84	480.61	753.84
483.57	753.11	491.03	757.9	497.08	761.96	499.95	764.03	500.37	764.26
511.72	774.64	516.08	778.18	527.36	778.68	536.51	779.14	546.11	779.49
555.42	780	562.38	780.38	567.51	776.72	578.61	774.62	586.36	774.07
592.75	775.14	605.77	780.09	608.37	780.13	610.07	780.09	638.71	779.87
651.97	779.79	652.8	779.76	654.61	779.29	661.34	777.44	665.51	776.83
677.07	775.11	694.85	769.61	699.13	768.31	705.49	767.03	729.28	762.29
736.02	762.2	744.7	761.86	759.08	761.89	762.43	761.54	763.33	761.48
764.69	761.48	766.34	761.48	772.06	761.48	814.12	761.48	814.41	761.48
818.77	761.75	820.95	762.06	829.35	764.51	830.9	764.91	834.73	765.58
837.36	766.32	843.47	766.84	851.38	766.02	859.25	767.4	863.22	768.31
871.99	769.47	874.94	769.77	875.87	769.66	876.75	769.76	880.97	769.25
884.57	768.96	891.06	768.48	892.08	768.3	899.2	768.31	899.32	768.31
908.89	768.32	910.4	768.31	920.83	769	930.2	770.09	943.74	771.67
944.89	771.82	945.23	771.86	947.42	772.01	947.43	772.01	947.71	772.03
955.18	772.61	967.2	774.25	968.74	774.51	978.81	775.46	981.2	775.71
983.59	776.06	984.34	776.17	986.02	776.3	988.01	776.29	988.37	776.29
988.82	776.28	993.28	776.36	1001.07	777.66	1017.47	780.32	1026.92	781.16
1034.34	781.37	1043.1	782.24	1045.26	782.47	1056.12	783.54	1060.85	784.14
1063.8	784.38	1069.14	784.74	1081.26	787.66	1088.79	788.6	1094.71	789.7
1094.85	789.71	1095.18	789.68	1095.49	789.66	1101.18	789.28	1105.32	788.65
1108.82	788	1110.09	787.85	1116.62	786.91	1122.61	786.71	1130.46	786.32
1148.11	785.73	1161.87	785.47	1175.86	785.75	1188.22	786.32	1198.45	786.55
1202.44	786.21	1230.58	783.78	1238.61	783.16	1272.25	780.79	1277.28	780.64
1282.75	780.17	1288.79	779.21	1291.87	778.51	1293.63	778.14	1303.88	775.13
1313.58	772.62	1316.42	771.99	1318.38	771.99	1366.97	771.99	1377.92	771.99
1385.09	773.49	1397.21	776.14	1400.96	776.92	1414.88	779.32	1423.12	779.29
1434.36	779.28	1453.05	778.85	1464.21	776.93	1469.12	776.14	1473.49	775.01
1476.94	773.9	1490.1	771.66	1499.76	770.47	1503.12	770.29	1510.01	769.74
1514.46	769.69	1516.8	769.59	1520.33	769.53	1527.24	769.34	1529.78	769.39
1548.26	769.83	1549.88	769.95	1552.13	770.03	1557.8	770.34	1557.89	770.36
1561.63	771.47	1562.34	771.51	1574.09	771.81	1576.04	773.28	1577.27	774.73
1582.84	776.41	1587.72	777.67	1591.02	777.97	1596.16	778.24	1619.57	784.9
1626.99	786.43	1638.2	787.9	1638.92	787.9	1652.64	787.02	1669.74	787.29
1677.64	786.92	1680.98	786.78	1683.36	786.82	1684.97	786.86	1691.09	785.93
1701.18	784.31	1716.07	782.74	1728.03	780.15	1752.84	775.26	1752.93	775.24
1753.03	775.23	1774.97	771.75	1779.56	771.52	1784.2	771.91	1789.91	772.42
1792.82	773.2	1807.57	773.15	1807.89	773.04	1808.89	773.09	1809.96	773.09
1811.58	772.96	1822.09	772.19	1827.14	771.77	1837.21	768.3	1837.23	768.29
1837.26	768.28	1837.28	768.28	1850.54	764.21	1852.16	763.37	1852.73	763.32
1857.14	762.91	1861.08	762.54	1871.21	760.77	1876.94	759.76	1881.62	759.77
1883.52	758.8	1888.35	757.17	1897.88	752.2	1906.26	748.65	1915	740.6
1928	739.59	1940	740.6	1949.35	748.43	1951.61	749.72	1954.25	751.77
1956.48	753.74	1970.78	759.18	1972.15	759.26	1979.2	759.65	1989.21	760.21
1991.14	760.32	2001.15	761.92	2013.22	763.36	2025.64	764.46	2035.84	764.85
2043.48	765.56	2049.24	766.1	2056.95	766.71	2065.8	768.23	2070.1	768.78
2081.6	770.49	2091.23	771.56	2099	772.95	2113.6	775.06	2117.07	775.67
2119.61	776.2	2123.93	776.92	2135.4	777.82	2149.81	779.39	2161.37	781.7
2169.25	783.22	2172.65	783.74	2186.54	785.27	2201.33	786.88	2204	787.01
2210.88	787.85	2217.05	788.58	2223.23	788.74	2223.27	788.74	2246.16	787.69
2248.98	787.56	2256.89	787.17	2269.16	786.46	2285	784.06	2291.73	783.74
2302.45	783.76	2307.2	782.23	2313.31	781	2315.11	779.5	2319.64	776.14
2326.81	772.27	2337.54	766.59	2342.08	764.33	2346.47	762.29	2352.35	761.44
2363.43	760.76	2365.08	760.64	2367.54	760.53	2373.38	759.43	2379.27	758.62
2380.23	758.73	2381.95	759.01	2382.24	759.05	2382.99	759.19	2384.29	759.42
2387.57	759.92	2396.99	762.43	2407.08	766.33	2409.44	767.23	2412.68	769.31
2416.88	771.68	2420.27	773.38	2428.11	775.79	2435.51	777.65	2441.94	778.8
2447.21	780.29	2449.27	780.44	2453.44	780.71	2465.43	782.71	2479.02	782.42
2488.49	781.86	2493.82	781.5	2499.98	780.96	2502.08	780.68	2504.19	780.41
2508.39	779.86	2509.13	779.76	2511.18	778.32	2520.57	773.3	2520.9	773.18
2521	773.18	2539.93	769.46	2541.12	769.5	2548.98	768.89	2557.95	768.32
2574.94	765.88	2576.18	766.3	2576.7	766.43	2579.07	767.17	2593.28	771.36
2599.12	773.3	2605.96	774.79	2616.44	775.06	2625.04	773.3	2626.01	773.17
2627.54	772.94	2636.61	771.38	2639.37	770.62	2643.73	772.12	2647.22	773.3

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 2650.26  774.65 2658.08   778.9 2665.05  783.06 2669.83  783.43 2678.24  784.15
 2687.33   784.3  2700.5  784.33 2703.75  784.35 2706.87  784.25 2718.07  783.88
 2723.28  781.49 2723.48  781.41  2723.7  781.33 2727.16  780.07 2737.49  780.66
 2737.69  780.67  2738.1   780.7 2742.11  781.27  2743.2  781.33 2753.78  782.64
 2756.03  782.82 2759.07  783.45 2763.75  783.17 2767.82   782.9 2777.06  783.23
 2792.11  784.17 2796.96  783.99 2818.44  784.29  2906.3  784.23 2907.84  784.22
 2911.91  784.23    2964  786.42 2985.02  787.19 3004.06  787.67 3017.56  787.83
 3027.15   787.6 3052.83  787.09 3066.91     785 3068.03  784.78 3117.74  785.22
 3169.37  785.46 3180.01  785.26 3210.35  785.92 3219.22  786.01 3224.12  786.51
 3245.89   787.3 3250.77  787.49 3251.48   787.5  3252.7  787.44 3259.85  787.07
 3276.08  786.14 3281.19  786.14 3326.58  786.66 3341.07  789.13 3344.43  789.63
 3351.46  789.11 3377.97  787.55 3403.85  787.51 3435.16  787.92 3520.62   789.3
 3536.15  789.57 3542.64  789.77 3636.34  791.47 3644.12  791.71  3648.4  791.93
 3671.68  793.34 3674.07  793.58 3677.88  794.04 3695.49   796.3 3699.76  796.13
 3703.19  796.05 3705.63  796.26 3711.31  796.75 3723.56  800.78  3732.8  803.35
 3743.56  807.76 3756.76  813.05 3761.17  814.24 3767.95  814.59 3768.13   814.6
 3769.92   814.7 3778.71  815.18 3798.25  822.75 3799.69  823.39 3802.57  824.46
  3804.5  825.43 3819.42  831.06 3825.31  833.35 3826.66  833.35  3840.8  837.28
 3853.47  841.53 3867.81  849.35 3869.81  850.18 3871.06  850.49  3887.9  853.24
 3888.72  853.43 3902.42  856.66 3904.65  857.16 3906.33  857.46 3910.74  858.26

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  677.07    .072 1881.62    .042 1972.15     .15 2678.24    .072
 3677.88     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1881.62 1972.15               32      32      32              .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  101.06  335.37  799.93       T
  532.25 1682.82   799.6       T
  2216.3 3776.92  800.24       T

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  770.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.40  * Wt. n-Val.             *   0.132  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  769.71  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)          *  756.64  * Flow Area (sq ft)      * 1878.91  * 1914.57  *  593.26  *
* E.G. Slope (ft/ft)      *0.000504  * Area (sq ft)           * 3299.27  * 1914.57  * 1263.57  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             * 2023.43  *10757.30  *  419.27  *
* Top Width (ft)          *  848.34  * Top Width (ft)         *  522.88  *   90.53  *  234.93  *
* Vel Total (ft/s)        *    3.01  * Avg. Vel. (ft/s)       *    1.08  *    5.62  *    0.71  *
* Max Chl Dpth (ft)       *   30.12  * Hydr. Depth (ft)       *    8.98  *   21.15  *    5.69  *
* Conv. Total (cfs)       *587688.3  * Conv. (cfs)            * 90087.0  *478934.8  * 18666.5  *
* Length Wtd. (ft)        *   10.00  * Wetted Per. (ft)       *  218.18  *  101.83  *  104.80  *
* Min Ch El (ft)          *  739.59  * Shear (lb/sq ft)       *    0.27  *    0.59  *    0.18  *
* Alpha                   *    2.86  * Stream Power (lb/ft s) *    0.29  *    3.33  *    0.13  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)   *  218.26  * 4689.20  *  252.13  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   42.00  *  381.51  *   61.93  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  774.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.57  * Wt. n-Val.             *   0.133  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  773.60  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)          *  760.52  * Flow Area (sq ft)      * 2812.72  * 2267.27  * 1054.40  *
* E.G. Slope (ft/ft)      *0.000602  * Area (sq ft)           * 5875.64  * 2267.27  * 2360.19  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 3696.39  *15580.66  * 1022.95  *
* Top Width (ft)          * 1246.37  * Top Width (ft)         *  822.95  *   90.53  *  332.89  *
* Vel Total (ft/s)        *    3.31  * Avg. Vel. (ft/s)       *    1.31  *    6.87  *    0.97  *
* Max Chl Dpth (ft)       *   34.01  * Hydr. Depth (ft)       *    9.58  *   25.04  *    8.03  *
* Conv. Total (cfs)       *827127.9  * Conv. (cfs)            *150610.3  *634837.4  * 41680.2  *
* Length Wtd. (ft)        *   10.00  * Wetted Per. (ft)       *  305.00  *  101.83  *  132.27  *
* Min Ch El (ft)          *  739.59  * Shear (lb/sq ft)       *    0.35  *    0.84  *    0.30  *
* Alpha                   *    3.34  * Stream Power (lb/ft s) *    0.46  *    5.75  *    0.29  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)   *  435.39  * 6350.25  *  528.41  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *   71.82  *  421.01  *   91.20  *
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Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  777.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.127  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  776.36  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  762.72  * Flow Area (sq ft)      * 3650.43  * 2517.10  * 1442.03  *
* E.G. Slope (ft/ft)     *0.000630  * Area (sq ft)           * 8359.73  * 2517.10  * 3379.89  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 5729.71  *18966.13  * 1624.16  *
* Top Width (ft)         * 1469.86  * Top Width (ft)         *  981.26  *   90.53  *  398.06  *
* Vel Total (ft/s)       *    3.46  * Avg. Vel. (ft/s)       *    1.57  *    7.53  *    1.13  *
* Max Chl Dpth (ft)      *   36.77  * Hydr. Depth (ft)       *   11.67  *   27.80  *    9.71  *
* Conv. Total (cfs)      *1048649.0  * Conv. (cfs)           *228284.7  *755654.3  * 64710.4  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  325.55  *  101.83  *  149.57  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.44  *    0.97  *    0.38  *
* Alpha                  *    3.47  * Stream Power (lb/ft s) *    0.69  *    7.32  *    0.43  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  644.72  * 7725.20  *  876.18  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   94.74  *  448.84  *  161.84  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  780.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.121  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  779.44  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  765.25  * Flow Area (sq ft)      * 4655.71  * 2795.47  * 1943.54  *
* E.G. Slope (ft/ft)     *0.000662  * Area (sq ft)           *11613.91  * 2795.47  * 4693.55  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 8408.05  *23164.02  * 2427.93  *
* Top Width (ft)         * 1725.38  * Top Width (ft)         * 1178.55  *   90.53  *  456.30  *
* Vel Total (ft/s)       *    3.62  * Avg. Vel. (ft/s)       *    1.81  *    8.29  *    1.25  *
* Max Chl Dpth (ft)      *   39.85  * Hydr. Depth (ft)       *   13.42  *   30.88  *   10.92  *
* Conv. Total (cfs)      *1321029.0  * Conv. (cfs)           *326684.7  *900009.8  * 94334.2  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  360.52  *  101.83  *  179.20  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.53  *    1.14  *    0.45  *
* Alpha                  *    3.64  * Stream Power (lb/ft s) *    0.96  *    9.41  *    0.56  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  963.05  * 9155.93  * 1481.99  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  131.02  *  471.57  *  241.18  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*************************************************************************************************
* E.G. Elev (ft)         *  783.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *   0.118  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  783.15  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  767.85  * Flow Area (sq ft)      * 5976.91  * 3131.60  * 2638.76  *
* E.G. Slope (ft/ft)     *0.000666  * Area (sq ft)           *16436.81  * 3131.60  * 6626.42  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *12655.06  *28058.98  * 3785.96  *
* Top Width (ft)         * 2076.12  * Top Width (ft)         * 1378.18  *   90.53  *  607.41  *
* Vel Total (ft/s)       *    3.79  * Avg. Vel. (ft/s)       *    2.12  *    8.96  *    1.43  *
* Max Chl Dpth (ft)      *   43.56  * Hydr. Depth (ft)       *   16.32  *   34.59  *   13.41  *
* Conv. Total (cfs)      *1724734.0  * Conv. (cfs)           *490485.6  *1087512.0  *146736.3  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  380.36  *  101.83  *  198.40  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.65  *    1.28  *    0.55  *
* Alpha                  *    3.63  * Stream Power (lb/ft s) *    1.38  *   11.45  *    0.79  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1836.90  *11430.95  * 3218.22  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  332.33  *  499.58  *  592.22  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
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* E.G. Elev (ft)         *  786.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.116  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  785.67  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  769.71  * Flow Area (sq ft)      * 6927.89  * 3359.91  * 3160.24  *
* E.G. Slope (ft/ft)     *0.000703  * Area (sq ft)           *20031.40  * 3359.91  * 8622.75  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *16355.65  *32427.27  * 4907.08  *
* Top Width (ft)         * 2603.87  * Top Width (ft)         * 1486.76  *   90.53  * 1026.58  *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *    2.36  *    9.65  *    1.55  *
* Max Chl Dpth (ft)      *   46.08  * Hydr. Depth (ft)       *   17.96  *   37.11  *   14.49  *
* Conv. Total (cfs)      *2024660.0  * Conv. (cfs)            *616774.6  *1222839.0  *185046.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  400.01  *  101.83  *  219.90  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.76  *    1.45  *    0.63  *
* Alpha                  *    3.65  * Stream Power (lb/ft s) *    1.80  *   13.98  *    0.98  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2948.70  *12768.90  * 5151.13  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  510.99  *  506.68  *  941.88  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  788.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.             *   0.115  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  787.68  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  771.20  * Flow Area (sq ft)      * 7716.70  * 3542.01  * 3618.39  *
* E.G. Slope (ft/ft)     *0.000734  * Area (sq ft)           *23187.92  * 3542.01  *10960.35  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *19895.54  *36167.68  * 5936.79  *
* Top Width (ft)         * 3075.36  * Top Width (ft)         * 1638.01  *   90.53  * 1346.82  *
* Vel Total (ft/s)       *    4.17  * Avg. Vel. (ft/s)       *    2.58  *   10.21  *    1.64  *
* Max Chl Dpth (ft)      *   48.09  * Hydr. Depth (ft)       *   19.50  *   39.13  *   15.24  *
* Conv. Total (cfs)      *2288995.0  * Conv. (cfs)            *734528.8  *1335284.0  *219181.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  409.97  *  101.83  *  239.30  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.86  *    1.59  *    0.69  *
* Alpha                  *    3.64  * Stream Power (lb/ft s) *    2.22  *   16.27  *    1.14  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 3903.44  *13614.75  * 7006.40  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  625.23  *  508.09  * 1292.78  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  791.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.112  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  790.34  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  774.35  * Flow Area (sq ft)      * 8766.44  * 3782.19  * 4263.38  *
* E.G. Slope (ft/ft)     *0.000771  * Area (sq ft)           *27599.96  * 3782.19  *14950.59  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *25517.18  *41353.31  * 7849.50  *
* Top Width (ft)         * 3369.26  * Top Width (ft)         * 1676.96  *   90.53  * 1601.77  *
* Vel Total (ft/s)       *    4.44  * Avg. Vel. (ft/s)       *    2.91  *   10.93  *    1.84  *
* Max Chl Dpth (ft)      *   50.75  * Hydr. Depth (ft)       *   22.16  *   41.78  *   17.46  *
* Conv. Total (cfs)      *2691467.0  * Conv. (cfs)            *919146.8  *1489575.0  *282744.6  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  409.97  *  101.83  *  246.12  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    1.03  *    1.79  *    0.83  *
* Alpha                  *    3.51  * Stream Power (lb/ft s) *    2.99  *   19.54  *    1.53  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 5765.18  *14927.83  *10698.77  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  799.35  *  510.18  * 1644.90  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  781.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.120  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  780.88  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  766.27  * Flow Area (sq ft)      * 5160.87  * 2925.97  * 2205.19  *
* E.G. Slope (ft/ft)     *0.000667  * Area (sq ft)           *13404.91  * 2925.97  * 5376.80  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 9992.50  *25080.00  * 2927.50  *
* Top Width (ft)         * 1881.78  * Top Width (ft)         * 1289.89  *   90.53  *  501.36  *
* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *    1.94  *    8.57  *    1.33  *
* Max Chl Dpth (ft)      *   41.29  * Hydr. Depth (ft)       *   14.59  *   32.32  *   11.91  *
* Conv. Total (cfs)      *1471393.0  * Conv. (cfs)            *386918.3  *971119.4  *113355.1  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  367.65  *  101.83  *  186.56  *
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* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.58  *    1.20  *    0.49  *
* Alpha                  *    3.64  * Stream Power (lb/ft s) *    1.13  *   10.26  *    0.65  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1172.32  * 9915.28  * 1899.31  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  167.87  *  481.94  *  302.58  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 15.879

INPUT
Description: Golf Bridge 2
Distance from Upstream XS =      10
Deck/Roadway Width        =      12
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
    1870     760     735    1906     760     735  1910.9     763     735
    1911     763     751    1916     763     754    1923     763   755.5
    1928     763     756    1934     763   755.5    1940     763     754
    1945     763     751  1945.1     763     735    1951     760     735
    1961     760     735    1990     760     735

Upstream Bridge Cross Section Data
Station Elevation Data     num=     495
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   833.53    7.92   833.17    11.76   832.83    15.82   832.66    18.86   832.56
   22.64   832.54    31.9   832.76    44.02   832.13    58.01   832.13    61.42   832.13
   67.98   832.13   79.22   831.29    84.95   830.55     88.7    830.3    92.66    830.2
  101.68   829.56  104.25    829.3   114.29    827.8   117.92   827.22   119.18   826.83
  123.88   825.28  127.21   823.66   129.54   825.24   132.01   827.13   135.09      827
  142.88   826.22  151.83   825.72    157.5    824.9   160.67   819.43   162.66   815.26
   176.5   809.34  176.58   809.31   176.62   809.29   176.67   809.27   184.64   804.11
  194.22   797.99   197.5    796.1   203.51   791.22   210.88   785.55   218.13   783.15
  224.72   781.26  228.35   778.86   235.54   773.55   248.76   766.05   251.55   764.26
  262.46   760.86  269.93   758.09   271.22   758.98   275.27   760.56   285.95    765.9
  301.75   772.31  310.51   775.05   310.83   775.15   312.33   775.15    317.3   775.15
  317.77   775.15  320.74   774.79   330.12   773.67   350.78   768.36   351.04    768.3
   351.3   768.22  364.63   764.26   376.65    762.7   388.31   760.91   395.28   760.31
  397.19   760.31  402.88   760.03   412.05   759.73      419   759.38   428.05   759.32
  433.99   758.78  438.32   758.28    443.8   756.68   453.83   754.54   455.39   754.38
  458.77   755.88  464.48   755.16   480.47   753.85   480.51   753.84   480.61   753.84
  483.57   753.11  491.03    757.9   497.08   761.96   499.95   764.03   500.37   764.26
  511.72   774.64  516.08   778.18   527.36   778.68   536.51   779.14   546.11   779.49
  555.42      780  562.38   780.38   567.51   776.72   578.61   774.62   586.36   774.07
  592.75   775.14  605.77   780.09   608.37   780.13   610.07   780.09   638.71   779.87
  651.97   779.79   652.8   779.76   654.61   779.29   661.34   777.44   665.51   776.83
  677.07   775.11  694.85   769.61   699.13   768.31   705.49   767.03   729.28   762.29
  736.02    762.2   744.7   761.86   759.08   761.89   762.43   761.54   763.33   761.48
  764.69   761.48  766.34   761.48   772.06   761.48   814.12   761.48   814.41   761.48
  818.77   761.75  820.95   762.06   829.35   764.51    830.9   764.91   834.73   765.58
  837.36   766.32  843.47   766.84   851.38   766.02   859.25    767.4   863.22   768.31
  871.99   769.47  874.94   769.77   875.87   769.66   876.75   769.76   880.97   769.25
  884.57   768.96  891.06   768.48   892.08    768.3    899.2   768.31   899.32   768.31
  908.89   768.32   910.4   768.31   920.83      769    930.2   770.09   943.74   771.67
  944.89   771.82  945.23   771.86   947.42   772.01   947.43   772.01   947.71   772.03
  955.18   772.61   967.2   774.25   968.74   774.51   978.81   775.46    981.2   775.71
  983.59   776.06  984.34   776.17   986.02    776.3   988.01   776.29   988.37   776.29
  988.82   776.28  993.28   776.36  1001.07   777.66  1017.47   780.32  1026.92   781.16
 1034.34   781.37  1043.1   782.24  1045.26   782.47  1056.12   783.54  1060.85   784.14
  1063.8   784.38 1069.14   784.74  1081.26   787.66  1088.79    788.6  1094.71    789.7
 1094.85   789.71 1095.18   789.68  1095.49   789.66  1101.18   789.28  1105.32   788.65
 1108.82      788 1110.09   787.85  1116.62   786.91  1122.61   786.71  1130.46   786.32
 1148.11   785.73 1161.87   785.47  1175.86   785.75  1188.22   786.32  1198.45   786.55
 1202.44   786.21 1230.58   783.78  1238.61   783.16  1272.25   780.79  1277.28   780.64
 1282.75   780.17 1288.79   779.21  1291.87   778.51  1293.63   778.14  1303.88   775.13
 1313.58   772.62 1316.42   771.99  1318.38   771.99  1366.97   771.99  1377.92   771.99
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 1385.09  773.49 1397.21  776.14 1400.96  776.92 1414.88  779.32 1423.12  779.29
 1434.36  779.28 1453.05  778.85 1464.21  776.93 1469.12  776.14 1473.49  775.01
 1476.94   773.9  1490.1  771.66 1499.76  770.47 1503.12  770.29 1510.01  769.74
 1514.46  769.69  1516.8  769.59 1520.33  769.53 1527.24  769.34 1529.78  769.39
 1548.26  769.83 1549.88  769.95 1552.13  770.03  1557.8  770.34 1557.89  770.36
 1561.63  771.47 1562.34  771.51 1574.09  771.81 1576.04  773.28 1577.27  774.73
 1582.84  776.41 1587.72  777.67 1591.02  777.97 1596.16  778.24 1619.57   784.9
 1626.99  786.43  1638.2   787.9 1638.92   787.9 1652.64  787.02 1669.74  787.29
 1677.64  786.92 1680.98  786.78 1683.36  786.82 1684.97  786.86 1691.09  785.93
 1701.18  784.31 1716.07  782.74 1728.03  780.15 1752.84  775.26 1752.93  775.24
 1753.03  775.23 1774.97  771.75 1779.56  771.52  1784.2  771.91 1789.91  772.42
 1792.82   773.2 1807.57  773.15 1807.89  773.04 1808.89  773.09 1809.96  773.09
 1811.58  772.96 1822.09  772.19 1827.14  771.77 1837.21   768.3 1837.23  768.29
 1837.26  768.28 1837.28  768.28 1850.54  764.21 1852.16  763.37 1852.73  763.32
 1857.14  762.91 1861.08  762.54 1871.21  760.77 1876.94  759.76 1881.62  759.77
 1883.52   758.8 1888.35  757.17 1897.88   752.2 1906.26  748.65    1915   740.6
    1928  739.59    1940   740.6 1949.35  748.43 1951.61  749.72 1954.25  751.77
 1956.48  753.74 1970.78  759.18 1972.15  759.26  1979.2  759.65 1989.21  760.21
 1991.14  760.32 2001.15  761.92 2013.22  763.36 2025.64  764.46 2035.84  764.85
 2043.48  765.56 2049.24   766.1 2056.95  766.71  2065.8  768.23  2070.1  768.78
  2081.6  770.49 2091.23  771.56    2099  772.95  2113.6  775.06 2117.07  775.67
 2119.61   776.2 2123.93  776.92  2135.4  777.82 2149.81  779.39 2161.37   781.7
 2169.25  783.22 2172.65  783.74 2186.54  785.27 2201.33  786.88    2204  787.01
 2210.88  787.85 2217.05  788.58 2223.23  788.74 2223.27  788.74 2246.16  787.69
 2248.98  787.56 2256.89  787.17 2269.16  786.46    2285  784.06 2291.73  783.74
 2302.45  783.76  2307.2  782.23 2313.31     781 2315.11   779.5 2319.64  776.14
 2326.81  772.27 2337.54  766.59 2342.08  764.33 2346.47  762.29 2352.35  761.44
 2363.43  760.76 2365.08  760.64 2367.54  760.53 2373.38  759.43 2379.27  758.62
 2380.23  758.73 2381.95  759.01 2382.24  759.05 2382.99  759.19 2384.29  759.42
 2387.57  759.92 2396.99  762.43 2407.08  766.33 2409.44  767.23 2412.68  769.31
 2416.88  771.68 2420.27  773.38 2428.11  775.79 2435.51  777.65 2441.94   778.8
 2447.21  780.29 2449.27  780.44 2453.44  780.71 2465.43  782.71 2479.02  782.42
 2488.49  781.86 2493.82   781.5 2499.98  780.96 2502.08  780.68 2504.19  780.41
 2508.39  779.86 2509.13  779.76 2511.18  778.32 2520.57   773.3  2520.9  773.18
    2521  773.18 2539.93  769.46 2541.12   769.5 2548.98  768.89 2557.95  768.32
 2574.94  765.88 2576.18   766.3  2576.7  766.43 2579.07  767.17 2593.28  771.36
 2599.12   773.3 2605.96  774.79 2616.44  775.06 2625.04   773.3 2626.01  773.17
 2627.54  772.94 2636.61  771.38 2639.37  770.62 2643.73  772.12 2647.22   773.3
 2650.26  774.65 2658.08   778.9 2665.05  783.06 2669.83  783.43 2678.24  784.15
 2687.33   784.3  2700.5  784.33 2703.75  784.35 2706.87  784.25 2718.07  783.88
 2723.28  781.49 2723.48  781.41  2723.7  781.33 2727.16  780.07 2737.49  780.66
 2737.69  780.67  2738.1   780.7 2742.11  781.27  2743.2  781.33 2753.78  782.64
 2756.03  782.82 2759.07  783.45 2763.75  783.17 2767.82   782.9 2777.06  783.23
 2792.11  784.17 2796.96  783.99 2818.44  784.29  2906.3  784.23 2907.84  784.22
 2911.91  784.23    2964  786.42 2985.02  787.19 3004.06  787.67 3017.56  787.83
 3027.15   787.6 3052.83  787.09 3066.91     785 3068.03  784.78 3117.74  785.22
 3169.37  785.46 3180.01  785.26 3210.35  785.92 3219.22  786.01 3224.12  786.51
 3245.89   787.3 3250.77  787.49 3251.48   787.5  3252.7  787.44 3259.85  787.07
 3276.08  786.14 3281.19  786.14 3326.58  786.66 3341.07  789.13 3344.43  789.63
 3351.46  789.11 3377.97  787.55 3403.85  787.51 3435.16  787.92 3520.62   789.3
 3536.15  789.57 3542.64  789.77 3636.34  791.47 3644.12  791.71  3648.4  791.93
 3671.68  793.34 3674.07  793.58 3677.88  794.04 3695.49   796.3 3699.76  796.13
 3703.19  796.05 3705.63  796.26 3711.31  796.75 3723.56  800.78  3732.8  803.35
 3743.56  807.76 3756.76  813.05 3761.17  814.24 3767.95  814.59 3768.13   814.6
 3769.92   814.7 3778.71  815.18 3798.25  822.75 3799.69  823.39 3802.57  824.46
  3804.5  825.43 3819.42  831.06 3825.31  833.35 3826.66  833.35  3840.8  837.28
 3853.47  841.53 3867.81  849.35 3869.81  850.18 3871.06  850.49  3887.9  853.24
 3888.72  853.43 3902.42  856.66 3904.65  857.16 3906.33  857.46 3910.74  858.26

Manning's n Values        num=       6
    Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*****************************************************************************
      0     .15  677.07    .072 1881.62    .042 1972.15     .15 2678.24    .072
 3677.88     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1881.62 1972.15             .1       .3
Ineffective Flow     num=        3
   Sta L   Sta R    Elev  Permanent
  101.06  335.37  799.93       T
  532.25 1682.82   799.6       T
  2216.3 3776.92  800.24       T

Downstream  Deck/Roadway Coordinates
    num=        14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
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1870	760	735	1906	760	735	1910.9	763	735	
1911	763	751	1916	763	754	1923	763	755.5	
1928	763	756	1934	763	755.5	1940	763	754	
1945	763	751	1945.1	763	735	1951	760	735	
1961	760	735	1990	760	735				

Downstream Bridge Cross Section Data
Station Elevation Data num= 495

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	833.53	7.92	833.17	11.76	832.83	15.82	832.66	18.86	832.56
22.64	832.54	31.9	832.76	44.02	832.13	58.01	832.13	61.42	832.13
67.98	832.13	79.22	831.29	84.95	830.55	88.7	830.3	92.66	830.2
101.68	829.56	104.25	829.3	114.29	827.8	117.92	827.22	119.18	826.83
123.88	825.28	127.21	823.66	129.54	825.24	132.01	827.13	135.09	827
142.88	826.22	151.83	825.72	157.5	824.9	160.67	819.43	162.66	815.26
176.5	809.34	176.58	809.31	176.62	809.29	176.67	809.27	184.64	804.11
194.22	797.99	197.5	796.1	203.51	791.22	210.88	785.55	218.13	783.15
224.72	781.26	228.35	778.86	235.54	773.55	248.76	766.05	251.55	764.26
262.46	760.86	269.93	758.09	271.22	758.98	275.27	760.56	285.95	765.9
301.75	772.31	310.51	775.05	310.83	775.15	312.33	775.15	317.3	775.15
317.77	775.15	320.74	774.79	330.12	773.67	350.78	768.36	351.04	768.3
351.3	768.22	364.63	764.26	376.65	762.7	388.31	760.91	395.28	760.31
397.19	760.31	402.88	760.03	412.05	759.73	419	759.38	428.05	759.32
433.99	758.78	438.32	758.28	443.8	756.68	453.83	754.54	455.39	754.38
458.77	755.88	464.48	755.16	480.47	753.85	480.51	753.84	480.61	753.84
483.57	753.11	491.03	757.9	497.08	761.96	499.95	764.03	500.37	764.26
511.72	774.64	516.08	778.18	527.36	778.68	536.51	779.14	546.11	779.49
555.42	780	562.38	780.38	567.51	776.72	578.61	774.62	586.36	774.07
592.75	775.14	605.77	780.09	608.37	780.13	610.07	780.09	638.71	779.87
651.97	779.79	652.8	779.76	654.61	779.29	661.34	777.44	665.51	776.83
677.07	775.11	694.85	769.61	699.13	768.31	705.49	767.03	729.28	762.29
736.02	762.2	744.7	761.86	759.08	761.89	762.43	761.54	763.33	761.48
764.69	761.48	766.34	761.48	772.06	761.48	814.12	761.48	814.41	761.48
818.77	761.75	820.95	762.06	829.35	764.51	830.9	764.91	834.73	765.58
837.36	766.32	843.47	766.84	851.38	766.02	859.25	767.4	863.22	768.31
871.99	769.47	874.94	769.77	875.87	769.66	876.75	769.76	880.97	769.25
884.57	768.96	891.06	768.48	892.08	768.3	899.2	768.31	899.32	768.31
908.89	768.32	910.4	768.31	920.83	769	930.2	770.09	943.74	771.67
944.89	771.82	945.23	771.86	947.42	772.01	947.43	772.01	947.71	772.03
955.18	772.61	967.2	774.25	968.74	774.51	978.81	775.46	981.2	775.71
983.59	776.06	984.34	776.17	986.02	776.3	988.01	776.29	988.37	776.29
988.82	776.28	993.28	776.36	1001.07	777.66	1017.47	780.32	1026.92	781.16
1034.34	781.37	1043.1	782.24	1045.26	782.47	1056.12	783.54	1060.85	784.14
1063.8	784.38	1069.14	784.74	1081.26	787.66	1088.79	788.6	1094.71	789.7
1094.85	789.71	1095.18	789.68	1095.49	789.66	1101.18	789.28	1105.32	788.65
1108.82	788	1110.09	787.85	1116.62	786.91	1122.61	786.71	1130.46	786.32
1148.11	785.73	1161.87	785.47	1175.86	785.75	1188.22	786.32	1198.45	786.55
1202.44	786.21	1230.58	783.78	1238.61	783.16	1272.25	780.79	1277.28	780.64
1282.75	780.17	1288.79	779.21	1291.87	778.51	1293.63	778.14	1303.88	775.13
1313.58	772.62	1316.42	771.99	1318.38	771.99	1366.97	771.99	1377.92	771.99
1385.09	773.49	1397.21	776.14	1400.96	776.92	1414.88	779.32	1423.12	779.29
1434.36	779.28	1453.05	778.85	1464.21	776.93	1469.12	776.14	1473.49	775.01
1476.94	773.9	1490.1	771.66	1499.76	770.47	1503.12	770.29	1510.01	769.74
1514.46	769.69	1516.8	769.59	1520.33	769.53	1527.24	769.34	1529.78	769.39
1548.26	769.83	1549.88	769.95	1552.13	770.03	1557.8	770.34	1557.89	770.36
1561.63	771.47	1562.34	771.51	1574.09	771.81	1576.04	773.28	1577.27	774.73
1582.84	776.41	1587.72	777.67	1591.02	777.97	1596.16	778.24	1619.57	784.9
1626.99	786.43	1638.2	787.9	1638.92	787.9	1652.64	787.02	1669.74	787.29
1677.64	786.92	1680.98	786.78	1683.36	786.82	1684.97	786.86	1691.09	785.93
1701.18	784.31	1716.07	782.74	1728.03	780.15	1752.84	775.26	1752.93	775.24
1753.03	775.23	1774.97	771.75	1779.56	771.52	1784.2	771.91	1789.91	772.42
1792.82	773.2	1807.57	773.15	1807.89	773.04	1808.89	773.09	1809.96	773.09
1811.58	772.96	1822.09	772.19	1827.14	771.77	1837.21	768.3	1837.23	768.29
1837.26	768.28	1837.28	768.28	1850.54	764.21	1852.16	763.37	1852.73	763.32
1857.14	762.91	1861.08	762.54	1871.21	760.77	1876.94	759.76	1881.62	759.77
1883.52	758.8	1888.35	757.17	1897.88	752.2	1906.26	748.65	1915	740.6
1928	739.59	1940	740.6	1949.35	748.43	1951.61	749.72	1954.25	751.77
1956.48	753.74	1970.78	759.18	1972.15	759.26	1979.2	759.65	1989.21	760.21
1991.14	760.32	2001.15	761.92	2013.22	763.36	2025.64	764.46	2035.84	764.85
2043.48	765.56	2049.24	766.1	2056.95	766.71	2065.8	768.23	2070.1	768.78
2081.6	770.49	2091.23	771.56	2099	772.95	2113.6	775.06	2117.07	775.67
2119.61	776.2	2123.93	776.92	2135.4	777.82	2149.81	779.39	2161.37	781.7
2169.25	783.22	2172.65	783.74	2186.54	785.27	2201.33	786.88	2204	787.01
2210.88	787.85	2217.05	788.58	2223.23	788.74	2223.27	788.74	2246.16	787.69

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 2248.98  787.56 2256.89  787.17 2269.16  786.46    2285  784.06 2291.73  783.74
 2302.45  783.76  2307.2  782.23 2313.31     781 2315.11   779.5 2319.64  776.14
 2326.81  772.27 2337.54  766.59 2342.08  764.33 2346.47  762.29 2352.35  761.44
 2363.43  760.76 2365.08  760.64 2367.54  760.53 2373.38  759.43 2379.27  758.62
 2380.23  758.73 2381.95  759.01 2382.24  759.05 2382.99  759.19 2384.29  759.42
 2387.57  759.92 2396.99  762.43 2407.08  766.33 2409.44  767.23 2412.68  769.31
 2416.88  771.68 2420.27  773.38 2428.11  775.79 2435.51  777.65 2441.94   778.8
 2447.21  780.29 2449.27  780.44 2453.44  780.71 2465.43  782.71 2479.02  782.42
 2488.49  781.86 2493.82   781.5 2499.98  780.96 2502.08  780.68 2504.19  780.41
 2508.39  779.86 2509.13  779.76 2511.18  778.32 2520.57   773.3  2520.9  773.18
    2521  773.18 2539.93  769.46 2541.12   769.5 2548.98  768.89 2557.95  768.32
 2574.94  765.88 2576.18   766.3  2576.7  766.43 2579.07  767.17 2593.28  771.36
 2599.12   773.3 2605.96  774.79 2616.44  775.06 2625.04   773.3 2626.01  773.17
 2627.54  772.94 2636.61  771.38 2639.37  770.62 2643.73  772.12 2647.22   773.3
 2650.26  774.65 2658.08   778.9 2665.05  783.06 2669.83  783.43 2678.24  784.15
 2687.33   784.3  2700.5  784.33 2703.75  784.35 2706.87  784.25 2718.07  783.88
 2723.28  781.49 2723.48  781.41  2723.7  781.33 2727.16  780.07 2737.49  780.66
 2737.69  780.67  2738.1   780.7 2742.11  781.27  2743.2  781.33 2753.78  782.64
 2756.03  782.82 2759.07  783.45 2763.75  783.17 2767.82   782.9 2777.06  783.23
 2792.11  784.17 2796.96  783.99 2818.44  784.29  2906.3  784.23 2907.84  784.22
 2911.91  784.23    2964  786.42 2985.02  787.19 3004.06  787.67 3017.56  787.83
 3027.15   787.6 3052.83  787.09 3066.91     785 3068.03  784.78 3117.74  785.22
 3169.37  785.46 3180.01  785.26 3210.35  785.92 3219.22  786.01 3224.12  786.51
 3245.89   787.3 3250.77  787.49 3251.48   787.5  3252.7  787.44 3259.85  787.07
 3276.08  786.14 3281.19  786.14 3326.58  786.66 3341.07  789.13 3344.43  789.63
 3351.46  789.11 3377.97  787.55 3403.85  787.51 3435.16  787.92 3520.62   789.3
 3536.15  789.57 3542.64  789.77 3636.34  791.47 3644.12  791.71  3648.4  791.93
 3671.68  793.34 3674.07  793.58 3677.88  794.04 3695.49   796.3 3699.76  796.13
 3703.19  796.05 3705.63  796.26 3711.31  796.75 3723.56  800.78  3732.8  803.35
 3743.56  807.76 3756.76  813.05 3761.17  814.24 3767.95  814.59 3768.13   814.6
 3769.92   814.7 3778.71  815.18 3798.25  822.75 3799.69  823.39 3802.57  824.46
  3804.5  825.43 3819.42  831.06 3825.31  833.35 3826.66  833.35  3840.8  837.28
 3853.47  841.53 3867.81  849.35 3869.81  850.18 3871.06  850.49  3887.9  853.24
 3888.72  853.43 3902.42  856.66 3904.65  857.16 3906.33  857.46 3910.74  858.26

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .148  677.07    .072 1881.62    .042 1972.15     .15 2678.24    .072
 3677.88     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1881.62 1972.15            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  127.49  322.16  799.92       T
  558.68 1700.44  799.89       T
 2225.11  3763.7   801.1       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	770.11	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	769.71	E.G. Elev (ft)	770.10	770.07
Q Total (cfs)	13200.00	W.S. Elev (ft)	769.69	769.66
Q Bridge (cfs)	2490.28	Crit W.S. (ft)	763.03	763.04
Q Weir (cfs)		Max Chl Dpth (ft)	30.10	30.07
Weir Sta Lft (ft)		Vel Total (ft/s)	3.58	3.59
Weir Sta Rgt (ft)		Flow Area (sq ft)	3684.94	3673.24
Weir Submerg		Froude # Chl	0.12	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	27794.98	27687.76
Min El Weir Flow (ft)	753.12	Hydr Depth (ft)	9.13	9.11
Min El Prs (ft)	756.00	W.P. Total (ft)	500.87	500.43
Delta EG (ft)	0.05	Conv. Total (cfs)	264457.2	264264.8
Delta WS (ft)	0.05	Top Width (ft)	845.38	840.99
BR Open Area (sq ft)	464.65	Frctn Loss (ft)	0.03	0.01
BR Open Vel (ft/s)	5.36	C & E Loss (ft)	0.00	0.00
Coef of Q		Shear Total (lb/sq ft)	1.14	1.14
Br Sel Method	Energy only	Power Total (lb/ft s)	4.10	4.11

Note: The weir over a bridge is submerged, the energy answer was used.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	774.17	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	773.60	E.G. Elev (ft)	774.13	774.11
Q Total (cfs)	20300.00	W.S. Elev (ft)	773.66	773.63
Q Bridge (cfs)	2266.50	Crit W.S. (ft)	765.12	765.11
Q Weir (cfs)		Max Chl Dpth (ft)	34.07	34.04
Weir Sta Lft (ft)		Vel Total (ft/s)	3.71	3.72
Weir Sta Rgt (ft)		Flow Area (sq ft)	5467.45	5455.42
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	47013.61	46863.73
Min El Weir Flow (ft)	753.12	Hydr Depth (ft)	10.59	10.47
Min El Prs (ft)	756.00	W.P. Total (ft)	616.22	621.04
Delta EG (ft)	0.09	Conv. Total (cfs)	433808.6	431834.0
Delta WS (ft)	0.09	Top Width (ft)	1250.17	1248.16
BR Open Area (sq ft)	464.65	Frctn Loss (ft)	0.03	0.01
BR Open Vel (ft/s)	4.88	C & E Loss (ft)	0.00	0.01
Coef of Q		Shear Total (lb/sq ft)	1.21	1.21
Br Sel Method	Energy only	Power Total (lb/ft s)	4.50	4.51

Note: The weir over a bridge is submerged, the energy answer was used.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	777.01	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	776.36	E.G. Elev (ft)	776.95	776.92
Q Total (cfs)	26320.00	W.S. Elev (ft)	776.47	776.45
Q Bridge (cfs)	2075.01	Crit W.S. (ft)	766.42	766.40
Q Weir (cfs)		Max Chl Dpth (ft)	36.88	36.86
Weir Sta Lft (ft)		Vel Total (ft/s)	3.77	3.76
Weir Sta Rgt (ft)		Flow Area (sq ft)	6975.01	6996.44
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	65416.48	65291.65
Min El Weir Flow (ft)	753.12	Hydr Depth (ft)	12.61	12.36
Min El Prs (ft)	756.00	W.P. Total (ft)	654.65	667.74

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* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *   605010.2  *   601546.5  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *    1476.70  *    1475.02  *
* BR Open Area (sq ft)   *     464.65  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.47  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.26  *       1.25  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.75  *       4.71  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     780.18  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     779.44  * E.G. Elev (ft)         *     780.09  *     780.07  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     779.60  *     779.57  *
* Q Bridge (cfs)         *    1951.28  * Crit W.S. (ft)         *     767.94  *     767.90  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.01  *      39.98  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.86  *       3.84  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8798.55  *    8862.01  *
* Weir Submerg           *             * Froude # Chl           *       0.11  *       0.11  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   91303.73  *   91294.06  *
* Min El Weir Flow (ft)  *     753.12  * Hydr Depth (ft)        *      14.26  *      13.74  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *     719.49  *     747.94  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *   820034.0  *   810962.7  *
* Delta WS (ft)          *       0.16  * Top Width (ft)         *    1735.84  *    1733.95  *
* BR Open Area (sq ft)   *     464.65  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.20  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.31  *       1.30  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.07  *       4.99  *
*********************************************************************************************

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations.
         However, the error was small enough that the solution was treated as valid.
Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     783.96  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     783.15  * E.G. Elev (ft)         *     783.86  *     783.84  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     783.36  *     783.34  *
* Q Bridge (cfs)         *    1803.03  * Crit W.S. (ft)         *     769.66  *     769.63  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.77  *      43.75  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.98  *       3.90  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11187.27  *   11404.45  *
* Weir Submerg           *             * Froude # Chl           *       0.11  *       0.11  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  130509.70  *  131083.20  *
* Min El Weir Flow (ft)  *     753.12  * Hydr Depth (ft)        *      17.03  *      16.38  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *     760.13  *     799.75  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *  1150319.0  *  1145135.0  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *    2098.01  *    2096.25  *
* BR Open Area (sq ft)   *     464.65  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       3.88  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.38  *       1.34  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.47  *       5.25  *
*********************************************************************************************

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations.
         However, the error was small enough that the solution was treated as valid.
Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
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0.7 or greater than 1.4. This may indicate the need for additional cross sections.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	786.58	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	785.67	E.G. Elev (ft)	786.46	786.43
Q Total (cfs)	53690.00	W.S. Elev (ft)	785.92	785.91
Q Bridge (cfs)	1777.17	Crit W.S. (ft)	770.99	770.96
Q Weir (cfs)		Max Chl Dpth (ft)	46.33	46.32
Weir Sta Lft (ft)		Vel Total (ft/s)	4.15	4.05
Weir Sta Rgt (ft)		Flow Area (sq ft)	12923.91	13243.19
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	163142.10	164422.10
Min El Weir Flow (ft)	753.12	Hydr Depth (ft)	18.51	18.18
Min El Prs (ft)	756.00	W.P. Total (ft)	801.86	832.29
Delta EG (ft)	0.19	Conv. Total (cfs)	1400931.0	1412757.0
Delta WS (ft)	0.20	Top Width (ft)	2649.84	2648.74
BR Open Area (sq ft)	464.65	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	3.82	C & E Loss (ft)	0.00	0.04
Coef of Q		Shear Total (lb/sq ft)	1.48	1.43
Br Sel Method	Energy only	Power Total (lb/ft s)	6.14	5.82

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations. However, the error was small enough that the solution was treated as valid.
Note: The weir over a bridge is submerged, the energy answer was used.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	788.67	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	787.68	E.G. Elev (ft)	788.53	788.51
Q Total (cfs)	62000.00	W.S. Elev (ft)	787.96	787.96
Q Bridge (cfs)	1761.81	Crit W.S. (ft)	771.78	771.78
Q Weir (cfs)		Max Chl Dpth (ft)	48.37	48.37
Weir Sta Lft (ft)		Vel Total (ft/s)	4.31	4.20
Weir Sta Rgt (ft)		Flow Area (sq ft)	14383.34	14757.52
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	192716.80	194712.70
Min El Weir Flow (ft)	753.12	Hydr Depth (ft)	19.81	19.73
Min El Prs (ft)	756.00	W.P. Total (ft)	829.71	851.80
Delta EG (ft)	0.21	Conv. Total (cfs)	1627343.0	1653177.0
Delta WS (ft)	0.20	Top Width (ft)	3139.62	3139.69
BR Open Area (sq ft)	464.65	Frctn Loss (ft)	0.02	0.01
BR Open Vel (ft/s)	3.79	C & E Loss (ft)	0.01	0.04
Coef of Q		Shear Total (lb/sq ft)	1.57	1.52
Br Sel Method	Energy only	Power Total (lb/ft s)	6.77	6.39

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations. However, the error was small enough that the solution was treated as valid.
Note: The weir over a bridge is submerged, the energy answer was used.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	791.42	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	790.34	E.G. Elev (ft)	791.26	791.24
Q Total (cfs)	74720.00	W.S. Elev (ft)	790.66	790.66
Q Bridge (cfs)	1744.02	Crit W.S. (ft)	774.65	774.84
Q Weir (cfs)		Max Chl Dpth (ft)	51.07	51.07
Weir Sta Lft (ft)		Vel Total (ft/s)	4.57	4.45
Weir Sta Rgt (ft)		Flow Area (sq ft)	16348.39	16799.14
Weir Submerg		Froude # Chl	0.11	0.11
Weir Max Depth (ft)		Specif Force (cu ft)	236742.50	239794.30
Min El Weir Flow (ft)	753.12	Hydr Depth (ft)	22.38	22.07
Min El Prs (ft)	756.00	W.P. Total (ft)	834.20	865.11
Delta EG (ft)	0.23	Conv. Total (cfs)	1977921.0	2004908.0
Delta WS (ft)	0.23	Top Width (ft)	3387.22	3387.23
BR Open Area (sq ft)	464.65	Frctn Loss (ft)	0.02	0.01

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* BR Open Vel (ft/s)     *       3.75  * C & E Loss (ft)        *       0.01  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.75  *       1.68  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.98  *       7.49  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     781.65  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     780.88  * E.G. Elev (ft)         *     781.56  *     781.54  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     781.06  *     781.03  *
* Q Bridge (cfs)         *    1889.07  * Crit W.S. (ft)         *     768.59  *     768.55  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.47  *      41.44  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.91  *       3.87  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9711.05  *    9828.60  *
* Weir Submerg           *             * Froude # Chl           *       0.11  *       0.11  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  105471.50  *  105589.90  *
* Min El Weir Flow (ft)  *     753.12  * Hydr Depth (ft)        *      15.38  *      14.66  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *     734.11  *     773.70  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *   942743.6  *   930327.9  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *    1894.51  *    1892.22  *
* BR Open Area (sq ft)   *     464.65  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.07  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.34  *       1.32  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.25  *       5.12  *
*********************************************************************************************

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations.
         However, the error was small enough that the solution was treated as valid.
Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 15.876

INPUT
Description: U/S of Golf Bridge 2.  Ineffective areas for local drainage
             ditches.
Station Elevation Data    num=     495
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  833.53    7.92  833.17   11.76  832.83   15.82  832.66   18.86  832.56
   22.64  832.54    31.9  832.76   44.02  832.13   58.01  832.13   61.42  832.13
   67.98  832.13   79.22  831.29   84.95  830.55    88.7   830.3   92.66   830.2
  101.68  829.56  104.25   829.3  114.29   827.8  117.92  827.22  119.18  826.83
  123.88  825.28  127.21  823.66  129.54  825.24  132.01  827.13  135.09     827
  142.88  826.22  151.83  825.72   157.5   824.9  160.67  819.43  162.66  815.26
   176.5  809.34  176.58  809.31  176.62  809.29  176.67  809.27  184.64  804.11
  194.22  797.99   197.5   796.1  203.51  791.22  210.88  785.55  218.13  783.15
  224.72  781.26  228.35  778.86  235.54  773.55  248.76  766.05  251.55  764.26
  262.46  760.86  269.93  758.09  271.22  758.98  275.27  760.56  285.95   765.9
  301.75  772.31  310.51  775.05  310.83  775.15  312.33  775.15   317.3  775.15
  317.77  775.15  320.74  774.79  330.12  773.67  350.78  768.36  351.04   768.3
   351.3  768.22  364.63  764.26  376.65   762.7  388.31  760.91  395.28  760.31
  397.19  760.31  402.88  760.03  412.05  759.73     419  759.38  428.05  759.32
  433.99  758.78  438.32  758.28   443.8  756.68  453.83  754.54  455.39  754.38
  458.77  755.88  464.48  755.16  480.47  753.85  480.51  753.84  480.61  753.84
  483.57  753.11  491.03   757.9  497.08  761.96  499.95  764.03  500.37  764.26
  511.72  774.64  516.08  778.18  527.36  778.68  536.51  779.14  546.11  779.49
  555.42     780  562.38  780.38  567.51  776.72  578.61  774.62  586.36  774.07
  592.75  775.14  605.77  780.09  608.37  780.13  610.07  780.09  638.71  779.87
  651.97  779.79   652.8  779.76  654.61  779.29  661.34  777.44  665.51  776.83
  677.07  775.11  694.85  769.61  699.13  768.31  705.49  767.03  729.28  762.29
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736.02	762.2	744.7	761.86	759.08	761.89	762.43	761.54	763.33	761.48
764.69	761.48	766.34	761.48	772.06	761.48	814.12	761.48	814.41	761.48
818.77	761.75	820.95	762.06	829.35	764.51	830.9	764.91	834.73	765.58
837.36	766.32	843.47	766.84	851.38	766.02	859.25	767.4	863.22	768.31
871.99	769.47	874.94	769.77	875.87	769.66	876.75	769.76	880.97	769.25
884.57	768.96	891.06	768.48	892.08	768.3	899.2	768.31	899.32	768.31
908.89	768.32	910.4	768.31	920.83	769	930.2	770.09	943.74	771.67
944.89	771.82	945.23	771.86	947.42	772.01	947.43	772.01	947.71	772.03
955.18	772.61	967.2	774.25	968.74	774.51	978.81	775.46	981.2	775.71
983.59	776.06	984.34	776.17	986.02	776.3	988.01	776.29	988.37	776.29
988.82	776.28	993.28	776.36	1001.07	777.66	1017.47	780.32	1026.92	781.16
1034.34	781.37	1043.1	782.24	1045.26	782.47	1056.12	783.54	1060.85	784.14
1063.8	784.38	1069.14	784.74	1081.26	787.66	1088.79	788.6	1094.71	789.7
1094.85	789.71	1095.18	789.68	1095.49	789.66	1101.18	789.28	1105.32	788.65
1108.82	788	1110.09	787.85	1116.62	786.91	1122.61	786.71	1130.46	786.32
1148.11	785.73	1161.87	785.47	1175.86	785.75	1188.22	786.32	1198.45	786.55
1202.44	786.21	1230.58	783.78	1238.61	783.16	1272.25	780.79	1277.28	780.64
1282.75	780.17	1288.79	779.21	1291.87	778.51	1293.63	778.14	1303.88	775.13
1313.58	772.62	1316.42	771.99	1318.38	771.99	1366.97	771.99	1377.92	771.99
1385.09	773.49	1397.21	776.14	1400.96	776.92	1414.88	779.32	1423.12	779.29
1434.36	779.28	1453.05	778.85	1464.21	776.93	1469.12	776.14	1473.49	775.01
1476.94	773.9	1490.1	771.66	1499.76	770.47	1503.12	770.29	1510.01	769.74
1514.46	769.69	1516.8	769.59	1520.33	769.53	1527.24	769.34	1529.78	769.39
1548.26	769.83	1549.88	769.95	1552.13	770.03	1557.8	770.34	1557.89	770.36
1561.63	771.47	1562.34	771.51	1574.09	771.81	1576.04	773.28	1577.27	774.73
1582.84	776.41	1587.72	777.67	1591.02	777.97	1596.16	778.24	1619.57	784.9
1626.99	786.43	1638.2	787.9	1638.92	787.9	1652.64	787.02	1669.74	787.29
1677.64	786.92	1680.98	786.78	1683.36	786.82	1684.97	786.86	1691.09	785.93
1701.18	784.31	1716.07	782.74	1728.03	780.15	1752.84	775.26	1752.93	775.24
1753.03	775.23	1774.97	771.75	1779.56	771.52	1784.2	771.91	1789.91	772.42
1792.82	773.2	1807.57	773.15	1807.89	773.04	1808.89	773.09	1809.96	773.09
1811.58	772.96	1822.09	772.19	1827.14	771.77	1837.21	768.3	1837.23	768.29
1837.26	768.28	1837.28	768.28	1850.54	764.21	1852.16	763.37	1852.73	763.32
1857.14	762.91	1861.08	762.54	1871.21	760.77	1876.94	759.76	1881.62	759.77
1883.52	758.8	1888.35	757.17	1897.88	752.2	1906.26	748.65	1915	740.6
1928	739.59	1940	740.6	1949.35	748.43	1951.61	749.72	1954.25	751.77
1956.48	753.74	1970.78	759.18	1972.15	759.26	1979.2	759.65	1989.21	760.21
1991.14	760.32	2001.15	761.92	2013.22	763.36	2025.64	764.46	2035.84	764.85
2043.48	765.56	2049.24	766.1	2056.95	766.71	2065.8	768.23	2070.1	768.78
2081.6	770.49	2091.23	771.56	2099	772.95	2113.6	775.06	2117.07	775.67
2119.61	776.2	2123.93	776.92	2135.4	777.82	2149.81	779.39	2161.37	781.7
2169.25	783.22	2172.65	783.74	2186.54	785.27	2201.33	786.88	2204	787.01
2210.88	787.85	2217.05	788.58	2223.23	788.74	2223.27	788.74	2246.16	787.69
2248.98	787.56	2256.89	787.17	2269.16	786.46	2285	784.06	2291.73	783.74
2302.45	783.76	2307.2	782.23	2313.31	781	2315.11	779.5	2319.64	776.14
2326.81	772.27	2337.54	766.59	2342.08	764.33	2346.47	762.29	2352.35	761.44
2363.43	760.76	2365.08	760.64	2367.54	760.53	2373.38	759.43	2379.27	758.62
2380.23	758.73	2381.95	759.01	2382.24	759.05	2382.99	759.19	2384.29	759.42
2387.57	759.92	2396.99	762.43	2407.08	766.33	2409.44	767.23	2412.68	769.31
2416.88	771.68	2420.27	773.38	2428.11	775.79	2435.51	777.65	2441.94	778.8
2447.21	780.29	2449.27	780.44	2453.44	780.71	2465.43	782.71	2479.02	782.42
2488.49	781.86	2493.82	781.5	2499.98	780.96	2502.08	780.68	2504.19	780.41
2508.39	779.86	2509.13	779.76	2511.18	778.32	2520.57	773.3	2520.9	773.18
2521	773.18	2539.93	769.46	2541.12	769.5	2548.98	768.89	2557.95	768.32
2574.94	765.88	2576.18	766.3	2576.7	766.43	2579.07	767.17	2593.28	771.36
2599.12	773.3	2605.96	774.79	2616.44	775.06	2625.04	773.3	2626.01	773.17
2627.54	772.94	2636.61	771.38	2639.37	770.62	2643.73	772.12	2647.22	773.3
2650.26	774.65	2658.08	778.9	2665.05	783.06	2669.83	783.43	2678.24	784.15
2687.33	784.3	2700.5	784.33	2703.75	784.35	2706.87	784.25	2718.07	783.88
2723.28	781.49	2723.48	781.41	2723.7	781.33	2727.16	780.07	2737.49	780.66
2737.69	780.67	2738.1	780.7	2742.11	781.27	2743.2	781.33	2753.78	782.64
2756.03	782.82	2759.07	783.45	2763.75	783.17	2767.82	782.9	2777.06	783.23
2792.11	784.17	2796.96	783.99	2818.44	784.29	2906.3	784.23	2907.84	784.22
2911.91	784.23	2964	786.42	2985.02	787.19	3004.06	787.67	3017.56	787.83
3027.15	787.6	3052.83	787.09	3066.91	785	3068.03	784.78	3117.74	785.22
3169.37	785.46	3180.01	785.26	3210.35	785.92	3219.22	786.01	3224.12	786.51
3245.89	787.3	3250.77	787.49	3251.48	787.5	3252.7	787.44	3259.85	787.07
3276.08	786.14	3281.19	786.14	3326.58	786.66	3341.07	789.13	3344.43	789.63
3351.46	789.11	3377.97	787.55	3403.85	787.51	3435.16	787.92	3520.62	789.3
3536.15	789.57	3542.64	789.77	3636.34	791.47	3644.12	791.71	3648.4	791.93
3671.68	793.34	3674.07	793.58	3677.88	794.04	3695.49	796.3	3699.76	796.13
3703.19	796.05	3705.63	796.26	3711.31	796.75	3723.56	800.78	3732.8	803.35
3743.56	807.76	3756.76	813.05	3761.17	814.24	3767.95	814.59	3768.13	814.6
3769.92	814.7	3778.71	815.18	3798.25	822.75	3799.69	823.39	3802.57	824.46
3804.5	825.43	3819.42	831.06	3825.31	833.35	3826.66	833.35	3840.8	837.28
3853.47	841.53	3867.81	849.35	3869.81	850.18	3871.06	850.49	3887.9	853.24

```
 3888.72  853.43 3902.42  856.66 3904.65  857.16 3906.33  857.46 3910.74  858.26

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .148  677.07    .072 1881.62    .042 1972.15     .15 2678.24    .072
 3677.88     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1881.62 1972.15            19.12  764.24  724.32              .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  127.49  322.16  799.92       T
  558.68 1700.44  799.89       T
 2225.11  3763.7   801.1       T

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  770.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.40  * Wt. n-Val.             *   0.131  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  769.66  * Reach Len. (ft)        *   19.12  *  764.24  *  724.32  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 1868.17  * 1909.92  *  587.91  *
* E.G. Slope (ft/ft)      *0.000508  * Area (sq ft)           * 3272.62  * 1909.92  * 1251.53  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             * 2034.09  *10750.58  *  415.33  *
* Top Width (ft)          *  839.87  * Top Width (ft)         *  515.38  *   90.53  *  233.96  *
* Vel Total (ft/s)        *    3.02  * Avg. Vel. (ft/s)       *    1.09  *    5.63  *    0.71  *
* Max Chl Dpth (ft)       *   30.07  * Hydr. Depth (ft)       *    8.94  *   21.10  *    5.66  *
* Conv. Total (cfs)       *585675.8  * Conv. (cfs)            * 90251.2  *476996.6  * 18428.0  *
* Length Wtd. (ft)        *  627.84  * Wetted Per. (ft)       *  217.74  *  101.83  *  104.45  *
* Min Ch El (ft)          *  739.59  * Shear (lb/sq ft)       *    0.27  *    0.59  *    0.18  *
* Alpha                   *    2.84  * Stream Power (lb/ft s) *    0.30  *    3.35  *    0.13  *
* Frctn Loss (ft)         *    0.39  * Cum Volume (acre-ft)   *  215.85  * 4688.14  *  251.21  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *   41.62  *  381.45  *   61.76  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  774.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.58  * Wt. n-Val.             *   0.131  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  773.51  * Reach Len. (ft)        *   19.12  *  764.24  *  724.32  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 2787.87  * 2258.75  * 1042.07  *
* E.G. Slope (ft/ft)      *0.000613  * Area (sq ft)           * 5798.37  * 2258.75  * 2328.97  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 3666.27  *15618.51  * 1015.22  *
* Top Width (ft)          * 1240.03  * Top Width (ft)         *  819.02  *   90.53  *  330.48  *
* Vel Total (ft/s)        *    3.33  * Avg. Vel. (ft/s)       *    1.32  *    6.91  *    0.97  *
* Max Chl Dpth (ft)       *   33.92  * Hydr. Depth (ft)       *    9.37  *   24.95  *    7.97  *
* Conv. Total (cfs)       *819961.9  * Conv. (cfs)            *148088.7  *630866.3  * 41006.9  *
* Length Wtd. (ft)        *  584.99  * Wetted Per. (ft)       *  309.03  *  101.83  *  131.62  *
* Min Ch El (ft)          *  739.59  * Shear (lb/sq ft)       *    0.35  *    0.85  *    0.30  *
* Alpha                   *    3.34  * Stream Power (lb/ft s) *    0.45  *    5.87  *    0.30  *
* Frctn Loss (ft)         *    0.40  * Cum Volume (acre-ft)   *  431.06  * 6348.93  *  526.67  *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)         *   71.22  *  420.95  *   90.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  776.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.66  * Wt. n-Val.             *   0.125  *   0.042  *   0.150  *
* W.S. Elev (ft)          *  776.23  * Reach Len. (ft)        *   19.12  *  764.24  *  724.32  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 3643.96  * 2505.48  * 1423.03  *
* E.G. Slope (ft/ft)      *0.000646  * Area (sq ft)           * 8234.68  * 2505.48  * 3328.92  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             * 5651.77  *19054.23  * 1614.00  *
* Top Width (ft)          * 1454.67  * Top Width (ft)         *  968.00  *   90.53  *  396.13  *
* Vel Total (ft/s)        *    3.48  * Avg. Vel. (ft/s)       *    1.55  *    7.61  *    1.13  *
* Max Chl Dpth (ft)       *   36.64  * Hydr. Depth (ft)       *   11.20  *   27.68  *    9.64  *
* Conv. Total (cfs)       *1035782.0  * Conv. (cfs)            *222416.3  *749849.1  * 63516.5  *
* Length Wtd. (ft)        *  555.23  * Wetted Per. (ft)       *  338.12  *  101.83  *  148.79  *
* Min Ch El (ft)          *  739.59  * Shear (lb/sq ft)       *    0.43  *    0.99  *    0.39  *
* Alpha                   *    3.52  * Stream Power (lb/ft s) *    0.67  *    7.54  *    0.44  *
* Frctn Loss (ft)         *    0.39  * Cum Volume (acre-ft)   *  638.54  * 7723.70  *  873.69  *
* C & E Loss (ft)         *    0.11  * Cum SA (acres)         *   94.02  *  448.77  *  161.55  *
*****************************************************************************************
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Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	780.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.	0.120	0.042	0.150
W.S. Elev (ft)	779.28	Reach Len. (ft)	19.12	764.24	724.32
Crit W.S. (ft)		Flow Area (sq ft)	4675.12	2780.91	1915.02
E.G. Slope (ft/ft)	0.000682	Area (sq ft)	11425.44	2780.91	4620.35
Q Total (cfs)	34000.00	Flow (cfs)	8288.74	23296.48	2414.78
Top Width (ft)	1693.66	Top Width (ft)	1149.40	90.53	453.74
Vel Total (ft/s)	3.63	Avg. Vel. (ft/s)	1.77	8.38	1.26
Max Chl Dpth (ft)	39.69	Hydr. Depth (ft)	12.73	30.72	10.84
Conv. Total (cfs)	1302135.0	Conv. (cfs)	317442.7	892210.6	92481.5
Length Wtd. (ft)	528.81	Wetted Per. (ft)	381.15	101.83	177.91
Min Ch El (ft)	739.59	Shear (lb/sq ft)	0.52	1.16	0.46
Alpha	3.72	Stream Power (lb/ft s)	0.93	9.74	0.58
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	954.45	9154.22	1478.52
C & E Loss (ft)	0.13	Cum SA (acres)	130.15	471.50	240.84

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	783.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.116	0.042	0.150
W.S. Elev (ft)	782.97	Reach Len. (ft)	19.12	764.24	724.32
Crit W.S. (ft)		Flow Area (sq ft)	6123.01	3114.85	2602.44
E.G. Slope (ft/ft)	0.000686	Area (sq ft)	16182.46	3114.85	6515.18
Q Total (cfs)	44500.00	Flow (cfs)	12504.77	28227.68	3767.55
Top Width (ft)	2056.43	Top Width (ft)	1370.62	90.53	595.27
Vel Total (ft/s)	3.76	Avg. Vel. (ft/s)	2.04	9.06	1.45
Max Chl Dpth (ft)	43.38	Hydr. Depth (ft)	15.15	34.41	13.29
Conv. Total (cfs)	1699167.0	Conv. (cfs)	477476.1	1077832.0	143858.3
Length Wtd. (ft)	501.08	Wetted Per. (ft)	418.49	101.83	197.43
Min Ch El (ft)	739.59	Shear (lb/sq ft)	0.63	1.31	0.56
Alpha	3.78	Stream Power (lb/ft s)	1.28	11.87	0.82
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	1824.72	11428.99	3213.31
C & E Loss (ft)	0.14	Cum SA (acres)	331.31	499.51	591.77

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	786.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.	0.115	0.042	0.150
W.S. Elev (ft)	785.48	Reach Len. (ft)	19.12	764.24	724.32
Crit W.S. (ft)		Flow Area (sq ft)	7161.99	3342.11	3117.54
E.G. Slope (ft/ft)	0.000714	Area (sq ft)	19741.66	3342.11	8422.71
Q Total (cfs)	53690.00	Flow (cfs)	16432.08	32396.04	4861.88
Top Width (ft)	2559.85	Top Width (ft)	1460.88	90.53	1008.44
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)	2.29	9.69	1.56
Max Chl Dpth (ft)	45.89	Hydr. Depth (ft)	17.15	36.92	14.41
Conv. Total (cfs)	2008752.0	Conv. (cfs)	614787.9	1212062.0	181901.8
Length Wtd. (ft)	484.67	Wetted Per. (ft)	432.06	101.83	218.09
Min Ch El (ft)	739.59	Shear (lb/sq ft)	0.74	1.46	0.64
Alpha	3.77	Stream Power (lb/ft s)	1.70	14.19	0.99
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	2933.84	12766.77	5144.69
C & E Loss (ft)	0.15	Cum SA (acres)	509.89	506.61	941.12

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	788.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.	0.113	0.042	0.150
W.S. Elev (ft)	787.48	Reach Len. (ft)	19.12	764.24	724.32
Crit W.S. (ft)		Flow Area (sq ft)	8000.32	3523.81	3570.82
E.G. Slope (ft/ft)	0.000736	Area (sq ft)	22859.24	3523.81	10695.08
Q Total (cfs)	62000.00	Flow (cfs)	20238.39	35917.68	5843.92
Top Width (ft)	3000.29	Top Width (ft)	1630.75	90.53	1279.02
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)	2.53	10.19	1.64

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* Max Chl Dpth (ft)      *   47.89  * Hydr. Depth (ft)       *   19.15  *   38.92  *   15.15  *
* Conv. Total (cfs)      *2285214.0  * Conv. (cfs)            *745952.6  *1323864.0  *215397.0  *
* Length Wtd. (ft)       *  472.36  * Wetted Per. (ft)       *  432.06  *  101.83  *  237.64  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.85  *    1.59  *    0.69  *
* Alpha                  *    3.71  * Stream Power (lb/ft s) *    2.15  *   16.21  *    1.13  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 3886.22  *13612.49  * 6998.18  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  624.02  *  508.02  * 1291.77  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  791.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.07  * Wt. n-Val.              *   0.112  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  790.11  * Reach Len. (ft)        *   19.12  *  764.24  *  724.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 9096.96  * 3761.49  * 4220.32  *
* E.G. Slope (ft/ft)     *0.000777  * Area (sq ft)           *27216.48  * 3761.49  *14585.71  *
* Q Total (cfs)          *74720.00  * Flow (cfs)              *26009.41  *41141.47  * 7569.12  *
* Top Width (ft)         * 3356.36  * Top Width (ft)         * 1676.67  *   90.53  * 1589.16  *
* Vel Total (ft/s)       *    4.38  * Avg. Vel. (ft/s)       *    2.86  *   10.94  *    1.79  *
* Max Chl Dpth (ft)      *   50.52  * Hydr. Depth (ft)       *   21.78  *   41.55  *   16.68  *
* Conv. Total (cfs)      *2680688.0  * Conv. (cfs)            *933125.1  *1476010.0  *271553.0  *
* Length Wtd. (ft)       *  459.00  * Wetted Per. (ft)       *  432.06  *  101.83  *  254.94  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    1.02  *    1.79  *    0.80  *
* Alpha                  *    3.61  * Stream Power (lb/ft s) *    2.92  *   19.60  *    1.44  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   * 5744.68  *14925.39  *10687.58  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  798.12  *  510.11  * 1643.71  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  781.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.              *   0.118  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  780.69  * Reach Len. (ft)        *   19.12  *  764.24  *  724.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5218.65  * 2909.10  * 2170.78  *
* E.G. Slope (ft/ft)     *0.000695  * Area (sq ft)           *13165.25  * 2909.10  * 5283.92  *
* Q Total (cfs)          *38000.00  * Flow (cfs)              * 9712.95  *25365.02  * 2922.04  *
* Top Width (ft)         * 1867.36  * Top Width (ft)         * 1281.48  *   90.53  *  495.35  *
* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *    1.86  *    8.72  *    1.35  *
* Max Chl Dpth (ft)      *   41.10  * Hydr. Depth (ft)       *   13.29  *   32.13  *   11.79  *
* Conv. Total (cfs)      *1440907.0  * Conv. (cfs)            *368301.3  *961805.8  *110799.6  *
* Length Wtd. (ft)       *  518.54  * Wetted Per. (ft)       *  406.66  *  101.83  *  185.60  *
* Min Ch El (ft)         *  739.59  * Shear (lb/sq ft)       *    0.56  *    1.24  *    0.51  *
* Alpha                  *    3.80  * Stream Power (lb/ft s) *    1.04  *   10.82  *    0.68  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   * 1162.40  * 9913.47  * 1895.33  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  166.92  *  481.87  *  302.21  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 15.731

INPUT
Description: Ineffective areas due to local drainage and golf course topography.
Station Elevation Data    num=     416
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  834.45   47.35  832.13    48.5  831.98   55.57  831.02   55.63  831.02
   59.86  830.59   61.51  830.42   61.54  830.42   61.75   830.4   68.97  829.65
   70.33  829.41   72.24  829.05    80.1  827.89   93.65  825.96   93.71  825.94
   96.44     825   99.76  823.88  101.61  823.24   105.6  824.66   106.8  825.45
  112.99  824.89  114.88  821.41  116.13  819.02  117.47  820.11  121.41   823.3
  122.21  824.04  123.65  823.73  126.62  822.96  129.52  817.72  129.66  817.42
  130.01  817.32  133.54  816.94  133.83  816.05   141.3  812.62  149.81  810.13
  158.67  805.59  161.14  804.11  170.49  797.96  173.03   796.1  179.16  790.41
  181.39  787.92  185.42  784.63  186.37  783.74  196.42  775.85  209.21  768.27
```

215.82	764.26	218.18	763.37	231.84	758.15	237.21	759.64	246.99	764.65
255.46	768.31	259.26	769.84	262.99	771.34	264.83	772.44	266.36	772.89
273.87	775	275.1	775	280.48	775.01	280.77	775.01	283.66	774.7
292.18	773.88	306.43	770.34	314.69	768.3	327.28	765.04	330.11	764.26
337.48	762.99	349.81	760.69	361.82	760.54	361.92	760.54	361.96	760.54
374.57	761.6	380.82	760.42	384.56	759.44	386.29	759.06	391.71	757.94
394.51	757.45	397.31	756.38	398.84	755.89	409.16	752.6	409.2	752.6
409.81	752.66	424.66	754.03	425.12	754.07	425.29	754.08	425.48	754.1
429.63	755.71	441.46	761.92	443.18	763.03	451.35	763.48	465.53	764.07
482.98	764.13	494.21	762.74	513.2	759.25	516.02	757.52	522.57	755.67
529.96	752.89	533.42	752.9	543.55	753.72	551.82	754.03	559.17	755.28
564.15	755.67	566.31	755.81	576.58	756.42	586.03	758.67	586.28	758.73
586.36	758.76	600.82	763.52	603.44	763.98	612.61	765	616.97	765.55
624.66	765.91	632.87	766.66	638.86	766.88	645.7	767.11	652.93	766.86
661.79	765.95	669.31	765.29	676.48	764.3	676.61	764.29	678.21	763.97
685.38	762.53	687.49	761.8	688.65	761.48	695.53	761.48	697.61	761.48
706.29	761.48	709.25	761.48	718.12	761.48	808.46	761.48	815.17	761.48
836.07	761.49	836.58	761.49	839.72	761.49	844.47	762.55	844.82	762.62
845	762.64	845.23	762.65	855.7	763.39	861.03	763.99	866.16	764.42
872.15	765.52	874.97	765.93	887.56	767.35	890.57	767.66	891.01	767.66
895.2	767.24	902.15	768.31	905.69	768.53	908.71	768.47	931.72	772.8
933.71	773.03	934.85	773.05	936.31	772.89	960	769.69	969.38	769.8
997.48	771.44	1000.7	771.59	1003.9	771.67	1005.9	771.76	1023.3	772.66
1035.36	773.18	1041.96	773.54	1049.01	773.79	1056.39	773.97	1057.54	774.03
1058.09	774.05	1079.54	775.08	1084.4	775.88	1094.85	777.02	1097.36	777.22
1100.68	777.17	1118.14	778.06	1130.42	779.52	1134.66	779.44	1139.63	779.34
1146.83	780.05	1148.38	780.14	1156.2	778.46	1160.78	777.66	1163.18	777.32
1163.2	777.32	1165.47	777.74	1168.61	778.16	1170.75	778.75	1174.41	778.62
1180.42	778.21	1189.14	777.83	1203.6	777.36	1224.56	776.25	1232.7	775.05
1252.6	772.46	1256.97	772.08	1266.62	771.38	1280.73	769.8	1292.32	768.14
1304.66	767.22	1318.15	766.2	1323.83	765.76	1335.33	765.54	1344.1	765.68
1349.8	764.7	1352.25	764.34	1356.9	764.34	1362.4	764.34	1404.07	764.33
1413.04	764.33	1433.37	768.1	1434.39	768.29	1434.56	768.32	1441.29	769.66
1446.92	770.32	1465.94	771.84	1478.52	772.34	1492.35	772.37	1517.94	772.38
1552.84	772.43	1566.32	772.75	1582.4	773.55	1584.06	773.77	1592.34	774.18
1603.17	773.03	1607.56	773.19	1611.21	773.36	1616.07	770.53	1616.15	770.48
1626.86	770.18	1626.88	770.18	1630.17	768.97	1633.42	767.68	1638.23	765.85
1641.47	764.37	1670.43	764.37	1687.25	764.37	1692	764.37	1694.13	765
1695.18	765.33	1696.22	765.58	1711.67	769.31	1713.98	769.37	1721.75	769.31
1746.78	770.4	1771.54	771.33	1817.88	770.42	1828.81	770.02	1842.02	769.53
1842.83	769.48	1876.99	769.05	1882.55	768.39	1886.41	768.26	1890.76	768.11
1900.63	767.78	1906.03	767.57	1914.44	768.07	1917.71	768.14	1919.01	768.05
1933.33	766.84	1935.7	766.67	1947.79	765.74	1948.24	765.72	1962.24	764.77
1964.62	764.72	1965.59	764.66	1966.05	764.64	1982.77	764.29	2010.95	763.77
2015.92	763.75	2061.45	764.36	2073.01	764.47	2094.95	764.95	2121.66	765.32
2137.5	764.66	2158.93	763.83	2163.34	761.38	2167.09	759.81	2171.97	758.66
2184.62	755.37	2187.42	754.64	2187.83	754.55	2187.95	754.48	2195.23	752.54
2199.05	750.55	2201.11	749.48	2202.11	748.65	2215	740.33	2230	739.33
2245	740.33	2253.66	748.68	2254.97	749.84	2261.7	755.8	2271.73	758.27
2279.48	758.73	2285.44	762.53	2290.64	765.85	2291.43	766.34	2300.98	773.3
2306.83	776.14	2313.25	778.74	2321.04	781.72	2321.69	782.04	2322.84	782.19
2328.04	782.95	2331.89	782.47	2336.99	781.42	2343.39	781.38	2355.31	774.44
2357.71	774.63	2363.99	775.85	2367.51	773.67	2370.4	772.2	2379.38	773.51
2393.71	774.06	2396.41	774.17	2396.46	774.17	2401.19	775.22	2405.46	776.14
2408.57	777.23	2424.79	784	2429.66	784.19	2438.82	784.75	2466.79	784.69
2474.87	784.72	2481.81	784.86	2502.63	785.25	2510.85	785.31	2516.02	785.28
2517.97	785.27	2523.53	784.46	2523.65	784.47	2527.45	784.71	2540.13	784.78
2543.66	784.83	2553.02	784.99	2554.59	785.02	2555.08	785.03	2568.91	785.04
2578.94	785.52	2585.8	785.66	2589.65	785.71	2599.46	785.89	2615.61	786.39
2623.34	786.24	2633.89	786.12	2646.51	785.94	2677.47	786.22	2700.76	786.33
2714.74	786.23	2716.86	786.22	2721.09	786.19	2729.5	786.23	2741.17	786.15
2744.81	786.19	2757.16	786.14	2777.52	785.9	2786.74	785.77	2790.81	785.71
2793.53	785.73	2831.94	786.29	2848.58	786.77	2858.38	786.81	2878.78	787.32
2916.08	787.27	2938.28	787.69	2986.98	787.8	3024.62	788.03	3083.28	788.43
3091.97	788.48	3136.52	788.77	3139.52	788.78	3149.35	788.94	3202.17	789.41
3214.97	789.75	3225.78	790.08	3233.2	790.17	3287.69	790.52	3295.14	790.49
3302.49	790.04	3346.47	790.18	3355.45	790.23	3369.81	790.26	3415.42	790.49
3443.27	790.88	3494.41	791.53	3517.22	792.53	3527.02	792.98	3531.21	793.15
3534.07	793.31	3539.33	793.47	3561.52	794.68	3579.63	800.57	3587.77	803.35
3596.06	806.92	3609.24	813.34	3622.85	818.71	3628.13	820.79	3632.18	823.39
3638.45	828.1	3647.56	835.38	3647.78	835.54	3647.82	835.57	3647.85	835.59
3652.65	839.11	3655.57	838.24	3658.75	835.96	3665.39	837.99	3680.58	839.77
3682.42	841.51	3684.08	841.97	3690.03	849.7	3694.22	850.46	3697.94	851.49
3707.45	853.33	3714.58	855.48	3721.17	856.24	3729.86	857.87	3747.98	860.4
3760.69	862.18								

```
Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .148  652.93    .072 1982.77     .15 2158.93    .042 2271.73     .15
 2633.89    .072 3561.52     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2158.93 2290.64            81.66  706.84 1091.32             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  137.71  283.83  799.85       T
  486.48 1920.84  799.14       T
  2329.3 3656.21  800.48       T

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  769.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.140  *   0.063  *   0.150  *
* W.S. Elev (ft)         *  769.38  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2608.07  * 2408.81  *    8.95  *
* E.G. Slope (ft/ft)     *0.000794  * Area (sq ft)           * 7044.05  * 2408.81  *    8.95  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 2776.34  *10420.44  *    3.22  *
* Top Width (ft)         * 1349.63  * Top Width (ft)         * 1212.95  *  131.71  *    4.96  *
* Vel Total (ft/s)       *    2.63  * Avg. Vel. (ft/s)       *    1.06  *    4.33  *    0.36  *
* Max Chl Dpth (ft)      *   30.05  * Hydr. Depth (ft)       *    6.30  *   18.29  *    1.80  *
* Conv. Total (cfs)      *468585.4  * Conv. (cfs)            * 98556.9  *369914.1  *   114.5  *
* Length Wtd. (ft)       *  590.27  * Wetted Per. (ft)       *  418.95  *  145.62  *    6.09  *
* Min Ch El (ft)         *  739.33  * Shear (lb/sq ft)       *    0.31  *    0.82  *    0.07  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.33  *    3.55  *    0.03  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  213.59  * 4650.26  *  240.73  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   41.24  *  379.50  *   59.77  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  773.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.135  *   0.063  *   0.150  *
* W.S. Elev (ft)         *  773.33  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4273.13  * 2928.22  *   39.19  *
* E.G. Slope (ft/ft)     *0.000772  * Area (sq ft)           *12784.66  * 2928.22  *   44.78  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 6045.00  *14232.26  *   22.74  *
* Top Width (ft)         * 1852.57  * Top Width (ft)         * 1700.54  *  131.71  *   20.32  *
* Vel Total (ft/s)       *    2.80  * Avg. Vel. (ft/s)       *    1.41  *    4.86  *    0.58  *
* Max Chl Dpth (ft)      *   34.00  * Hydr. Depth (ft)       *    9.93  *   22.23  *    3.77  *
* Conv. Total (cfs)      *730564.9  * Conv. (cfs)            *217549.9  *512196.6  *   818.4  *
* Length Wtd. (ft)       *  549.70  * Wetted Per. (ft)       *  435.33  *  145.62  *   12.81  *
* Min Ch El (ft)         *  739.33  * Shear (lb/sq ft)       *    0.47  *    0.97  *    0.15  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.67  *    4.71  *    0.09  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  426.98  * 6303.43  *  506.94  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   70.66  *  419.00  *   88.04  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  776.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.134  *   0.063  *   0.150  *
* W.S. Elev (ft)         *  776.10  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5487.94  * 3293.82  *   75.98  *
* E.G. Slope (ft/ft)     *0.000766  * Area (sq ft)           *17722.94  * 3293.82  *  177.65  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 9024.87  *17242.96  *   52.17  *
* Top Width (ft)         * 2024.34  * Top Width (ft)         * 1823.69  *  131.71  *   68.94  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.64  *    5.23  *    0.69  *
* Max Chl Dpth (ft)      *   36.77  * Hydr. Depth (ft)       *   12.45  *   25.01  *    4.72  *
* Conv. Total (cfs)      *951199.4  * Conv. (cfs)            *326156.9  *623157.1  *  1885.4  *
* Length Wtd. (ft)       *  529.05  * Wetted Per. (ft)       *  446.02  *  145.62  *   19.16  *
* Min Ch El (ft)         *  739.33  * Shear (lb/sq ft)       *    0.59  *    1.08  *    0.19  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    0.97  *    5.66  *    0.13  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  632.85  * 7672.83  *  844.53  *
```

```
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   93.41  *  446.82  *  157.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  779.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.133  *   0.063  *   0.150  *
* W.S. Elev (ft)         *  779.20  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 6855.38  * 3702.47  *  137.81  *
* E.G. Slope (ft/ft)     *0.000757  * Area (sq ft)           *23568.26  * 3702.47  *  424.70  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *13061.11  *20828.86  *  110.03  *
* Top Width (ft)         * 2163.51  * Top Width (ft)         * 1941.81  *  131.71  *   90.00  *
* Vel Total (ft/s)       *    3.18  * Avg. Vel. (ft/s)       *    1.91  *    5.63  *    0.80  *
* Max Chl Dpth (ft)      *   39.87  * Hydr. Depth (ft)       *   15.55  *   28.11  *    5.78  *
* Conv. Total (cfs)      *1236125.0  * Conv. (cfs)           *474857.5  *757266.8  *  4000.3  *
* Length Wtd. (ft)       *  511.43  * Wetted Per. (ft)       *  446.02  *  145.62  *   27.48  *
* Min Ch El (ft)         *  739.33  * Shear (lb/sq ft)       *    0.73  *    1.20  *    0.24  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    1.38  *    6.76  *    0.19  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  946.77  * 9097.34  * 1436.57  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  129.48  *  469.55  *  236.32  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  783.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.132  *   0.063  *   0.150  *
* W.S. Elev (ft)         *  782.93  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 8498.77  * 4193.57  *  246.48  *
* E.G. Slope (ft/ft)     *0.000753  * Area (sq ft)           *30901.18  * 4193.57  *  822.26  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *18713.95  *25566.61  *  219.43  *
* Top Width (ft)         * 2234.58  * Top Width (ft)         * 1971.53  *  131.71  *  131.34  *
* Vel Total (ft/s)       *    3.44  * Avg. Vel. (ft/s)       *    2.20  *    6.10  *    0.89  *
* Max Chl Dpth (ft)      *   43.60  * Hydr. Depth (ft)       *   19.28  *   31.84  *    6.42  *
* Conv. Total (cfs)      *1622150.0  * Conv. (cfs)           *682175.9  *931974.6  *  7999.0  *
* Length Wtd. (ft)       *  496.05  * Wetted Per. (ft)       *  446.02  *  145.62  *   42.67  *
* Min Ch El (ft)         *  739.33  * Shear (lb/sq ft)       *    0.90  *    1.35  *    0.27  *
* Alpha                  *    1.98  * Stream Power (lb/ft s) *    1.97  *    8.25  *    0.24  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 1814.38  *11364.88  * 3152.31  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  330.58  *  497.56  *  585.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  785.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.132  *   0.063  *   0.150  *
* W.S. Elev (ft)         *  785.46  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 9612.80  * 4526.49  *  344.20  *
* E.G. Slope (ft/ft)     *0.000789  * Area (sq ft)           *35888.34  * 4526.49  * 1250.24  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *23576.01  *29730.33  *  383.66  *
* Top Width (ft)         * 2393.29  * Top Width (ft)         * 1974.53  *  131.71  *  287.05  *
* Vel Total (ft/s)       *    3.71  * Avg. Vel. (ft/s)       *    2.45  *    6.57  *    1.11  *
* Max Chl Dpth (ft)      *   46.13  * Hydr. Depth (ft)       *   21.81  *   34.37  *    8.90  *
* Conv. Total (cfs)      *1911583.0  * Conv. (cfs)           *839402.1  *1058521.0  * 13659.7  *
* Length Wtd. (ft)       *  487.01  * Wetted Per. (ft)       *  446.02  *  145.62  *   42.93  *
* Min Ch El (ft)         *  739.33  * Shear (lb/sq ft)       *    1.06  *    1.53  *    0.39  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    2.60  *   10.05  *    0.44  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 2921.63  *12697.74  * 5064.27  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  509.14  *  504.66  *  930.35  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.132  *   0.063  *   0.150  *
* W.S. Elev (ft)         *  787.47  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
```

```
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *10500.25  * 4791.70  *  422.04  *
* E.G. Slope (ft/ft)      *0.000826  * Area (sq ft)           *39866.62  * 4791.70  * 2222.92  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             *27993.01  *33455.46  *  551.54  *
* Top Width (ft)          * 2744.92  * Top Width (ft)         * 1976.99  *  131.71  *  636.22  *
* Vel Total (ft/s)        *    3.95  * Avg. Vel. (ft/s)       *    2.67  *    6.98  *    1.31  *
* Max Chl Dpth (ft)       *   48.14  * Hydr. Depth (ft)       *   23.82  *   36.38  *   10.92  *
* Conv. Total (cfs)       *2156934.0  * Conv. (cfs)           *973856.1  *1163891.0  * 19187.6  *
* Length Wtd. (ft)        *  482.06  * Wetted Per. (ft)       *  446.02  *  145.62  *   42.93  *
* Min Ch El (ft)          *  739.33  * Shear (lb/sq ft)       *    1.21  *    1.70  *    0.51  *
* Alpha                   *    1.90  * Stream Power (lb/ft s) *    3.24  *   11.85  *    0.66  *
* Frctn Loss (ft)         *    0.33  * Cum Volume (acre-ft)   * 3872.45  *13539.54  * 6890.78  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  623.23  *  506.07  * 1275.85  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  790.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.54  * Wt. n-Val.             *   0.131  *   0.063  *   0.150  *
* W.S. Elev (ft)          *  790.10  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *11658.14  * 5137.72  *  523.61  *
* E.G. Slope (ft/ft)      *0.000896  * Area (sq ft)           *45063.90  * 5137.72  * 4384.38  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *34760.39  *39136.78  *  822.82  *
* Top Width (ft)          * 3068.27  * Top Width (ft)         * 1979.49  *  131.71  *  957.07  *
* Vel Total (ft/s)        *    4.31  * Avg. Vel. (ft/s)       *    2.98  *    7.62  *    1.57  *
* Max Chl Dpth (ft)       *   50.77  * Hydr. Depth (ft)       *   26.45  *   39.01  *   13.54  *
* Conv. Total (cfs)       *2495928.0  * Conv. (cfs)           *1161128.0  *1307315.0  * 27485.4  *
* Length Wtd. (ft)        *  478.79  * Wetted Per. (ft)       *  446.02  *  145.62  *   42.93  *
* Min Ch El (ft)          *  739.33  * Shear (lb/sq ft)       *    1.46  *    1.97  *    0.68  *
* Alpha                   *    1.86  * Stream Power (lb/ft s) *    4.36  *   15.04  *    1.07  *
* Frctn Loss (ft)         *    0.36  * Cum Volume (acre-ft)   * 5728.82  *14847.33  *10529.86  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *  797.32  *  508.16  * 1622.54  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  780.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.34  * Wt. n-Val.             *   0.133  *   0.063  *   0.150  *
* W.S. Elev (ft)          *  780.64  * Reach Len. (ft)        *   81.66  *  706.84  * 1091.32  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 7488.97  * 3891.81  *  174.76  *
* E.G. Slope (ft/ft)      *0.000759  * Area (sq ft)           *26387.47  * 3891.81  *  561.03  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             *15183.25  *22667.29  *  149.45  *
* Top Width (ft)          * 2199.99  * Top Width (ft)         * 1968.61  *  131.71  *   99.67  *
* Vel Total (ft/s)        *    3.29  * Avg. Vel. (ft/s)       *    2.03  *    5.82  *    0.86  *
* Max Chl Dpth (ft)       *   41.31  * Hydr. Depth (ft)       *   16.99  *   29.55  *    6.34  *
* Conv. Total (cfs)       *1379537.0  * Conv. (cfs)           *551206.7  *822904.3  *  5425.7  *
* Length Wtd. (ft)        *  505.02  * Wetted Per. (ft)       *  446.02  *  145.62  *   31.50  *
* Min Ch El (ft)          *  739.33  * Shear (lb/sq ft)       *    0.80  *    1.27  *    0.26  *
* Alpha                   *    2.02  * Stream Power (lb/ft s) *    1.61  *    7.37  *    0.22  *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)   * 1153.72  * 9853.81  * 1846.74  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  166.20  *  479.92  *  297.26  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 15.597

INPUT
Description:
Station Elevation Data    num=     381
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   835.3   37.15  832.13   39.71  831.94   52.01  830.98   52.67  830.93
   55.28  830.71   57.89  830.49   59.47  830.36   71.72  828.34   82.55  826.62
   83.49  826.58   84.22  826.51   88.14  826.45  101.81  826.14     108  817.12
  108.27   816.7  109.16  816.42   115.4  814.47  116.01  814.28  117.82  813.77
  118.45  813.54  133.26  810.04  136.02  809.23   137.8   808.9  140.07  807.28
```

143.82	804.11	151.09	800.86	162.31	796.1	164.82	794.66	175.27	785.55
189.08	776.36	200.55	769	208.8	764.26	218.06	761.53	226.83	758.27
244.81	763.31	253.33	767.55	261.21	772.66	265.14	773.48	269.84	774.47
271.86	774.47	276.72	774.47	281.94	774.08	287.16	773.67	304.6	769.18
310.35	767.62	320.41	764.26	334.62	761.31	336.58	760.84	341.11	760.72
349.75	760.5	351.88	760.31	359.85	760.03	368.16	762.34	369.44	762.32
375.79	761.97	376.75	761.66	391.85	752.47	392.56	751.95	392.84	751.96
399.8	752.59	403.58	752.92	403.93	753.09	411.63	757.81	417.92	757.77
433.39	758.8	436.09	758.77	436.18	758.77	436.57	758.77	445.08	758.81
455.59	758.67	463.23	758.89	469.63	759.41	475.66	759.5	481.53	759.24
487.97	758.62	499.98	755.45	512.9	750.74	517.38	753.05	523.56	755.3
530.47	759.79	534.02	762.2	567.43	762.09	580.86	761.99	583.57	761.92
587.45	761.64	607	760.4	616.57	754.59	620.32	748.38	628.37	750.27
631.08	751.37	644.72	755.07	658.43	758.76	660.62	759.31	691.67	770.11
693.51	771.04	694.54	771.25	694.62	771.24	694.81	771.23	699.19	770.87
715.48	768.79	719.75	767.95	719.87	767.98	723.35	768.28	730.74	767.38
737.6	768.28	743.32	768.73	746.47	769.51	746.54	769.52	751.55	770.23
755.23	770.74	770.26	771.5	784.32	769.99	792.67	769.24	804.14	767.04
810.53	765.96	813	765.93	815.92	765.89	832.94	765.13	849.29	763.19
851.72	763.24	853.14	763.24	854.34	763.25	857.23	762.43	858.43	762.21
861.94	762.21	867.33	762.21	873.29	762.21	879.37	762.21	879.71	762.19
890.8	762.18	902.75	762.19	909.07	762.18	936.85	762.18	954.11	762.19
967.3	762.19	993	762.19	1000.46	762.19	1018.23	762.18	1023.4	762.18
1027.15	762.44	1030.83	762.78	1033.29	762.6	1043	762.96	1050.95	762.94
1064.14	764.59	1083.03	766.46	1092.07	767.81	1092.38	767.83	1092.94	767.87
1103.88	768.8	1104.79	768.91	1104.81	768.92	1104.95	768.93	1110.45	769.07
1111.51	769.24	1114.87	768.71	1119.07	768.4	1127.01	768.26	1128.14	768.19
1128.47	768.21	1128.57	768.22	1134.11	768.58	1142.58	769.16	1148.89	769.65
1151.39	769.76	1153.07	770.86	1154.35	770.86	1154.6	770.86	1158.72	770.85
1161.33	770.86	1171.09	768.99	1174.25	768.05	1182.01	767.42	1186.41	767.05
1188.26	766.8	1189.02	766.7	1189.44	766.64	1200.15	766.11	1208.44	765.77
1215.16	765.53	1219.56	765.24	1222.78	765.02	1222.96	765.02	1227.59	765.02
1236.6	765.02	1239.71	765.02	1257.23	765.02	1261.03	765.02	1264.41	765.02
1283.7	765.02	1289.18	765.02	1302.51	765.02	1307.75	765.02	1321.76	765.02
1337.06	765.02	1347.39	765.02	1356.01	767.18	1357.59	767.59	1364.27	767.95
1365.77	768.03	1368.68	767.92	1370.14	767.84	1370.4	767.84	1371.08	767.85
1373.42	768.17	1394.69	770.59	1420.77	769.9	1421.99	769.86	1423.32	769.72
1425.04	769.53	1442.84	767.3	1447.7	766.71	1457.5	765.77	1458.46	765.64
1461.67	765.23	1466.04	764.68	1483.88	765.91	1485.49	766.02	1487.04	766.07
1501.88	767.35	1511.95	768.28	1513.71	768.47	1514.57	768.55	1516.01	768.78
1532.36	770.91	1534.59	771.15	1549.87	773.37	1554.15	774.39	1565.4	776.67
1573.39	778.86	1580.59	780.67	1589.02	781.44	1596.24	782.13	1598.75	782.21
1607.5	783.34	1613.63	784.21	1616.63	784.68	1621.81	784.78	1647.48	785.51
1665.18	785.76	1674.67	785.77	1682.76	785.94	1687.85	785.99	1690.4	786.03
1702.65	786.14	1724	786.17	1732.06	786.26	1735.39	786	1739.17	785.78
1751.91	783.72	1773.17	779.54	1778.5	779.57	1780.35	779.64	1794.46	776.63
1809.07	773.58	1823.68	771.38	1824.73	771.21	1825.8	770.88	1829.81	769.56
1835.08	769.58	1841.12	769.62	1842.18	769.52	1845.45	769.19	1853.25	768.88
1853.62	768.86	1854.32	768.78	1872.67	766.87	1895.6	765.83	1914.64	765.91
1936.93	764.96	1941.56	764.97	1946.83	764.73	1968.33	763.95	1971.38	763.69
1972.34	763.66	1972.38	763.66	1990.33	763.01	1999.02	762.56	2014.94	762.45
2063.42	762.49	2125.5	763.26	2137.35	763.33	2173.17	763.47	2214.22	763.95
2222	764.04	2232.86	764.21	2242.06	764.17	2253.5	764.08	2275.52	763.91
2282.18	760.27	2285.28	758.97	2291.92	756.19	2298.38	754.47	2301.88	752.44
2310.18	748.51	2321	740	2338	739.1	2355	740	2365.95	748.51
2367.89	750.14	2371.68	752.45	2376.29	754.37	2377.86	754.92	2379.41	755.17
2385.55	755.84	2394.17	756.78	2407.16	759.02	2415.13	760.46	2418.11	761.25
2424.48	763.34	2437.88	763.42	2449.04	763.43	2465.87	765.03	2468.22	765.11
2471.33	765.38	2477.52	766.43	2490.03	771.3	2493.08	772.01	2502.01	772.39
2504.14	772.59	2509.39	773.04	2520.25	774.72	2533.26	776.14	2535.26	776.46
2536.56	776.61	2541.11	778.05	2549.87	780.79	2550.98	781.18	2552.76	782.02
2557.74	782.34	2575.27	783.71	2581.81	783.89	2585.67	784.23	2616.81	786.12
2617.57	786.13	2653.59	786.54	2655.49	786.21	2657.65	785.86	2671.61	786.67
2679.4	787.04	2686.15	787.32	2735.81	789.91	2748.19	790.52	2750.05	790.66
2750.92	790.73	2785.71	794.14	2794.63	794.97	2799.62	795.2	2803.22	796.1
2809.2	796.7	2815.32	797.13	2826.37	797.88	2827.42	798.03	2840.68	800.97
2843.03	801.63	2851.01	804.11	2871.03	811.51	2876.45	813.52	2881.81	815.44
2899.2	821.68	2906.88	824.96	2921.46	831.25	2923.43	831.89	2926.66	833.3
2929.02	835.78	2929.99	835.44	2932.1	835.88	2933.01	836.47	2935.46	838.07
2937.29	839.22	2937.88	839.43	2943.88	841.25	2945.27	845.41	2948.55	849.17
2949.96	849.2	2958.5	852.16	2966.37	855.1	2970.83	858.12	2972.65	859.03
2972.68	859.03								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

****

```
       0    .148  770.26    .072 1972.38     .15 2275.52    .042 2379.41     .15
 2616.81     .11 2799.62     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2275.52 2379.41            71.06 1233.99  446.93             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
    94.2  378.48  794.47       T
  534.81 2058.47  795.56       T

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  769.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.149  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  769.06  * Reach Len. (ft)        *   71.06  * 1233.99  *  446.93  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3108.71  * 2215.33  *  750.26  *
* E.G. Slope (ft/ft)     *0.000331  * Area (sq ft)           * 8970.82  * 2215.33  *  750.26  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 2453.90  *10248.92  *  497.18  *
* Top Width (ft)         * 1750.99  * Top Width (ft)         * 1542.23  *  103.89  *  104.88  *
* Vel Total (ft/s)       *    2.17  * Avg. Vel. (ft/s)       *    0.79  *    4.63  *    0.66  *
* Max Chl Dpth (ft)      *   29.96  * Hydr. Depth (ft)       *    8.33  *   21.32  *    7.15  *
* Conv. Total (cfs)      *725622.4  * Conv. (cfs)            *134894.3  *563397.7  * 27330.4  *
* Length Wtd. (ft)       *  934.00  * Wetted Per. (ft)       *  381.62  *  114.95  *  106.39  *
* Min Ch El (ft)         *  739.10  * Shear (lb/sq ft)       *    0.17  *    0.40  *    0.15  *
* Alpha                  *    3.55  * Stream Power (lb/ft s) *    0.13  *    1.84  *    0.10  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *  198.58  * 4612.74  *  231.22  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   38.65  *  377.59  *   58.39  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  773.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.149  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  772.95  * Reach Len. (ft)        *   71.06  * 1233.99  *  446.93  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4559.63  * 2619.04  * 1186.07  *
* E.G. Slope (ft/ft)     *0.000380  * Area (sq ft)           *15585.42  * 2619.04  * 1186.07  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 4785.85  *14518.96  *  995.19  *
* Top Width (ft)         * 2020.30  * Top Width (ft)         * 1787.49  *  103.89  *  128.93  *
* Vel Total (ft/s)       *    2.43  * Avg. Vel. (ft/s)       *    1.05  *    5.54  *    0.84  *
* Max Chl Dpth (ft)      *   33.85  * Hydr. Depth (ft)       *   12.21  *   25.21  *    9.20  *
* Conv. Total (cfs)      *1041233.0  * Conv. (cfs)           *245477.1  *744710.6  * 51045.5  *
* Length Wtd. (ft)       *  857.25  * Wetted Per. (ft)       *  381.62  *  114.95  *  130.98  *
* Min Ch El (ft)         *  739.10  * Shear (lb/sq ft)       *    0.28  *    0.54  *    0.21  *
* Alpha                  *    3.78  * Stream Power (lb/ft s) *    0.30  *    3.00  *    0.18  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *  400.39  * 6258.42  *  491.52  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   67.39  *  417.09  *   86.17  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  776.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.149  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  775.68  * Reach Len. (ft)        *   71.06  * 1233.99  *  446.93  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5579.84  * 2902.90  * 1564.99  *
* E.G. Slope (ft/ft)     *0.000412  * Area (sq ft)           *20561.17  * 2902.90  * 1564.99  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 6893.37  *17937.21  * 1489.42  *
* Top Width (ft)         * 2100.45  * Top Width (ft)         * 1846.91  *  103.89  *  149.65  *
* Vel Total (ft/s)       *    2.62  * Avg. Vel. (ft/s)       *    1.24  *    6.18  *    0.95  *
* Max Chl Dpth (ft)      *   36.58  * Hydr. Depth (ft)       *   14.94  *   27.94  *   10.46  *
* Conv. Total (cfs)      *1297188.0  * Conv. (cfs)           *339741.4  *884040.3  * 73406.3  *
* Length Wtd. (ft)       *  815.57  * Wetted Per. (ft)       *  381.62  *  114.95  *  151.89  *
* Min Ch El (ft)         *  739.10  * Shear (lb/sq ft)       *    0.38  *    0.65  *    0.26  *
* Alpha                  *    3.86  * Stream Power (lb/ft s) *    0.46  *    4.01  *    0.25  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  596.96  * 7622.55  *  822.70  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   89.97  *  444.91  *  154.94  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	779.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.149	0.042	0.150
W.S. Elev (ft)	778.74	Reach Len. (ft)	71.06	1233.99	446.93
Crit W.S. (ft)		Flow Area (sq ft)	6720.42	3220.26	2048.89
E.G. Slope (ft/ft)	0.000441	Area (sq ft)	26252.52	3220.26	2048.89
Q Total (cfs)	34000.00	Flow (cfs)	9658.10	22070.14	2271.75
Top Width (ft)	2146.15	Top Width (ft)	1878.37	103.89	163.90
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)	1.44	6.85	1.11
Max Chl Dpth (ft)	39.64	Hydr. Depth (ft)	18.00	31.00	12.50
Conv. Total (cfs)	1618987.0	Conv. (cfs)	459892.5	1050920.0	108174.6
Length Wtd. (ft)	777.36	Wetted Per. (ft)	381.62	114.95	166.52
Min Ch El (ft)	739.10	Shear (lb/sq ft)	0.48	0.77	0.34
Alpha	3.87	Stream Power (lb/ft s)	0.70	5.29	0.38
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	900.07	9041.18	1405.59
C & E Loss (ft)	0.01	Cum SA (acres)	125.90	467.64	233.14

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	782.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.149	0.042	0.150
W.S. Elev (ft)	782.41	Reach Len. (ft)	71.06	1233.99	446.93
Crit W.S. (ft)		Flow Area (sq ft)	8091.13	3601.65	2672.11
E.G. Slope (ft/ft)	0.000472	Area (sq ft)	33250.53	3601.65	2672.11
Q Total (cfs)	44500.00	Flow (cfs)	13546.04	27511.28	3442.68
Top Width (ft)	2220.31	Top Width (ft)	1937.23	103.89	179.20
Vel Total (ft/s)	3.10	Avg. Vel. (ft/s)	1.67	7.64	1.29
Max Chl Dpth (ft)	43.31	Hydr. Depth (ft)	21.67	34.67	14.91
Conv. Total (cfs)	2048500.0	Conv. (cfs)	623574.4	1266446.0	158479.3
Length Wtd. (ft)	736.81	Wetted Per. (ft)	381.62	114.95	182.40
Min Ch El (ft)	739.10	Shear (lb/sq ft)	0.62	0.92	0.43
Alpha	3.86	Stream Power (lb/ft s)	1.05	7.05	0.56
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1754.25	11301.63	3108.53
C & E Loss (ft)	0.00	Cum SA (acres)	326.91	495.65	581.83

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	785.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.	0.149	0.042	0.150
W.S. Elev (ft)	784.85	Reach Len. (ft)	71.06	1233.99	446.93
Crit W.S. (ft)		Flow Area (sq ft)	9003.12	3855.40	3152.74
E.G. Slope (ft/ft)	0.000524	Area (sq ft)	38025.36	3855.40	3152.74
Q Total (cfs)	53690.00	Flow (cfs)	17012.30	32458.80	4218.90
Top Width (ft)	2298.93	Top Width (ft)	1978.56	103.89	216.48
Vel Total (ft/s)	3.35	Avg. Vel. (ft/s)	1.89	8.42	1.34
Max Chl Dpth (ft)	45.75	Hydr. Depth (ft)	24.11	37.11	14.56
Conv. Total (cfs)	2346540.0	Conv. (cfs)	743528.3	1418623.0	184388.4
Length Wtd. (ft)	713.24	Wetted Per. (ft)	381.62	114.95	219.77
Min Ch El (ft)	739.10	Shear (lb/sq ft)	0.77	1.10	0.47
Alpha	3.92	Stream Power (lb/ft s)	1.46	9.23	0.63
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	2852.35	12629.74	5009.11
C & E Loss (ft)	0.04	Cum SA (acres)	505.43	502.75	924.04

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	787.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.149	0.042	0.150
W.S. Elev (ft)	786.80	Reach Len. (ft)	71.06	1233.99	446.93
Crit W.S. (ft)		Flow Area (sq ft)	9729.25	4057.44	3628.23
E.G. Slope (ft/ft)	0.000566	Area (sq ft)	41998.54	4057.44	3628.23
Q Total (cfs)	62000.00	Flow (cfs)	20101.45	36741.73	5156.82
Top Width (ft)	2500.40	Top Width (ft)	2101.68	103.89	294.83
Vel Total (ft/s)	3.56	Avg. Vel. (ft/s)	2.07	9.06	1.42
Max Chl Dpth (ft)	47.70	Hydr. Depth (ft)	26.06	39.06	12.31
Conv. Total (cfs)	2606577.0	Conv. (cfs)	845096.1	1544680.0	216800.9

```
* Length Wtd. (ft)       *  697.01  * Wetted Per. (ft)       *  381.62  *  114.95  *  298.25  *
* Min Ch El (ft)         *  739.10  * Shear (lb/sq ft)       *    0.90  *    1.25  *    0.43  *
* Alpha                  *    3.96  * Stream Power (lb/ft s) *    1.86  *   11.29  *    0.61  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   * 3795.71  *13467.75  * 6817.49  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  619.41  *  504.16  * 1264.19  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  790.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *   0.149  *   0.042  *   0.149  *
* W.S. Elev (ft)         *  789.33  * Reach Len. (ft)        *   71.06  * 1233.99  *  446.93  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *10677.06  * 4321.16  * 4442.52  *
* E.G. Slope (ft/ft)     *0.000626  * Area (sq ft)           *47337.25  * 4321.16  * 4442.52  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *24653.40  *42917.89  * 7148.71  *
* Top Width (ft)         * 2553.83  * Top Width (ft)         * 2104.59  *  103.89  *  345.35  *
* Vel Total (ft/s)       *    3.84  * Avg. Vel. (ft/s)       *    2.31  *    9.93  *    1.61  *
* Max Chl Dpth (ft)      *   50.23  * Hydr. Depth (ft)       *   28.60  *   41.59  *   12.86  *
* Conv. Total (cfs)      *2986876.0  * Conv. (cfs)           *985501.1  *1715611.0  *285764.4  *
* Length Wtd. (ft)       *  676.54  * Wetted Per. (ft)       *  381.62  *  114.95  *  348.83  *
* Min Ch El (ft)         *  739.10  * Shear (lb/sq ft)       *    1.09  *    1.47  *    0.50  *
* Alpha                  *    3.97  * Stream Power (lb/ft s) *    2.52  *   14.59  *    0.80  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   * 5642.21  *14770.58  *10419.29  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  793.49  *  506.25  * 1606.23  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  780.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.149  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  780.15  * Reach Len. (ft)        *   71.06  * 1233.99  *  446.93  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 7248.00  * 3367.05  * 2283.66  *
* E.G. Slope (ft/ft)     *0.000456  * Area (sq ft)           *28921.20  * 3367.05  * 2283.66  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *11113.32  *24170.37  * 2716.32  *
* Top Width (ft)         * 2172.89  * Top Width (ft)         * 1900.59  *  103.89  *  168.41  *
* Vel Total (ft/s)       *    2.95  * Avg. Vel. (ft/s)       *    1.53  *    7.18  *    1.19  *
* Max Chl Dpth (ft)      *   41.05  * Hydr. Depth (ft)       *   19.41  *   32.41  *   13.56  *
* Conv. Total (cfs)      *1779651.0  * Conv. (cfs)           *520469.1  *1131969.0  *127213.0  *
* Length Wtd. (ft)       *  764.36  * Wetted Per. (ft)       *  381.62  *  114.95  *  171.25  *
* Min Ch El (ft)         *  739.10  * Shear (lb/sq ft)       *    0.54  *    0.83  *    0.38  *
* Alpha                  *    3.87  * Stream Power (lb/ft s) *    0.83  *    5.99  *    0.45  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   * 1101.87  * 9794.92  * 1811.10  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  162.58  *  478.01  *  293.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 15.363

INPUT
Description: U/S of Golf Bridge 1.  Copied from D/S side.
Station Elevation Data    num=     381
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  834.96   18.02  833.31   30.63  832.13   37.22  831.81   37.85  831.76
   40.51  831.65   44.05  831.48    46.8  831.03   53.73  829.84   64.11  828.21
    70.9  826.64   70.94  826.62   71.19   826.5   73.76  825.23   77.29  822.76
   80.49  821.27    86.5  821.34   87.56  821.19   88.17  821.18   88.85  821.35
   97.84  822.44   99.68  822.55  101.81  817.05  102.83  814.39  105.95  814.12
  109.24  813.54  113.81   812.3   120.7   810.2  127.66  807.57  142.06  802.78
  148.61   800.2  150.54  800.12  153.73  799.12  164.23  794.27  166.56  793.28
  166.92  793.13  167.98  791.92  174.94  785.55  179.38   783.7  197.39  775.85
   215.3  766.53  219.38  764.26  231.15  759.68  234.97  758.33  252.03  763.73
   253.8  764.26  256.39  765.72  269.05  772.79  273.94  773.76  276.48  774.24
  278.51  774.24  283.32  774.24  290.99  773.65  292.91   773.5  295.39  772.83
  299.25  771.68  322.02   765.3  324.54  764.26  336.09  762.81  357.04  760.43
  368.35  760.11  370.03  760.09  389.12  763.79  389.57  763.88  403.54  763.98
  435.54  763.69  461.68   763.5  472.02  763.32   476.8  763.34  484.08  763.21
  504.99  760.68  525.02  758.78  530.47  758.57   544.2  755.62  548.31  756.37
  565.43  756.97  567.45  756.73  574.88   756.6  583.43  754.13  591.59  751.45
  598.58  750.64  602.33  749.48  610.29  748.84  613.49  747.76  627.35  756.53
  636.42  761.47  638.19  761.22  648.85  759.77  656.74  758.76  659.04  758.53
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   660.5   758.3  668.41  756.95  686.19  753.83  693.42  753.41  711.37  754.74
  713.69  754.49   717.9  752.73  727.64  754.79  735.34   755.8  743.59  758.41
  747.85  758.83  754.23  759.44  777.39  764.36  781.15  765.02  792.31  769.53
  796.64  771.03  797.33  771.13  841.27  773.47  845.64  773.57  851.18  773.42
  871.04   774.1  897.03  775.05  905.64  775.42  915.47  776.83  915.74  776.82
  915.76  776.82  927.13  776.62  938.96  775.94  942.98  775.83  955.19  775.68
  967.61  774.39  976.25  773.41  979.75  772.85  986.53  771.84  994.95     772
  995.08  771.99  997.22  771.96 1004.06  771.58 1004.67  771.56 1005.72  771.54
 1008.76  771.37 1011.35  771.31 1013.05  770.95 1024.18     770 1034.12  769.06
 1043.05  768.23 1049.06  768.43 1065.73  768.64 1070.54  768.28 1096.86  770.64
 1109.65  771.61 1114.81  772.16 1117.75  772.23 1164.61  773.22 1173.16  773.61
  1179.3  773.83 1206.45  774.02 1213.63  774.02 1225.17  774.42  1240.3  774.47
 1256.81  774.86 1306.51  775.56 1324.59  776.48 1325.75  776.58 1330.68  777.07
 1338.32  777.64 1347.79   777.4 1360.89  777.76 1378.25   778.7 1382.68     779
 1407.49  779.76  1410.5   779.9 1428.53  781.41 1430.35  781.29 1439.07  782.24
 1445.99  782.95 1465.69  784.29 1475.69  785.45 1481.19  785.53 1493.16  785.52
 1500.54   785.6 1510.55  785.72 1562.21  786.81 1562.64  786.81 1568.31  786.89
 1582.09  787.84 1583.34  788.05  1585.4  788.28 1589.48  788.41 1590.95  788.32
  1592.4  788.28 1594.12  788.11 1610.18  786.39 1631.95   783.3 1635.83  782.29
 1660.54  774.79 1664.93   773.6 1675.86  771.51 1691.34  768.28 1694.77  767.67
 1706.07  766.43 1717.26  764.21 1721.09  763.92  1729.5   763.6 1737.09   763.3
 1739.27  763.32 1744.69  762.95 1761.76  762.54 1763.67  762.46 1765.06  762.32
  1776.2  761.68  1785.1  760.76 1785.65  760.76 1787.57  760.79 1790.32  760.67
 1803.18  759.88 1806.51  756.42 1807.23   755.7 1807.42  755.51 1810.47  752.45
 1811.43  750.05 1814.28  749.14 1820.29   746.9    1828  739.69    1836  738.69
    1845  739.69 1853.88   746.9 1855.07  750.61 1858.77  754.01 1863.61  756.04
 1866.32  758.11 1876.95  759.18 1888.07     760 1890.23  760.16 1899.94  761.09
 1912.33  763.11 1932.41  764.27 1938.89  764.89 1972.53  768.65 1980.62  769.99
 1987.79  770.77 1991.77   771.4 2012.01  774.51 2016.48  775.01 2018.09   775.2
 2021.54  775.48 2036.65  777.47  2048.7  778.44 2049.91  778.36 2059.78   777.8
 2068.92  777.52 2069.39  777.51 2069.88  777.49  2075.4   777.5 2081.23  777.61
 2094.51  777.41 2104.46  777.52 2110.63  778.18 2114.78  778.55 2122.83  779.19
 2128.49  779.38 2134.54  779.47 2145.16  779.37 2151.87  779.76     2158  779.73
 2163.84  779.52 2168.98     779 2189.72  779.03 2196.56  779.16 2199.38  779.18
 2215.45  779.17 2249.69  779.44 2249.96  779.44 2250.02  779.44 2259.78  779.49
 2262.11  779.49 2292.22  779.44 2295.33  779.44 2299.01  779.44 2316.04  779.48
 2319.18   779.5 2348.87  779.47 2356.44  779.63 2381.55   779.4 2383.85   779.4
 2413.46  779.12 2413.69  779.11 2414.14  779.11 2418.01  779.09 2429.94   779.1
 2448.48  779.12 2455.99  779.13 2463.46  779.12 2489.63  779.11 2495.61   779.1
 2502.78   779.1 2516.47  779.09 2527.72  779.09 2534.95  779.06 2556.22  778.98
 2559.29  778.97 2566.04  778.95  2584.8  778.77 2603.59  778.57 2617.98  778.42
 2644.85  778.13 2651.07  778.06 2654.07  778.08 2670.62  778.18 2677.67  778.21
 2680.32  778.22  2706.9  778.11  2731.8  778.12 2743.64  778.18 2763.99  778.16
 2773.23  778.11 2785.35  777.94 2791.71  777.91 2804.64   777.7 2807.13  777.68
 2822.52  777.42 2822.72  777.42 2838.32   777.2  2839.2  777.19  2839.9   777.2
 2856.99  777.34 2858.43  777.35 2873.98  777.48 2876.68   777.5 2879.68  777.53
 2900.32   777.7 2903.03  777.73 2912.58   777.8 2940.56  778.01     2944  778.03
 2956.46  778.13 2965.65   778.2 2978.05   778.5 2990.38  778.79 3006.55  779.18
 3015.12  779.39 3023.37  779.49 3044.44  779.77 3050.79  779.85 3073.76  780.15
  3103.1  780.78 3103.96   780.8 3109.34  780.91 3133.84  781.42 3134.16  781.42
 3134.24  781.43 3137.79  781.58 3148.73  781.99  3161.4  782.37 3170.24  782.75
 3178.69  783.15 3185.88   783.5 3227.07  784.03  3238.3  784.51 3238.68   784.5
 3239.19  784.52 3260.37  784.39 3283.71  785.13 3293.12  785.07 3333.65   785.6
  3333.7   785.6 3333.71   785.6 3333.73   785.6  3342.5  785.34 3348.27  785.73
 3350.87  785.91 3353.42  786.06 3361.03  786.52 3380.62  789.06 3380.98  789.11
 3381.06  789.12 3406.88  791.23 3410.71  792.16 3425.94  796.11 3433.99  799.12
 3447.72  804.11  3462.6  811.33 3469.86  814.28 3477.51  816.95 3496.03  824.55
 3497.61  825.18 3498.37  826.14 3500.61  829.93 3500.79  830.16 3500.88  830.16
 3510.15  830.35

Manning's n Values        num=       5
      Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
        0    .148  986.53    .072 1803.18    .042 1866.32     .09 2168.98     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1803.18 1866.32               32      32      32              .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
   128.9   505.1  798.86       T
  640.66 1592.95  798.04       T

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.127  *   0.042  *   0.090  *
```

```
* W.S. Elev (ft)         *  768.40  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  756.54  * Flow Area (sq ft)      * 2310.90  * 1373.41  *  547.70  *
* E.G. Slope (ft/ft)     *0.000753  * Area (sq ft)           * 5192.85  * 1373.41  *  547.70  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 3513.24  * 8938.45  *  748.31  *
* Top Width (ft)         *  817.50  * Top Width (ft)         *  650.38  *   63.14  *  103.98  *
* Vel Total (ft/s)       *    3.12  * Avg. Vel. (ft/s)       *    1.52  *    6.51  *    1.37  *
* Max Chl Dpth (ft)      *   29.71  * Hydr. Depth (ft)       *    9.32  *   21.75  *    5.27  *
* Conv. Total (cfs)      *481174.5  * Conv. (cfs)            *128066.8  *325830.0  * 27277.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  254.02  *   79.09  *  104.54  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)       *    0.43  *    0.82  *    0.25  *
* Alpha                  *    3.02  * Stream Power (lb/ft s) *    0.65  *    5.31  *    0.34  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  187.02  * 4561.91  *  224.56  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   36.87  *  375.22  *   57.32  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  772.82  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.119  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  772.29  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  761.70  * Flow Area (sq ft)      * 3312.53  * 1619.17  * 1005.98  *
* E.G. Slope (ft/ft)     *0.000787  * Area (sq ft)           * 8101.53  * 1619.17  * 1005.98  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 6472.94  *12023.91  * 1803.16  *
* Top Width (ft)         * 1048.96  * Top Width (ft)         *  854.56  *   63.14  *  131.26  *
* Vel Total (ft/s)       *    3.42  * Avg. Vel. (ft/s)       *    1.95  *    7.43  *    1.79  *
* Max Chl Dpth (ft)      *   33.60  * Hydr. Depth (ft)       *   12.41  *   25.64  *    7.66  *
* Conv. Total (cfs)      *723759.7  * Conv. (cfs)            *230780.8  *428690.6  * 64288.3  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  273.41  *   79.09  *  132.10  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)       *    0.60  *    1.01  *    0.37  *
* Alpha                  *    2.92  * Stream Power (lb/ft s) *    1.16  *    7.47  *    0.67  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  381.07  * 6198.39  *  480.27  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   65.24  *  414.72  *   84.84  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  775.62  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.116  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  775.04  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  764.02  * Flow Area (sq ft)      * 4065.09  * 1792.85  * 1392.02  *
* E.G. Slope (ft/ft)     *0.000799  * Area (sq ft)           *10831.85  * 1792.85  * 1392.02  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 9109.70  *14360.28  * 2850.02  *
* Top Width (ft)         * 1363.52  * Top Width (ft)         * 1149.93  *   63.14  *  150.45  *
* Vel Total (ft/s)       *    3.63  * Avg. Vel. (ft/s)       *    2.24  *    8.01  *    2.05  *
* Max Chl Dpth (ft)      *   36.35  * Hydr. Depth (ft)       *   14.57  *   28.39  *    9.25  *
* Conv. Total (cfs)      *931154.3  * Conv. (cfs)            *322284.9  *508040.8  *100828.5  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *  285.79  *   79.09  *  151.49  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)       *    0.71  *    1.13  *    0.46  *
* Alpha                  *    2.82  * Stream Power (lb/ft s) *    1.59  *    9.06  *    0.94  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  571.36  * 7556.04  *  807.54  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   87.52  *  442.54  *  153.40  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  778.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.113  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  778.13  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  766.23  * Flow Area (sq ft)      * 4941.66  * 1987.65  * 2011.80  *
* E.G. Slope (ft/ft)     *0.000804  * Area (sq ft)           *14713.96  * 1987.65  * 2011.80  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *12596.78  *17105.98  * 4297.24  *
* Top Width (ft)         * 1862.04  * Top Width (ft)         * 1329.18  *   63.14  *  469.72  *
* Vel Total (ft/s)       *    3.80  * Avg. Vel. (ft/s)       *    2.55  *    8.61  *    2.14  *
* Max Chl Dpth (ft)      *   39.44  * Hydr. Depth (ft)       *   17.09  *   31.48  *    4.28  *
```

```
* Conv. Total (cfs)      *1199194.0  * Conv. (cfs)            *444293.4  *603334.8  *151565.3  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)        *  296.41  *   79.09  *  471.00  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)        *    0.84  *    1.26  *    0.21  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    2.13  *   10.85  *    0.46  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *  866.66  * 8967.41  * 1384.75  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)          *  123.28  *  465.27  *  229.89  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  782.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.110  *   0.042  *   0.103  *
* W.S. Elev (ft)         *  781.96  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  768.53  * Flow Area (sq ft)      * 6074.52  * 2229.70  * 6033.07  *
* E.G. Slope (ft/ft)     *0.000732  * Area (sq ft)           *19998.90  * 2229.70  * 6033.07  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *16806.65  *19762.81  * 7930.54  *
* Top Width (ft)         * 2764.24  * Top Width (ft)         * 1419.43  *   63.14  * 1281.67  *
* Vel Total (ft/s)       *    3.10  * Avg. Vel. (ft/s)       *    2.77  *    8.86  *    1.31  *
* Max Chl Dpth (ft)      *   43.27  * Hydr. Depth (ft)       *   20.13  *   35.31  *    4.71  *
* Conv. Total (cfs)      *1645304.0  * Conv. (cfs)            *621394.4  *730692.7  *293216.6  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)        *  309.61  *   79.09  * 1283.12  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)        *    0.90  *    1.29  *    0.21  *
* Alpha                  *    3.95  * Stream Power (lb/ft s) *    2.48  *   11.41  *    0.28  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    * 1710.82  *11219.03  * 3063.88  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)          *  324.18  *  493.28  *  574.34  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  785.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.109  *   0.042  *   0.110  *
* W.S. Elev (ft)         *  784.53  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  770.07  * Flow Area (sq ft)      * 6865.03  * 2391.99  * 9435.20  *
* E.G. Slope (ft/ft)     *0.000670  * Area (sq ft)           *23707.50  * 2391.99  * 9435.20  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *19395.09  *21260.55  *13034.36  *
* Top Width (ft)         * 2932.01  * Top Width (ft)         * 1470.32  *   63.14  * 1398.55  *
* Vel Total (ft/s)       *    2.87  * Avg. Vel. (ft/s)       *    2.83  *    8.89  *    1.38  *
* Max Chl Dpth (ft)      *   45.84  * Hydr. Depth (ft)       *   21.76  *   37.88  *    6.75  *
* Conv. Total (cfs)      *2074482.0  * Conv. (cfs)            *749390.1  *821468.1  *503623.6  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)        *  323.52  *   79.09  * 1400.05  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)        *    0.89  *    1.26  *    0.28  *
* Alpha                  *    4.20  * Stream Power (lb/ft s) *    2.51  *   11.24  *    0.39  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    * 2801.99  *12541.25  * 4944.54  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)          *  502.62  *  500.38  *  915.76  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  787.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.108  *   0.042  *   0.114  *
* W.S. Elev (ft)         *  786.57  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  771.44  * Flow Area (sq ft)      * 7522.66  * 2520.67  *12403.57  *
* E.G. Slope (ft/ft)     *0.000632  * Area (sq ft)           *26787.80  * 2520.67  *12403.57  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *21509.65  *22529.33  *17961.02  *
* Top Width (ft)         * 3129.98  * Top Width (ft)         * 1571.74  *   63.14  * 1495.10  *
* Vel Total (ft/s)       *    2.76  * Avg. Vel. (ft/s)       *    2.86  *    8.94  *    1.45  *
* Max Chl Dpth (ft)      *   47.88  * Hydr. Depth (ft)       *   22.78  *   39.92  *    8.30  *
* Conv. Total (cfs)      *2466966.0  * Conv. (cfs)            *855864.0  *896436.8  *714664.9  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)        *  338.43  *   79.09  * 1496.66  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)        *    0.88  *    1.26  *    0.33  *
* Alpha                  *    4.26  * Stream Power (lb/ft s) *    2.51  *   11.23  *    0.47  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    * 3739.61  *13374.57  * 6735.24  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *  616.41  *  501.79  * 1255.01  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
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*****************************************************************************************
* E.G. Elev (ft)          *  789.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.47  * Wt. n-Val.             *   0.107  *   0.042  *   0.118  *
* W.S. Elev (ft)          *  789.23  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)          *  773.16  * Flow Area (sq ft)      * 8430.33  * 2688.77  *16411.33  *
* E.G. Slope (ft/ft)      *0.000590  * Area (sq ft)           *31084.27  * 2688.77  *16411.33  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *24703.96  *24249.84  *25766.20  *
* Top Width (ft)          * 3211.53  * Top Width (ft)         * 1632.26  *   63.14  * 1516.13  *
* Vel Total (ft/s)        *    2.71  * Avg. Vel. (ft/s)       *    2.93  *    9.02  *    1.57  *
* Max Chl Dpth (ft)       *   50.54  * Hydr. Depth (ft)       *   24.38  *   42.58  *   10.82  *
* Conv. Total (cfs)       *3075930.0  * Conv. (cfs)           *1016965.0  *998270.8  *1060694.0  *
* Length Wtd. (ft)        *   10.00  * Wetted Per. (ft)       *  354.06  *   79.09  * 1517.85  *
* Min Ch El (ft)          *  738.69  * Shear (lb/sq ft)       *    0.88  *    1.25  *    0.40  *
* Alpha                   *    4.08  * Stream Power (lb/ft s) *    2.57  *   11.30  *    0.63  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)   * 5578.24  *14671.29  *10312.30  *
* C & E Loss (ft)         *    0.08  * Cum SA (acres)         *  790.44  *  503.88  * 1596.68  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  780.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.68  * Wt. n-Val.             *   0.111  *   0.042  *   0.093  *
* W.S. Elev (ft)          *  779.52  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)          *  767.11  * Flow Area (sq ft)      * 5346.08  * 2075.25  * 3024.34  *
* E.G. Slope (ft/ft)      *0.000839  * Area (sq ft)           *16582.44  * 2075.25  * 3024.34  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             *14629.25  *18775.29  * 4595.47  *
* Top Width (ft)          * 2556.96  * Top Width (ft)         * 1368.77  *   63.14  * 1125.05  *
* Vel Total (ft/s)        *    3.64  * Avg. Vel. (ft/s)       *    2.74  *    9.05  *    1.52  *
* Max Chl Dpth (ft)       *   40.83  * Hydr. Depth (ft)       *   18.20  *   32.87  *    2.69  *
* Conv. Total (cfs)       *1312122.0  * Conv. (cfs)           *505141.0  *648301.7  *158679.3  *
* Length Wtd. (ft)        *   10.00  * Wetted Per. (ft)       *  301.19  *   79.09  * 1126.46  *
* Min Ch El (ft)          *  738.69  * Shear (lb/sq ft)       *    0.93  *    1.37  *    0.14  *
* Alpha                   *    3.29  * Stream Power (lb/ft s) *    2.54  *   12.43  *    0.21  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   * 1064.76  * 9717.83  * 1783.87  *
* C & E Loss (ft)         *          * Cum SA (acres)         *  159.91  *  475.65  *  287.27  *
*****************************************************************************************

BRIDGE


RIVER: Blue River
REACH: Main               RS: 15.360

INPUT
Description: Golf Bridge 1
Distance from Upstream XS =      10
Deck/Roadway Width        =      12
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    1790     760     735    1815     760     735  1819.9     763     735
    1820     763     751    1825     763     754    1832     763   755.5
    1837     763     756    1843     763   755.5    1849     763     754
    1854     763     751  1854.1     763     735    1860     760     735
    1870     760     735    1890     760     735

Upstream Bridge Cross Section Data
Station Elevation Data    num=     381
      Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
        0  834.96   18.02  833.31   30.63  832.13   37.22  831.81   37.85  831.76
    40.51  831.65   44.05  831.48    46.8  831.03   53.73  829.84   64.11  828.21
     70.9  826.64   70.94  826.62   71.19   826.5   73.76  825.23   77.29  822.76
    80.49  821.27    86.5  821.34   87.56  821.19   88.17  821.18   88.85  821.35
    97.84  822.44   99.68  822.55  101.81  817.05  102.83  814.39  105.95  814.12
   109.24  813.54  113.81   812.3   120.7   810.2  127.66  807.57  142.06  802.78
   148.61   800.2  150.54  800.12  153.73  799.12  164.23  794.27  166.56  793.28
   166.92  793.13  167.98  791.92  174.94  785.55  179.38   783.7  197.39  775.85
    215.3  766.53  219.38  764.26  231.15  759.68  234.97  758.33  252.03  763.73
    253.8  764.26  256.39  765.72  269.05  772.79  273.94  773.76  276.48  774.24
   278.51  774.24  283.32  774.24  290.99  773.65  292.91   773.5  295.39  772.83
   299.25  771.68  322.02   765.3  324.54  764.26  336.09  762.81  357.04  760.43
   368.35  760.11  370.03  760.09  389.12  763.79  389.57  763.88  403.54  763.98
   435.54  763.69  461.68   763.5  472.02  763.32   476.8  763.34  484.08  763.21
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  504.99  760.68  525.02  758.78  530.47  758.57   544.2  755.62  548.31  756.37
  565.43  756.97  567.45  756.73  574.88   756.6  583.43  754.13  591.59  751.45
  598.58  750.64  602.33  749.48  610.29  748.84  613.49  747.76  627.35  756.53
  636.42  761.47  638.19  761.22  648.85  759.77  656.74  758.76  659.04  758.53
   660.5   758.3  668.41  756.95  686.19  753.83  693.42  753.41  711.37  754.74
  713.69  754.49   717.9  752.73  727.64  754.79  735.34   755.8  743.59  758.41
  747.85  758.83  754.23  759.44  777.39  764.36  781.15  765.02  792.31  769.53
  796.64  771.03  797.33  771.13  841.27  773.47  845.64  773.57  851.18  773.42
  871.04   774.1  897.03  775.05  905.64  775.42  915.47  776.83  915.74  776.82
  915.76  776.82  927.13  776.62  938.96  775.94  942.98  775.83  955.19  775.68
  967.61  774.39  976.25  773.41  979.75  772.85  986.53  771.84  994.95     772
  995.08  771.99  997.22  771.96 1004.06  771.58 1004.67  771.56 1005.72  771.54
 1008.76  771.37 1011.35  771.31 1013.05  770.95 1024.18     770 1034.12  769.06
 1043.05  768.23 1049.06  768.43 1065.73  768.64 1070.54  768.28 1096.86  770.64
 1109.65  771.61 1114.81  772.16 1117.75  772.23 1164.61  773.22 1173.16  773.61
  1179.3  773.83 1206.45  774.02 1213.63  774.02 1225.17  774.42  1240.3  774.47
 1256.81  774.86 1306.51  775.56 1324.59  776.48 1325.75  776.58 1330.68  777.07
 1338.32  777.64 1347.79   777.4 1360.89  777.76 1378.25   778.7 1382.68     779
 1407.49  779.76  1410.5   779.9 1428.53  781.41 1430.35  781.29 1439.07  782.24
 1445.99  782.95 1465.69  784.29 1475.69  785.45 1481.19  785.53 1493.16  785.52
 1500.54   785.6 1510.55  785.72 1562.21  786.81 1562.64  786.81 1568.31  786.89
 1582.09  787.84 1583.34  788.05  1585.4  788.28 1589.48  788.41 1590.95  788.32
  1592.4  788.28 1594.12  788.11 1610.18  786.39 1631.95   783.3 1635.83  782.29
 1660.54  774.79 1664.93   773.6 1675.86  771.51 1691.34  768.28 1694.77  767.67
 1706.07  766.43 1717.26  764.21 1721.09  763.92  1729.5   763.6 1737.09   763.3
 1739.27  763.32 1744.69  762.95 1761.76  762.54 1763.67  762.46 1765.06  762.32
  1776.2  761.68  1785.1  760.76 1785.65  760.76 1787.57  760.79 1790.32  760.67
 1803.18  759.88 1806.51  756.42 1807.23   755.7 1807.42  755.51 1810.47  752.45
 1811.43  750.05 1814.28  749.14 1820.29   746.9    1828  739.69    1836  738.69
    1845  739.69 1853.88   746.9 1855.07  750.61 1858.77  754.01 1863.61  756.04
 1866.32  758.11 1876.95  759.18 1888.07     760 1890.23  760.16 1899.94  761.09
 1912.33  763.11 1932.41  764.27 1938.89  764.89 1972.53  768.65 1980.62  769.99
 1987.79  770.77 1991.77   771.4 2012.01  774.51 2016.48  775.01 2018.09   775.2
 2021.54  775.48 2036.65  777.47  2048.7  778.44 2049.91  778.36 2059.78   777.8
 2068.92  777.52 2069.39  777.51 2069.88  777.49  2075.4   777.5 2081.23  777.61
 2094.51  777.41 2104.46  777.52 2110.63  778.18 2114.78  778.55 2122.83  779.19
 2128.49  779.38 2134.54  779.47 2145.16  779.37 2151.87  779.76    2158  779.73
 2163.84  779.52 2168.98     779 2189.72  779.03 2196.56  779.16 2199.38  779.18
 2215.45  779.17 2249.69  779.44 2249.96  779.44 2250.02  779.44 2259.78  779.49
 2262.11  779.49 2292.22  779.44 2295.33  779.44 2299.01  779.44 2316.04  779.48
 2319.18   779.5 2348.87  779.47 2356.44  779.63 2381.55   779.4 2383.85   779.4
 2413.46  779.12 2413.69  779.11 2414.14  779.11 2418.01  779.09 2429.94   779.1
 2448.48  779.12 2455.99  779.13 2463.46  779.12 2489.63  779.11 2495.61   779.1
 2502.78   779.1 2516.47  779.09 2527.72  779.09 2534.95  779.06 2556.22  778.98
 2559.29  778.97 2566.04  778.95  2584.8  778.77 2603.59  778.57 2617.98  778.42
 2644.85  778.13 2651.07  778.06 2654.07  778.08 2670.62  778.18 2677.67  778.21
 2680.32  778.22  2706.9  778.11  2731.8  778.12 2743.64  778.18 2763.99  778.16
 2773.23  778.11 2785.35  777.94 2791.71  777.91 2804.64   777.7 2807.13  777.68
 2822.52  777.42 2822.72  777.42 2838.32   777.2  2839.2  777.19  2839.9   777.2
 2856.99  777.34 2858.43  777.35 2873.98  777.48 2876.68   777.5 2879.68  777.53
 2900.32   777.7 2903.03  777.73 2912.58   777.8 2940.56  778.01    2944  778.03
 2956.46  778.13 2965.65   778.2 2978.05   778.5 2990.38  778.79 3006.55  779.18
 3015.12  779.39 3023.37  779.49 3044.44  779.77 3050.79  779.85 3073.76  780.15
  3103.1  780.78 3103.96   780.8 3109.34  780.91 3133.84  781.42 3134.16  781.42
 3134.24  781.43 3137.79  781.58 3148.73  781.99  3161.4  782.37 3170.24  782.75
 3178.69  783.15 3185.88   783.5 3227.07  784.03  3238.3  784.51 3238.68   784.5
 3239.19  784.52 3260.37  784.39 3283.71  785.13 3293.12  785.07 3333.65   785.6
  3333.7   785.6 3333.71   785.6 3333.73   785.6  3342.5  785.34 3348.27  785.73
 3350.87  785.91 3353.42  786.06 3361.03  786.52 3380.62  789.06 3380.98  789.11
 3381.06  789.12 3406.88  791.23 3410.71  792.16 3425.94  796.11 3433.99  799.12
 3447.72  804.11  3462.6  811.33 3469.86  814.28 3477.51  816.95 3496.03  824.55
 3497.61  825.18 3498.37  826.14 3500.61  829.93 3500.79  830.16 3500.88  830.16
 3510.15  830.35

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .148  986.53    .072 1803.18    .042 1866.32     .09 2168.98     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1803.18 1866.32            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   128.9   505.1  798.86       T
  640.66 1592.95  798.04       T
```

Downstream Deck/Roadway Coordinates
num= 14

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1790	760	735	1815	760	735	1819.9	763	735
1820	763	751	1825	763	754	1832	763	755.5
1837	763	756	1843	763	755.5	1849	763	754
1854	763	751	1854.1	763	735	1860	760	735
1870	760	735	1890	760	735			

Downstream Bridge Cross Section Data
Station Elevation Data num= 381

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	834.96	18.02	833.31	30.63	832.13	37.22	831.81	37.85	831.76
40.51	831.65	44.05	831.48	46.8	831.03	53.73	829.84	64.11	828.21
70.9	826.64	70.94	826.62	71.19	826.5	73.76	825.23	77.29	822.76
80.49	821.27	86.5	821.34	87.56	821.19	88.17	821.18	88.85	821.35
97.84	822.44	99.68	822.55	101.81	817.05	102.83	814.39	105.95	814.12
109.24	813.54	113.81	812.3	120.7	810.2	127.66	807.57	142.06	802.78
148.61	800.2	150.54	800.12	153.73	799.12	164.23	794.27	166.56	793.28
166.92	793.13	167.98	791.92	174.94	785.55	179.38	783.7	197.39	775.85
215.3	766.53	219.38	764.26	231.15	759.68	234.97	758.33	252.03	763.73
253.8	764.26	256.39	765.72	269.05	772.79	273.94	773.76	276.48	774.24
278.51	774.24	283.32	774.24	290.99	773.65	292.91	773.5	295.39	772.83
299.25	771.68	322.02	765.3	324.54	764.26	336.09	762.81	357.04	760.43
368.35	760.11	370.03	760.09	389.12	763.79	389.57	763.88	403.54	763.98
435.54	763.69	461.68	763.5	472.02	763.32	476.8	763.34	484.08	763.21
504.99	760.68	525.02	758.78	530.47	758.57	544.2	755.62	548.31	756.37
565.43	756.97	567.45	756.73	574.88	756.6	583.43	754.13	591.59	751.45
598.58	750.64	602.33	749.48	610.29	748.84	613.49	747.76	627.35	756.53
636.42	761.47	638.19	761.22	648.85	759.77	656.74	758.76	659.04	758.53
660.5	758.3	668.41	756.95	686.19	753.83	693.42	753.41	711.37	754.74
713.69	754.49	717.9	752.73	727.64	754.79	735.34	755.8	743.59	758.41
747.85	758.83	754.23	759.44	777.39	764.36	781.15	765.02	792.31	769.53
796.64	771.03	797.33	771.13	841.27	773.47	845.64	773.57	851.18	773.42
871.04	774.1	897.03	775.05	905.64	775.42	915.47	776.83	915.74	776.82
915.76	776.82	927.13	776.62	938.96	775.94	942.98	775.83	955.19	775.68
967.61	774.39	976.25	773.41	979.75	772.85	986.53	771.84	994.95	772
995.08	771.99	997.22	771.96	1004.06	771.58	1004.67	771.56	1005.72	771.54
1008.76	771.37	1011.35	771.31	1013.05	770.95	1024.18	770	1034.12	769.06
1043.05	768.23	1049.06	768.43	1065.73	768.64	1070.54	768.28	1096.86	770.64
1109.65	771.61	1114.81	772.16	1117.75	772.23	1164.61	773.22	1173.16	773.61
1179.3	773.83	1206.45	774.02	1213.63	774.02	1225.17	774.42	1240.3	774.47
1256.81	774.86	1306.51	775.56	1324.59	776.48	1325.75	776.58	1330.68	777.07
1338.32	777.64	1347.79	777.4	1360.89	777.76	1378.25	778.7	1382.68	779
1407.49	779.76	1410.5	779.9	1428.53	781.41	1430.35	781.29	1439.07	782.24
1445.99	782.95	1465.69	784.29	1475.69	785.45	1481.19	785.53	1493.16	785.52
1500.54	785.6	1510.55	785.72	1562.21	786.81	1562.64	786.81	1568.31	786.89
1582.09	787.84	1583.34	788.05	1585.4	788.28	1589.48	788.41	1590.95	788.32
1592.4	788.28	1594.12	788.11	1610.18	786.39	1631.95	783.3	1635.83	782.29
1660.54	774.79	1664.93	773.6	1675.86	771.51	1691.34	768.28	1694.77	767.67
1706.07	766.43	1717.26	764.21	1721.09	763.92	1729.5	763.6	1737.09	763.3
1739.27	763.32	1744.69	762.95	1761.76	762.54	1763.67	762.46	1765.06	762.32
1776.2	761.68	1785.1	760.76	1785.65	760.76	1787.57	760.79	1790.32	760.67
1803.18	759.88	1806.51	756.42	1807.23	755.7	1807.42	755.51	1810.47	752.45
1811.43	750.05	1814.28	749.14	1820.29	746.9	1828	739.69	1836	738.69
1845	739.69	1853.88	746.9	1855.07	750.61	1858.77	754.01	1863.61	756.04
1866.32	758.11	1876.95	759.18	1888.07	760	1890.23	760.16	1899.94	761.09
1912.33	763.11	1932.41	764.27	1938.89	764.89	1972.53	768.65	1980.62	769.99
1987.79	770.77	1991.77	771.4	2012.01	774.51	2016.48	775.01	2018.09	775.2
2021.54	775.48	2036.65	777.47	2048.7	778.44	2049.91	778.36	2059.78	777.8
2068.92	777.52	2069.39	777.51	2069.88	777.49	2075.4	777.5	2081.23	777.61
2094.51	777.41	2104.46	777.52	2110.63	778.18	2114.78	778.55	2122.83	779.19
2128.49	779.38	2134.54	779.47	2145.16	779.37	2151.87	779.76	2158	779.73
2163.84	779.52	2168.98	779	2189.72	779.03	2196.56	779.16	2199.38	779.18
2215.45	779.17	2249.69	779.44	2249.96	779.44	2250.02	779.44	2259.78	779.49
2262.11	779.49	2292.22	779.44	2295.33	779.44	2299.01	779.44	2316.04	779.48
2319.18	779.5	2348.87	779.47	2356.44	779.63	2381.55	779.4	2383.85	779.4
2413.46	779.12	2413.69	779.11	2414.14	779.11	2418.01	779.09	2429.94	779.1
2448.48	779.12	2455.99	779.13	2463.46	779.12	2489.63	779.11	2495.61	779.1
2502.78	779.1	2516.47	779.09	2527.72	779.09	2534.95	779.06	2556.22	778.98
2559.29	778.97	2566.04	778.95	2584.8	778.77	2603.59	778.57	2617.98	778.42
2644.85	778.13	2651.07	778.06	2654.07	778.08	2670.62	778.18	2677.67	778.21
2680.32	778.22	2706.9	778.11	2731.8	778.12	2743.64	778.18	2763.99	778.16
2773.23	778.11	2785.35	777.94	2791.71	777.91	2804.64	777.7	2807.13	777.68

```
 2822.52  777.42 2822.72  777.42 2838.32   777.2  2839.2  777.19  2839.9   777.2
 2856.99  777.34 2858.43  777.35 2873.98  777.48 2876.68   777.5 2879.68  777.53
 2900.32   777.7 2903.03  777.73 2912.58   777.8 2940.56  778.01    2944  778.03
 2956.46  778.13 2965.65   778.2 2978.05   778.5 2990.38  778.79 3006.55  779.18
 3015.12  779.39 3023.37  779.49 3044.44  779.77 3050.79  779.85 3073.76  780.15
  3103.1  780.78 3103.96   780.8 3109.34  780.91 3133.84  781.42 3134.16  781.42
 3134.24  781.43 3137.79  781.58 3148.73  781.99  3161.4  782.37 3170.24  782.75
 3178.69  783.15 3185.88   783.5 3227.07  784.03  3238.3  784.51 3238.68   784.5
 3239.19  784.52 3260.37  784.39 3283.71  785.13 3293.12  785.07 3333.65   785.6
  3333.7   785.6 3333.71   785.6 3333.73   785.6  3342.5  785.34 3348.27  785.73
 3350.87  785.91 3353.42  786.06 3361.03  786.52 3380.62  789.06 3380.98  789.11
 3381.06  789.12 3406.88  791.23 3410.71  792.16 3425.94  796.11 3433.99  799.12
 3447.72  804.11  3462.6  811.33 3469.86  814.28 3477.51  816.95 3496.03  824.55
 3497.61  825.18 3498.37  826.14 3500.61  829.93 3500.79  830.16 3500.88  830.16
 3510.15  830.35

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .148  986.53    .072 1803.18    .042 1866.32     .09 2168.98     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1803.18 1866.32             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  115.68  487.06  799.36       T
  640.66 1588.55  800.78       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. US. (ft)          *     768.86  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     768.40  * E.G. Elev (ft)         *     768.79  *     768.76  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     768.51  *     768.48  *
* Q Bridge (cfs)         *    2481.58  * Crit W.S. (ft)         *     761.97  *     761.95  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.82  *      29.79  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.53  *       3.43  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3741.90  *    3853.19  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *       0.12  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   28131.66  *   28416.79  *
* Min El Weir Flow (ft)  *     747.77  * Hydr Depth (ft)        *       8.98  *       8.87  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *     508.26  *     526.09  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *   256061.5  *   258037.4  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *     830.82  *     827.49  *
* BR Open Area (sq ft)   *     446.33  * Frctn Loss (ft)        *       0.03  *       0.01  *
* BR Open Vel (ft/s)     *       5.56  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.22  *       1.20  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.31  *       4.10  *
*******************************************************************************************
```

```
Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     772.82  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     772.29  * E.G. Elev (ft)         *     772.74  *     772.71  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     772.45  *     772.43  *
* Q Bridge (cfs)         *    2130.55  * Crit W.S. (ft)         *     763.56  *     763.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.76  *      33.74  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.71  *       3.59  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5474.24  *    5660.75  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *       0.11  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   47167.77  *   48051.44  *
* Min El Weir Flow (ft)  *     747.77  * Hydr Depth (ft)        *      11.82  *      11.77  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *     555.56  *     573.58  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)       *  450577.7  *   458019.8  *
* Delta WS (ft)          *       0.14  * Top Width (ft)          *    1063.06  *    1061.85  *
* BR Open Area (sq ft)   *     446.33  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.77  * C & E Loss (ft)         *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.25  *       1.21  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.63  *       4.34  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     775.62  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     775.04  * E.G. Elev (ft)         *     775.53  *     775.50  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     775.22  *     775.21  *
* Q Bridge (cfs)         *    1974.54  * Crit W.S. (ft)         *     765.02  *     765.10  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.53  *      36.52  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.87  *       3.74  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6802.51  *    7040.92  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *       0.11  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   65044.43  *   66512.85  *
* Min El Weir Flow (ft)  *     747.77  * Hydr Depth (ft)        *      13.75  *      13.73  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *     587.69  *     605.72  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)       *  622501.1  *   634605.8  *
* Delta WS (ft)          *       0.15  * Top Width (ft)          *    1384.36  *    1383.31  *
* BR Open Area (sq ft)   *     446.33  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.42  * C & E Loss (ft)         *       0.01  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.29  *       1.25  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.00  *       4.67  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     778.75  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     778.13  * E.G. Elev (ft)         *     778.65  *     778.63  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     778.33  *     778.32  *
```

```
* Q Bridge (cfs)         *    1847.33  * Crit W.S. (ft)         *     766.26  *     766.29  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.64  *      39.63  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.96  *       3.83  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8586.73  *    8880.56  *
* Weir Submerg           *             * Froude # Chl           *       0.11  *       0.11  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   89821.53  *   92106.77  *
* Min El Weir Flow (ft)  *     747.77  * Hydr Depth (ft)        *       9.13  *       9.28  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *    1033.83  *    1051.06  *
* Delta EG (ft)          *       0.17  * Conv. Total (cfs)      *   849764.9  *   867782.2  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *    1984.32  *    1983.26  *
* BR Open Area (sq ft)   *     446.33  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.14  * C & E Loss (ft)        *       0.01  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.83  *       0.81  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.29  *       3.10  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     782.55  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     781.96  * E.G. Elev (ft)         *     782.45  *     782.43  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     782.17  *     782.17  *
* Q Bridge (cfs)         *    1628.85  * Crit W.S. (ft)         *     767.80  *     767.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.48  *      43.48  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.15  *       3.07  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   14148.03  *   14509.86  *
* Weir Submerg           *             * Froude # Chl           *       0.09  *       0.08  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  133404.60  *  136951.80  *
* Min El Weir Flow (ft)  *     747.77  * Hydr Depth (ft)        *       8.55  *       8.68  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *    1748.47  *    1766.50  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *  1251829.0  *  1277898.0  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *    2774.12  *    2773.94  *
* BR Open Area (sq ft)   *     446.33  * Frctn Loss (ft)        *       0.01  *       0.01  *
* BR Open Vel (ft/s)     *       3.65  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.64  *       0.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.01  *       1.91  *
*********************************************************************************************

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations.
         However, the error was small enough that the solution was treated as valid.
Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     785.07  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     784.53  * E.G. Elev (ft)         *     784.97  *     784.96  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     784.73  *     784.73  *
* Q Bridge (cfs)         *    1495.39  * Crit W.S. (ft)         *     768.99  *     768.92  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.04  *      46.04  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.90  *       2.84  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   18509.22  *   18916.92  *
* Weir Submerg           *             * Froude # Chl           *       0.08  *       0.08  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  175746.90  *  180280.30  *
* Min El Weir Flow (ft)  *     747.77  * Hydr Depth (ft)        *      10.37  *      10.49  *
* Min El Prs (ft)        *     756.00  * W.P. Total (ft)        *    1879.42  *    1897.45  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *  1643709.0  *  1675731.0  *
* Delta WS (ft)          *       0.14  * Top Width (ft)         *    2941.80  *    2941.62  *
* BR Open Area (sq ft)   *     446.33  * Frctn Loss (ft)        *       0.01  *       0.01  *
* BR Open Vel (ft/s)     *       3.35  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.66  *       0.64  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.90  *       1.81  *
*********************************************************************************************

Note:    The weir over a bridge is submerged, the energy answer was used.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
```

orifice flow equation was used for pressure flow.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	787.08	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	786.57	E.G. Elev (ft)	786.98	786.97
Q Total (cfs)	62000.00	W.S. Elev (ft)	786.76	786.76
Q Bridge (cfs)	1414.71	Crit W.S. (ft)	769.92	769.79
Q Weir (cfs)		Max Chl Dpth (ft)	48.07	48.07
Weir Sta Lft (ft)		Vel Total (ft/s)	2.78	2.73
Weir Sta Rgt (ft)		Flow Area (sq ft)	22269.07	22713.10
Weir Submerg		Froude # Chl	0.07	0.07
Weir Max Depth (ft)		Specif Force (cu ft)	217695.40	223092.80
Min El Weir Flow (ft)	747.77	Hydr Depth (ft)	11.77	11.89
Min El Prs (ft)	756.00	W.P. Total (ft)	1986.55	2004.66
Delta EG (ft)	0.14	Conv. Total (cfs)	2006332.0	2043383.0
Delta WS (ft)	0.13	Top Width (ft)	3142.35	3142.11
BR Open Area (sq ft)	446.33	Frctn Loss (ft)	0.01	0.01
BR Open Vel (ft/s)	3.17	C & E Loss (ft)	0.00	0.03
Coef of Q		Shear Total (lb/sq ft)	0.67	0.65
Br Sel Method	Energy only	Power Total (lb/ft s)	1.86	1.78

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations. However, the error was small enough that the solution was treated as valid.
Note: The weir over a bridge is submerged, the energy answer was used.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	789.70	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	789.23	E.G. Elev (ft)	789.62	789.60
Q Total (cfs)	74720.00	W.S. Elev (ft)	789.41	789.41
Q Bridge (cfs)	1329.11	Crit W.S. (ft)	771.25	771.09
Q Weir (cfs)		Max Chl Dpth (ft)	50.72	50.72
Weir Sta Lft (ft)		Vel Total (ft/s)	2.73	2.68
Weir Sta Rgt (ft)		Flow Area (sq ft)	27334.11	27830.63
Weir Submerg		Froude # Chl	0.07	0.07
Weir Max Depth (ft)		Specif Force (cu ft)	284434.10	291064.30
Min El Weir Flow (ft)	747.77	Hydr Depth (ft)	14.18	14.28
Min El Prs (ft)	756.00	W.P. Total (ft)	2022.29	2044.82
Delta EG (ft)	0.13	Conv. Total (cfs)	2576220.0	2613703.0
Delta WS (ft)	0.12	Top Width (ft)	3213.87	3213.82
BR Open Area (sq ft)	446.33	Frctn Loss (ft)	0.01	0.01
BR Open Vel (ft/s)	2.98	C & E Loss (ft)	0.00	0.03
Coef of Q		Shear Total (lb/sq ft)	0.71	0.69
Br Sel Method	Energy only	Power Total (lb/ft s)	1.94	1.86

Note: The weir over a bridge is submerged, the energy answer was used.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	780.19	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	779.52	E.G. Elev (ft)	780.19	780.11
Q Total (cfs)	38000.00	W.S. Elev (ft)	779.52	779.46
Q Bridge (cfs)	2445.98	Crit W.S. (ft)	766.82	766.81
Q Weir (cfs)	35554.02	Max Chl Dpth (ft)	40.83	40.77
Weir Sta Lft (ft)	505.10	Vel Total (ft/s)	3.83	3.74
Weir Sta Rgt (ft)	3075.78	Flow Area (sq ft)	9911.13	10155.61
Weir Submerg	0.94	Froude # Chl	0.11	0.11
Weir Max Depth (ft)	32.43	Specif Force (cu ft)	101437.10	103588.20
Min El Weir Flow (ft)	747.77	Hydr Depth (ft)	6.69	7.13
Min El Prs (ft)	756.00	W.P. Total (ft)	1575.87	1518.03
Delta EG (ft)	0.08	Conv. Total (cfs)		
Delta WS (ft)	0.05	Top Width (ft)	2556.96	2479.16
BR Open Area (sq ft)	446.33	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.48	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)		

```
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *              *              *
*****************************************************************************************

Warning: The pressure flow/weir flow answer did not converge within the given number of iterations.
         However, the error was small enough that the solution was treated as valid.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    For the cross section inside the bridge at the downstream end, the water surface and energy
         have been projected from the downstream cross section.  The selected bridge modeling
         method does not compute answers inside the bridge.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 15.357

INPUT
Description: D/S of Golf Bridge 1
Station Elevation Data    num=     381
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  834.96   18.02  833.31   30.63  832.13   37.22  831.81   37.85  831.76
   40.51  831.65   44.05  831.48    46.8  831.03   53.73  829.84   64.11  828.21
    70.9  826.64   70.94  826.62   71.19   826.5   73.76  825.23   77.29  822.76
   80.49  821.27    86.5  821.34   87.56  821.19   88.17  821.18   88.85  821.35
   97.84  822.44   99.68  822.55  101.81  817.05  102.83  814.39  105.95  814.12
  109.24  813.54  113.81   812.3   120.7   810.2  127.66  807.57  142.06  802.78
  148.61   800.2  150.54  800.12  153.73  799.12  164.23  794.27  166.56  793.28
  166.92  793.13  167.98  791.92  174.94  785.55  179.38   783.7  197.39  775.85
   215.3  766.53  219.38  764.26  231.15  759.68  234.97  758.33  252.03  763.73
   253.8  764.26  256.39  765.72  269.05  772.79  273.94  773.76  276.48  774.24
  278.51  774.24  283.32  774.24  290.99  773.65  292.91   773.5  295.39  772.83
  299.25  771.68  322.02   765.3  324.54  764.26  336.09  762.81  357.04  760.43
  368.35  760.11  370.03  760.09  389.12  763.79  389.57  763.88  403.54  763.98
  435.54  763.69  461.68   763.5  472.02  763.32   476.8  763.34  484.08  763.21
  504.99  760.68  525.02  758.78  530.47  758.57   544.2  755.62  548.31  756.37
  565.43  756.97  567.45  756.73  574.88   756.6  583.43  754.13  591.59  751.45
  598.58  750.64  602.33  749.48  610.29  748.84  613.49  747.76  627.35  756.53
  636.42  761.47  638.19  761.22  648.85  759.77  656.74  758.76  659.04  758.53
   660.5   758.3  668.41  756.95  686.19  753.83  693.42  753.41  711.37  754.74
  713.69  754.49   717.9  752.73  727.64  754.79  735.34   755.8  743.59  758.41
  747.85  758.83  754.23  759.44  777.39  764.36  781.15  765.02  792.31  769.53
  796.64  771.03  797.33  771.13  841.27  773.47  845.64  773.57  851.18  773.42
  871.04   774.1  897.03  775.05  905.64  775.42  915.47  776.83  915.74  776.82
  915.76  776.82  927.13  776.62  938.96  775.94  942.98  775.83  955.19  775.68
  967.61  774.39  976.25  773.41  979.75  772.85  986.53  771.84  994.95     772
  995.08  771.99  997.22  771.96 1004.06  771.58 1004.67  771.56 1005.72  771.54
 1008.76  771.37 1011.35  771.31 1013.05  770.95 1024.18     770 1034.12  769.06
 1043.05  768.23 1049.06  768.43 1065.73  768.64 1070.54  768.28 1096.86  770.64
 1109.65  771.61 1114.81  772.16 1117.75  772.23 1164.61  773.22 1173.16  773.61
  1179.3  773.83 1206.45  774.02 1213.63  774.02 1225.17  774.42  1240.3  774.47
 1256.81  774.86 1306.51  775.56 1324.59  776.48 1325.75  776.58 1330.68  777.07
 1338.32  777.64 1347.79   777.4 1360.89  777.76 1378.25   778.7 1382.68     779
 1407.49  779.76  1410.5   779.9 1428.53  781.41 1430.35  781.29 1439.07  782.24
 1445.99  782.95 1465.69  784.29 1475.69  785.45 1481.19  785.53 1493.16  785.52
 1500.54   785.6 1510.55  785.72 1562.21  786.81 1562.64  786.81 1568.31  786.89
 1582.09  787.84 1583.34  788.05  1585.4  788.28 1589.48  788.41 1590.95  788.32
  1592.4  788.28 1594.12  788.11 1610.18  786.39 1631.95   783.3 1635.83  782.29
 1660.54  774.79 1664.93   773.6 1675.86  771.51 1691.34  768.28 1694.77  767.67
 1706.07  766.43 1717.26  764.21 1721.09  763.92  1729.5   763.6 1737.09   763.3
 1739.27  763.32 1744.69  762.95 1761.76  762.54 1763.67  762.46 1765.06  762.32
  1776.2  761.68  1785.1  760.76 1785.65  760.76 1787.57  760.79 1790.32  760.67
 1803.18  759.88 1806.51  756.42 1807.23   755.7 1807.42  755.51 1810.47  752.45
 1811.43  750.05 1814.28  749.14 1820.29   746.9    1828  739.69    1836  738.69
    1845  739.69 1853.88   746.9 1855.07  750.61 1858.77  754.01 1863.61  756.04
 1866.32  758.11 1876.95  759.18 1888.07     760 1890.23  760.16 1899.94  761.09
 1912.33  763.11 1932.41  764.27 1938.89  764.89 1972.53  768.65 1980.62  769.99
 1987.79  770.77 1991.77   771.4 2012.01  774.51 2016.48  775.01 2018.09   775.2
 2021.54  775.48 2036.65  777.47  2048.7  778.44 2049.91  778.36 2059.78   777.8
 2068.92  777.52 2069.39  777.51 2069.88  777.49  2075.4   777.5 2081.23  777.61
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 2094.51  777.41 2104.46  777.52 2110.63  778.18 2114.78  778.55 2122.83  779.19
 2128.49  779.38 2134.54  779.47 2145.16  779.37 2151.87  779.76    2158  779.73
 2163.84  779.52 2168.98     779 2189.72  779.03 2196.56  779.16 2199.38  779.18
 2215.45  779.17 2249.69  779.44 2249.96  779.44 2250.02  779.44 2259.78  779.49
 2262.11  779.49 2292.22  779.44 2295.33  779.44 2299.01  779.44 2316.04  779.48
 2319.18   779.5 2348.87  779.47 2356.44  779.63 2381.55   779.4 2383.85   779.4
 2413.46  779.12 2413.69  779.11 2414.14  779.11 2418.01  779.09 2429.94   779.1
 2448.48  779.12 2455.99  779.13 2463.46  779.12 2489.63  779.11 2495.61   779.1
 2502.78   779.1 2516.47  779.09 2527.72  779.09 2534.95  779.06 2556.22  778.98
 2559.29  778.97 2566.04  778.95  2584.8  778.77 2603.59  778.57 2617.98  778.42
 2644.85  778.13 2651.07  778.06 2654.07  778.08 2670.62  778.18 2677.67  778.21
 2680.32  778.22  2706.9  778.11  2731.8  778.12 2743.64  778.18 2763.99  778.16
 2773.23  778.11 2785.35  777.94 2791.71  777.91 2804.64   777.7 2807.13  777.68
 2822.52  777.42 2822.72  777.42 2838.32   777.2  2839.2  777.19  2839.9   777.2
 2856.99  777.34 2858.43  777.35 2873.98  777.48 2876.68   777.5 2879.68  777.53
 2900.32   777.7 2903.03  777.73 2912.58   777.8 2940.56  778.01    2944  778.03
 2956.46  778.13 2965.65   778.2 2978.05   778.5 2990.38  778.79 3006.55  779.18
 3015.12  779.39 3023.37  779.49 3044.44  779.77 3050.79  779.85 3073.76  780.15
  3103.1  780.78 3103.96   780.8 3109.34  780.91 3133.84  781.42 3134.16  781.42
 3134.24  781.43 3137.79  781.58 3148.73  781.99  3161.4  782.37 3170.24  782.75
 3178.69  783.15 3185.88   783.5 3227.07  784.03  3238.3  784.51 3238.68   784.5
 3239.19  784.52 3260.37  784.39 3283.71  785.13 3293.12  785.07 3333.65   785.6
  3333.7   785.6 3333.71   785.6 3333.73   785.6  3342.5  785.34 3348.27  785.73
 3350.87  785.91 3353.42  786.06 3361.03  786.52 3380.62  789.06 3380.98  789.11
 3381.06  789.12 3406.88  791.23 3410.71  792.16 3425.94  796.11 3433.99  799.12
 3447.72  804.11  3462.6  811.33 3469.86  814.28 3477.51  816.95 3496.03  824.55
 3497.61  825.18 3498.37  826.14 3500.61  829.93 3500.79  830.16 3500.88  830.16
 3510.15  830.35

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .148  986.53    .072 1803.18    .042 1866.32     .09 2168.98     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1803.18 1866.32           425.93 1356.95   17.81             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  115.68  487.06  799.36       T
  640.66 1588.55  800.78       T

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  768.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.46  * Wt. n-Val.              *   0.128  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  768.27  * Reach Len. (ft)        *  425.93  * 1356.95  *   17.81  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 2395.17  * 1364.96  *  533.86  *
* E.G. Slope (ft/ft)      *0.000767  * Area (sq ft)           * 5106.51  * 1364.96  *  533.86  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             * 3539.54  * 8930.97  *  729.49  *
* Top Width (ft)          *  805.93  * Top Width (ft)         *  640.01  *   63.14  *  102.78  *
* Vel Total (ft/s)        *    3.07  * Avg. Vel. (ft/s)       *    1.48  *    6.54  *    1.37  *
* Max Chl Dpth (ft)       *   29.58  * Hydr. Depth (ft)       *    9.03  *   21.62  *    5.19  *
* Conv. Total (cfs)       *476648.7  * Conv. (cfs)            *127811.9  *322495.2  * 26341.7  *
* Length Wtd. (ft)        * 1149.78  * Wetted Per. (ft)       *  271.52  *   79.09  *  103.33  *
* Min Ch El (ft)          *  738.69  * Shear (lb/sq ft)       *    0.42  *    0.83  *    0.25  *
* Alpha                   *    3.14  * Stream Power (lb/ft s) *    0.62  *    5.41  *    0.34  *
* Frctn Loss (ft)         *    0.87  * Cum Volume (acre-ft)   *  183.19  * 4561.16  *  224.16  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   36.38  *  375.17  *   57.25  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  772.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.53  * Wt. n-Val.              *   0.121  *   0.042  *   0.090  *
* W.S. Elev (ft)          *  772.15  * Reach Len. (ft)        *  425.93  * 1356.95  *   17.81  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 3461.71  * 1610.10  *  987.20  *
* E.G. Slope (ft/ft)      *0.000792  * Area (sq ft)           * 7979.67  * 1610.10  *  987.20  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 6590.21  *11948.60  * 1761.19  *
* Top Width (ft)          * 1036.58  * Top Width (ft)         *  843.12  *   63.14  *  130.33  *
* Vel Total (ft/s)        *    3.35  * Avg. Vel. (ft/s)       *    1.90  *    7.42  *    1.78  *
* Max Chl Dpth (ft)       *   33.46  * Hydr. Depth (ft)       *   12.18  *   25.50  *    7.57  *
* Conv. Total (cfs)       *721535.8  * Conv. (cfs)            *234239.9  *424696.8  * 62599.2  *
* Length Wtd. (ft)        * 1079.22  * Wetted Per. (ft)       *  290.81  *   79.09  *  131.16  *
* Min Ch El (ft)          *  738.69  * Shear (lb/sq ft)       *    0.59  *    1.01  *    0.37  *
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* Alpha                  *    3.02  * Stream Power (lb/ft s) *    1.12  *    7.47  *    0.66  *
* Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   *  375.07  * 6197.46  *  479.53  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   64.61  *  414.67  *   84.74  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  775.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.117  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  774.90  * Reach Len. (ft)        *  425.93  * 1356.95  *   17.81  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4261.00  * 1783.54  * 1369.94  *
* E.G. Slope (ft/ft)     *0.000798  * Area (sq ft)           *10663.51  * 1783.54  * 1369.94  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 9297.93  *14231.77  * 2790.30  *
* Top Width (ft)         * 1345.52  * Top Width (ft)         * 1133.24  *   63.14  *  149.14  *
* Vel Total (ft/s)       *    3.55  * Avg. Vel. (ft/s)       *    2.18  *    7.98  *    2.04  *
* Max Chl Dpth (ft)      *   36.21  * Hydr. Depth (ft)       *   14.37  *   28.25  *    9.19  *
* Conv. Total (cfs)      *931444.0  * Conv. (cfs)            *329046.3  *503651.2  * 98746.5  *
* Length Wtd. (ft)       * 1038.06  * Wetted Per. (ft)       *  303.45  *   79.09  *  150.17  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)       *    0.70  *    1.12  *    0.45  *
* Alpha                  *    2.90  * Stream Power (lb/ft s) *    1.53  *    8.97  *    0.93  *
* Frctn Loss (ft)        *    0.94  * Cum Volume (acre-ft)   *  563.32  * 7554.98  *  806.51  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   86.67  *  442.50  *  153.29  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  778.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.114  *   0.042  *   0.090  *
* W.S. Elev (ft)         *  777.98  * Reach Len. (ft)        *  425.93  * 1356.95  *   17.81  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5190.18  * 1978.02  * 1949.67  *
* E.G. Slope (ft/ft)     *0.000799  * Area (sq ft)           *14511.59  * 1978.02  * 1949.67  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *12878.58  *16917.15  * 4204.27  *
* Top Width (ft)         * 1770.67  * Top Width (ft)         * 1325.51  *   63.14  *  382.01  *
* Vel Total (ft/s)       *    3.73  * Avg. Vel. (ft/s)       *    2.48  *    8.55  *    2.16  *
* Max Chl Dpth (ft)      *   39.29  * Hydr. Depth (ft)       *   16.92  *   31.33  *    5.10  *
* Conv. Total (cfs)      *1202807.0  * Conv. (cfs)            *455601.0  *598472.4  *148733.0  *
* Length Wtd. (ft)       *  996.44  * Wetted Per. (ft)       *  314.06  *   79.09  *  383.27  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)       *    0.82  *    1.25  *    0.25  *
* Alpha                  *    2.83  * Stream Power (lb/ft s) *    2.05  *   10.67  *    0.55  *
* Frctn Loss (ft)        *    0.95  * Cum Volume (acre-ft)   *  855.74  * 8966.20  * 1383.24  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  122.30  *  465.23  *  229.50  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  782.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.111  *   0.042  *   0.102  *
* W.S. Elev (ft)         *  781.81  * Reach Len. (ft)        *  425.93  * 1356.95  *   17.81  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 6389.67  * 2219.95  * 5835.55  *
* E.G. Slope (ft/ft)     *0.000730  * Area (sq ft)           *19779.98  * 2219.95  * 5835.55  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *17277.20  *19596.52  * 7626.29  *
* Top Width (ft)         * 2757.84  * Top Width (ft)         * 1417.15  *   63.14  * 1277.56  *
* Vel Total (ft/s)       *    3.08  * Avg. Vel. (ft/s)       *    2.70  *    8.83  *    1.31  *
* Max Chl Dpth (ft)      *   43.12  * Hydr. Depth (ft)       *   20.01  *   35.16  *    4.57  *
* Conv. Total (cfs)      *1647195.0  * Conv. (cfs)            *639526.1  *725377.3  *282291.8  *
* Length Wtd. (ft)       *  936.92  * Wetted Per. (ft)       *  327.25  *   79.09  * 1279.00  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)       *    0.89  *    1.28  *    0.21  *
* Alpha                  *    3.95  * Stream Power (lb/ft s) *    2.41  *   11.29  *    0.27  *
* Frctn Loss (ft)        *    0.87  * Cum Volume (acre-ft)   * 1696.00  *11217.65  * 3059.34  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  323.13  *  493.24  *  573.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
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additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	784.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.110	0.042	0.110
W.S. Elev (ft)	784.39	Reach Len. (ft)	425.93	1356.95	17.81
Crit W.S. (ft)		Flow Area (sq ft)	7229.97	2383.28	9244.20
E.G. Slope (ft/ft)	0.000664	Area (sq ft)	23504.95	2383.28	9244.20
Q Total (cfs)	53690.00	Flow (cfs)	19949.82	21036.20	12703.98
Top Width (ft)	2901.20	Top Width (ft)	1467.83	63.14	1370.24
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	2.76	8.83	1.37
Max Chl Dpth (ft)	45.70	Hydr. Depth (ft)	21.74	37.75	6.75
Conv. Total (cfs)	2083904.0	Conv. (cfs)	774325.1	816491.3	493087.4
Length Wtd. (ft)	864.57	Wetted Per. (ft)	340.71	79.09	1371.73
Min Ch El (ft)	738.69	Shear (lb/sq ft)	0.88	1.25	0.28
Alpha	4.17	Stream Power (lb/ft s)	2.43	11.02	0.38
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	2784.45	12539.75	4937.50
C & E Loss (ft)	0.11	Cum SA (acres)	501.54	500.34	914.73

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	786.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.110	0.042	0.113
W.S. Elev (ft)	786.44	Reach Len. (ft)	425.93	1356.95	17.81
Crit W.S. (ft)		Flow Area (sq ft)	7924.60	2512.38	12207.20
E.G. Slope (ft/ft)	0.000627	Area (sq ft)	26581.76	2512.38	12207.20
Q Total (cfs)	62000.00	Flow (cfs)	22179.36	22316.04	17504.60
Top Width (ft)	3120.66	Top Width (ft)	1564.14	63.14	1493.38
Vel Total (ft/s)	2.74	Avg. Vel. (ft/s)	2.80	8.88	1.43
Max Chl Dpth (ft)	47.75	Hydr. Depth (ft)	22.83	39.79	8.17
Conv. Total (cfs)	2476896.0	Conv. (cfs)	886064.1	891524.4	699307.8
Length Wtd. (ft)	805.23	Wetted Per. (ft)	355.37	79.09	1494.93
Min Ch El (ft)	738.69	Shear (lb/sq ft)	0.87	1.24	0.32
Alpha	4.24	Stream Power (lb/ft s)	2.44	11.04	0.46
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	3719.80	13372.98	6726.02
C & E Loss (ft)	0.10	Cum SA (acres)	615.25	501.75	1253.91

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	789.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.109	0.042	0.117
W.S. Elev (ft)	789.11	Reach Len. (ft)	425.93	1356.95	17.81
Crit W.S. (ft)		Flow Area (sq ft)	8884.44	2680.97	16224.13
E.G. Slope (ft/ft)	0.000588	Area (sq ft)	30882.63	2680.97	16224.13
Q Total (cfs)	74720.00	Flow (cfs)	25341.96	24083.29	25294.75
Top Width (ft)	3209.93	Top Width (ft)	1632.13	63.14	1514.66
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)	2.85	8.98	1.56
Max Chl Dpth (ft)	50.42	Hydr. Depth (ft)	24.13	42.46	10.71
Conv. Total (cfs)	3082241.0	Conv. (cfs)	1045370.0	993448.7	1043422.0
Length Wtd. (ft)	728.90	Wetted Per. (ft)	376.64	79.09	1516.38
Min Ch El (ft)	738.69	Shear (lb/sq ft)	0.87	1.24	0.39
Alpha	4.09	Stream Power (lb/ft s)	2.47	11.17	0.61
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	5555.29	14669.57	10300.15
C & E Loss (ft)	0.09	Cum SA (acres)	789.25	503.84	1595.57

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	780.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.113	0.042	0.093
W.S. Elev (ft)	779.46	Reach Len. (ft)	425.93	1356.95	17.81
Crit W.S. (ft)		Flow Area (sq ft)	5650.38	2072.00	2967.77

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* E.G. Slope (ft/ft)     *0.000814  * Area (sq ft)           *16511.98  * 2072.00  * 2967.77  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *14940.84  *18451.74  * 4607.42  *
* Top Width (ft)         * 2479.16  * Top Width (ft)         * 1366.80  *   63.14  * 1049.22  *
* Vel Total (ft/s)       *    3.55  * Avg. Vel. (ft/s)       *    2.64  *    8.91  *    1.55  *
* Max Chl Dpth (ft)      *   40.77  * Hydr. Depth (ft)       *   18.13  *   32.82  *    2.83  *
* Conv. Total (cfs)      *1331644.0  * Conv. (cfs)            *523575.6  *646609.1  *161459.1  *
* Length Wtd. (ft)       *  983.48  * Wetted Per. (ft)       *  319.18  *   79.09  * 1050.62  *
* Min Ch El (ft)         *  738.69  * Shear (lb/sq ft)       *    0.90  *    1.33  *    0.14  *
* Alpha                  *    3.29  * Stream Power (lb/ft s) *    2.38  *   11.86  *    0.22  *
* Frctn Loss (ft)        *    0.96  * Cum Volume (acre-ft)   * 1052.60  * 9716.57  * 1781.68  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  158.91  *  475.60  *  286.47  *
*****************************************************************************************
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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 15.100

INPUT
Description: Ineffective area due to road embankment downstream.
Station Elevation Data num= 353

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	838.77	10.38	837.35	48.11	832.13	50.47	831.86	51.15	831.79
74.51	828.99	77.34	828.78	80.83	828.61	85.84	827.46	86.22	827.35
86.41	827.3	88.2	826.69	98.24	823.68	102.56	821.89	103.6	822.52
107.95	824.84	116.76	822.69	123	821.05	125.76	816.02	127.01	814.3
127.09	814.28	127.16	814.24	127.18	814.24	127.72	814.03	140.65	804.53
141.3	804.11	162.34	796.29	162.75	796.11	163.35	795.77	182.04	785.55
194.36	780.38	198.17	778.85	201.56	778.68	215.2	777.98	215.7	777.95
215.76	777.92	224.11	773.78	232.88	772.3	235.78	771.82	241.15	769.61
254.84	764.26	267.54	761.14	270.72	760.43	272.61	760.4	283.1	760.38
296.18	763.8	297.88	764.26	300.91	765.93	311.64	772.01	315.45	772.58
320.19	773.25	325	773.25	327	773.25	336.77	772.16	337.58	772.09
338.19	771.73	340.48	770.72	355.65	763.59	369.44	757.31	374.58	757.17
380.14	757	381.49	757.6	385	759.01	395.78	758.99	399.24	758.85
401.64	756.79	412.48	747.44	413.06	746.92	413.15	746.88	420	739.24
438	738.24	453	739.24	460.76	746.88	461.47	747.91	463.25	749.59
467.91	751.93	475.33	756.25	490.27	759	492.83	759.42	496.08	760.12
501.67	760.12	503.93	760.13	513.19	760.33	532.03	760.93	542.27	760.98
550.35	760.75	556.58	761	560.68	761.11	571.86	760.95	583.29	760.72
590.94	761.59	601.15	762.65	616.26	764.26	628.43	767.13	649.54	771.62
651.8	772.44	662.18	774.9	663.27	775.19	663.54	775.27	665.15	775.6
683.88	779.51	694.87	781.47	701.32	781.6	702.31	781.67	703.03	781.66
709.63	782.27	712.4	782.64	720.04	783.53	736.3	783.16	753.4	782.67
781.15	782.06	786.37	781.99	798.73	781.34	800.69	781.28	803.98	781.07
825.49	779.09	835.35	778.15	838.95	778.06	849.15	776.59	857.19	776.46
860.6	776.38	865.53	775.95	885.02	773.82	893.36	773.66	916.07	772.39
927.07	772.05	936.87	771.64	944.94	771.24	953.63	770.59	962.92	769.88
977.65	768.66	996.09	768.15	998.59	768.15	1002.72	768.22	1015.78	768.41
1022.18	768.55	1028.62	768.51	1048.17	768.44	1069.25	768.38	1071.55	768.74
1080.69	770.04	1085.38	770.31	1091.77	770.67	1096.99	770.64	1100.97	770.7
1105.11	770.76	1108.56	770.6	1110.87	770.43	1112.5	770.31	1114.18	770.21
1120.49	768.95	1130.91	768.97	1133.52	768.94	1146.13	769.98	1150.29	770.82
1168.27	773	1169.86	773.21	1172.75	773.43	1182.73	774.77	1187.63	775.35
1195.95	776.48	1206.44	777.95	1211.2	778.65	1220.72	778.61	1231.51	777.67
1233.97	777.69	1254.26	778.66	1254.55	778.67	1254.93	778.73	1255.23	778.74
1273.13	779.48	1278.76	778.79	1286	778.79	1291.42	778.73	1292.24	778.7
1292.6	778.64	1294.5	778.69	1304.49	779.62	1308.67	779.66	1316.32	780.25
1331.26	780.78	1344.68	781.7	1363.21	781.37	1371.31	781.68	1385.85	782.44
1404.55	782.92	1419.11	783.23	1429.2	783.7	1442.38	784.96	1444.81	785.16
1460.23	785.91	1463.87	786.1	1469.59	786.53	1476.56	787.48	1488.54	788.41
1490.58	788.13	1493.39	787.84	1500.74	786.82	1506.26	786.74	1517.27	786.16
1518.55	785.98	1538.36	784.24	1538.42	784.23	1544.13	784.11	1547.76	784.05
1553.49	783.13	1558.7	782.31	1563.16	782.12	1586.13	781.47	1593.21	781.07
1603.3	780.75	1605.32	780.66	1609.26	780.57	1614.6	780.48	1621.46	780.07
1626.33	779.73	1626.52	779.72	1640.3	779.53	1642.6	779.46	1659.09	779.43
1661.33	779.35	1679.2	779.35	1680.14	779.35	1687.96	779.36	1697.93	779.37
1698.52	779.37	1715.59	779.4	1717.23	779.4	1720.32	779.41	1746.97	779.44

```
 1753.75  779.45 1776.71  779.48 1788.01  779.49 1794.11   779.5 1804.46  779.51
 1811.51  779.52 1829.37  779.53 1846.33  779.55 1867.22  779.51 1877.45  779.48
 1905.74  779.42 1908.61  779.41 1911.19  779.42 1923.16  779.42 1929.68  779.42
 1944.37  779.41  1950.8  779.41 1956.39   779.4 1976.43  779.35 1981.38  779.34
 1988.39  779.33 1994.42  779.32 2000.04  779.31 2017.66  779.27 2022.42  779.26
 2027.81  779.23 2050.89  779.11 2051.56  779.11  2054.9  779.09 2058.69  779.07
 2060.46  779.06 2079.48  778.92 2096.14  778.78 2112.76  778.64 2134.63  778.45
 2145.95  778.33 2167.04  778.45  2173.1  778.49 2181.88  778.45  2202.7  778.37
  2216.8  778.38 2238.79  778.39 2258.63  778.39 2269.48  778.39 2281.35  778.23
 2285.97  778.16 2298.99  777.98 2302.48  777.94 2316.64  777.74 2318.98  777.71
 2321.04  777.68 2335.49  777.49 2347.13  777.59 2347.51  777.59 2352.18  777.63
 2358.92  777.68 2359.32  777.69 2359.76  777.69 2373.69   777.8 2374.99  777.81
 2387.14   777.9 2389.18  777.92 2391.72  777.94 2399.28     778 2418.73  778.14
 2430.65  778.22 2446.17  778.33 2462.03  778.44 2480.34  778.86 2486.76  779.01
 2509.55  779.54 2511.49  779.58 2537.01  779.88  2540.8  779.92 2562.97  780.18
  2570.1  780.27 2587.47   780.6 2599.91  780.84 2611.91  781.07 2630.19  781.42
 2630.46  781.43 2630.81  781.44 2636.62  781.69 2648.89  782.14 2650.88  782.21
 2653.85  782.31 2660.94  782.61 2672.63  783.06 2676.38  783.17 2712.78  783.57
 2726.07  783.79 2727.66  783.77 2738.01  784.04 2748.67  783.98 2786.19  785.18
 2786.21  785.18 2826.73   785.6 2833.89  785.48 2834.27  785.48  2835.3  785.51
 2842.07  785.95 2844.42  786.09 2852.93   786.6  2861.7  787.42 2872.77  788.72
 2879.96  789.95 2895.37  791.21 2909.93  794.73 2915.27  796.11 2925.85  800.05
 2936.75  804.11 2941.79  806.21  2950.2  810.26 2956.78  813.52 2960.24  815.05
 2966.86  817.51 2975.98  820.67 2982.33  823.27 2990.14  826.38 2993.89  831.09
 2994.15  831.54 2996.16  831.55 3001.32   831.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  399.24    .042  496.08     .15  649.54     .09 1720.32     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       399.24  496.08          416.32  409.51    12.2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   53.96  327.64  790.06       T
  734.46 1488.77  792.67       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  767.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  767.26  * Reach Len. (ft)        *  416.32  *  409.51  *   12.20  *
* Crit W.S. (ft)         *  753.76  * Flow Area (sq ft)      *  379.11  * 1905.63  *  746.41  *
* E.G. Slope (ft/ft)     *0.000740  * Area (sq ft)           *  635.39  * 1905.63  *  746.41  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  374.61  *12191.87  *  633.51  *
* Top Width (ft)         *  337.30  * Top Width (ft)         *  107.50  *   96.84  *  132.96  *
* Vel Total (ft/s)       *    4.35  * Avg. Vel. (ft/s)       *    0.99  *    6.40  *    0.85  *
* Max Chl Dpth (ft)      *   29.02  * Hydr. Depth (ft)       *    7.38  *   19.68  *    5.61  *
* Conv. Total (cfs)      *485257.9  * Conv. (cfs)            * 13771.6  *448197.2  * 23289.2  *
* Length Wtd. (ft)       *  384.94  * Wetted Per. (ft)       *   53.99  *  111.18  *  133.53  *
* Min Ch El (ft)         *  738.24  * Shear (lb/sq ft)       *    0.32  *    0.79  *    0.26  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    0.32  *    5.07  *    0.22  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *  155.12  * 4510.21  *  223.90  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   32.73  *  372.68  *   57.20  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  771.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  770.84  * Reach Len. (ft)        *  416.32  *  409.51  *   12.20  *
* Crit W.S. (ft)         *  758.23  * Flow Area (sq ft)      *  576.58  * 2252.03  * 1252.10  *
* E.G. Slope (ft/ft)     *0.000923  * Area (sq ft)           * 1061.08  * 2252.03  * 1584.45  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  764.11  *17989.95  * 1545.93  *
* Top Width (ft)         *  577.16  * Top Width (ft)         *  130.43  *   96.84  *  349.89  *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)       *    1.33  *    7.99  *    1.23  *
* Max Chl Dpth (ft)      *   32.60  * Hydr. Depth (ft)       *    9.77  *   23.26  *    8.36  *
* Conv. Total (cfs)      *668078.3  * Conv. (cfs)            * 25147.2  *592054.0  * 50877.1  *
* Length Wtd. (ft)       *  368.51  * Wetted Per. (ft)       *   62.41  *  111.18  *  150.72  *
* Min Ch El (ft)         *  738.24  * Shear (lb/sq ft)       *    0.53  *    1.17  *    0.48  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    0.71  *    9.33  *    0.59  *
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* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *  330.87  * 6137.30  *  479.01  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   59.85  *  412.18  *   84.64  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  774.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *   0.150  *   0.042  *   0.150  *
* W.S. Elev (ft)         *  773.35  * Reach Len. (ft)        *  416.32  *  409.51  *   12.20  *
* Crit W.S. (ft)         *  761.30  * Flow Area (sq ft)      *  737.18  * 2495.38  * 1641.03  *
* E.G. Slope (ft/ft)     *0.001045  * Area (sq ft)           * 1423.80  * 2495.38  * 2565.60  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1080.11  *22710.38  * 2529.52  *
* Top Width (ft)         *  701.79  * Top Width (ft)         *  172.58  *   96.84  *  432.37  *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *    1.47  *    9.10  *    1.54  *
* Max Chl Dpth (ft)      *   35.11  * Hydr. Depth (ft)       *   10.30  *   25.77  *   10.28  *
* Conv. Total (cfs)      *814131.6  * Conv. (cfs)            * 33409.9  *702478.5  * 78243.2  *
* Length Wtd. (ft)       *  358.36  * Wetted Per. (ft)       *   75.33  *  111.18  *  160.83  *
* Min Ch El (ft)         *  738.24  * Shear (lb/sq ft)       *    0.64  *    1.46  *    0.67  *
* Alpha                  *    2.46  * Stream Power (lb/ft s) *    0.94  *   13.33  *    1.03  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  504.22  * 7488.33  *  805.71  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *   80.29  *  440.00  *  153.17  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  777.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.36  * Wt. n-Val.             *   0.150  *   0.042  *   0.149  *
* W.S. Elev (ft)         *  776.20  * Reach Len. (ft)        *  416.32  *  409.51  *   12.20  *
* Crit W.S. (ft)         *  763.97  * Flow Area (sq ft)      *  941.56  * 2771.80  * 2113.72  *
* E.G. Slope (ft/ft)     *0.001146  * Area (sq ft)           * 1929.07  * 2771.80  * 3910.83  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1700.67  *28333.50  * 3965.84  *
* Top Width (ft)         *  780.14  * Top Width (ft)         *  180.02  *   96.84  *  503.28  *
* Vel Total (ft/s)       *    5.83  * Avg. Vel. (ft/s)       *    1.81  *   10.22  *    1.88  *
* Max Chl Dpth (ft)      *   37.96  * Hydr. Depth (ft)       *   13.15  *   28.62  *   12.29  *
* Conv. Total (cfs)      *1004276.0  * Conv. (cfs)            * 50233.4  *836901.2  *117141.0  *
* Length Wtd. (ft)       *  348.62  * Wetted Per. (ft)       *   75.33  *  111.18  *  173.57  *
* Min Ch El (ft)         *  738.24  * Shear (lb/sq ft)       *    0.89  *    1.78  *    0.87  *
* Alpha                  *    2.57  * Stream Power (lb/ft s) *    1.62  *   18.24  *    1.64  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  775.36  * 8892.22  * 1382.04  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *  114.94  *  462.73  *  229.32  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  781.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.60  * Wt. n-Val.             *   0.150  *   0.042  *   0.148  *
* W.S. Elev (ft)         *  779.82  * Reach Len. (ft)        *  416.32  *  409.51  *   12.20  *
* Crit W.S. (ft)         *  766.84  * Flow Area (sq ft)      * 1200.32  * 3121.78  * 3612.26  *
* E.G. Slope (ft/ft)     *0.001205  * Area (sq ft)           * 2615.29  * 3121.78  * 6849.71  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 2614.08  *35425.63  * 6460.28  *
* Top Width (ft)         * 1889.75  * Top Width (ft)         *  203.48  *   96.84  * 1589.43  *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)       *    2.18  *   11.35  *    1.79  *
* Max Chl Dpth (ft)      *   41.58  * Hydr. Depth (ft)       *   16.76  *   32.24  *    3.30  *
* Conv. Total (cfs)      *1281693.0  * Conv. (cfs)            * 75291.1  *1020333.0  *186069.7  *
* Length Wtd. (ft)       *  336.28  * Wetted Per. (ft)       *   75.33  *  111.18  * 1098.28  *
* Min Ch El (ft)         *  738.24  * Shear (lb/sq ft)       *    1.20  *    2.11  *    0.25  *
* Alpha                  *    3.28  * Stream Power (lb/ft s) *    2.61  *   23.98  *    0.44  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   * 1586.51  *11134.45  * 3056.75  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *  315.21  *  490.75  *  572.81  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	784.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.61	Wt. n-Val.	0.150	0.042	0.146
W.S. Elev (ft)	782.46	Reach Len. (ft)	416.32	409.51	12.20
Crit W.S. (ft)	768.94	Flow Area (sq ft)	1389.10	3377.10	6818.57
E.G. Slope (ft/ft)	0.001170	Area (sq ft)	3160.20	3377.10	11494.78
Q Total (cfs)	53690.00	Flow (cfs)	3284.74	39781.15	10624.11
Top Width (ft)	2244.39	Top Width (ft)	209.83	96.84	1937.73
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	2.36	11.78	1.56
Max Chl Dpth (ft)	44.22	Hydr. Depth (ft)	19.40	34.87	5.19
Conv. Total (cfs)	1569860.0	Conv. (cfs)	96043.7	1163174.0	310641.8
Length Wtd. (ft)	313.37	Wetted Per. (ft)	75.33	111.18	1316.74
Min Ch El (ft)	738.24	Shear (lb/sq ft)	1.35	2.22	0.38
Alpha	4.83	Stream Power (lb/ft s)	3.18	26.13	0.59
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	2654.09	12450.03	4933.26
C & E Loss (ft)	0.25	Cum SA (acres)	493.33	497.85	914.05

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	786.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.	0.150	0.042	0.143
W.S. Elev (ft)	784.65	Reach Len. (ft)	416.32	409.51	12.20
Crit W.S. (ft)	770.66	Flow Area (sq ft)	1546.11	3589.47	9871.12
E.G. Slope (ft/ft)	0.001099	Area (sq ft)	3626.06	3589.47	16041.89
Q Total (cfs)	62000.00	Flow (cfs)	3805.30	42676.99	15517.71
Top Width (ft)	2490.78	Top Width (ft)	215.05	96.84	2178.89
Vel Total (ft/s)	4.13	Avg. Vel. (ft/s)	2.46	11.89	1.57
Max Chl Dpth (ft)	46.41	Hydr. Depth (ft)	21.59	37.07	6.70
Conv. Total (cfs)	1870619.0	Conv. (cfs)	114810.7	1287619.0	468189.3
Length Wtd. (ft)	288.83	Wetted Per. (ft)	75.33	111.18	1476.77
Min Ch El (ft)	738.24	Shear (lb/sq ft)	1.41	2.21	0.46
Alpha	5.76	Stream Power (lb/ft s)	3.46	26.33	0.72
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	3572.12	13277.94	6720.25
C & E Loss (ft)	0.26	Cum SA (acres)	606.55	499.26	1253.16

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	788.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.	0.150	0.042	0.141
W.S. Elev (ft)	787.54	Reach Len. (ft)	416.32	409.51	12.20
Crit W.S. (ft)	773.03	Flow Area (sq ft)	1753.15	3869.49	14366.33
E.G. Slope (ft/ft)	0.001001	Area (sq ft)	4256.76	3869.49	22636.85
Q Total (cfs)	74720.00	Flow (cfs)	4479.79	46182.03	24058.18
Top Width (ft)	2666.10	Top Width (ft)	220.84	96.84	2348.42
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)	2.56	11.93	1.67
Max Chl Dpth (ft)	49.30	Hydr. Depth (ft)	24.49	39.96	8.95
Conv. Total (cfs)	2361148.0	Conv. (cfs)	141561.2	1459349.0	760236.9
Length Wtd. (ft)	256.46	Wetted Per. (ft)	75.33	111.18	1608.31
Min Ch El (ft)	738.24	Shear (lb/sq ft)	1.45	2.18	0.56
Alpha	6.39	Stream Power (lb/ft s)	3.72	25.97	0.94
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	5383.49	14567.54	10292.20
C & E Loss (ft)	0.26	Cum SA (acres)	780.19	501.35	1594.78

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	779.07	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.48	Wt. n-Val.	0.150	0.042	0.149	
W.S. Elev (ft)	777.59	Reach Len. (ft)	416.32	409.51	12.20	
Crit W.S. (ft)	765.19	Flow Area (sq ft)	1040.86	2906.10	2357.81	
E.G. Slope (ft/ft)	0.001185	Area (sq ft)	2180.67	2906.10	4640.00	
Q Total (cfs)	38000.00	Flow (cfs)	2043.94	31176.31	4779.75	
Top Width (ft)	839.88	Top Width (ft)	182.82	96.84	560.23	
Vel Total (ft/s)	6.03	Avg. Vel. (ft/s)	1.96	10.73	2.03	
Max Chl Dpth (ft)	39.35	Hydr. Depth (ft)	14.54	30.01	11.88	
Conv. Total (cfs)	1103777.0	Conv. (cfs)	59369.8	905570.7	138836.3	
Length Wtd. (ft)	344.49	Wetted Per. (ft)	75.33	111.18	200.29	
Min Ch El (ft)	738.24	Shear (lb/sq ft)	1.02	1.93	0.87	
Alpha	2.62	Stream Power (lb/ft s)	2.01	20.75	1.77	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	961.21	9639.03	1780.13	
C & E Loss (ft)	0.20	Cum SA (acres)	151.33	473.11	286.14	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 15.023

INPUT
Description: U/S of Gregory Blvd
Station Elevation Data num= 319

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	836.35	7.97	836.04	21.27	835.41	30.58	835.15	39	834.77
53.65	834.08	62.09	833.69	66.56	833.7	79.24	833.1	117.04	831.65
126.79	831.19	133.68	830.81	149.1	829.65	155.93	829.27	177.48	827.65
177.51	827.65	190.24	827.16	191.05	827.12	208.04	820.49	208.45	820.24
209.59	819.8	222.61	813.54	233.54	809.2	244.39	805.25	252.07	802.48
257.83	800.49	263.52	798.4	272.09	795.32	285.44	790.36	289.66	787.06
322.51	777.72	334.9	774.5	337.37	774	353.65	771.07	361.7	771.46
380.77	769.71	388.63	768.53	406.25	773.41	409.27	774.19	411.54	774.16
418.12	774.05	423.25	774.05	424.93	774.04	433.32	772.35	434.44	772.14
434.89	772.07	435.37	771.77	437.27	771.08	465.23	759.86	469.11	759.95
478.75	760.15	487.57	760.41	512.41	761.52	515.21	761.64	516.39	760.61
525.92	751.95	529.27	750.33	536.57	746.71	545	739.11	562	738.11
580	739.11	586.26	746.72	592.29	752.14	596.08	751.99	608.95	751.93
612.46	753.83	619.28	757.52	627.12	760.48	644.21	761.12	657.5	761.22
681.89	761.11	687.24	761.24	687.93	761.24	722.43	761.83	730.81	761.8
764.89	762.08	779.73	762.47	827.2	764.92	829.12	765.03	829.69	765.1
872.6	779.69	878.77	781.86	881.28	782.39	891.24	783.21	892.07	783.58
900.15	789.45	900.78	789.41	903.43	789.24	926.37	787.79	935.07	787.57
942.79	787.36	951.66	786.93	967.82	786.14	975.6	785.92	992.75	785.51
994.65	785.46	1000.63	785.33	1017.44	784.92	1037.57	784.65	1040.07	784.72
1040.85	784.74	1051.08	784.58	1061.88	784.4	1063.15	784.38	1067.32	784.34
1074.26	784.15	1075.84	784.1	1086.99	783.79	1095.6	783.55	1101.67	783.35
1109.02	783.13	1119.32	783	1125.21	782.9	1129.5	782.83	1143.94	782.67
1145.84	782.64	1153.34	782.45	1165.66	782.18	1179.13	781.88	1186.33	781.72
1195.35	781.68	1207.6	781.62	1211.62	781.6	1224.63	781.54	1227.58	781.52
1228.99	781.51	1233.06	781.47	1248.52	781.35	1251.52	781.32	1254.96	781.28
1267.81	781.12	1275.34	781.13	1285.93	781.15	1300.81	781.17	1304	781.17
1306.62	781.18	1324.5	781.2	1324.79	781.2	1344.97	781.21	1379.32	781.03
1386.12	780.99	1407.89	780.86	1413.6	780.83	1419.72	780.79	1441.08	780.66
1444.5	780.68	1458.46	780.74	1461.93	780.76	1475.81	780.82	1479.33	780.84
1492.1	780.9	1495.66	780.91	1512.36	780.9	1518.29	780.9	1524.23	780.89
1540.92	780.88	1549.87	780.8	1575.31	780.57	1579.66	780.53	1592.5	780.41

```
 1596.78  780.37  1609.7  780.26 1628.28  780.24 1633.45  780.23 1652.93  780.22
  1657.2  780.21 1662.14  780.22 1686.34  780.27 1690.61  780.28 1715.47  780.33
 1731.32  780.18 1733.06  780.16 1749.47  780.01 1750.65     780 1767.61  779.85
 1768.24  779.84 1768.82  779.84 1785.83  779.68 1785.89  779.68 1787.65  779.68
 1804.53  779.69 1805.49  779.69 1823.24   779.7 1825.25  779.71 1841.95  779.72
 1856.95  779.73 1860.66  779.73 1867.62  779.73 1890.38  779.74    1901  779.74
 1920.11  779.75 1929.58  779.75 1937.54  779.75 1946.13  779.76 1954.97  779.76
 1969.63  779.76 1989.85  779.77 2015.81  779.67    2021  779.65 2038.38  779.59
 2052.17  779.52 2082.66  779.47 2094.31  779.45 2102.14  779.42 2115.76  779.38
  2121.1  779.36 2131.84  779.32 2136.26  779.31 2160.73  779.22 2165.91  779.21
 2170.03  779.18  2194.4  779.03 2194.49  779.03 2195.06  779.02 2204.96  778.95
 2208.84  778.94 2222.98  778.88 2241.49  778.76 2256.34  778.67 2284.68  778.49
 2289.63  778.44 2310.16  778.59 2317.04  778.64 2328.58   778.6 2346.95  778.54
 2364.61  778.56 2383.42  778.57 2399.86  778.56 2414.34  778.55 2425.12   778.4
 2430.86  778.31 2443.45  778.13 2447.38  778.08 2461.77  777.87 2463.91  777.84
 2480.11   777.6 2480.43   777.6 2480.63   777.6 2483.28  777.62  2494.7   777.7
 2496.48  777.71 2505.15  777.77 2512.88  777.82 2516.73  777.84 2524.27  777.89
 2530.98  777.94 2537.21  777.98 2544.17  778.03 2561.36  778.13  2575.6  778.22
 2588.85  778.31 2607.03  778.42 2627.98  778.87 2631.77  778.95 2645.31  779.24
 2656.51  779.47 2681.67  779.75 2685.79  779.79 2708.61  780.05 2715.07  780.12
  2723.3  780.27 2744.92  780.66 2758.32   780.9 2774.41   781.2 2775.69  781.22
 2775.79  781.22  2777.5  781.28 2778.89  781.33 2788.01  781.66 2793.02  781.83
 2800.48  782.09    2813  782.62 2815.83  782.73 2820.47  782.87    2861   783.3
 2868.36  783.49 2877.79  783.59 2884.35  783.76 2888.64  783.73 2903.42  784.21
 2919.16  784.67 2929.09  785.14  2968.6   785.6 2968.99   785.6 2969.54  785.61
 2970.05  785.61 2970.33  785.61 2972.74  785.65 2978.97  785.84 2983.28  785.96
 2983.59  785.98 2993.37  786.55 2994.37  786.61 3002.56  787.38 3004.67  787.56
 3008.22  787.88 3014.67  788.48 3014.69  788.51 3015.77  788.67 3017.36   788.9
 3017.43  788.92    3027  790.56 3034.73  791.19 3050.37  794.98 3055.52  796.11
 3058.09   797.2 3076.59  804.11 3088.67  809.16 3097.71  813.52 3106.23  817.15
 3108.49  818.15 3115.89  820.91 3120.94  822.74 3124.54     824 3132.89  827.28
    3135  830.17 3137.14  832.72 3141.95  832.47 3144.21  832.45

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  515.21    .042  627.12      .1  926.37     .06 1856.95     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       515.21  627.12           71.56   71.12   18.53              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  420.15  795.28       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  767.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.40  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)          *  767.16  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  753.58  * Flow Area (sq ft)      *  392.97  * 2207.67  * 1035.05  *
* E.G. Slope (ft/ft)      *0.000513  * Area (sq ft)           *  392.97  * 2207.67  * 1035.05  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *  349.37  *11838.95  * 1011.68  *
* Top Width (ft)          *  388.69  * Top Width (ft)         *   68.16  *  111.91  *  208.62  *
* Vel Total (ft/s)        *    3.63  * Avg. Vel. (ft/s)       *    0.89  *    5.36  *    0.98  *
* Max Chl Dpth (ft)       *   29.05  * Hydr. Depth (ft)       *    5.77  *   19.73  *    4.96  *
* Conv. Total (cfs)       *582938.6  * Conv. (cfs)            * 15428.7  *522832.0  * 44677.9  *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)       *   69.60  *  127.47  *  209.05  *
* Min Ch El (ft)          *  738.11  * Shear (lb/sq ft)       *    0.18  *    0.55  *    0.16  *
* Alpha                   *    1.96  * Stream Power (lb/ft s) *    0.16  *    2.97  *    0.15  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *  150.20  * 4490.88  *  223.65  *
* C & E Loss (ft)         *          * Cum SA (acres)         *   31.89  *  371.70  *   57.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  771.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.54  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)          *  770.81  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  756.77  * Flow Area (sq ft)      *  658.73  * 2616.68  * 1817.15  *
* E.G. Slope (ft/ft)      *0.000587  * Area (sq ft)           *  688.00  * 2616.68  * 1817.15  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             *  809.98  *16819.55  * 2670.47  *
* Top Width (ft)          *  436.63  * Top Width (ft)         *  105.35  *  111.91  *  219.36  *
* Vel Total (ft/s)        *    3.99  * Avg. Vel. (ft/s)       *    1.23  *    6.43  *    1.47  *
```

```
* Max Chl Dpth (ft)      *   32.70  * Hydr. Depth (ft)       *    8.53  *   23.38  *    8.28  *
* Conv. Total (cfs)      *837669.0  * Conv. (cfs)            * 33423.4  *694049.9  *110195.7  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   79.42  *  127.47  *  220.41  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.30  *    0.75  *    0.30  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.37  *    4.84  *    0.44  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  322.51  * 6114.41  *  478.53  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   58.72  *  411.20  *   84.56  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  774.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  773.40  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  759.13  * Flow Area (sq ft)      *  869.28  * 2906.14  * 2394.38  *
* E.G. Slope (ft/ft)     *0.000633  * Area (sq ft)           * 1031.49  * 2906.14  * 2394.38  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1231.79  *20800.63  * 4287.58  *
* Top Width (ft)         *  491.45  * Top Width (ft)         *  152.57  *  111.91  *  226.97  *
* Vel Total (ft/s)       *    4.27  * Avg. Vel. (ft/s)       *    1.42  *    7.16  *    1.79  *
* Max Chl Dpth (ft)      *   35.29  * Hydr. Depth (ft)       *    9.98  *   25.97  *   10.55  *
* Conv. Total (cfs)      *1046029.0  * Conv. (cfs)            * 48954.8  *826673.8  *170400.1  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   89.63  *  127.47  *  228.44  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.38  *    0.90  *    0.41  *
* Alpha                  *    2.26  * Stream Power (lb/ft s) *    0.54  *    6.45  *    0.74  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  492.49  * 7462.94  *  805.01  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   78.73  *  439.02  *  153.08  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  777.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  776.33  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  762.95  * Flow Area (sq ft)      * 1144.38  * 3234.87  * 3073.79  *
* E.G. Slope (ft/ft)     *0.000670  * Area (sq ft)           * 1551.39  * 3234.87  * 3073.79  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1892.81  *25589.54  * 6517.66  *
* Top Width (ft)         *  534.89  * Top Width (ft)         *  187.37  *  111.91  *  235.61  *
* Vel Total (ft/s)       *    4.56  * Avg. Vel. (ft/s)       *    1.65  *    7.91  *    2.12  *
* Max Chl Dpth (ft)      *   38.22  * Hydr. Depth (ft)       *   12.04  *   28.91  *   13.05  *
* Conv. Total (cfs)      *1313159.0  * Conv. (cfs)            * 73104.5  *988327.4  *251727.1  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   97.66  *  127.47  *  237.56  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.49  *    1.06  *    0.54  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.81  *    8.40  *    1.15  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  758.73  * 8863.99  * 1381.06  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  113.18  *  461.75  *  229.21  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  780.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.120  *   0.042  *   0.101  *
* W.S. Elev (ft)         *  780.06  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  765.96  * Flow Area (sq ft)      * 1498.45  * 3651.71  * 4946.37  *
* E.G. Slope (ft/ft)     *0.000677  * Area (sq ft)           * 2275.07  * 3651.71  * 4946.37  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 2981.70  *31479.61  *10038.70  *
* Top Width (ft)         * 1524.72  * Top Width (ft)         *  200.93  *  111.91  * 1211.88  *
* Vel Total (ft/s)       *    4.41  * Avg. Vel. (ft/s)       *    1.99  *    8.62  *    2.03  *
* Max Chl Dpth (ft)      *   41.95  * Hydr. Depth (ft)       *   15.76  *   32.63  *    4.08  *
* Conv. Total (cfs)      *1709869.0  * Conv. (cfs)            *114568.7  *1209574.0  *385727.1  *
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```
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   97.66  *  127.47  * 1214.48  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.65  *    1.21  *    0.17  *
* Alpha                  *    2.77  * Stream Power (lb/ft s) *    1.29  *   10.44  *    0.35  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1563.14  *11102.61  * 3055.10  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  313.28  *  489.76  *  572.42  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  783.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.              *   0.120  *   0.042  *   0.101  *
* W.S. Elev (ft)         *  782.78  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  767.74  * Flow Area (sq ft)      * 1756.96  * 3956.04  * 9548.12  *
* E.G. Slope (ft/ft)     *0.000622  * Area (sq ft)           * 2834.48  * 3956.04  * 9548.12  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              * 3726.46  *34482.98  *15480.56  *
* Top Width (ft)         * 2264.57  * Top Width (ft)         *  210.49  *  111.91  * 1942.17  *
* Vel Total (ft/s)       *    3.52  * Avg. Vel. (ft/s)       *    2.12  *    8.72  *    1.62  *
* Max Chl Dpth (ft)      *   44.67  * Hydr. Depth (ft)       *   18.48  *   35.35  *    4.92  *
* Conv. Total (cfs)      *2152096.0  * Conv. (cfs)            *149370.5  *1382207.0  *620518.7  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   97.66  *  127.47  * 1945.21  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.70  *    1.21  *    0.19  *
* Alpha                  *    4.03  * Stream Power (lb/ft s) *    1.48  *   10.51  *    0.31  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2625.44  *12415.56  * 4930.31  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  491.32  *  496.87  *  913.51  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  785.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.              *   0.120  *   0.042  *   0.098  *
* W.S. Elev (ft)         *  785.04  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  769.13  * Flow Area (sq ft)      * 1972.40  * 4209.66  *14244.17  *
* E.G. Slope (ft/ft)     *0.000537  * Area (sq ft)           * 3320.56  * 4209.66  *14244.17  *
* Q Total (cfs)          *62000.00  * Flow (cfs)              * 4196.79  *35520.77  *22282.43  *
* Top Width (ft)         * 2512.10  * Top Width (ft)         *  218.46  *  111.91  * 2181.73  *
* Vel Total (ft/s)       *    3.04  * Avg. Vel. (ft/s)       *    2.13  *    8.44  *    1.56  *
* Max Chl Dpth (ft)      *   46.93  * Hydr. Depth (ft)       *   20.75  *   37.62  *    6.53  *
* Conv. Total (cfs)      *2675845.0  * Conv. (cfs)            *181128.5  *1533033.0  *961682.6  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   97.66  *  127.47  * 2185.40  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.68  *    1.11  *    0.22  *
* Alpha                  *    4.56  * Stream Power (lb/ft s) *    1.44  *    9.34  *    0.34  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 3538.92  *13241.28  * 6716.01  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  604.48  *  498.28  * 1252.55  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.              *   0.120  *   0.042  *   0.095  *
* W.S. Elev (ft)         *  787.99  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  771.02  * Flow Area (sq ft)      * 2252.73  * 4539.68  *21001.38  *
* E.G. Slope (ft/ft)     *0.000437  * Area (sq ft)           * 3979.12  * 4539.68  *21001.38  *
* Q Total (cfs)          *74720.00  * Flow (cfs)              * 4723.31  *36328.85  *33667.84  *
* Top Width (ft)         * 2695.98  * Top Width (ft)         *  226.74  *  111.91  * 2357.32  *
* Vel Total (ft/s)       *    2.69  * Avg. Vel. (ft/s)       *    2.10  *    8.00  *    1.60  *
* Max Chl Dpth (ft)      *   49.88  * Hydr. Depth (ft)       *   23.70  *   40.57  *    8.91  *
* Conv. Total (cfs)      *3575750.0  * Conv. (cfs)            *226035.6  *1738529.0  *1611186.0  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   97.66  *  127.47  * 2362.10  *
```

```
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.63  *    0.97  *    0.24  *
* Alpha                  *    4.51  * Stream Power (lb/ft s) *    1.32  *    7.77  *    0.39  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 5344.13  *14528.02  *10286.09  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  778.05  *  500.37  * 1594.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  778.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  777.77  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  764.23  * Flow Area (sq ft)      * 1280.45  * 3395.06  * 3417.02  *
* E.G. Slope (ft/ft)     *0.000682  * Area (sq ft)           * 1823.53  * 3395.06  * 3417.02  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2301.51  *27966.13  * 7732.36  *
* Top Width (ft)         *  580.20  * Top Width (ft)          *  192.86  *  111.91  *  275.43  *
* Vel Total (ft/s)       *    4.70  * Avg. Vel. (ft/s)       *    1.80  *    8.24  *    2.26  *
* Max Chl Dpth (ft)      *   39.66  * Hydr. Depth (ft)       *   13.47  *   30.34  *   12.41  *
* Conv. Total (cfs)      *1455580.0  * Conv. (cfs)            * 88158.5  *1071235.0  *296186.1  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   97.66  *  127.47  *  277.62  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.56  *    1.13  *    0.52  *
* Alpha                  *    2.32  * Stream Power (lb/ft s) *    1.00  *    9.33  *    1.19  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  942.08  * 9609.41  * 1779.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  149.53  *  472.13  *  286.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 15.017

INPUT
Description: Gregory Blvd
Distance from Upstream XS =       5
Deck/Roadway Width        =      53
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=     180
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
      190     826     826  259.25   822.5     793     280   821.5     793
      280     795     793     288   807.5   805.5     288   821.1   805.5
    290.5     821     807   290.5     809     807   298.5     814     812
    298.5   820.6     812     301   820.5     813     301     815     813
      309   816.5   814.5     309   820.1   814.5   311.5   819.9     814
    311.5     816     814   319.5   812.2   810.2   319.5   819.5   810.2
      322   819.4   808.5     322   810.5   808.5     330     804     802
      330     819     802   332.5   818.9     798   332.5     800     798
    340.5     786     784   340.5   818.5     784     358   817.6     784
      358     786     784     366     796     794     366   817.2     794
    368.5   817.1     796   368.5     798     796   376.5   803.5   801.5
    376.5   816.7   801.5     379   816.6   802.5     379   804.5   802.5
      387   807.5   805.5     387   816.2   805.5   389.5     816     807
    389.5     809     807   397.5   810.5   808.5   397.5   815.6   808.5
      400   815.5     809     400     811     809     408   811.2   809.2
      408   815.1   809.2   410.5     815     809   410.5     811     809
    418.5   808.5   806.5   418.5   814.6   806.5     421   814.5     806
      421     808     806     429   803.7   801.7     429   814.1   801.7
    431.5   813.9     801   431.5     803     801   439.5     797     795
    439.5   813.5     795     442   813.4     793     442     795     793
      450     789     787     450     813     787   452.5   812.9   783.7
    452.5   785.7   783.7     462   775.8   773.8     462   812.4   773.8
      478   811.6   773.8     478   775.8   773.8     486   782.8   780.8
      486   811.2   780.8   488.5   811.1     783   488.5     785     783
```

496.5	791.2	789.2	496.5	810.7	789.2	499	810.6	790.5
499	792.5	790.5	507	797.5	795.5	507	810.2	795.5
509.5	810	796.5	509.5	798.5	796.5	517.5	801.5	799.5
517.5	809.6	799.5	520	809.5	800.7	520	802.7	800.7
528	804.3	802.3	528	809.1	802.3	530.5	809	802.3
530.5	804.3	802.3	538.5	804.5	802.5	538.5	808.6	802.5
541	808.5	802.5	541	804.5	802.5	549	802.5	800.5
549	808.1	800.5	551.5	807.9	800.3	551.5	802.3	800.3
559.5	799.5	797.5	559.5	807.5	797.5	562	807.4	797
562	799	797	570	794.8	792.8	570	807	792.8
572.5	806.9	791.5	572.5	793.5	791.5	580.5	787.8	785.8
580.5	806.5	785.8	583	806.4	784	583	786	784
591	779.5	777.5	591	806	777.5	593.5	805.8	775
593.5	777	775	601.5	769	767	601.5	805.4	767
618	804.6	767	618	769	767	626	777.9	775.9
626	804.2	775.9	628.5	804.1	777	628.5	779	777
636.5	785.5	783.5	636.5	803.7	783.5	639	803.6	785.5
639	787.5	785.5	647	791.8	789.8	647	803.2	789.8
649.5	803	790.1	649.5	792.1	790.1	657.5	795.5	793.5
657.5	802.6	793.5	660	802.5	793.8	660	795.8	793.8
668	797	795	668	802.1	795	670.5	802	795
670.5	797	795	678.5	796	794	678.5	801.6	794
681	801.5	793.7	681	795.7	793.7	689	793	791
689	801.1	791	691.5	800.9	790	691.5	792	790
699.5	787.7	785.7	699.5	800.5	785.7	702	800.4	784
702	786	784	710	779.5	777.5	710	800	777.5
712.5	799.9	775	712.5	777	775	720.5	768	766
720.5	799.5	766	738	798.6	766	738	768	766
746	779.5	777.5	746	798.2	777.5	748.5	798.1	780
748.5	782	780	756.5	789	787	756.5	797.7	787
759	797.6	788	759	790	788	767	792.5	790.5
767	797.2	790.5	769.5	797	790.5	769.5	792.5	790.5
777.5	789.5	787.5	777.5	796.6	787.5	780	796.5	786
780	788	786	788	783	781	788	796.1	781
790.5	796	779.5	790.5	781.5	779.5	798.5	769	767
798.5	795.6	760	890	791	760	1037	784	775

Upstream Bridge Cross Section Data
Station Elevation Data num= 319

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	836.35	7.97	836.04	21.27	835.41	30.58	835.15	39	834.77
53.65	834.08	62.09	833.69	66.56	833.7	79.24	833.1	117.04	831.65
126.79	831.19	133.68	830.81	149.1	829.65	155.93	829.27	177.48	827.65
177.51	827.65	190.24	827.16	191.05	827.12	208.04	820.49	208.45	820.24
209.59	819.8	222.61	813.54	233.54	809.2	244.39	805.25	252.07	802.48
257.83	800.49	263.52	798.4	272.09	795.32	285.44	790.36	289.66	787.06
322.51	777.72	334.9	774.5	337.37	774	353.65	771.07	361.7	771.46
380.77	769.71	388.63	768.53	406.25	773.41	409.27	774.19	411.54	774.16
418.12	774.05	423.25	774.05	424.93	774.04	433.32	772.35	434.44	772.14
434.89	772.07	435.37	771.77	437.27	771.08	465.23	759.86	469.11	759.95
478.75	760.15	487.57	760.41	512.41	761.52	515.21	761.64	516.39	760.61
525.92	751.95	529.27	750.33	536.57	746.71	545	739.11	562	738.11
580	739.11	586.26	746.72	592.29	752.14	596.08	751.99	608.95	751.93
612.46	753.83	619.28	757.52	627.12	760.48	644.21	761.12	657.5	761.22
681.89	761.11	687.24	761.24	687.93	761.24	722.43	761.83	730.81	761.8
764.89	762.08	779.73	762.47	827.2	764.92	829.12	765.03	829.69	765.1
872.6	779.69	878.77	781.86	881.28	782.39	891.24	783.21	892.07	783.58
900.15	789.45	900.78	789.41	903.43	789.24	926.37	787.79	935.07	787.57
942.79	787.36	951.66	786.93	967.82	786.14	975.6	785.92	992.75	785.51
994.65	785.46	1000.63	785.33	1017.44	784.92	1037.57	784.65	1040.07	784.72
1040.85	784.74	1051.08	784.58	1061.88	784.4	1063.15	784.38	1067.32	784.34
1074.26	784.15	1075.84	784.1	1086.99	783.79	1095.6	783.55	1101.67	783.35
1109.02	783.13	1119.32	783	1125.21	782.9	1129.5	782.83	1143.94	782.67
1145.84	782.64	1153.34	782.45	1165.66	782.18	1179.13	781.88	1186.33	781.72
1195.35	781.68	1207.6	781.62	1211.62	781.6	1224.63	781.54	1227.58	781.52
1228.99	781.51	1233.06	781.47	1248.52	781.35	1251.52	781.32	1254.96	781.28
1267.81	781.12	1275.34	781.13	1285.93	781.15	1300.81	781.17	1304	781.17
1306.62	781.18	1324.5	781.2	1324.79	781.2	1344.97	781.21	1379.32	781.03
1386.12	780.99	1407.89	780.86	1413.6	780.83	1419.72	780.79	1441.08	780.66
1444.5	780.68	1458.46	780.74	1461.93	780.76	1475.81	780.82	1479.33	780.84
1492.1	780.9	1495.66	780.91	1512.36	780.9	1518.29	780.9	1524.23	780.89
1540.92	780.88	1549.87	780.8	1575.31	780.57	1579.66	780.53	1592.5	780.41
1596.78	780.37	1609.7	780.26	1628.28	780.24	1633.45	780.23	1652.93	780.22
1657.2	780.21	1662.14	780.22	1686.34	780.27	1690.61	780.28	1715.47	780.33
1731.32	780.18	1733.06	780.16	1749.47	780.01	1750.65	780	1767.61	779.85

1768.24	779.84	1768.82	779.84	1785.83	779.68	1785.89	779.68	1787.65	779.68
1804.53	779.69	1805.49	779.69	1823.24	779.7	1825.25	779.71	1841.95	779.72
1856.95	779.73	1860.66	779.73	1867.62	779.73	1890.38	779.74	1901	779.74
1920.11	779.75	1929.58	779.75	1937.54	779.75	1946.13	779.76	1954.97	779.76
1969.63	779.76	1989.85	779.77	2015.81	779.67	2021	779.65	2038.38	779.59
2052.17	779.52	2082.66	779.47	2094.31	779.45	2102.14	779.42	2115.76	779.38
2121.1	779.36	2131.84	779.32	2136.26	779.31	2160.73	779.22	2165.91	779.21
2170.03	779.18	2194.4	779.03	2194.49	779.03	2195.06	779.02	2204.96	778.95
2208.84	778.94	2222.98	778.88	2241.49	778.76	2256.34	778.67	2284.68	778.49
2289.63	778.44	2310.16	778.59	2317.04	778.64	2328.58	778.6	2346.95	778.54
2364.61	778.56	2383.42	778.57	2399.86	778.56	2414.34	778.55	2425.12	778.4
2430.86	778.31	2443.45	778.13	2447.38	778.08	2461.77	777.87	2463.91	777.84
2480.11	777.6	2480.43	777.6	2480.63	777.6	2483.28	777.62	2494.7	777.7
2496.48	777.71	2505.15	777.77	2512.88	777.82	2516.73	777.84	2524.27	777.89
2530.98	777.94	2537.21	777.98	2544.17	778.03	2561.36	778.13	2575.6	778.22
2588.85	778.31	2607.03	778.42	2627.98	778.87	2631.77	778.95	2645.31	779.24
2656.51	779.47	2681.67	779.75	2685.79	779.79	2708.61	780.05	2715.07	780.12
2723.3	780.27	2744.92	780.66	2758.32	780.9	2774.41	781.2	2775.69	781.22
2775.79	781.22	2777.5	781.28	2778.89	781.33	2788.01	781.66	2793.02	781.83
2800.48	782.09	2813	782.62	2815.83	782.73	2820.47	782.87	2861	783.3
2868.36	783.49	2877.79	783.59	2884.35	783.76	2888.64	783.73	2903.42	784.21
2919.16	784.67	2929.09	785.14	2968.6	785.6	2968.99	785.6	2969.54	785.61
2970.05	785.61	2970.33	785.61	2972.74	785.65	2978.97	785.84	2983.28	785.96
2983.59	785.98	2993.37	786.55	2994.37	786.61	3002.56	787.38	3004.67	787.56
3008.22	787.88	3014.67	788.48	3014.69	788.51	3015.77	788.67	3017.36	788.9
3017.43	788.92	3027	790.56	3034.73	791.19	3050.37	794.98	3055.52	796.11
3058.09	797.2	3076.59	804.11	3088.67	809.16	3097.71	813.52	3106.23	817.15
3108.49	818.15	3115.89	820.91	3120.94	822.74	3124.54	824	3132.89	827.28
3135	830.17	3137.14	832.72	3141.95	832.47	3144.21	832.45		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	515.21	.042	627.12	.1	926.37	.06	1856.95	.13

Bank Sta: Left Right Coeff Contr. Expan.

515.21	627.12	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	420.15	795.28	F

Downstream Deck/Roadway Coordinates
num= 180

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
178	826	826	247.25	822.5	793	268	821.5	793
268	795	793	276	807.5	805.5	276	821.1	805.5
278.5	821	807	278.5	809	807	286.5	814	812
286.5	820.6	812	289	820.5	813	289	815	813
297	816.5	814.5	297	820.1	814.5	299.5	819.9	814
299.5	816	814	307.5	812.2	810.2	307.5	819.5	810.2
310	819.4	808.5	310	810.5	808.5	318	804	802
318	819	802	320.5	818.9	798	320.5	800	798
328.5	786	784	328.5	818.5	784	346	817.6	784
346	786	784	354	796	794	354	817.2	794
356.5	817.1	796	356.5	798	796	364.5	803.5	801.5
364.5	816.7	801.5	367	816.6	802.5	367	804.5	802.5
375	807.5	805.5	375	816.2	805.5	377.5	816	807
377.5	809	807	385.5	810.5	808.5	385.5	815.6	808.5
388	815.5	809	388	811	809	396	811.2	809.2
396	815.1	809.2	398.5	815	809	398.5	811	809
406.5	808.5	806.5	406.5	814.6	806.5	409	814.5	806
409	808	806	417	803.7	801.7	417	814.1	801.7
419.5	813.9	801	419.5	803	801	427.5	797	795
427.5	813.5	795	430	813.4	793	430	795	793
438	789	787	438	813	787	440.5	812.9	783.7
440.5	785.7	783.7	450	775.8	773.8	450	812.4	773.8
466	811.6	773.8	466	775.8	773.8	474	782.8	780.8
474	811.2	780.8	476.5	811.1	783	476.5	785	783
484.5	791.2	789.2	484.5	810.7	789.2	487	810.6	790.5
487	792.5	790.5	495	797.5	795.5	495	810.2	795.5
497.5	810	796.5	497.5	798.5	796.5	505.5	801.5	799.5
505.5	809.6	799.5	508	809.5	800.7	508	802.7	800.7
516	804.3	802.3	516	809.1	802.3	518.5	809	802.3
518.5	804.3	802.3	526.5	804.5	802.5	526.5	808.6	802.5
529	808.5	802.5	529	804.5	802.5	537	802.5	800.5

537	808.1	800.5	539.5	807.9	800.3	539.5	802.3	800.3
547.5	799.5	797.5	547.5	807.5	797.5	550	807.4	797
550	799	797	558	794.8	792.8	558	807	792.8
560.5	806.9	791.5	560.5	793.5	791.5	568.5	787.8	785.8
568.5	806.5	785.8	571	806.4	784	571	786	784
579	779.5	777.5	579	806	777.5	581.5	805.8	775
581.5	777	775	589.5	769	767	589.5	805.4	767
606	804.6	767	606	769	767	614	777.9	775.9
614	804.2	775.9	616.5	804.1	777	616.5	779	777
624.5	785.5	783.5	624.5	803.7	783.5	627	803.6	785.5
627	787.5	785.5	635	791.8	789.8	635	803.2	789.8
637.5	803	790.1	637.5	792.1	790.1	645.5	795.5	793.5
645.5	802.6	793.5	648	802.5	793.8	648	795.8	793.8
656	797	795	656	802.1	795	658.5	802	795
658.5	797	795	666.5	796	794	666.5	801.6	794
669	801.5	793.7	669	795.7	793.7	677	793	791
677	801.1	791	679.5	800.9	790	679.5	792	790
687.5	787.7	785.7	687.5	800.5	785.7	690	800.4	784
690	786	784	698	779.5	777.5	698	800	777.5
700.5	799.9	775	700.5	777	775	708.5	768	766
708.5	799.5	766	726	798.6	766	726	768	766
734	779.5	777.5	734	798.2	777.5	736.5	798.1	780
736.5	782	780	744.5	789	787	744.5	797.7	787
747	797.6	788	747	790	788	755	792.5	790.5
755	797.2	790.5	757.5	797	790.5	757.5	792.5	790.5
765.5	789.5	787.5	765.5	796.6	787.5	768	796.5	786
768	788	786	776	783	781	776	796.1	781
778.5	796	779.5	778.5	781.5	779.5	786.5	769	767
786.5	795.6	760	878	791	760	1015	784	775

Downstream Bridge Cross Section Data
Station Elevation Data num= 301

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	837.16	18.14	836.27	20.21	836.13	26.1	835.62	35.19	834.91
39.95	834.27	46.91	834	56.07	833.56	68.79	833	80.03	832.31
88.92	831.76	105.5	831.08	111.55	830.79	116.88	830.46	148.02	828.99
156.8	828.08	176.78	827.09	180.2	826.9	187.68	824.11	187.93	824.02
188.29	823.9	218.27	813.54	226.03	809.71	236.98	804.11	261.5	794.97
273.1	790.58	274.63	790.03	276.93	789.23	316.58	774.24	331.15	771.59
335.55	771.01	342.83	770.29	358.35	768.76	373.7	771.75	385.38	774.01
389.77	774.17	394.76	774.42	398.43	774.42	401.57	774.42	404.23	774.04
410.94	773.01	426.44	766.05	430.53	764.26	432.44	763.96	449.09	760.86
460.45	761.1	460.91	761.09	462.16	761.11	489.27	761.27	492.25	759.95
504.38	754.58	510.23	752.66	517.83	747.32	518.77	746.71	525	739.11
544	738.11	562	739.11	569.75	746.71	573.03	749.47	578.25	752.42
587.77	756.77	592.45	757.82	594.92	758.37	597.04	759.55	601.23	759.56
629.54	760.83	634.25	760.77	653.33	760.82	667.32	761.14	685.09	761.24
699.14	761.48	733.7	761.33	742.29	761.46	750.14	761.81	770.08	762.01
796.81	763.47	809.72	764.26	821.17	765.89	829.47	767.11	855.78	779.33
866.01	784.31	877.79	788.29	885.12	787.88	894.76	788.15	907.03	787.47
916.75	786.92	920.29	787.02	929.09	787.26	945.85	787.6	945.94	787.6
946.5	787.62	963.16	786.98	976.25	786.74	983.52	786.47	985.75	786.49
999.02	786.42	1015.39	786.12	1020.55	785.94	1020.57	785.94	1026.88	785.71
1037.54	785.33	1047.96	784.96	1059.59	784.54	1065.42	784.37	1077.11	784.02
1078.53	783.97	1084.06	783.81	1097.45	783.41	1114.7	783.23	1119.03	783.19
1136.71	783.01	1138.72	782.96	1156.92	782.48	1157.53	782.46	1177.06	781.95
1178.34	781.92	1198.35	781.72	1199.58	781.71	1200.79	781.7	1220.82	781.51
1229.7	781.4	1240.21	781.28	1246.81	781.2	1253.89	781.14	1259.67	781.09
1274.07	781.13	1277.96	781.14	1283.41	781.16	1296.21	781.2	1306.76	781.22
1316.85	781.25	1330.29	781.28	1337.47	781.3	1348.43	781.26	1378.86	781.12
1383.32	781.1	1406.42	780.98	1431.99	780.84	1433.97	780.83	1451.29	780.91
1452.48	780.92	1469.9	781	1471	781.01	1487.73	781.08	1488.65	781.09
1489.85	781.08	1511.29	781.07	1532.69	781.06	1533.94	781.05	1566	780.76
1568.38	780.74	1584.28	780.59	1585.61	780.58	1601.38	780.44	1602.83	780.42
1604.96	780.42	1626.6	780.38	1630.13	780.38	1650.37	780.34	1650.76	780.34
1656.7	780.35	1679.7	780.39	1686.73	780.4	1708.66	780.44	1713.62	780.39
1726.26	780.26	1732.1	780.2	1743.87	780.08	1750.58	780.02	1761.48	779.91
1769.06	779.83	1779.09	779.73	1788.14	779.73	1797.81	779.73	1806.48	779.73
1816.53	779.73	1824.24	779.73	1835.25	779.74	1842	779.74	1853.97	779.74
1876.51	779.73	1883.71	779.73	1909.93	779.72	1913.44	779.72	1915.18	779.72
1930.92	779.72	1931.76	779.71	1947.28	779.71	1948.36	779.71	1948.4	779.71
1980.91	779.69	1983.37	779.68	1986.15	779.67	2014.6	779.5	2023.1	779.45
2045.85	779.31	2068.13	779.25	2087.96	779.2	2098.66	779.16	2106.53	779.12
2118.79	779.07	2124.8	779.04	2154.98	778.91	2159.57	778.89	2162.68	778.87
2188.08	778.69	2188.32	778.69	2190.54	778.67	2193.64	778.67	2194.91	778.65

```
 2216.69  778.59 2237.47  778.49 2250.18  778.43 2272.62  778.33 2283.59  778.28
 2289.31  778.34 2311.33  778.55 2331.39  778.53 2341.63  778.51 2343.79  778.51
  2378.6  778.54 2395.16  778.51 2409.89  778.48 2410.67  778.47 2426.43  778.21
 2428.49  778.18 2442.98  777.94 2446.31  777.89 2459.54  777.67 2471.02  777.48
  2476.1   777.4 2484.87  777.45 2499.99  777.53 2510.33  777.59 2522.01  777.66
 2530.69  777.71 2539.78  777.76 2550.81  777.82 2571.28  777.94 2579.28  777.98
  2602.8  778.11 2626.98  778.59 2627.54  778.61 2630.61  778.67 2651.86  779.05
 2654.07  779.11 2679.29  779.38 2680.73  779.42 2686.22  779.59 2708.52  779.87
 2716.16   780.2 2737.34   780.7 2742.74  780.69 2764.16  781.17 2769.13  781.25
 2769.44  781.25 2782.65  781.24  2783.4  781.27 2786.02  781.34 2793.13  781.55
 2798.76  781.74 2800.53  781.82 2804.81  781.97 2814.93  782.28 2827.54  782.42
 2856.78  783.18 2870.38  783.32 2873.04  783.37 2877.21  783.46 2893.83  783.76
 2893.91  783.77 2921.31  785.05 2931.12  785.17 2961.65  785.61 2967.21  785.87
 2967.51  785.88 2968.52  785.91 2974.66  786.23 2979.06  786.48 2993.18  787.67
 3005.22  788.67 3017.85  790.61 3021.28  791.02 3028.03  792.53 3044.72  796.11
 3052.96   799.5 3061.46   803.1 3064.17  804.11 3082.03  811.57  3086.5  813.52
 3087.35  813.86 3098.35  819.21 3107.01  821.93 3110.83  823.32 3118.46  825.92
 3125.31  828.32 3126.39  831.29 3127.71     834 3129.79  833.88 3135.31  833.57
 3139.16  833.66

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  489.27    .042  597.04      .1  929.09     .06 1853.97     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
         489.27  597.04           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  400.88     795       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=     349    Downstream=     337
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     750    20.5     785
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     750    20.5     785

Pier Data
Pier Station     Upstream=     470    Downstream=     458
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     750    20.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     750    20.5     775

Pier Data
Pier Station     Upstream=     610    Downstream=     598
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     750    20.5     770
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     750    20.5     770

Pier Data
Pier Station     Upstream=     729    Downstream=     717
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Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     760    20.5     767
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    20.5     760    20.5     767

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     767.56  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     767.16  * E.G. Elev (ft)         *     767.55  *     767.15  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     767.00  *     766.62  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     753.29  *     752.93  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      28.89  *      28.51  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.45  *       4.39  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2965.70  *    3005.54  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   27904.24  *   27777.24  *
* Min El Weir Flow (ft)  *     768.01  * Hydr Depth (ft)        *      10.24  *      10.02  *
* Min El Prs (ft)        *     814.50  * W.P. Total (ft)        *     350.93  *     351.78  *
* Delta EG (ft)          *       0.43  * Conv. Total (cfs)      *   451886.2  *   490489.0  *
* Delta WS (ft)          *       0.48  * Top Width (ft)         *     289.56  *     299.83  *
* BR Open Area (sq ft)   *   13152.27  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.45  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.39  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.00  *       1.70  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     771.35  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     770.81  * E.G. Elev (ft)         *     771.32  *     771.26  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     770.56  *     770.52  *
* Q Bridge (cfs)         *   20297.06  * Crit W.S. (ft)         *     756.69  *     756.94  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.45  *      32.41  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.06  *       4.84  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4009.71  *    4189.99  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   42169.46  *   43618.62  *
* Min El Weir Flow (ft)  *     768.01  * Hydr Depth (ft)        *      13.49  *      13.64  *
* Min El Prs (ft)        *     814.50  * W.P. Total (ft)        *     416.66  *     419.56  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *   586071.8  *   672848.3  *
* Delta WS (ft)          *       0.17  * Top Width (ft)         *     321.65  *     327.44  *
* BR Open Area (sq ft)   *   13152.27  * Frctn Loss (ft)        *       0.06  *       0.01  *
* BR Open Vel (ft/s)     *       5.07  * C & E Loss (ft)        *       0.01  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.72  *       0.57  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.65  *       2.75  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
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Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	774.04	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	773.40	E.G. Elev (ft)	774.00	773.93
Q Total (cfs)	26320.00	W.S. Elev (ft)	773.10	773.03
Q Bridge (cfs)	26289.11	Crit W.S. (ft)	759.43	759.35
Q Weir (cfs)		Max Chl Dpth (ft)	34.99	34.92
Weir Sta Lft (ft)		Vel Total (ft/s)	5.51	5.30
Weir Sta Rgt (ft)		Flow Area (sq ft)	4774.61	4966.04
Weir Submerg		Froude # Chl	0.25	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	55017.97	56859.71
Min El Weir Flow (ft)	768.01	Hydr Depth (ft)	15.59	15.87
Min El Prs (ft)	814.50	W.P. Total (ft)	476.90	475.81
Delta EG (ft)	0.19	Conv. Total (cfs)	671183.9	785654.1
Delta WS (ft)	0.20	Top Width (ft)	352.06	349.48
BR Open Area (sq ft)	13152.27	Frctn Loss (ft)	0.07	0.01
BR Open Vel (ft/s)	5.55	C & E Loss (ft)	0.00	0.08
Coef of Q		Shear Total (lb/sq ft)	0.96	0.73
Br Sel Method	Energy only	Power Total (lb/ft s)	5.30	3.88

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	777.08	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	776.33	E.G. Elev (ft)	777.05	776.95
Q Total (cfs)	34000.00	W.S. Elev (ft)	775.99	775.83
Q Bridge (cfs)	33869.01	Crit W.S. (ft)	764.13	763.55
Q Weir (cfs)		Max Chl Dpth (ft)	37.88	37.72
Weir Sta Lft (ft)		Vel Total (ft/s)	5.98	5.80
Weir Sta Rgt (ft)		Flow Area (sq ft)	5680.93	5864.45
Weir Submerg		Froude # Chl	0.25	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	72407.76	74563.43
Min El Weir Flow (ft)	768.01	Hydr Depth (ft)	18.00	18.15
Min El Prs (ft)	814.50	W.P. Total (ft)	548.24	544.88
Delta EG (ft)	0.25	Conv. Total (cfs)	773063.1	914585.5
Delta WS (ft)	0.26	Top Width (ft)	386.15	391.08
BR Open Area (sq ft)	13152.27	Frctn Loss (ft)	0.09	0.01
BR Open Vel (ft/s)	6.08	C & E Loss (ft)	0.01	0.11
Coef of Q		Shear Total (lb/sq ft)	1.25	0.93
Br Sel Method	Energy only	Power Total (lb/ft s)	7.49	5.38

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	780.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	780.06	E.G. Elev (ft)	780.85	780.73
Q Total (cfs)	44500.00	W.S. Elev (ft)	779.63	779.36
Q Bridge (cfs)	43797.44	Crit W.S. (ft)	766.96	766.33
Q Weir (cfs)		Max Chl Dpth (ft)	41.52	41.25
Weir Sta Lft (ft)		Vel Total (ft/s)	6.00	5.88
Weir Sta Rgt (ft)		Flow Area (sq ft)	7419.32	7568.42

```
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   98697.96  *  101222.50  *
* Min El Weir Flow (ft)  *     768.01  * Hydr Depth (ft)        *       7.80  *       7.93  *
* Min El Prs (ft)        *     814.50  * W.P. Total (ft)        *    1290.81  *    1278.60  *
* Delta EG (ft)          *       0.33  * Conv. Total (cfs)      *   915853.4  *  1085672.0  *
* Delta WS (ft)          *       0.34  * Top Width (ft)         *    1035.11  *    1031.70  *
* BR Open Area (sq ft)   *   13152.27  * Frctn Loss (ft)        *       0.10  *       0.01  *
* BR Open Vel (ft/s)     *       6.68  * C & E Loss (ft)        *       0.02  *       0.16  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.85  *       0.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.08  *       3.65  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     783.55  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     782.78  * E.G. Elev (ft)         *     783.53  *     783.39  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     782.56  *     782.14  *
* Q Bridge (cfs)         *   47386.84  * Crit W.S. (ft)         *     768.81  *     768.18  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      44.45  *      44.03  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.39  *       4.55  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12231.84  *   11804.58  *
* Weir Submerg           *             * Froude # Chl           *       0.16  *       0.16  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  127091.70  *  128780.30  *
* Min El Weir Flow (ft)  *     768.01  * Hydr Depth (ft)        *       6.23  *       6.06  *
* Min El Prs (ft)        *     814.50  * W.P. Total (ft)        *    2408.57  *    2372.24  *
* Delta EG (ft)          *       0.31  * Conv. Total (cfs)      *  1131811.0  *  1283479.0  *
* Delta WS (ft)          *       0.33  * Top Width (ft)         *    2056.34  *    2032.77  *
* BR Open Area (sq ft)   *   13152.27  * Frctn Loss (ft)        *       0.10  *       0.01  *
* BR Open Vel (ft/s)     *       6.51  * C & E Loss (ft)        *       0.03  *       0.14  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.71  *       0.54  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.13  *       2.47  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     785.70  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     785.04  * E.G. Elev (ft)         *     785.68  *     785.57  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     785.06  *     784.72  *
* Q Bridge (cfs)         *   45809.78  * Crit W.S. (ft)         *     770.71  *     769.78  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.95  *      46.61  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.55  *       3.62  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   17470.90  *   17137.18  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *       0.12  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  162941.90  *  164849.20  *
* Min El Weir Flow (ft)  *     768.01  * Hydr Depth (ft)        *       7.91  *       7.92  *
* Min El Prs (ft)        *     814.50  * W.P. Total (ft)        *    2754.85  *    2689.08  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *  1474517.0  *  1632266.0  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *    2313.13  *    2254.68  *
* BR Open Area (sq ft)   *   13152.27  * Frctn Loss (ft)        *       0.08  *       0.01  *
* BR Open Vel (ft/s)     *       5.85  * C & E Loss (ft)        *       0.02  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.70  *       0.57  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.48  *       2.08  *
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*****************************************************************************************
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     788.50  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     787.99  * E.G. Elev (ft)         *     788.45  *     788.37  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     788.09  *     787.85  *
* Q Bridge (cfs)         *   42842.93  * Crit W.S. (ft)         *     772.76  *     771.96  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      49.98  *      49.74  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.06  *       3.08  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   24420.77  *   24238.81  *
* Weir Submerg           *             * Froude # Chl           *       0.10  *       0.10  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  225486.80  *  228509.40  *
* Min El Weir Flow (ft)  *     768.01  * Hydr Depth (ft)        *      10.43  *      10.34  *
* Min El Prs (ft)        *     814.50  * W.P. Total (ft)        *    3031.13  *    3015.87  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *  2081884.0  *  2243353.0  *
* Delta WS (ft)          *       0.14  * Top Width (ft)         *    2452.20  *    2445.38  *
* BR Open Area (sq ft)   *   13152.27  * Frctn Loss (ft)        *       0.06  *       0.01  *
* BR Open Vel (ft/s)     *       5.09  * C & E Loss (ft)        *       0.02  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.65  *       0.56  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.98  *       1.72  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     778.56  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     777.77  * E.G. Elev (ft)         *     778.52  *     778.42  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     777.39  *     777.19  *
* Q Bridge (cfs)         *   37781.03  * Crit W.S. (ft)         *     765.36  *     764.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.28  *      39.08  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.21  *       6.03  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6120.52  *    6301.41  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   81930.48  *   84226.94  *
* Min El Weir Flow (ft)  *     768.01  * Hydr Depth (ft)        *      19.54  *      19.63  *
* Min El Prs (ft)        *     814.50  * W.P. Total (ft)        *     585.36  *     581.15  *
* Delta EG (ft)          *       0.28  * Conv. Total (cfs)      *   824430.0  *   977810.8  *
* Delta WS (ft)          *       0.29  * Top Width (ft)         *     389.13  *     392.59  *
* BR Open Area (sq ft)   *   13152.27  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       6.34  * C & E Loss (ft)        *       0.01  *       0.13  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.39  *       1.02  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       8.61  *       6.17  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 15.009

INPUT
Description: D/S of Gregory Blvd
Station Elevation Data num= 301

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	837.16	18.14	836.27	20.21	836.13	26.1	835.62	35.19	834.91
39.95	834.27	46.91	834	56.07	833.56	68.79	833	80.03	832.31
88.92	831.76	105.5	831.08	111.55	830.79	116.88	830.46	148.02	828.99
156.8	828.08	176.78	827.09	180.2	826.9	187.68	824.11	187.93	824.02
188.29	823.9	218.27	813.54	226.03	809.71	236.98	804.11	261.5	794.97
273.1	790.58	274.63	790.03	276.93	789.23	316.58	774.24	331.15	771.59
335.55	771.01	342.83	770.29	358.35	768.76	373.7	771.75	385.38	774.01
389.77	774.17	394.76	774.42	398.43	774.42	401.57	774.42	404.23	774.04
410.94	773.01	426.44	766.05	430.53	764.26	432.44	763.96	449.09	760.86
460.45	761.1	460.91	761.09	462.16	761.11	489.27	761.27	492.25	759.95
504.38	754.58	510.23	752.66	517.83	747.32	518.77	746.71	525	739.11
544	738.11	562	739.11	569.75	746.71	573.03	749.47	578.25	752.42
587.77	756.77	592.45	757.82	594.92	758.37	597.04	759.55	601.23	759.56
629.54	760.83	634.25	760.77	653.33	760.82	667.32	761.14	685.09	761.24
699.14	761.48	733.7	761.33	742.29	761.46	750.14	761.81	770.08	762.01
796.81	763.47	809.72	764.26	821.17	765.89	829.47	767.11	855.78	779.33
866.01	784.31	877.79	788.29	885.12	787.88	894.76	788.15	907.03	787.47
916.75	786.92	920.29	787.02	929.09	787.26	945.85	787.6	945.94	787.6
946.5	787.62	963.16	786.98	976.25	786.74	983.52	786.47	985.75	786.49
999.02	786.42	1015.39	786.12	1020.55	785.94	1020.57	785.94	1026.88	785.71
1037.54	785.33	1047.96	784.96	1059.59	784.54	1065.42	784.37	1077.11	784.02
1078.53	783.97	1084.06	783.81	1097.45	783.41	1114.7	783.23	1119.03	783.19
1136.71	783.01	1138.72	782.96	1156.92	782.48	1157.53	782.46	1177.06	781.95
1178.34	781.92	1198.35	781.72	1199.58	781.71	1200.79	781.7	1220.82	781.51
1229.7	781.4	1240.21	781.28	1246.81	781.2	1253.89	781.14	1259.67	781.09
1274.07	781.13	1277.96	781.14	1283.41	781.16	1296.21	781.2	1306.76	781.22
1316.85	781.25	1330.29	781.28	1337.47	781.3	1348.43	781.26	1378.86	781.12
1383.32	781.1	1406.42	780.98	1431.99	780.84	1433.97	780.83	1451.29	780.91
1452.48	780.92	1469.9	781	1471	781.01	1487.73	781.08	1488.65	781.09
1489.85	781.08	1511.29	781.07	1532.69	781.06	1533.94	781.05	1566	780.76
1568.38	780.74	1584.28	780.59	1585.61	780.58	1601.38	780.44	1602.83	780.42
1604.96	780.42	1626.6	780.38	1630.13	780.38	1650.37	780.34	1650.76	780.34
1656.7	780.35	1679.7	780.39	1686.73	780.4	1708.66	780.44	1713.62	780.39
1726.26	780.26	1732.1	780.2	1743.87	780.08	1750.58	780.02	1761.48	779.91
1769.06	779.83	1779.09	779.73	1788.14	779.73	1797.81	779.73	1806.48	779.73
1816.53	779.73	1824.24	779.73	1835.25	779.74	1842	779.74	1853.97	779.74
1876.51	779.73	1883.71	779.73	1909.93	779.72	1913.44	779.72	1915.18	779.72
1930.92	779.72	1931.76	779.71	1947.28	779.71	1948.36	779.71	1948.4	779.71
1980.91	779.69	1983.37	779.68	1986.15	779.67	2014.6	779.5	2023.1	779.45
2045.85	779.31	2068.13	779.25	2087.96	779.2	2098.66	779.16	2106.53	779.12
2118.79	779.07	2124.8	779.04	2154.98	778.91	2159.57	778.89	2162.68	778.87
2188.08	778.69	2188.32	778.69	2190.54	778.67	2193.64	778.67	2194.91	778.65
2216.69	778.59	2237.47	778.49	2250.18	778.43	2272.62	778.33	2283.59	778.28
2289.31	778.34	2311.33	778.55	2331.39	778.53	2341.63	778.51	2343.79	778.51
2378.6	778.54	2395.16	778.51	2409.89	778.48	2410.67	778.47	2426.43	778.21
2428.49	778.18	2442.98	777.94	2446.31	777.89	2459.54	777.67	2471.02	777.48
2476.1	777.4	2484.87	777.45	2499.99	777.53	2510.33	777.59	2522.01	777.66
2530.69	777.71	2539.78	777.76	2550.81	777.82	2571.28	777.94	2579.28	777.98
2602.8	778.11	2626.98	778.59	2627.54	778.61	2630.61	778.67	2651.86	779.05
2654.07	779.11	2679.29	779.38	2680.73	779.42	2686.22	779.59	2708.52	779.87
2716.16	780.2	2737.34	780.7	2742.74	780.69	2764.16	781.17	2769.13	781.25
2769.44	781.25	2782.65	781.24	2783.4	781.27	2786.02	781.34	2793.13	781.55
2798.76	781.74	2800.53	781.82	2804.81	781.97	2814.93	782.28	2827.54	782.42
2856.78	783.18	2870.38	783.32	2873.04	783.37	2877.21	783.46	2893.83	783.76
2893.91	783.77	2921.31	785.05	2931.12	785.17	2961.65	785.61	2967.21	785.87
2967.51	785.88	2968.52	785.91	2974.66	786.23	2979.06	786.48	2993.18	787.67
3005.22	788.67	3017.85	790.61	3021.28	791.02	3028.03	792.53	3044.72	796.11
3052.96	799.5	3061.46	803.1	3064.17	804.11	3082.03	811.57	3086.5	813.52
3087.35	813.86	3098.35	819.21	3107.01	821.93	3110.83	823.32	3118.46	825.92
3125.31	828.32	3126.39	831.29	3127.71	834	3129.79	833.88	3135.31	833.57
3139.16	833.66								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
*******************************************************************************
       0     .12  489.27    .042  597.04      .1  929.09     .06 1853.97     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       489.27  597.04          708.58  707.95  637.79             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  400.88     795       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  766.67  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  752.91  * Flow Area (sq ft)      *  305.39  * 2063.87  * 1128.55  *
* E.G. Slope (ft/ft)     *0.000593  * Area (sq ft)           *  305.39  * 2063.87  * 1128.55  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  258.24  *11761.63  * 1180.13  *
* Top Width (ft)         *  401.45  * Top Width (ft)          *   64.22  *  107.77  *  229.46  *
* Vel Total (ft/s)       *    3.77  * Avg. Vel. (ft/s)       *    0.85  *    5.70  *    1.05  *
* Max Chl Dpth (ft)      *   28.56  * Hydr. Depth (ft)       *    4.76  *   19.15  *    4.92  *
* Conv. Total (cfs)      *542015.6  * Conv. (cfs)            * 10603.8  *482953.5  * 48458.3  *
* Length Wtd. (ft)       *  704.86  * Wetted Per. (ft)       *   65.04  *  121.33  *  229.74  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.17  *    0.63  *    0.18  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.15  *    3.59  *    0.19  *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)   *  149.83  * 4487.67  *  222.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   31.81  *  371.54  *   56.88  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  771.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  770.64  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  756.96  * Flow Area (sq ft)      *  577.74  * 2491.49  * 2063.60  *
* E.G. Slope (ft/ft)     *0.000617  * Area (sq ft)           *  604.78  * 2491.49  * 2063.60  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  694.79  *16418.53  * 3186.68  *
* Top Width (ft)         *  449.59  * Top Width (ft)          *  101.79  *  107.77  *  240.03  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *    1.20  *    6.59  *    1.54  *
* Max Chl Dpth (ft)      *   32.53  * Hydr. Depth (ft)       *    7.91  *   23.12  *    8.60  *
* Conv. Total (cfs)      *817266.9  * Conv. (cfs)            * 27971.9  *661001.1  *128293.9  *
* Length Wtd. (ft)       *  702.52  * Wetted Per. (ft)       *   74.73  *  121.33  *  241.13  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.30  *    0.79  *    0.33  *
* Alpha                  *    2.27  * Stream Power (lb/ft s) *    0.36  *    5.21  *    0.51  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *  321.78  * 6110.60  *  476.12  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   58.59  *  411.04  *   84.29  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  773.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  773.20  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  759.64  * Flow Area (sq ft)      *  771.87  * 2767.02  * 2684.31  *
* E.G. Slope (ft/ft)     *0.000659  * Area (sq ft)           *  913.48  * 2767.02  * 2684.31  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1095.79  *20204.48  * 5019.72  *
* Top Width (ft)         *  491.74  * Top Width (ft)          *  138.43  *  107.77  *  245.54  *
* Vel Total (ft/s)       *    4.23  * Avg. Vel. (ft/s)       *    1.42  *    7.30  *    1.87  *
* Max Chl Dpth (ft)      *   35.09  * Hydr. Depth (ft)       *    9.70  *   25.68  *   10.93  *
* Conv. Total (cfs)      *1025562.0  * Conv. (cfs)            * 42697.7  *787270.0  *195594.0  *
* Length Wtd. (ft)       *  701.35  * Wetted Per. (ft)       *   81.75  *  121.33  *  247.20  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.39  *    0.94  *    0.45  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.55  *    6.85  *    0.83  *
* Frctn Loss (ft)        *    0.53  * Cum Volume (acre-ft)   *  491.37  * 7458.73  *  801.92  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   78.56  *  438.87  *  152.81  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

```
CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  776.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  776.07  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  763.67  * Flow Area (sq ft)      * 1020.23  * 3077.03  * 3399.52  *
* E.G. Slope (ft/ft)     *0.000697  * Area (sq ft)           * 1387.23  * 3077.03  * 3399.52  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1674.68  *24808.26  * 7517.06  *
* Top Width (ft)         *  537.04  * Top Width (ft)         *  177.54  *  107.77  *  251.73  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    1.64  *    8.06  *    2.21  *
* Max Chl Dpth (ft)      *   37.96  * Hydr. Depth (ft)       *   11.54  *   28.55  *   13.50  *
* Conv. Total (cfs)      *1287865.0  * Conv. (cfs)            * 63434.1  *939696.6  *284733.9  *
* Length Wtd. (ft)       *  700.30  * Wetted Per. (ft)       *   90.67  *  121.33  *  254.02  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.49  *    1.10  *    0.58  *
* Alpha                  *    2.36  * Stream Power (lb/ft s) *    0.80  *    8.90  *    1.29  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   *  757.00  * 8859.33  * 1377.21  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  112.95  *  461.60  *  228.94  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  780.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.120  *   0.042  *   0.101  *
* W.S. Elev (ft)         *  779.72  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  766.31  * Flow Area (sq ft)      * 1342.00  * 3469.35  * 5144.39  *
* E.G. Slope (ft/ft)     *0.000706  * Area (sq ft)           * 2051.08  * 3469.35  * 5144.39  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 2662.19  *30502.79  *11335.02  *
* Top Width (ft)         * 1319.30  * Top Width (ft)         *  187.17  *  107.77  * 1024.36  *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *    1.98  *    8.79  *    2.20  *
* Max Chl Dpth (ft)      *   41.60  * Hydr. Depth (ft)       *   15.18  *   32.19  *    5.02  *
* Conv. Total (cfs)      *1674440.0  * Conv. (cfs)            *100172.5  *1147755.0  *426512.5  *
* Length Wtd. (ft)       *  698.68  * Wetted Per. (ft)       *   90.67  *  121.33  * 1027.49  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.65  *    1.26  *    0.22  *
* Alpha                  *    2.73  * Stream Power (lb/ft s) *    1.29  *   11.09  *    0.49  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   * 1560.52  *11097.39  * 3049.26  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  313.02  *  489.61  *  571.07  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  783.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.120  *   0.042  *   0.101  *
* W.S. Elev (ft)         *  782.45  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  768.08  * Flow Area (sq ft)      * 1583.77  * 3764.13  * 9508.75  *
* E.G. Slope (ft/ft)     *0.000652  * Area (sq ft)           * 2572.93  * 3764.13  * 9508.75  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 3371.87  *33581.54  *16736.59  *
* Top Width (ft)         * 2238.12  * Top Width (ft)         *  194.41  *  107.77  * 1935.95  *
* Vel Total (ft/s)       *    3.61  * Avg. Vel. (ft/s)       *    2.13  *    8.92  *    1.76  *
* Max Chl Dpth (ft)      *   44.34  * Hydr. Depth (ft)       *   17.92  *   34.93  *    4.91  *
* Conv. Total (cfs)      *2102174.0  * Conv. (cfs)            *132022.0  *1314849.0  *655303.3  *
* Length Wtd. (ft)       *  695.59  * Wetted Per. (ft)       *   90.67  *  121.33  * 1939.77  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.71  *    1.26  *    0.20  *
* Alpha                  *    3.91  * Stream Power (lb/ft s) *    1.51  *   11.27  *    0.35  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 2622.07  *12409.89  * 4917.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  491.05  *  496.71  *  910.55  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  785.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.120  *   0.042  *   0.099  *
* W.S. Elev (ft)         *  784.85  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  769.41  * Flow Area (sq ft)      * 1796.02  * 4022.91  *14429.55  *
* E.G. Slope (ft/ft)     *0.000548  * Area (sq ft)           * 3047.37  * 4022.91  *14429.55  *
```

```
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3810.31  *34378.45  *23811.24  *
* Top Width (ft)         * 2445.19  * Top Width (ft)         *  200.76  *  107.77  * 2136.67  *
* Vel Total (ft/s)       *    3.06  * Avg. Vel. (ft/s)       *    2.12  *    8.55  *    1.65  *
* Max Chl Dpth (ft)      *   46.74  * Hydr. Depth (ft)       *   20.32  *   37.33  *    6.75  *
* Conv. Total (cfs)      *2649159.0  * Conv. (cfs)           *162808.2  *1468935.0  *1017415.0  *
* Length Wtd. (ft)       *  692.03  * Wetted Per. (ft)       *   90.67  *  121.33  * 2141.08  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.68  *    1.13  *    0.23  *
* Alpha                  *    4.46  * Stream Power (lb/ft s) *    1.44  *    9.69  *    0.38  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   * 3534.86  *13235.23  * 6695.54  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  604.20  *  498.12  * 1249.22  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  788.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.120  *   0.042  *   0.097  *
* W.S. Elev (ft)         *  787.85  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  771.23  * Flow Area (sq ft)      * 2060.96  * 4345.94  *21191.28  *
* E.G. Slope (ft/ft)     *0.000449  * Area (sq ft)           * 3661.02  * 4345.94  *21191.28  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 4338.43  *35397.03  *34984.54  *
* Top Width (ft)         * 2691.04  * Top Width (ft)         *  208.69  *  107.77  * 2374.58  *
* Vel Total (ft/s)       *    2.71  * Avg. Vel. (ft/s)       *    2.11  *    8.14  *    1.65  *
* Max Chl Dpth (ft)      *   49.74  * Hydr. Depth (ft)       *   23.32  *   40.33  *    8.92  *
* Conv. Total (cfs)      *3526785.0  * Conv. (cfs)           *204774.1  *1670740.0  *1651270.0  *
* Length Wtd. (ft)       *  687.78  * Wetted Per. (ft)       *   90.67  *  121.33  * 2379.66  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.64  *    1.00  *    0.25  *
* Alpha                  *    4.50  * Stream Power (lb/ft s) *    1.34  *    8.18  *    0.41  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 5339.20  *14521.50  *10254.91  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  777.76  *  500.21  * 1590.51  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  778.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.120  *   0.042  *   0.100  *
* W.S. Elev (ft)         *  777.47  * Reach Len. (ft)        *  708.58  *  707.95  *  637.79  *
* Crit W.S. (ft)         *  764.87  * Flow Area (sq ft)      * 1143.82  * 3227.71  * 3754.23  *
* E.G. Slope (ft/ft)     *0.000709  * Area (sq ft)           * 1638.05  * 3227.71  * 3754.23  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2043.33  *27092.26  * 8864.41  *
* Top Width (ft)         *  561.45  * Top Width (ft)         *  181.24  *  107.77  *  272.44  *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)       *    1.79  *    8.39  *    2.36  *
* Max Chl Dpth (ft)      *   39.36  * Hydr. Depth (ft)       *   12.94  *   29.95  *   13.78  *
* Conv. Total (cfs)      *1427354.0  * Conv. (cfs)           * 76751.4  *1017638.0  *332964.3  *
* Length Wtd. (ft)       *  699.87  * Wetted Per. (ft)       *   90.67  *  121.33  *  275.04  *
* Min Ch El (ft)         *  738.11  * Shear (lb/sq ft)       *    0.56  *    1.18  *    0.60  *
* Alpha                  *    2.36  * Stream Power (lb/ft s) *    1.00  *    9.88  *    1.43  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   *  940.01  * 9604.54  * 1774.77  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  149.29  *  471.97  *  285.75  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 14.875

INPUT
Description: Tributary basin blocked out on right side.
Station Elevation Data    num=     328
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  831.67    2.33  831.45   13.51   830.7   16.94  827.57   24.28  822.52
   31.69   817.9   37.99  815.09   42.13  813.52   52.01  809.39   64.45  804.11
   71.04  800.69   72.63   800.3    87.3  798.15   96.84   796.1  101.59   795.4
```

```
   104.3  794.83  109.99   792.9  137.64  783.77  144.23  782.11  152.53  778.19
  152.69  778.12   153.2  778.02  167.73     775  178.44   777.1  180.54  777.53
  183.78   777.4  187.71   777.3  191.04  777.22   193.6  777.22   197.9  777.23
   205.2  776.58  207.91  776.35   219.7  773.33  224.53  772.12  226.04  772.05
  235.05  771.63  249.51  769.84  257.06  769.04  272.57  768.42  283.96  768.07
   287.4   767.9   296.8  767.44  322.12  766.38  331.34  765.79  345.08  764.93
  365.42  764.09  371.92   762.9  382.05  762.48  389.41  761.02  391.67  760.69
  393.04  760.49  410.67  760.04  421.07  759.95  429.17  759.69  489.41  759.51
  491.89  759.52   493.7  759.56  497.79  759.58  560.24  759.95  573.23  759.37
  586.44  758.79  593.74  758.47  596.77  758.32  601.18   755.7  606.53  751.95
  609.28  751.28  619.45  749.24  620.82  748.96  620.85   748.9  623.72   745.8
     630   738.8     646  737.83     660   738.8  667.69   745.8  671.94  747.57
  676.74  749.61   679.1  752.08  686.68   759.2  701.76  773.39  703.62  774.91
  704.37  775.66  705.96   775.7  713.68  775.79  727.87  776.06  728.98  776.12
  730.03  776.13  734.05  776.77   741.3   778.1  744.97  778.68  767.22  778.97
  770.63     779  772.96     779   785.8  779.28  807.34  779.66  813.86  780.04
  816.27  780.16  828.95  780.06  829.32  780.06  829.61  780.07  835.95  780.27
  849.56  780.26  863.88  779.96  870.31  779.99  879.62  780.21  912.02  779.77
  925.71   779.7  930.62  779.74     967  780.16  993.78  780.06  997.06  780.05
 1004.12  780.05 1039.41  780.12 1043.47  780.14  1049.4  780.22 1052.37  780.45
  1053.9  780.57 1061.24   780.7 1071.17  780.84 1081.59  781.03 1089.08  781.26
 1105.46  781.26 1131.04  781.35 1157.05  781.32 1169.41  781.16 1179.33  781.18
 1179.68  781.19 1203.11  781.46 1203.15  781.46 1203.17  781.46  1203.2  781.46
 1224.83  781.45 1225.31  781.44 1225.72  781.44 1228.64  781.41 1228.89   781.4
 1229.31  781.39    1231  781.34 1234.73  780.94 1247.15     778 1247.94  777.84
 1248.15  777.79 1248.27  777.78 1274.78  774.87 1276.45  774.65 1277.83  774.34
 1289.16  773.17 1300.52  772.31 1302.03   772.2 1303.59  772.08 1320.04  770.99
 1326.81  770.59 1338.61  770.44 1339.96  770.42 1341.88  770.41 1343.66  770.41
 1351.14  769.94 1357.75  769.98 1366.67  769.42 1378.35  769.07 1393.03  767.26
 1396.23  766.91 1399.15  766.38 1412.13   765.9 1441.59  764.96 1464.51   764.2
 1464.71  764.21 1464.84  764.23 1476.48  765.68 1494.24  765.78 1495.06  765.85
 1496.98  766.05 1525.26  766.53  1549.5  766.95 1575.18  767.38 1581.91  767.68
 1609.32  767.68  1612.7  767.59 1617.42  768.31 1631.25  770.67 1634.64   771.7
 1643.12   774.6 1656.16  778.48 1660.67  779.71 1666.02  779.77 1673.21  779.61
 1704.69  779.84 1734.48  780.05 1744.34  780.11 1760.85   780.2  1784.4  780.39
 1802.86  780.55 1823.07   781.1 1842.82  781.66 1846.98  781.52 1856.22  781.21
 1856.57  781.11 1857.08  781.15 1873.79  780.25 1883.13  778.97 1892.34  777.51
 1897.62  776.98 1906.95  769.11 1907.31  768.86 1907.73  768.68 1927.85  758.99
 1974.21  758.48 1977.31  758.43 1981.15  758.37 1983.23  758.37 1986.77  758.34
 2026.26  758.63 2037.16  758.82 2044.92  753.71 2044.98  753.66 2045.24  753.66
  2045.8  753.66 2050.49  755.31 2058.97   758.3 2059.71   758.6 2060.51  758.62
 2117.65  759.17 2131.55  759.25 2164.56  759.65 2165.13  759.66  2165.4  759.66
 2167.25   759.7 2204.75  760.35 2218.81   760.6 2238.19  760.81 2265.13  761.37
    2278  761.56 2285.09  762.86 2290.24  764.25 2299.48  767.35 2300.06  767.53
 2300.53  767.67 2311.04  771.37    2319  774.04 2325.44  775.38 2326.93  775.55
 2328.63  775.11 2340.35  775.36 2341.35  774.63 2344.43  772.39 2346.96  770.15
 2348.33  768.99 2355.06  773.24    2359  776.14 2362.23  777.94 2367.66   779.2
 2374.89  779.24  2387.5  779.57 2398.11  780.38 2431.58   781.5 2458.05  782.21
 2495.57  782.91 2511.02   783.1 2524.06  783.25 2555.08  783.67 2586.66  784.08
  2596.3  784.09 2623.26  784.57 2652.82  784.74 2691.25  785.21 2698.01  785.33
 2703.13  785.31  2752.5   784.8 2759.63  784.91 2778.59  784.62 2784.83  784.66
 2803.56  784.71  2817.5  784.81 2837.05  784.93 2842.62  785.01 2863.75  785.75
 2865.18   785.8 2866.36  785.86 2873.07  785.97 2911.83  786.63 2919.19  786.69
 2933.64  786.73 2948.13  786.76 2948.79  786.76 2955.44  786.72 2972.44  786.72
 2983.25  786.95 2987.44  787.03 2996.22  787.13 2997.52  787.15 3000.11  787.17
 3009.72  787.23 3013.16  787.25 3020.28  787.29 3020.98   787.3 3027.75   787.4
 3029.74  787.43 3031.81  787.46 3040.02   787.5 3048.98  787.53 3053.32  787.53
 3064.16  787.52 3072.92  787.51 3083.21  787.64 3101.26  788.35 3111.21  790.23
 3117.41  793.21 3123.69   796.1 3125.49   797.2 3131.48  799.66  3144.9  804.11
 3148.54  805.65 3160.15  812.09 3176.26  820.55 3184.33  825.11 3197.44  830.44
 3204.73  832.84 3213.32  836.85  3214.4  837.25 3223.69  840.13 3223.72  840.14
 3234.79  843.73 3238.87  845.72 3254.86  848.47 3260.94  849.49 3266.46  850.34
 3286.02  856.44 3301.63  860.61 3308.18  861.46

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .11  596.77    .042  704.37     .07 1247.15     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        596.77  704.37          1227.71  1159.7    83.1             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  797.91 1846.37   799.5       F
 1865.64 2409.14     777       T
```

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	766.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.110	0.042	
W.S. Elev (ft)	766.13	Reach Len. (ft)	1227.71	1159.70	83.10
Crit W.S. (ft)	753.65	Flow Area (sq ft)	1466.85	1860.04	
E.G. Slope (ft/ft)	0.000744	Area (sq ft)	1466.85	1860.04	2588.91
Q Total (cfs)	13200.00	Flow (cfs)	1665.60	11534.40	
Top Width (ft)	846.22	Top Width (ft)	270.69	97.27	478.26
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	1.14	6.20	
Max Chl Dpth (ft)	28.30	Hydr. Depth (ft)	5.42	19.12	
Conv. Total (cfs)	483997.5	Conv. (cfs)	61071.7	422925.8	
Length Wtd. (ft)	1133.48	Wetted Per. (ft)	271.09	114.16	
Min Ch El (ft)	737.83	Shear (lb/sq ft)	0.25	0.76	
Alpha	2.14	Stream Power (lb/ft s)	0.29	4.69	
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	135.41	4455.78	195.03
C & E Loss (ft)	0.04	Cum SA (acres)	29.09	369.88	51.70

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	770.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.110	0.042	
W.S. Elev (ft)	770.03	Reach Len. (ft)	1227.71	1159.70	83.10
Crit W.S. (ft)	757.17	Flow Area (sq ft)	2692.28	2247.99	
E.G. Slope (ft/ft)	0.000833	Area (sq ft)	2692.28	2247.99	4930.64
Q Total (cfs)	20300.00	Flow (cfs)	4095.72	16204.28	
Top Width (ft)	1132.31	Top Width (ft)	348.81	101.42	682.08
Vel Total (ft/s)	4.11	Avg. Vel. (ft/s)	1.52	7.21	
Max Chl Dpth (ft)	32.20	Hydr. Depth (ft)	7.72	22.17	
Conv. Total (cfs)	703310.7	Conv. (cfs)	141899.8	561410.9	
Length Wtd. (ft)	1104.71	Wetted Per. (ft)	349.33	119.86	
Min Ch El (ft)	737.83	Shear (lb/sq ft)	0.40	0.98	
Alpha	2.48	Stream Power (lb/ft s)	0.61	7.03	
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	294.96	6072.09	424.92
C & E Loss (ft)	0.05	Cum SA (acres)	54.92	409.34	77.54

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	773.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.110	0.042	
W.S. Elev (ft)	772.57	Reach Len. (ft)	1227.71	1159.70	83.10
Crit W.S. (ft)	761.20	Flow Area (sq ft)	3607.57	2508.78	
E.G. Slope (ft/ft)	0.000892	Area (sq ft)	3607.57	2508.78	6777.33
Q Total (cfs)	26320.00	Flow (cfs)	6587.89	19732.11	
Top Width (ft)	1239.81	Top Width (ft)	374.03	104.12	761.66
Vel Total (ft/s)	4.30	Avg. Vel. (ft/s)	1.83	7.87	
Max Chl Dpth (ft)	34.74	Hydr. Depth (ft)	9.65	24.10	
Conv. Total (cfs)	881113.3	Conv. (cfs)	220542.3	660570.9	
Length Wtd. (ft)	1083.12	Wetted Per. (ft)	374.72	123.57	
Min Ch El (ft)	737.83	Shear (lb/sq ft)	0.54	1.13	
Alpha	2.55	Stream Power (lb/ft s)	0.98	8.90	
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	454.60	7415.86	732.66
C & E Loss (ft)	0.06	Cum SA (acres)	74.39	437.14	145.44

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	776.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.110	0.042	
W.S. Elev (ft)	775.47	Reach Len. (ft)	1227.71	1159.70	83.10
Crit W.S. (ft)	763.84	Flow Area (sq ft)	4711.12	2815.83	
E.G. Slope (ft/ft)	0.000923	Area (sq ft)	4711.12	2815.83	9079.61

```
* Q Total (cfs)          *34000.00  * Flow (cfs)             *10235.64  *23764.36  *          *
* Top Width (ft)         * 1331.98  * Top Width (ft)         *  390.11  *  107.41  *  834.45  *
* Vel Total (ft/s)       *    4.52  * Avg. Vel. (ft/s)       *    2.17  *    8.44  *          *
* Max Chl Dpth (ft)      *   37.64  * Hydr. Depth (ft)       *   12.08  *   26.22  *          *
* Conv. Total (cfs)      *1119245.0  * Conv. (cfs)            *336946.6  *782298.3  *          *
* Length Wtd. (ft)       * 1055.18  * Wetted Per. (ft)       *  391.25  *  127.96  *          *
* Min Ch El (ft)         *  737.83  * Shear (lb/sq ft)       *    0.69  *    1.27  *          *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *    1.51  *   10.70  *          *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *  707.40  * 8811.44  * 1285.85  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  108.33  *  459.85  *  220.99  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  780.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.87  * Wt. n-Val.             *   0.110  *   0.042  *   0.136  *
* W.S. Elev (ft)         *  779.13  * Reach Len. (ft)        * 1227.71  * 1159.70  *   83.10  *
* Crit W.S. (ft)         *  766.35  * Flow Area (sq ft)      * 6263.86  * 3209.71  * 1128.26  *
* E.G. Slope (ft/ft)     *0.000902  * Area (sq ft)           * 6263.86  * 3209.71  *12371.23  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *14740.66  *29177.73  *  581.60  *
* Top Width (ft)         * 1530.13  * Top Width (ft)         *  446.24  *  107.60  *  976.29  *
* Vel Total (ft/s)       *    4.20  * Avg. Vel. (ft/s)       *    2.35  *    9.09  *    0.52  *
* Max Chl Dpth (ft)      *   41.30  * Hydr. Depth (ft)       *   14.04  *   29.83  *    2.01  *
* Conv. Total (cfs)      *1481991.0  * Conv. (cfs)            *490910.9  *971711.2  * 19369.2  *
* Length Wtd. (ft)       * 1018.37  * Wetted Per. (ft)       *  448.23  *  128.23  *  575.27  *
* Min Ch El (ft)         *  737.83  * Shear (lb/sq ft)       *    0.79  *    1.41  *    0.11  *
* Alpha                  *    3.18  * Stream Power (lb/ft s) *    1.85  *   12.81  *    0.06  *
* Frctn Loss (ft)        *    0.73  * Cum Volume (acre-ft)   * 1492.89  *11043.11  * 2921.04  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  307.87  *  487.86  *  556.42  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  782.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.110  *   0.042  *   0.131  *
* W.S. Elev (ft)         *  781.89  * Reach Len. (ft)        * 1227.71  * 1159.70  *   83.10  *
* Crit W.S. (ft)         *  768.07  * Flow Area (sq ft)      * 7504.12  * 3506.82  * 2873.75  *
* E.G. Slope (ft/ft)     *0.000828  * Area (sq ft)           * 7504.12  * 3506.82  *16181.01  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *18903.61  *32399.89  * 2386.50  *
* Top Width (ft)         * 2301.58  * Top Width (ft)         *  452.08  *  107.60  * 1741.90  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    2.52  *    9.24  *    0.83  *
* Max Chl Dpth (ft)      *   44.06  * Hydr. Depth (ft)       *   16.60  *   32.59  *    4.14  *
* Conv. Total (cfs)      *1866241.0  * Conv. (cfs)            *657081.0  *1126206.0  * 82953.7  *
* Length Wtd. (ft)       *  979.79  * Wetted Per. (ft)       *  454.70  *  128.23  *  708.80  *
* Min Ch El (ft)         *  737.83  * Shear (lb/sq ft)       *    0.85  *    1.41  *    0.21  *
* Alpha                  *    3.60  * Stream Power (lb/ft s) *    2.15  *   13.06  *    0.17  *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)   * 2540.11  *12350.81  * 4729.74  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  485.80  *  494.96  *  883.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  785.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.110  *   0.042  *   0.129  *
* W.S. Elev (ft)         *  784.24  * Reach Len. (ft)        * 1227.71  * 1159.70  *   83.10  *
* Crit W.S. (ft)         *  770.16  * Flow Area (sq ft)      * 8574.91  * 3759.32  * 4660.72  *
* E.G. Slope (ft/ft)     *0.000766  * Area (sq ft)           * 8574.91  * 3759.32  *20428.32  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *22430.17  *35007.26  * 4562.57  *
* Top Width (ft)         * 2468.55  * Top Width (ft)         *  460.56  *  107.60  * 1900.39  *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)       *    2.62  *    9.31  *    0.98  *
* Max Chl Dpth (ft)      *   46.41  * Hydr. Depth (ft)       *   18.62  *   34.94  *    5.47  *
* Conv. Total (cfs)      *2239634.0  * Conv. (cfs)            *810247.9  *1264571.0  *164814.3  *
* Length Wtd. (ft)       *  950.64  * Wetted Per. (ft)       *  463.50  *  128.23  *  867.31  *
* Min Ch El (ft)         *  737.83  * Shear (lb/sq ft)       *    0.89  *    1.40  *    0.26  *
* Alpha                  *    3.87  * Stream Power (lb/ft s) *    2.32  *   13.06  *    0.25  *
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* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)   * 3440.33  *13171.99  * 6440.35  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  598.82  *  496.37  * 1219.66  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.110  *   0.042  *   0.129  *
* W.S. Elev (ft)         *  787.16  * Reach Len. (ft)        * 1227.71  * 1159.70  *   83.10  *
* Crit W.S. (ft)         *  771.63  * Flow Area (sq ft)      * 9932.92  * 4073.58  * 7813.35  *
* E.G. Slope (ft/ft)     *0.000726  * Area (sq ft)           * 9932.92  * 4073.58  *26643.08  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *27517.26  *38939.46  * 8263.29  *
* Top Width (ft)         * 2871.61  * Top Width (ft)         *  469.40  *  107.60  * 2294.61  *
* Vel Total (ft/s)       *    3.42  * Avg. Vel. (ft/s)       *    2.77  *    9.56  *    1.06  *
* Max Chl Dpth (ft)      *   49.33  * Hydr. Depth (ft)       *   21.16  *   37.86  *    6.27  *
* Conv. Total (cfs)      *2773966.0  * Conv. (cfs)           *1021573.0  *1445620.0  *306772.9  *
* Length Wtd. (ft)       *  914.54  * Wetted Per. (ft)       *  472.82  *  128.23  * 1261.57  *
* Min Ch El (ft)         *  737.83  * Shear (lb/sq ft)       *    0.95  *    1.44  *    0.28  *
* Alpha                  *    4.31  * Stream Power (lb/ft s) *    2.64  *   13.76  *    0.30  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   * 5228.63  *14453.08  * 9904.72  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  772.24  *  498.46  * 1556.33  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  777.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.110  *   0.042  *   0.070  *
* W.S. Elev (ft)         *  776.88  * Reach Len. (ft)        * 1227.71  * 1159.70  *   83.10  *
* Crit W.S. (ft)         *  764.61  * Flow Area (sq ft)      * 5274.40  * 2967.11  *   27.60  *
* E.G. Slope (ft/ft)     *0.000922  * Area (sq ft)           * 5274.40  * 2967.11  *10296.86  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *12095.78  *25887.52  *   16.70  *
* Top Width (ft)         * 1408.28  * Top Width (ft)         *  413.53  *  107.60  *  887.14  *
* Vel Total (ft/s)       *    4.60  * Avg. Vel. (ft/s)       *    2.29  *    8.72  *    0.61  *
* Max Chl Dpth (ft)      *   39.05  * Hydr. Depth (ft)       *   12.75  *   27.58  *    0.91  *
* Conv. Total (cfs)      *1251249.0  * Conv. (cfs)           *398285.1  *852414.0  *   550.0  *
* Length Wtd. (ft)       * 1043.50  * Wetted Per. (ft)       *  415.09  *  128.23  *   30.33  *
* Min Ch El (ft)         *  737.83  * Shear (lb/sq ft)       *    0.73  *    1.33  *    0.05  *
* Alpha                  *    2.53  * Stream Power (lb/ft s) *    1.68  *   11.62  *    0.03  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   *  883.79  * 9554.20  * 1671.91  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  144.45  *  470.22  *  277.26  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 14.656

INPUT
Description: Blocked obstructions are buildings.  Tributary basin blocked out
             on right side.
Station Elevation Data    num=     392
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  837.06    14.5  834.77   22.52   834.5   25.63  834.31   31.35  833.97
    35.3  833.83   37.32  833.84   42.51  833.93   43.25  833.55   44.36  832.71
   49.35   828.9   51.21  817.44   51.71  815.39   52.02  815.41   53.12  815.31
   69.46  813.97   87.28  813.31  104.18  813.03  122.06  813.31   126.7   813.2
  131.68     813  155.35  812.34  177.58  812.33  213.41  812.96  217.57  813.15
  219.24  813.11  220.58  813.04  241.03  812.98   253.6  812.85  273.65  812.87
   283.1  812.82  295.12  812.78  299.19  812.76  303.36  812.84  303.56  812.72
  307.18  812.68  309.74  812.57  316.44  812.35   322.4   812.2   324.2  814.15
  327.38  817.06  330.86  816.98   335.1   816.8  337.02  818.12  337.55  818.45
  357.99  818.19  364.39   818.1  364.57  818.03  365.03  817.94  365.32  817.88
  389.86  811.43  394.21  810.75  404.71  809.54  408.32  804.28  410.74  801.14
  421.98  801.11  428.25  801.05  440.29  800.97  459.39  800.73  479.21  800.12
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  482.53  800.04  486.04  799.67  497.81  795.95  509.19  792.95  518.48  790.34
  532.11  788.62  532.64  788.55   533.3  788.53  553.74  787.82  560.99  787.19
  584.19  784.96  588.78  784.27  606.48  783.22  628.33  782.13   632.8  781.97
  638.44  781.98  643.15  782.18  648.36  782.57  659.61  783.77  660.33  783.84
  666.42  783.85  667.24  783.85  670.06  783.22  677.89  781.55  685.39  779.08
  688.81  777.94  690.67  778.15  695.67  778.19   707.1  778.66  714.63  778.46
  738.04  777.89  763.77  777.76  781.16     779  803.38  781.14  803.45  781.15
  803.48  781.15  840.43  780.67   864.4  780.17  866.36  780.11  869.13  777.25
  879.39  769.34  885.13  766.47  889.85  764.48   909.4  760.78  910.81  760.56
   924.8  756.89  927.75  756.11  936.33  753.71  948.02  751.16  950.96   750.9
  952.25  749.15  955.01  745.55     962  738.37     980  737.37     999  738.37
 1006.22  745.55 1009.73   748.9 1011.48  750.82 1016.33  751.42  1024.2  752.04
 1026.38  752.75 1036.85  756.17 1046.97  759.65 1059.96  759.74 1071.37  760.07
 1084.78  760.43 1116.18  760.56 1138.76  760.65 1151.55  761.56 1161.08   761.8
 1175.78  761.73 1194.27  761.28  1200.4  761.02 1218.35  761.81 1249.72  762.44
 1309.91  764.97    1312  765.02 1312.48  765.06 1380.11  767.67 1426.09  768.05
 1435.21  768.18 1438.45  768.39 1498.75  770.32 1513.91  770.53 1541.64  772.01
 1546.05  772.32  1558.3  772.05 1558.47  772.05 1558.63  772.05 1578.11  771.99
 1587.74  771.83 1591.18  771.83  1606.9  771.56 1632.27   772.3 1643.87  772.17
 1663.46  772.12  1686.7  771.78  1689.1  771.72 1692.17  771.72 1705.46   771.8
 1708.49  771.71 1727.67  772.03 1768.88  771.73 1776.99  771.69 1780.02  771.75
 1811.19  772.21 1817.54  773.01  1818.6  772.89 1823.99  773.28 1826.72  773.76
 1828.86  774.03 1854.67  774.43  1865.9   774.7 1866.46   774.7 1867.39  774.76
 1868.89  774.98 1878.06  776.42 1883.77  777.18 1894.83  779.03 1898.85   779.7
 1913.55  780.83 1914.99  780.96 1915.21  780.98  1915.8  780.98 1943.83  780.84
  1949.1  780.84 1968.93  780.78 1974.71  780.77 1986.18  780.75 2052.53  780.42
 2055.72   780.4 2057.86  780.36 2072.57  780.11 2080.37  779.96  2081.8  779.96
 2084.79  779.81    2107  778.72 2109.05  778.87 2111.29  779.16 2111.52  779.18
 2120.12  780.18 2125.32  780.24 2128.01  780.25 2138.17  780.33 2153.36  780.53
 2159.82  780.93 2173.63  781.52 2195.05  781.41 2197.31  780.93 2198.87  780.59
 2212.39   780.6 2212.59   780.6 2212.91  780.64 2212.95  780.67 2217.79   781.2
 2218.98  781.32 2223.31  781.14 2225.29  781.18 2244.98  781.23 2246.49  781.22
 2246.64  781.21 2250.19  780.77  2253.8   780.7 2271.38  780.36 2272.43  780.34
 2288.12  780.16 2291.13  780.17    2312  780.39 2333.77  780.69 2334.11  780.69
 2336.48  780.75 2358.27  781.25 2363.55  781.37 2369.16  781.35 2380.33  781.28
 2394.98   781.2 2396.32  781.31 2398.85  781.53 2403.71  781.47 2422.04  781.44
 2424.38   781.5 2431.55  781.73 2434.83   781.6 2450.74  781.09 2469.03  780.94
 2507.14   781.2 2508.49  781.18 2509.33  781.17 2536.53  780.54  2560.6  780.08
 2566.75  779.96 2567.96  779.95 2570.38  779.88 2593.96  779.58 2595.21   779.5
  2600.7  779.43 2601.38  779.42 2602.17  779.04 2616.78  774.21 2620.23  773.07
 2624.57  772.52 2635.76  770.62 2647.33  769.73    2650  768.52 2654.69  762.62
    2664  764.72 2669.81  764.77  2676.6  764.99 2693.12  764.27 2723.72  763.15
 2726.24  763.04 2727.08  763.02 2730.95  763.55 2762.32  768.58 2784.02  772.69
 2798.68  776.69 2806.67  778.92 2838.15  779.59 2846.58  779.66  2849.1  779.78
 2854.24  779.97 2861.82  780.01 2896.07  780.06 2928.71   780.6 2942.12  780.84
 2953.69  780.89 2961.82  781.13 2971.22  781.29 2995.75  767.44 2996.24  767.13
  2996.5  766.98  2996.7  766.92 3013.25  760.01 3014.78  759.39 3033.86  759.08
  3068.1  758.71 3089.87  758.94 3116.72  759.22 3123.88  755.39 3127.37  753.54
 3137.95  758.46 3138.39  758.66 3138.87  758.68 3154.38  759.07 3171.57  759.49
 3210.52  759.68  3217.2  759.69 3224.87  759.74 3270.92     760 3283.38  760.08
  3299.6  760.34 3330.88  760.69 3369.02  760.92 3377.52  761.01 3390.43  761.17
 3407.88  761.46 3438.29  761.99 3444.17  762.15 3448.81  763.34 3454.96  765.22
 3462.92  767.53 3471.97  770.68 3472.42  770.87 3477.23  775.06 3478.65  776.14
 3481.97  777.53 3484.82   778.4 3491.05  778.79 3504.09  780.84  3528.9  781.52
  3543.2  782.16 3549.69  782.33 3570.08  782.53 3603.13  782.92 3638.91  783.04
 3655.01  783.17 3696.12   783.6  3706.4  783.73 3729.24  783.99 3752.49  784.23
 3775.44   784.2 3802.99  784.29 3818.81  784.27 3849.31  784.44    3884  785.22
 3890.57  785.37 3896.47  785.57 3898.16  785.65 3904.04  785.77 3945.73  786.52
 3961.19  786.71 3970.33  787.27 4004.75  788.27 4009.32   788.3 4024.15  788.17
 4035.42  788.08 4038.72  788.06 4040.63  788.04 4043.02  787.99 4054.23   787.9
 4063.61  787.68 4079.19  787.37  4092.4  786.43 4101.78  786.35 4106.32  784.83
 4114.96  782.73 4116.99  783.11 4128.05  785.14 4131.63  785.93 4139.28  786.62
 4145.17  787.24 4160.18  792.21 4172.07   796.1 4183.44  800.36 4192.65  804.11
 4201.82  807.84 4214.98  813.53 4226.43  819.15 4235.95  822.97 4239.11  824.48
 4248.62  831.81 4249.22  832.12 4249.63  832.31 4255.14  835.36 4261.73  836.99
 4275.64  842.69 4279.27  844.11 4298.02  848.55 4299.22  848.83 4324.08  858.45
 4327.49  859.77 4342.62  863.28

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11   864.4    .042 1046.97     .12 1894.83     .07 2507.14     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        864.4 1046.97           301.98 1333.74   67.62              .1       .3
Ineffective Flow     num=       2
```

```
   Sta L   Sta R    Elev  Permanent
    1540    2960     800       F
    2960    3550     777       T
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
     100     300     830     395     485     820    1950    2030     800

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  765.41  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  752.74  * Flow Area (sq ft)      *          * 2375.04  *  992.13  *
* E.G. Slope (ft/ft)     *0.000669  * Area (sq ft)           *          * 2375.04  * 3578.33  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *12451.89  *  748.11  *
* Top Width (ft)         *  979.36  * Top Width (ft)         *          *  159.33  *  820.03  *
* Vel Total (ft/s)       *    3.92  * Avg. Vel. (ft/s)       *          *    5.24  *    0.75  *
* Max Chl Dpth (ft)      *   28.04  * Hydr. Depth (ft)       *          *   14.91  *    3.61  *
* Conv. Total (cfs)      *510175.9  * Conv. (cfs)            *          *481261.8  * 28914.2  *
* Length Wtd. (ft)       * 1232.32  * Wetted Per. (ft)       *          *  173.27  *  274.77  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *          *    0.57  *    0.15  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *          *    3.00  *    0.11  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   *  114.74  * 4399.40  *  189.15  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.27  *  366.46  *   50.46  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  769.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  769.32  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  756.30  * Flow Area (sq ft)      *          * 3014.04  * 2322.27  *
* E.G. Slope (ft/ft)     *0.000674  * Area (sq ft)           *          * 3014.04  * 7134.80  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *17967.55  * 2332.45  *
* Top Width (ft)         * 1181.63  * Top Width (ft)         *          *  167.54  * 1014.10  *
* Vel Total (ft/s)       *    3.80  * Avg. Vel. (ft/s)       *          *    5.96  *    1.00  *
* Max Chl Dpth (ft)      *   31.95  * Hydr. Depth (ft)       *          *   17.99  *    5.52  *
* Conv. Total (cfs)      *781703.5  * Conv. (cfs)            *          *691886.6  * 89817.0  *
* Length Wtd. (ft)       * 1141.56  * Wetted Per. (ft)       *          *  182.36  *  420.69  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *          *    0.70  *    0.23  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *          *    4.15  *    0.23  *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   *  257.02  * 6002.04  *  413.41  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   50.01  *  405.76  *   75.93  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  772.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  771.86  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  758.58  * Flow Area (sq ft)      *          * 3444.58  * 3494.62  *
* E.G. Slope (ft/ft)     *0.000677  * Area (sq ft)           *          * 3444.58  * 9886.01  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *22159.28  * 4160.72  *
* Top Width (ft)         * 1404.79  * Top Width (ft)         *          *  170.85  * 1233.94  *
* Vel Total (ft/s)       *    3.79  * Avg. Vel. (ft/s)       *          *    6.43  *    1.19  *
* Max Chl Dpth (ft)      *   34.49  * Hydr. Depth (ft)       *          *   20.16  *    7.10  *
* Conv. Total (cfs)      *1011229.0  * Conv. (cfs)            *          *851371.3  *159857.3  *
* Length Wtd. (ft)       * 1077.40  * Wetted Per. (ft)       *          *  186.54  *  492.18  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *          *    0.78  *    0.30  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *          *    5.02  *    0.36  *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   *  403.76  * 7336.61  *  716.76  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   69.12  *  433.48  *  143.53  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  775.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  774.83  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  761.48  * Flow Area (sq ft)      *          * 3956.52  * 4955.47  *
* E.G. Slope (ft/ft)     *0.000644  * Area (sq ft)           *          * 3956.52  *14111.66  *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *26751.44  * 7248.56  *
* Top Width (ft)         * 1666.79  * Top Width (ft)         *          *  174.70  * 1492.09  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *          *    6.76  *    1.46  *
* Max Chl Dpth (ft)      *   37.46  * Hydr. Depth (ft)       *          *   22.65  *   10.05  *
* Conv. Total (cfs)      *1340017.0  * Conv. (cfs)            *          *1054335.0  *285682.4  *
* Length Wtd. (ft)       *  997.46  * Wetted Per. (ft)       *          *  191.40  *  493.30  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *          *    0.83  *    0.40  *
* Alpha                  *    2.50  * Stream Power (lb/ft s) *          *    5.62  *    0.59  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   *  641.01  * 8721.29  * 1263.73  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  102.83  *  456.09  *  218.77  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  779.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.110  *   0.042  *   0.121  *
* W.S. Elev (ft)         *  778.61  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  764.62  * Flow Area (sq ft)      *   42.18  * 4627.08  * 7624.02  *
* E.G. Slope (ft/ft)     *0.000585  * Area (sq ft)           *   42.18  * 4627.08  *19883.10  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *    8.74  *32457.73  *12033.53  *
* Top Width (ft)         * 1824.91  * Top Width (ft)         *   86.02  *  179.16  * 1559.73  *
* Vel Total (ft/s)       *    3.62  * Avg. Vel. (ft/s)       *    0.21  *    7.01  *    1.58  *
* Max Chl Dpth (ft)      *   41.24  * Hydr. Depth (ft)       *    0.49  *   25.83  *    7.58  *
* Conv. Total (cfs)      *1839077.0  * Conv. (cfs)            *   361.1  *1341399.0  *497316.6  *
* Length Wtd. (ft)       *  915.14  * Wetted Per. (ft)       *   86.19  *  197.26  * 1016.40  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *    0.02  *    0.86  *    0.27  *
* Alpha                  *    2.79  * Stream Power (lb/ft s) *    0.00  *    6.01  *    0.43  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   * 1404.03  *10938.79  * 2890.27  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  300.37  *  484.04  *  554.00  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  782.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.110  *   0.042  *   0.122  *
* W.S. Elev (ft)         *  781.44  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  766.39  * Flow Area (sq ft)      *  394.65  * 5139.34  *10489.90  *
* E.G. Slope (ft/ft)     *0.000543  * Area (sq ft)           *  394.65  * 5139.34  *25057.49  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *  204.36  *36720.61  *16765.03  *
* Top Width (ft)         * 2709.29  * Top Width (ft)         *  186.18  *  182.57  * 2340.54  *
* Vel Total (ft/s)       *    3.35  * Avg. Vel. (ft/s)       *    0.52  *    7.15  *    1.60  *
* Max Chl Dpth (ft)      *   44.07  * Hydr. Depth (ft)       *    2.12  *   28.15  *    9.91  *
* Conv. Total (cfs)      *2304971.0  * Conv. (cfs)            *  8773.3  *1576457.0  *719741.3  *
* Length Wtd. (ft)       *  857.54  * Wetted Per. (ft)       *  186.93  *  201.31  * 1071.04  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *    0.07  *    0.86  *    0.33  *
* Alpha                  *    3.18  * Stream Power (lb/ft s) *    0.04  *    6.18  *    0.53  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   * 2428.80  *12235.72  * 4690.40  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  476.80  *  491.10  *  879.74  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  784.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.110  *   0.042  *   0.123  *
* W.S. Elev (ft)         *  783.84  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  767.67  * Flow Area (sq ft)      *  925.39  * 5577.58  *13213.16  *
```

```
* E.G. Slope (ft/ft)     *0.000498  * Area (sq ft)           *  925.39  * 5577.58  *30993.56  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *  705.07  *40316.84  *20978.09  *
* Top Width (ft)         * 3044.69  * Top Width (ft)         *  262.31  *  182.57  * 2599.81  *
* Vel Total (ft/s)       *    3.14  * Avg. Vel. (ft/s)       *    0.76  *    7.23  *    1.59  *
* Max Chl Dpth (ft)      *   46.47  * Hydr. Depth (ft)       *    3.53  *   30.55  *   10.49  *
* Conv. Total (cfs)      *2778548.0  * Conv. (cfs)            * 31597.7  *1806811.0  *940139.3  *
* Length Wtd. (ft)       *  814.60  * Wetted Per. (ft)       *  263.45  *  201.31  * 1272.06  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *    0.11  *    0.86  *    0.32  *
* Alpha                  *    3.52  * Stream Power (lb/ft s) *    0.08  *    6.23  *    0.51  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   * 3306.46  *13047.70  * 6391.31  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  588.63  *  492.51  * 1215.37  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  787.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.              *   0.110  *   0.042  *   0.125  *
* W.S. Elev (ft)         *  786.81  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  769.87  * Flow Area (sq ft)      * 1770.62  * 6120.00  *17474.09  *
* E.G. Slope (ft/ft)     *0.000464  * Area (sq ft)           * 1770.62  * 6120.00  *39235.64  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 1679.68  *45429.81  *27610.51  *
* Top Width (ft)         * 3372.03  * Top Width (ft)         *  299.48  *  182.57  * 2889.97  *
* Vel Total (ft/s)       *    2.95  * Avg. Vel. (ft/s)       *    0.95  *    7.42  *    1.58  *
* Max Chl Dpth (ft)      *   49.44  * Hydr. Depth (ft)       *    5.91  *   33.52  *   11.27  *
* Conv. Total (cfs)      *3468840.0  * Conv. (cfs)            * 77978.1  *2109057.0  *1281805.0  *
* Length Wtd. (ft)       *  763.62  * Wetted Per. (ft)       *  300.78  *  201.31  * 1562.88  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *    0.17  *    0.88  *    0.32  *
* Alpha                  *    3.97  * Stream Power (lb/ft s) *    0.16  *    6.54  *    0.51  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   * 5063.71  *14317.39  * 9841.88  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  761.41  *  494.60  * 1551.38  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  776.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *          *   0.042  *   0.120  *
* W.S. Elev (ft)         *  776.27  * Reach Len. (ft)        *  301.98  * 1333.74  *   67.62  *
* Crit W.S. (ft)         *  763.06  * Flow Area (sq ft)      *          * 4210.44  * 5668.26  *
* E.G. Slope (ft/ft)     *0.000627  * Area (sq ft)           *          * 4210.44  *16285.77  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *29049.37  * 8950.63  *
* Top Width (ft)         * 1692.18  * Top Width (ft)         *          *  176.57  * 1515.61  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *          *    6.90  *    1.58  *
* Max Chl Dpth (ft)      *   38.90  * Hydr. Depth (ft)       *          *   23.85  *   11.50  *
* Conv. Total (cfs)      *1517362.0  * Conv. (cfs)            *          *1159958.0  *357403.6  *
* Length Wtd. (ft)       *  964.47  * Wetted Per. (ft)       *          *  193.76  *  493.30  *
* Min Ch El (ft)         *  737.37  * Shear (lb/sq ft)       *          *    0.85  *    0.45  *
* Alpha                  *    2.50  * Stream Power (lb/ft s) *          *    5.87  *    0.71  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   *  809.46  * 9458.65  * 1646.55  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  138.62  *  466.44  *  274.97  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 14.403

INPUT
Description: Blocked obstructions are buildings.  Tributary basins blocked out
             on right side.
Station Elevation Data    num=     405
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   815.9     9.3  815.72   17.77  815.72   18.85  816.38   20.52  818.03
```

41.72	818	41.76	818	41.78	818.01	59.26	820.02	78.88	818.98
83.5	818.79	89	818.09	104.52	816.28	114.23	814.23	119.18	811.55
122.01	810.43	122.35	810.3	124.34	808.5	134.65	803.72	135.48	803.45
142.45	800.19	152.24	795.83	153.78	795	157.86	794.39	175.99	791.55
200.49	788.78	217.41	786.72	229.74	785.59	249.44	785.21	288.6	784.08
290.32	784.39	299.76	785.26	311.91	785.03	325.2	784.75	336.18	784.35
356.12	783.56	357.87	783.5	372.45	783.03	372.67	783.02	410.62	782.11
423.74	782.11	430.91	782.72	435.95	783.01	438.43	783.13	445.54	783.57
452	783.57	452.68	783.57	453.8	783.47	465.19	782.5	470.35	781.99
474.9	781.36	491.58	781.32	515.59	781.17	535.87	781.01	560.51	780.8
592.76	780.69	593.56	780.69	595.34	780.69	621.18	779.91	624.98	779.84
648.01	779.37	665.11	779.13	679	779.17	688.05	779.47	688.94	779.46
697.53	779.13	725.78	779.47	735.98	779.48	739.44	779.47	755.58	779.47
768.56	779.77	781.27	779.94	787.56	779.83	795.56	779.95	828.87	780.16
836.45	780.21	855.1	780.24	888.18	780.29	906.87	780.76	923.97	781.1
931.76	781.26	935.28	781.33	951.31	781.42	957.68	781.36	968.84	781.25
987.95	781.1	1022.2	780.87	1041.66	781.02	1049.56	781.01	1068.12	781.14
1079.38	781.2	1087.71	781.3	1092.15	781.35	1117.29	781.02	1130.87	780.8
1139.47	780.35	1148.7	780.34	1149.14	780.34	1180.89	779.97	1214.28	779.53
1214.47	779.54	1214.82	779.54	1247.87	779.69	1264.7	779.55	1274.9	779.49
1285.1	779.65	1292.56	779.64	1312.15	779.94	1322.8	779.66	1335.16	779.24
1354.33	779.26	1370.74	779.54	1384.56	779.74	1399.69	779.31	1403.02	779.37
1415.68	779.57	1426.07	779.6	1441.35	780.04	1444.65	780.22	1450.29	780.41
1452.55	780.53	1463.42	779.86	1483.75	778.86	1490.27	778.44	1494.59	778.39
1504.77	777.14	1521.73	775.23	1540.83	773.64	1547.38	772.64	1549.04	771.92
1551.76	772.53	1556.82	772.98	1569.75	773.19	1575.24	772.96	1581.76	772.63
1600.08	771.91	1617.13	771.24	1644.06	769.59	1657.08	769.52	1662.55	769.58
1674.12	769.72	1702.51	769.29	1706.83	769.22	1707.62	769.21	1730.42	768.08
1749.31	767.35	1772.42	767.3	1776.51	767.25	1788.41	767.44	1793.72	766.97
1795.12	766.97	1798.13	767.49	1817.77	767.34	1833.48	767.08	1840.15	767.07
1864.06	767.63	1871.62	767.69	1888.6	767.99	1906.68	768.28	1911.37	768.32
1939.48	768.26	1958.36	768.31	1961.13	768.38	1994.04	768.69	2014.7	769.17
2016.63	769.23	2028.23	769.3	2034.65	769.24	2046.28	769.54	2049.1	769.48
2053.96	766.41	2062.76	758.28	2076.5	752.28	2077.97	751.85	2090.87	750.25
2099.08	749.23	2100.63	749.05	2100.72	749.04	2100.79	749.02	2110.99	745.59
2120	737.84	2133	736.84	2146	737.84	2153.75	745.59	2154.61	746.07
2159.72	748.98	2169.63	750.1	2177.37	751.18	2179.72	752.5	2190.74	758.39
2190.93	758.39	2192.54	758.43	2229.49	758.99	2257.23	758.95	2288.59	759.62
2347.37	759.06	2369.65	758.94	2383.7	758.7	2410.09	758.4	2452.9	759.32
2461.77	759.44	2465.81	760.02	2479.75	762.47	2489.03	762.63	2522.99	763.73
2572.25	764.68	2580.88	764.76	2595.94	765.58	2631.74	768.03	2655.07	768.78
2681.6	769.17	2705	770.4	2715.94	770.93	2730.15	772.4	2745.71	774
2760.14	776.54	2765.55	777.74	2770.6	778.33	2781.96	778.89	2784.97	779.16
2802.84	780.63	2823.36	780.37	2856.85	780.13	2861.5	780.11	2864.57	780.31
2872.33	780.6	2880.14	780.84	2891.54	780.89	2896.87	780.88	2921.79	780.55
2953.83	780.37	2955.36	780.35	2956.05	780.38	2981.27	781.26	2992.53	781.36
3026.5	780.64	3034.14	780.57	3034.86	780.5	3035.32	780.5	3037.12	780.51
3057.9	780.43	3077.82	781.03	3095.06	781.15	3097.9	781.2	3102.24	781.18
3114.93	781.12	3119.91	781.13	3138.98	781.06	3144.52	780.93	3149.49	780.91
3160.25	780.79	3160.33	780.79	3160.46	780.76	3189.9	774.17	3204.37	773.88
3225.7	773.83	3244.5	773.64	3269.13	773.26	3275.13	773.65	3277	773.82
3282.58	773.6	3298.22	772.38	3300.77	772.27	3303.75	771.16	3319.78	766.04
3334.45	762.97	3344.27	762.58	3351.67	762.45	3370.49	761.65	3381.14	761.6
3408.91	761.53	3432.13	761.45	3457.18	761.37	3467.77	761.33	3476.79	764.22
3489.16	767.32	3509.58	772.25	3526.68	775.41	3535.41	778.53	3550.41	778.83
3561.81	779.05	3568.51	779.17	3581.8	779.34	3608.78	779.39	3630.19	779.34
3639.87	779.51	3666.94	780.08	3672.96	780.12	3674.48	780.15	3695.24	779.99
3701.21	780.31	3715.65	772.09	3723.64	767.03	3729.07	763.55	3734.42	760.56
3737.48	759.82	3741.06	759.09	3757.18	759.07	3775.91	759.12	3801.46	759.51
3803.24	759.52	3804.36	758.76	3809.25	755.28	3812.37	753.05	3813.35	753.63
3821.24	758.56	3828.14	758.73	3845.59	759.02	3855.53	759.27	3887.18	759.55
3921.69	759.94	3937.29	760.11	3979.13	760.34	3997.02	760.41	4004.16	760.49
4031.44	760.78	4066.65	761.04	4073.73	761.09	4085.38	761.26	4118.35	761.83
4127.38	762.24	4151.96	763.38	4154.87	763.54	4159.98	764.67	4176.77	767.53
4180.12	768.76	4190.55	772.48	4190.72	772.56	4191.55	772.85	4200.43	776.14
4207.14	778.1	4218.57	782	4223.43	781.94	4236.85	782.29	4250.63	782.69
4255.5	782.6	4264.62	782.73	4288.67	782.87	4304.63	783.12	4332.32	783.1
4347.34	783.09	4375.2	783.35	4413.8	783.61	4435.69	783.73	4468.68	783.76
4515.81	783.94	4518.95	783.94	4520.19	783.95	4562.24	783.98	4578.01	784.36
4593.64	784.58	4596.77	785.14	4601.73	785.54	4617.97	786.04	4625.47	786.19
4626.18	786.2	4627.98	786.24	4630.81	786.4	4653.87	787.15	4670.46	788.03
4677.34	789.36	4680.77	789.86	4688.69	789.77	4735.58	790.11	4741.68	789.76
4761.15	789.64	4801.71	788.44	4803.36	788.38	4804.43	788.36	4810.12	788.2
4821.32	788.09	4841.26	794.83	4845.14	796.1	4858.79	801.73	4863.68	804.11
4880.15	810.77	4883.8	812.4	4884.25	814.73	4885.3	816.04	4887.19	816.52
4889.05	820	4892.8	819.89	4893.07	819.15	4894.31	817.33	4894.72	817.61

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 4900.52  821.47 4910.54   823.8 4914.31  824.96 4921.48  833.19 4922.35   834.1
 4926.91  834.22  4930.1  834.76 4945.44  841.21  4950.1   843.2  4951.6  843.55
 4956.38  844.53 4975.72  849.45 4977.54   849.9 4979.77  850.81 4992.73  856.11
  4998.1  858.44 5009.83  861.27 5052.96  872.01 5059.56  873.12 5066.32  874.25

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11 1441.35     .13  2049.1    .042 2190.93     .12    2705     .07
 3204.37     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         2049.1 2190.93            36.87 1342.52  287.06             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
   52.86 1440.53  799.83       F
    2825    3695     800       T
    3695    4250     777       T
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
     875     915     800    1075    1115     800    4675    4750     805

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  765.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.38  * Wt. n-Val.             *          *   0.042  *   0.120  *
* W.S. Elev (ft)          *  764.66  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)          *  753.28  * Flow Area (sq ft)      *          * 2260.78  * 1692.96  *
* E.G. Slope (ft/ft)      *0.000581  * Area (sq ft)           *          * 2260.78  * 4034.24  *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *          *11833.40  * 1366.60  *
* Top Width (ft)          * 1100.06  * Top Width (ft)          *          *  135.07  *  964.98  *
* Vel Total (ft/s)        *    3.34  * Avg. Vel. (ft/s)        *          *    5.23  *    0.81  *
* Max Chl Dpth (ft)       *   27.82  * Hydr. Depth (ft)        *          *   16.74  *    4.45  *
* Conv. Total (cfs)       *547715.8  * Conv. (cfs)             *          *491010.6  * 56705.2  *
* Length Wtd. (ft)        * 1236.46  * Wetted Per. (ft)        *          *  148.64  *  380.54  *
* Min Ch El (ft)          *  736.84  * Shear (lb/sq ft)        *          *    0.55  *    0.16  *
* Alpha                   *    2.21  * Stream Power (lb/ft s) *          *    2.89  *    0.13  *
* Frctn Loss (ft)         *    0.84  * Cum Volume (acre-ft)    *  114.74  * 4328.43  *  183.24  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   25.27  *  361.95  *   49.08  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  769.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)          *  768.64  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)          *  756.07  * Flow Area (sq ft)      *  227.90  * 2808.96  * 3370.61  *
* E.G. Slope (ft/ft)      *0.000578  * Area (sq ft)           *  227.90  * 2808.96  * 8163.62  *
* Q Total (cfs)           *20300.00  * Flow (cfs)              *   55.91  *16459.64  * 3784.45  *
* Top Width (ft)          * 1512.34  * Top Width (ft)          *  270.18  *  140.51  * 1101.66  *
* Vel Total (ft/s)        *    3.17  * Avg. Vel. (ft/s)        *    0.25  *    5.86  *    1.12  *
* Max Chl Dpth (ft)       *   31.80  * Hydr. Depth (ft)        *    0.84  *   19.99  *    7.33  *
* Conv. Total (cfs)       *844165.4  * Conv. (cfs)             *  2324.9  *684465.9  *157374.5  *
* Length Wtd. (ft)        * 1118.09  * Wetted Per. (ft)        *  270.29  *  155.40  *  460.35  *
* Min Ch El (ft)          *  736.84  * Shear (lb/sq ft)        *    0.03  *    0.65  *    0.26  *
* Alpha                   *    2.80  * Stream Power (lb/ft s) *    0.01  *    3.82  *    0.30  *
* Frctn Loss (ft)         *    0.71  * Cum Volume (acre-ft)    *  256.23  * 5912.90  *  401.54  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   49.07  *  401.05  *   74.28  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)          *  771.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.45  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)          *  771.27  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)          *  758.12  * Flow Area (sq ft)      * 1225.32  * 3180.64  * 4691.18  *
* E.G. Slope (ft/ft)      *0.000555  * Area (sq ft)           * 1225.32  * 3180.64  *11208.51  *
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* Q Total (cfs)          *26320.00  * Flow (cfs)             *  660.14  *19701.08  * 5958.78  *
* Top Width (ft)         * 1775.09  * Top Width (ft)         *  432.71  *  141.83  * 1200.55  *
* Vel Total (ft/s)       *    2.89  * Avg. Vel. (ft/s)       *    0.54  *    6.19  *    1.27  *
* Max Chl Dpth (ft)      *   34.43  * Hydr. Depth (ft)       *    2.83  *   22.43  *    8.88  *
* Conv. Total (cfs)      *1117363.0  * Conv. (cfs)           * 28024.8  *836370.3  *252968.2  *
* Length Wtd. (ft)       * 1007.46  * Wetted Per. (ft)       *  432.90  *  156.97  *  528.78  *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *    0.10  *    0.70  *    0.31  *
* Alpha                  *    3.48  * Stream Power (lb/ft s) *    0.05  *    4.35  *    0.39  *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   *  399.51  * 7235.18  *  700.39  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   67.62  *  428.70  *  141.64  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  774.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  774.37  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)         *  761.47  * Flow Area (sq ft)      * 2715.34  * 3620.90  * 6377.49  *
* E.G. Slope (ft/ft)     *0.000483  * Area (sq ft)           * 2715.34  * 3620.90  *15121.02  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2058.54  *22806.73  * 9134.73  *
* Top Width (ft)         * 2031.91  * Top Width (ft)         *  517.08  *  141.83  * 1373.00  *
* Vel Total (ft/s)       *    2.67  * Avg. Vel. (ft/s)       *    0.76  *    6.30  *    1.43  *
* Max Chl Dpth (ft)      *   37.53  * Hydr. Depth (ft)       *    5.25  *   25.53  *   11.45  *
* Conv. Total (cfs)      *1547578.0  * Conv. (cfs)           * 93698.4  *1038094.0  *415785.6  *
* Length Wtd. (ft)       *  903.19  * Wetted Per. (ft)       *  517.66  *  156.97  *  557.57  *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *    0.16  *    0.70  *    0.34  *
* Alpha                  *    3.80  * Stream Power (lb/ft s) *    0.12  *    4.38  *    0.49  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *  631.59  * 8605.29  * 1241.04  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  101.04  *  451.25  *  216.55  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  778.69  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.130  *   0.042  *   0.119  *
* W.S. Elev (ft)         *  778.31  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)         *  763.61  * Flow Area (sq ft)      * 4830.03  * 4179.60  * 9262.67  *
* E.G. Slope (ft/ft)     *0.000396  * Area (sq ft)           * 4830.03  * 4179.60  *20674.36  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4652.78  *26254.35  *13592.87  *
* Top Width (ft)         * 2141.68  * Top Width (ft)         *  553.88  *  141.83  * 1445.97  *
* Vel Total (ft/s)       *    2.44  * Avg. Vel. (ft/s)       *    0.96  *    6.28  *    1.47  *
* Max Chl Dpth (ft)      *   41.47  * Hydr. Depth (ft)       *    8.72  *   29.47  *    8.56  *
* Conv. Total (cfs)      *2234902.0  * Conv. (cfs)           *233674.3  *1318559.0  *682668.2  *
* Length Wtd. (ft)       *  806.88  * Wetted Per. (ft)       *  554.67  *  156.97  * 1094.56  *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *    0.22  *    0.66  *    0.21  *
* Alpha                  *    4.05  * Stream Power (lb/ft s) *    0.21  *    4.14  *    0.31  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   * 1387.14  *10803.97  * 2858.79  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  298.15  *  479.13  *  551.67  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  781.56  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  781.22  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)         *  765.69  * Flow Area (sq ft)      * 6528.97  * 4591.39  *12499.22  *
* E.G. Slope (ft/ft)     *0.000353  * Area (sq ft)           * 7460.08  * 4591.39  *25431.80  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 6818.40  *28973.01  *17898.59  *
* Top Width (ft)         * 3565.08  * Top Width (ft)         * 1417.24  *  141.83  * 2006.01  *
* Vel Total (ft/s)       *    2.27  * Avg. Vel. (ft/s)       *    1.04  *    6.31  *    1.43  *
* Max Chl Dpth (ft)      *   44.38  * Hydr. Depth (ft)       *   10.73  *   32.37  *   10.82  *
* Conv. Total (cfs)      *2857696.0  * Conv. (cfs)           *362915.3  *1542113.0  *952667.4  *
* Length Wtd. (ft)       *  753.01  * Wetted Per. (ft)       *  609.44  *  156.97  * 1168.45  *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *    0.24  *    0.64  *    0.24  *
```

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* Alpha                  *    4.32  * Stream Power (lb/ft s) *    0.25  *    4.07  *    0.34  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 2401.58  *12086.75  * 4651.21  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  471.24  *  486.13  *  876.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  784.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  783.68  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)         *  766.96  * Flow Area (sq ft)      * 8026.43  * 4940.39  *15483.76  *
* E.G. Slope (ft/ft)     *0.000317  * Area (sq ft)           *11240.32  * 4940.39  *30555.51  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 9113.93  *31022.61  *21863.46  *
* Top Width (ft)         * 3992.73  * Top Width (ft)         * 1615.92  *  141.83  * 2234.98  *
* Vel Total (ft/s)       *    2.18  * Avg. Vel. (ft/s)       *    1.14  *    6.28  *    1.41  *
* Max Chl Dpth (ft)      *   46.84  * Hydr. Depth (ft)       *   13.19  *   34.83  *   11.34  *
* Conv. Total (cfs)      *3482225.0  * Conv. (cfs)           *511883.1  *1742382.0  *1227960.0  *
* Length Wtd. (ft)       *  713.78  * Wetted Per. (ft)       *  609.44  *  156.97  * 1378.24  *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *    0.26  *    0.62  *    0.22  *
* Alpha                  *    4.34  * Stream Power (lb/ft s) *    0.30  *    3.91  *    0.31  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 3264.29  *12886.68  * 6343.53  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  582.12  *  487.54  * 1211.62  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  787.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  786.70  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)         *  768.77  * Flow Area (sq ft)      * 9865.66  * 5369.03  *20107.04  *
* E.G. Slope (ft/ft)     *0.000291  * Area (sq ft)           *16370.76  * 5369.03  *37808.12  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *12308.99  *34129.93  *28281.08  *
* Top Width (ft)         * 4342.35  * Top Width (ft)         * 1751.46  *  141.83  * 2449.06  *
* Vel Total (ft/s)       *    2.11  * Avg. Vel. (ft/s)       *    1.25  *    6.36  *    1.41  *
* Max Chl Dpth (ft)      *   49.86  * Hydr. Depth (ft)       *   16.21  *   37.86  *   12.73  *
* Conv. Total (cfs)      *4381969.0  * Conv. (cfs)           *721863.1  *2001556.0  *1658549.0  *
* Length Wtd. (ft)       *  671.99  * Wetted Per. (ft)       *  609.44  *  156.97  * 1592.40  *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *    0.29  *    0.62  *    0.23  *
* Alpha                  *    4.35  * Stream Power (lb/ft s) *    0.37  *    3.95  *    0.32  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 5000.82  *14141.50  * 9782.08  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  754.30  *  489.64  * 1547.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  776.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.130  *   0.042  *   0.119  *
* W.S. Elev (ft)         *  775.88  * Reach Len. (ft)        *   36.87  * 1342.52  *  287.06  *
* Crit W.S. (ft)         *  762.41  * Flow Area (sq ft)      * 3507.70  * 3834.68  * 7223.33  *
* E.G. Slope (ft/ft)     *0.000450  * Area (sq ft)           * 3507.70  * 3834.68  *17212.94  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2984.11  *24232.59  *10783.30  *
* Top Width (ft)         * 2076.91  * Top Width (ft)         *  533.15  *  141.83  * 1401.94  *
* Vel Total (ft/s)       *    2.61  * Avg. Vel. (ft/s)       *    0.85  *    6.32  *    1.49  *
* Max Chl Dpth (ft)      *   39.04  * Hydr. Depth (ft)       *    6.58  *   27.04  *   12.77  *
* Conv. Total (cfs)      *1791185.0  * Conv. (cfs)           *140660.2  *1142238.0  *508286.6  *
* Length Wtd. (ft)       *  862.44  * Wetted Per. (ft)       *  533.80  *  156.97  *  566.26  *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *    0.18  *    0.69  *    0.36  *
* Alpha                  *    3.84  * Stream Power (lb/ft s) *    0.16  *    4.34  *    0.54  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   *  797.30  * 9335.49  * 1620.55  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  136.78  *  461.56  *  272.71  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 14.149

INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data num= 274

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	818.38	11.25	818.52	17.35	818.52	18.78	819.29	19.79	819.81
29.91	819.88	36.85	820.26	40.48	820.96	46.61	822.25	57.32	822.2
69.17	821.93	78.61	820.78	87.71	820.15	97.23	818.34	106.4	817.43
119.07	815.26	125.85	807.85	125.87	807.84	125.91	807.82	140.84	803.61
151.32	796.85	154.88	795	165.13	793.24	165.26	793.22	166.48	793.02
167.44	792.86	169.99	792.43	171.36	792.2	176.38	791.34	211.3	787.42
221.67	786.46	275.08	783.84	298.78	783.07	303.27	783.98	306.61	785.26
316.42	786.77	320.68	787.47	328.71	788.32	332.68	787.85	335.58	787.85
353.83	783.51	367.19	783.03	368.6	782.98	375.75	782.78	394.7	782.25
407.4	782.1	428.39	782.07	438.7	782.61	439.98	782.65	443.17	782.91
449.88	783.4	452.7	783.39	457.06	783.39	460.5	783.09	469.8	782.31
473.22	781.98	479.71	781.33	498.63	781.3	525.25	781.14	551.6	780.93
592.93	780.8	608.55	780.76	615.89	780.76	644.54	780.7	660.83	780.75
663.83	780.79	665.99	780.84	672.99	780.79	681.69	780.89	690.52	780.63
733.98	780.88	740.4	780.86	741.26	780.86	742.97	780.88	788.67	780.12
827.48	780.67	840.71	780.75	895.98	780.86	898.54	780.87	911.78	780.98
931.76	781.29	933.65	781.33	943.69	781.27	947.17	781.28	958.63	781.15
989.85	780.85	995.08	780.81	1004.48	780.75	1009.81	780.79	1047.61	780.76
1076.63	780.95	1097.9	780.84	1103.88	781.06	1110.82	781.32	1116.46	781.67
1129.03	781.8	1131.27	781.83	1132.58	781.84	1135.13	781.64	1148.7	780.93
1161.29	780.16	1184.32	780.17	1195.64	780.04	1207.54	779.89	1220.26	780.24
1226.54	780.28	1229.36	780.29	1251.15	780.1	1256.81	780.1	1264.96	780.01
1285.86	779.9	1287.15	779.92	1327.04	779.84	1327.58	779.85	1327.87	779.84
1328.21	779.83	1379.53	779.87	1385.3	779.97	1390.17	780.04	1395.5	779.89
1404.44	780.05	1431.74	780.47	1437.61	780.21	1449.76	779.62	1463.42	778.92
1468.92	778.75	1487.32	777.94	1509.61	775.94	1520.76	774.99	1548.5	772.91
1555.89	772.09	1558.08	771.91	1559.1	771.76	1560	771.84	1561.63	771.87
1586.69	770.93	1614.49	769.61	1620.43	769.4	1626.21	769.2	1635.84	768.65
1678.55	768.51	1681.46	768.55	1687.71	768.64	1703.67	768.43	1731.01	768.05
1745.31	767.32	1756.81	766.86	1770.46	766.82	1800.55	766.41	1811.59	766.56
1826.32	766.43	1835.78	766.25	1863.58	766.18	1881.6	766.57	1898.97	766.68
1910.37	766.74	1929.78	766.62	1950.09	766.32	1962.65	766.19	1997.35	766.81
2022.31	766.82	2036.81	767.03	2064	767.61	2071.19	767.6	2089.49	767.34
2146.37	767.19	2154.23	767.12	2159.77	767.06	2189.32	767.35	2212.02	766.97
2231.69	766.5	2243.02	766.05	2282.52	764.29	2327.6	763.29	2333.47	763.16
2391.37	761.99	2398.18	761.84	2399.01	761.85	2468.43	760.84	2474.61	760.78
2528.74	760.94	2541.16	760.94	2606.39	760.59	2618.2	760.66	2676.94	760.97
2703.51	761.03	2750.57	761.09	2784.39	761.03	2804.89	760.62	2838.41	759.93
2843.85	759.82	2856.1	758.07	2859.54	757.74	2870.59	758.7	2876.35	759.34
2880.89	759.4	2889.07	759.29	2891.01	759.31	2903.05	759.2	2909.94	759.17
2910.5	759.01	2911.37	758.78	2921.1	756.05	2928.17	754.29	2932.66	753.18
2938.45	751.75	2943	750.89	2945.98	748.59	2949.1	746.37	2951.96	744.86
2960	737.3	2975	736.31	2990	737.3	2999.63	744.48	3000.92	745.58
3001.48	745.96	3009.29	749.25	3010.24	749.67	3016.27	752.26	3028.22	756.72
3036.19	759.69	3044.78	766.46	3045.72	767.53	3054.97	773.19	3068.74	782.18
3077.7	782.37	3083.39	782.46	3094.72	782.65	3136.58	783.16	3142.16	783.21
3149.9	783.37	3184.65	783.85	3209.64	784.68	3216.61	784.87	3219.69	785.89
3232.88	789.97	3234.66	790.04	3240.45	790.25	3253.83	790.52	3257.09	790.6
3279.81	790.94	3320.08	791.54	3367.54	791.53	3399.81	791.15	3413.58	790.86
3419.1	790.83	3424.12	790.74	3430.56	790.63	3432.5	791.54	3437.37	793.86
3453.27	801.97	3456.83	804.11	3461.95	806.46	3476.69	813.54	3480.79	815.11
3493.94	819.84	3496.89	820.63	3502.22	823.25	3509.02	827.93	3512.4	830.97
3518.61	833.84	3540.22	843.06	3547.84	844.32	3549.16	844.53	3563.4	848.7
3568.24	849.9	3571.85	851.27	3583.81	855.11	3590.54	858.1	3595.45	860.17
3632.45	871.1	3633.63	871.44	3633.77	871.46	3646.04	872.9		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	1437.61	.13	2910.5	.042	3045.72	.11	3184.65	.05
3413.58	.13								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
        2910.5 3045.72            29.32 1027.21 1102.77             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 1779.74  799.83       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
     875     915     800    1075    1115     800    3230    3380     805

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.130  *   0.042  *          *
* W.S. Elev (ft)         *  763.69  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)         *  752.06  * Flow Area (sq ft)      * 1642.81  * 2057.03  *          *
* E.G. Slope (ft/ft)     *0.000803  * Area (sq ft)           * 1642.81  * 2057.03  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             * 1039.79  *12160.21  *          *
* Top Width (ft)         *  731.72  * Top Width (ft)         *  600.96  *  130.77  *          *
* Vel Total (ft/s)       *    3.57  * Avg. Vel. (ft/s)       *    0.63  *    5.91  *          *
* Max Chl Dpth (ft)      *   27.38  * Hydr. Depth (ft)       *    2.73  *   15.73  *          *
* Conv. Total (cfs)      *465902.3  * Conv. (cfs)            * 36700.0  *429202.3  *          *
* Length Wtd. (ft)       *  969.11  * Wetted Per. (ft)       *  601.24  *  143.62  *          *
* Min Ch El (ft)         *  736.31  * Shear (lb/sq ft)       *    0.14  *    0.72  *          *
* Alpha                  *    2.53  * Stream Power (lb/ft s) *    0.09  *    4.24  *          *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)   *  114.05  * 4261.90  *  169.95  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   25.02  *  357.86  *   45.90  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.130  *   0.042  *   0.110  *
* W.S. Elev (ft)         *  767.87  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)         *  755.88  * Flow Area (sq ft)      * 4852.10  * 2613.82  *    0.09  *
* E.G. Slope (ft/ft)     *0.000696  * Area (sq ft)           * 4888.29  * 2613.82  *    0.09  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 3863.63  *16436.37  *    0.01  *
* Top Width (ft)         * 1311.68  * Top Width (ft)         * 1175.91  *  135.22  *    0.55  *
* Vel Total (ft/s)       *    2.72  * Avg. Vel. (ft/s)       *    0.80  *    6.29  *    0.10  *
* Max Chl Dpth (ft)      *   31.56  * Hydr. Depth (ft)       *    4.29  *   19.33  *    0.17  *
* Conv. Total (cfs)      *769292.8  * Conv. (cfs)            *146416.7  *622875.8  *     0.3  *
* Length Wtd. (ft)       *  895.81  * Wetted Per. (ft)       * 1131.14  *  149.52  *    0.65  *
* Min Ch El (ft)         *  736.31  * Shear (lb/sq ft)       *    0.19  *    0.76  *    0.01  *
* Alpha                  *    4.35  * Stream Power (lb/ft s) *    0.15  *    4.78  *    0.00  *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   *  254.07  * 5829.33  *  374.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   48.46  *  396.80  *   70.65  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  771.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.130  *   0.042  *   0.110  *
* W.S. Elev (ft)         *  770.75  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)         *  758.30  * Flow Area (sq ft)      * 8111.04  * 3003.54  *    8.47  *
* E.G. Slope (ft/ft)     *0.000542  * Area (sq ft)           * 8550.86  * 3003.54  *    8.47  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 8029.05  *18287.66  *    3.29  *
* Top Width (ft)         * 1460.48  * Top Width (ft)         * 1320.00  *  135.22  *    5.26  *
* Vel Total (ft/s)       *    2.37  * Avg. Vel. (ft/s)       *    0.99  *    6.09  *    0.39  *
* Max Chl Dpth (ft)      *   34.44  * Hydr. Depth (ft)       *    7.17  *   22.21  *    1.61  *
* Conv. Total (cfs)      *1130119.0  * Conv. (cfs)            *344748.4  *785228.9  *   141.3  *
* Length Wtd. (ft)       *  801.45  * Wetted Per. (ft)       * 1131.14  *  149.52  *    6.17  *
* Min Ch El (ft)         *  736.31  * Shear (lb/sq ft)       *    0.24  *    0.68  *    0.05  *
* Alpha                  *    4.65  * Stream Power (lb/ft s) *    0.24  *    4.14  *    0.02  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *  395.37  * 7139.88  *  663.43  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   66.88  *  424.43  *  137.67  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
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*****************************************************************************************
* E.G. Elev (ft)          *  774.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.34  * Wt. n-Val.              *   0.130  *   0.042  *   0.110  *
* W.S. Elev (ft)          *  774.02  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)          *  762.56  * Flow Area (sq ft)      *11805.20  * 3445.29  *   34.34  *
* E.G. Slope (ft/ft)      *0.000434  * Area (sq ft)           *12972.44  * 3445.29  *   34.34  *
* Q Total (cfs)           *34000.00  * Flow (cfs)             *13422.51  *20558.39  *   19.10  *
* Top Width (ft)          * 1522.49  * Top Width (ft)         * 1376.75  *  135.22  *   10.52  *
* Vel Total (ft/s)        *    2.22  * Avg. Vel. (ft/s)       *    1.14  *    5.97  *    0.56  *
* Max Chl Dpth (ft)       *   37.71  * Hydr. Depth (ft)       *   10.44  *   25.48  *    3.27  *
* Conv. Total (cfs)       *1632333.0  * Conv. (cfs)           *644411.9  *987004.3  *   917.1  *
* Length Wtd. (ft)        *  722.72  * Wetted Per. (ft)       * 1131.14  *  149.52  *   12.36  *
* Min Ch El (ft)          *  736.31  * Shear (lb/sq ft)       *    0.28  *    0.62  *    0.08  *
* Alpha                   *    4.45  * Stream Power (lb/ft s) *    0.32  *    3.72  *    0.04  *
* Frctn Loss (ft)         *    0.32  * Cum Volume (acre-ft)   *  624.95  * 8496.40  * 1191.10  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  100.24  *  446.98  *  211.99  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  778.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.30  * Wt. n-Val.              *   0.130  *   0.042  *   0.110  *
* W.S. Elev (ft)          *  778.06  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)          *  764.95  * Flow Area (sq ft)      *16381.24  * 3992.51  *   89.44  *
* E.G. Slope (ft/ft)      *0.000350  * Area (sq ft)           *18644.39  * 3992.51  *   89.44  *
* Q Total (cfs)           *44500.00  * Flow (cfs)             *20820.81  *23617.31  *   61.88  *
* Top Width (ft)          * 1577.91  * Top Width (ft)         * 1425.98  *  135.22  *   16.71  *
* Vel Total (ft/s)        *    2.17  * Avg. Vel. (ft/s)       *    1.27  *    5.92  *    0.69  *
* Max Chl Dpth (ft)       *   41.75  * Hydr. Depth (ft)       *   14.49  *   29.53  *    5.35  *
* Conv. Total (cfs)       *2377654.0  * Conv. (cfs)           *1112465.0  *1261883.0  *  3306.1  *
* Length Wtd. (ft)        *  655.21  * Wetted Per. (ft)       * 1131.14  *  149.52  *   19.76  *
* Min Ch El (ft)          *  736.31  * Shear (lb/sq ft)       *    0.32  *    0.58  *    0.10  *
* Alpha                   *    4.09  * Stream Power (lb/ft s) *    0.40  *    3.45  *    0.07  *
* Frctn Loss (ft)         *    0.24  * Cum Volume (acre-ft)   * 1377.20  *10678.04  * 2790.37  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  297.31  *  474.86  *  546.85  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  781.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.              *   0.130  *   0.042  *   0.110  *
* W.S. Elev (ft)          *  781.00  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)          *  766.36  * Flow Area (sq ft)      *19701.88  * 4389.61  *  145.13  *
* E.G. Slope (ft/ft)      *0.000321  * Area (sq ft)           *23312.02  * 4389.61  *  145.13  *
* Q Total (cfs)           *53690.00  * Flow (cfs)             *27104.18  *26472.79  *  113.03  *
* Top Width (ft)          * 2352.44  * Top Width (ft)         * 2196.01  *  135.22  *   21.21  *
* Vel Total (ft/s)        *    2.22  * Avg. Vel. (ft/s)       *    1.38  *    6.03  *    0.78  *
* Max Chl Dpth (ft)       *   44.69  * Hydr. Depth (ft)       *   17.42  *   32.46  *    6.84  *
* Conv. Total (cfs)       *2997400.0  * Conv. (cfs)           *1513170.0  *1477920.0  *  6310.4  *
* Length Wtd. (ft)        *  620.04  * Wetted Per. (ft)       * 1131.14  *  149.52  *   25.13  *
* Min Ch El (ft)          *  736.31  * Shear (lb/sq ft)       *    0.35  *    0.59  *    0.12  *
* Alpha                   *    3.85  * Stream Power (lb/ft s) *    0.48  *    3.55  *    0.09  *
* Frctn Loss (ft)         *    0.22  * Cum Volume (acre-ft)   * 2388.55  *11948.35  * 4566.94  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  469.72  *  481.86  *  869.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  783.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.              *   0.130  *   0.042  *   0.110  *
* W.S. Elev (ft)          *  783.47  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)          *  767.08  * Flow Area (sq ft)      *22500.34  * 4724.26  *  255.51  *
* E.G. Slope (ft/ft)      *0.000303  * Area (sq ft)           *29203.58  * 4724.26  *  255.51  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             *32842.17  *29056.21  *  101.62  *
* Top Width (ft)          * 2737.10  * Top Width (ft)         * 2490.13  *  135.22  *  111.75  *
* Vel Total (ft/s)        *    2.26  * Avg. Vel. (ft/s)       *    1.46  *    6.15  *    0.40  *
```

```
* Max Chl Dpth (ft)      *   47.16  * Hydr. Depth (ft)       *   19.90  *   34.94  *    2.29  *
* Conv. Total (cfs)      *3564375.0  * Conv. (cfs)            *1888094.0  *1670439.0  *  5842.1  *
* Length Wtd. (ft)       *  596.27  * Wetted Per. (ft)       * 1131.14  *  149.52  *  116.03  *
* Min Ch El (ft)         *  736.31  * Shear (lb/sq ft)       *    0.38  *    0.60  *    0.04  *
* Alpha                  *    3.70  * Stream Power (lb/ft s) *    0.55  *    3.67  *    0.02  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 3247.17  *12737.75  * 6242.01  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  580.39  *  483.27  * 1203.88  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  786.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.              *   0.130  *   0.042  *   0.103  *
* W.S. Elev (ft)         *  786.50  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)         *  769.82  * Flow Area (sq ft)      *25917.54  * 5132.89  *  742.06  *
* E.G. Slope (ft/ft)     *0.000297  * Area (sq ft)           *36872.57  * 5132.89  *  742.06  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *41176.87  *33049.72  *  493.41  *
* Top Width (ft)         * 2893.75  * Top Width (ft)         * 2582.60  *  135.22  *  175.93  *
* Vel Total (ft/s)       *    2.35  * Avg. Vel. (ft/s)       *    1.59  *    6.44  *    0.66  *
* Max Chl Dpth (ft)      *   50.19  * Hydr. Depth (ft)       *   22.92  *   37.96  *    4.22  *
* Conv. Total (cfs)      *4336587.0  * Conv. (cfs)            *2389816.0  *1918134.0  * 28636.4  *
* Length Wtd. (ft)       *  574.47  * Wetted Per. (ft)       * 1131.14  *  149.52  *  180.49  *
* Min Ch El (ft)         *  736.31  * Shear (lb/sq ft)       *    0.42  *    0.64  *    0.08  *
* Alpha                  *    3.57  * Stream Power (lb/ft s) *    0.67  *    4.10  *    0.05  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   * 4978.29  *13979.67  * 9655.06  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  752.46  *  485.37  * 1538.59  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  775.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.              *   0.130  *   0.042  *   0.110  *
* W.S. Elev (ft)         *  775.57  * Reach Len. (ft)        *   29.32  * 1027.21  * 1102.77  *
* Crit W.S. (ft)         *  763.59  * Flow Area (sq ft)      *13565.52  * 3655.80  *   52.57  *
* E.G. Slope (ft/ft)     *0.000399  * Area (sq ft)           *15131.60  * 3655.80  *   52.57  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *16217.51  *21750.08  *   32.41  *
* Top Width (ft)         * 1544.70  * Top Width (ft)         * 1396.58  *  135.22  *   12.90  *
* Vel Total (ft/s)       *    2.20  * Avg. Vel. (ft/s)       *    1.20  *    5.95  *    0.62  *
* Max Chl Dpth (ft)      *   39.26  * Hydr. Depth (ft)       *   12.00  *   27.04  *    4.08  *
* Conv. Total (cfs)      *1903568.0  * Conv. (cfs)            *812398.1  *1089546.0  *  1623.8  *
* Length Wtd. (ft)       *  693.57  * Wetted Per. (ft)       * 1131.14  *  149.52  *   15.20  *
* Min Ch El (ft)         *  736.31  * Shear (lb/sq ft)       *    0.30  *    0.61  *    0.09  *
* Alpha                  *    4.31  * Stream Power (lb/ft s) *    0.36  *    3.62  *    0.05  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  789.41  * 9220.06  * 1563.66  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  135.96  *  457.29  *  268.04  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 13.954

INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data    num=     339
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
       0   820.25     1.05    820.3    11.73   820.82    14.15   821.19    27.53   822.47
   35.43   824.02    45.25   823.51    60.31    823.1    69.93   822.47    85.04   820.89
   86.31   820.73    86.55   820.67    95.98   818.26    113.2   816.39   114.62   816.23
   115.6   815.38   124.67   807.59   135.88   804.15   145.29   797.67   151.26   795.03
  164.84   792.63   176.05   790.69    185.6   789.62   207.96   787.55   270.24    784.5
  291.55   783.03   297.19    782.5    298.3   782.52   298.39   782.52   301.98   783.11
   304.3   783.36   318.01   784.24   326.67   784.64   335.13   784.47   341.14   784.73
```

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   342.1  784.54  346.13  783.73  347.93  783.38  351.47  783.25  362.95  782.91
  374.61  782.58  424.15  781.97  426.19  781.97  427.19  782.02  430.13  782.12
  437.47  782.43  446.87  783.19  447.67  783.26  447.84  783.26  449.72  783.25
  454.45  783.24  454.85  783.24  467.13  782.22  467.74  782.17  468.61  782.08
  474.14  781.51  477.27  781.19  522.79  781.14  527.13  781.11  531.43  781.08
   546.8  781.03   607.4  781.11  631.27  781.19   635.4   781.2  651.13  781.38
  651.29  781.38  651.31  781.38  662.95  781.11  677.38  780.69  708.06  780.87
  727.81  780.89  764.28  780.67  783.83  780.34  799.14  780.56  855.33  780.92
  874.01  780.96  887.66  781.02  910.18  781.21  918.91  781.26  932.72  781.31
  936.48  781.32  940.31  781.26  974.65   780.7  983.99  780.63 1003.41  780.57
 1040.35  780.53 1058.18  780.65 1106.01  780.39 1110.37  780.55 1120.23  781.13
 1129.62  782.48 1138.88  782.57 1140.83  782.56 1154.62  782.28 1171.88  780.42
 1175.79  780.23 1195.45   780.5 1206.43  780.45 1206.79  780.44 1206.96  780.42
  1217.9  780.14 1224.15  780.16 1241.12  780.06 1258.85  780.62 1277.64  780.63
  1292.4   780.3 1293.76  780.26 1296.92  780.26 1305.67  780.21 1310.51   780.2
 1343.34  779.93 1375.94  780.12 1387.08  780.35 1388.78  780.34 1389.71   780.3
 1390.37  780.27 1403.54  779.95 1437.93  778.39 1443.89  778.23 1445.73  778.18
 1448.05  778.12 1472.11  773.85 1481.43  772.49  1492.7  772.06 1513.96  771.28
 1521.77  771.56 1546.12  770.16 1548.35  769.96 1549.09   769.9 1568.13   769.4
 1581.13  769.05 1590.27  768.67 1605.22   767.9 1622.71  767.43 1634.29  767.11
 1681.26  766.95 1690.88  766.64 1696.29  766.74 1746.63  766.01 1751.02  765.96
 1751.34  765.96  1752.7  765.97 1754.26  765.97 1777.25   765.7 1821.99  765.11
 1823.11  765.12 1824.62  765.11  1825.6  765.09 1882.67  764.97 1892.59   765.2
 1902.21  765.26 1908.56  765.29 1941.63  765.11 1956.16   764.9 1965.18  764.82
 2020.16  765.82 2039.08  765.84 2050.12     766 2089.05  766.85  2093.6  766.85
 2105.23  766.68 2110.97  766.67 2124.29  766.33 2136.01   766.1 2138.49  766.02
 2166.17  764.71 2188.55  762.81 2210.73  761.31 2257.91  759.09 2263.59  758.68
  2267.4  758.57 2324.72  757.98 2339.48  757.99 2352.22  758.16 2367.21  758.32
 2383.12  758.51 2384.44  758.26 2391.01  756.95 2396.97  755.59 2417.96  753.57
 2424.83  751.89 2430.12   750.6 2439.75  749.03 2447.81  748.86 2450.51  748.35
 2452.78   745.9 2454.48  744.44    2462     737    2481  735.91    2500     737
 2509.37  744.42 2512.69  746.19 2524.45  752.13  2525.6  752.84 2529.18  755.08
 2542.57  755.86 2548.82  756.26 2560.95  759.67 2561.19  759.74 2561.67  759.76
 2587.93  761.18 2616.48  777.95 2617.24  778.46    2621  778.69 2633.68  779.05
 2634.82  778.89 2637.48  778.58 2642.14  777.25 2667.72  778.04 2670.52  778.05
 2671.78  778.05 2678.76   778.1 2686.48  778.14 2688.22  778.16 2711.59  782.25
 2711.73  782.28 2729.08  783.67 2738.89  783.64 2747.08  783.81 2754.96  783.38
  2760.4  774.85 2762.24  772.18 2764.25  773.09 2765.77  773.74 2777.87  779.09
 2798.14  786.29 2799.58  786.42 2802.14  786.66 2813.86  787.79 2822.49  788.19
 2838.68  788.06 2859.69   788.8 2864.08  788.94  2865.6  789.01 2869.47  789.19
 2895.68  788.91 2910.16  788.61 2918.83  788.49 2923.61  788.44  2951.3  788.45
 2954.45  788.45 2973.24  787.69 2974.21  787.69 2974.31  787.69 2974.34  787.69
 2974.46  787.69 2976.48  787.23 2984.18  786.58 2992.16  786.03 2998.51  784.49
 3009.17  782.42 3012.64  782.03 3019.23  781.36 3020.07  781.34 3034.58  773.96
 3038.95  771.69 3042.46  772.12  3046.4  772.26 3055.79  777.66 3069.71  784.99
  3078.2  784.97 3082.64  784.93 3092.68  781.37 3095.41  780.37 3098.68  780.14
  3116.7  779.49 3129.22  779.03 3137.94  780.27 3144.43  780.93  3158.1  780.98
 3160.68  780.99 3161.09  780.99 3161.22  780.99 3161.37  780.99 3164.18  781.06
 3165.16  781.09 3171.61  781.12  3194.3  780.99 3198.94  780.96 3210.03  780.46
 3226.75  779.77 3228.46  778.55 3233.07   774.6 3246.45   774.6 3247.47   774.6
 3256.16   780.2 3257.66  781.16 3257.89  781.17 3270.59  781.65 3283.41   782.8
 3301.11  784.49 3310.19  784.27 3312.09  784.18 3327.05   785.5 3338.65  786.58
  3340.2  786.59 3347.81   786.8 3348.96  786.81 3364.77  786.43 3370.18  786.46
 3372.38  786.48    3393  787.84 3404.89  788.43 3411.01  788.32 3415.11   788.4
 3419.08  788.38 3423.65  788.36  3429.8  788.69 3431.22  785.89 3433.76  779.78
 3441.36  782.11 3443.99  782.92 3446.06  783.56 3454.63  790.34 3457.87   792.8
 3469.49  793.28 3482.36  794.24 3494.41  795.25 3527.65  802.54 3556.36  809.15
 3572.35  816.19 3581.28  819.23 3594.47  823.44 3611.76  831.09 3635.52  845.15
 3640.96  845.35    3651  845.68 3652.56  845.78 3656.55  846.02 3663.62  846.64
 3690.33  851.57 3698.96  853.16 3707.39   856.4 3707.45  856.42 3707.59  856.46
 3720.24  860.34    3763  875.15  3777.8   877.4 3785.26  878.54

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .11 1437.93     .13 2383.12    .042 2529.18     .12 3198.94     .08
 3527.65     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2383.12 2529.18          129.85  799.39  606.97             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1696.04  799.83       F
    2620 3785.26     800       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
```

```
***************************************************************************
     875     915     800    1075    1115     800    2750    3260     780
    3350    3460     800

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  763.12  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  750.69  * Flow Area (sq ft)      *  768.52  * 2404.98  *  284.23  *
* E.G. Slope (ft/ft)     *0.000564  * Area (sq ft)           *  768.52  * 2404.98  *  284.23  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  514.44  *12457.76  *  227.80  *
* Top Width (ft)         *  406.31  * Top Width (ft)         *  198.20  *  146.06  *   62.05  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *    0.67  *    5.18  *    0.80  *
* Max Chl Dpth (ft)      *   27.21  * Hydr. Depth (ft)       *    3.88  *   16.47  *    4.58  *
* Conv. Total (cfs)      *556042.4  * Conv. (cfs)            * 21670.4  *524775.9  *  9596.0  *
* Length Wtd. (ft)       *  777.54  * Wetted Per. (ft)       *  198.34  *  157.01  *   63.13  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.14  *    0.54  *    0.16  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.09  *    2.79  *    0.13  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *  113.24  * 4209.29  *  166.35  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   24.75  *  354.59  *   45.11  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  767.31  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  754.06  * Flow Area (sq ft)      * 2435.43  * 3016.69  *  559.03  *
* E.G. Slope (ft/ft)     *0.000560  * Area (sq ft)           * 2457.24  * 3016.69  *  559.03  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 1531.44  *18122.49  *  646.07  *
* Top Width (ft)         *  971.19  * Top Width (ft)         *  755.95  *  146.06  *   69.18  *
* Vel Total (ft/s)       *    3.38  * Avg. Vel. (ft/s)       *    0.63  *    6.01  *    1.16  *
* Max Chl Dpth (ft)      *   31.40  * Hydr. Depth (ft)       *    3.54  *   20.65  *    8.08  *
* Conv. Total (cfs)      *857601.4  * Conv. (cfs)            * 64697.6  *765609.4  * 27294.3  *
* Length Wtd. (ft)       *  759.44  * Wetted Per. (ft)       *  687.36  *  157.01  *   71.40  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.12  *    0.67  *    0.27  *
* Alpha                  *    2.83  * Stream Power (lb/ft s) *    0.08  *    4.04  *    0.32  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  251.59  * 5762.95  *  367.56  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   47.81  *  393.48  *   69.77  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  770.24  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  756.44  * Flow Area (sq ft)      * 4450.50  * 3445.06  *  769.25  *
* E.G. Slope (ft/ft)     *0.000501  * Area (sq ft)           * 4799.05  * 3445.06  *  769.25  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 3954.82  *21378.01  *  987.17  *
* Top Width (ft)         * 1058.62  * Top Width (ft)         *  838.38  *  146.06  *   74.17  *
* Vel Total (ft/s)       *    3.04  * Avg. Vel. (ft/s)       *    0.89  *    6.21  *    1.28  *
* Max Chl Dpth (ft)      *   34.33  * Hydr. Depth (ft)       *    6.48  *   23.59  *   10.37  *
* Conv. Total (cfs)      *1176075.0  * Conv. (cfs)            *176716.2  *955248.2  * 44110.5  *
* Length Wtd. (ft)       *  731.13  * Wetted Per. (ft)       *  687.36  *  157.01  *   77.19  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.20  *    0.69  *    0.31  *
* Alpha                  *    3.41  * Stream Power (lb/ft s) *    0.18  *    4.26  *    0.40  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *  390.88  * 7063.85  *  653.59  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   66.15  *  421.11  *  136.66  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  774.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
```

```
* W.S. Elev (ft)         *  773.55  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  758.99  * Flow Area (sq ft)      * 6725.99  * 3928.78  * 1024.23  *
* E.G. Slope (ft/ft)     *0.000447  * Area (sq ft)           * 7711.41  * 3928.78  * 1024.23  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 7436.05  *25140.40  * 1423.55  *
* Top Width (ft)         * 1134.83  * Top Width (ft)         *  908.96  *  146.06  *   79.81  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    1.11  *    6.40  *    1.39  *
* Max Chl Dpth (ft)      *   37.64  * Hydr. Depth (ft)       *    9.79  *   26.90  *   12.83  *
* Conv. Total (cfs)      *1608146.0  * Conv. (cfs)           *351713.2  *1189101.0  * 67331.9  *
* Length Wtd. (ft)       *  705.00  * Wetted Per. (ft)       *  687.36  *  157.01  *   83.73  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.27  *    0.70  *    0.34  *
* Alpha                  *    3.61  * Stream Power (lb/ft s) *    0.30  *    4.47  *    0.47  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *  617.99  * 8409.45  * 1177.70  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   99.47  *  443.66  *  210.85  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  778.10  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  777.64  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  761.74  * Flow Area (sq ft)      * 9532.35  * 4525.36  * 1364.42  *
* E.G. Slope (ft/ft)     *0.000396  * Area (sq ft)           *11472.48  * 4525.36  * 1367.09  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *12516.04  *29951.35  * 2032.60  *
* Top Width (ft)         * 1179.01  * Top Width (ft)         *  932.34  *  146.06  *  100.61  *
* Vel Total (ft/s)       *    2.89  * Avg. Vel. (ft/s)       *    1.31  *    6.62  *    1.49  *
* Max Chl Dpth (ft)      *   41.73  * Hydr. Depth (ft)       *   13.87  *   30.98  *   15.73  *
* Conv. Total (cfs)      *2236082.0  * Conv. (cfs)           *628919.1  *1505027.0  *102136.4  *
* Length Wtd. (ft)       *  680.63  * Wetted Per. (ft)       *  687.36  *  157.01  *   91.80  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.34  *    0.71  *    0.37  *
* Alpha                  *    3.61  * Stream Power (lb/ft s) *    0.45  *    4.72  *    0.55  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 1367.07  *10577.60  * 2771.94  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  296.52  *  471.54  *  545.37  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  781.06  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  780.57  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  763.54  * Flow Area (sq ft)      *11551.78  * 4954.65  * 1628.33  *
* E.G. Slope (ft/ft)     *0.000381  * Area (sq ft)           *14374.18  * 4954.65  * 1897.45  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *16915.10  *34177.66  * 2597.24  *
* Top Width (ft)         * 1749.03  * Top Width (ft)         * 1269.73  *  146.06  *  333.24  *
* Vel Total (ft/s)       *    2.96  * Avg. Vel. (ft/s)       *    1.46  *    6.90  *    1.60  *
* Max Chl Dpth (ft)      *   44.66  * Hydr. Depth (ft)       *   16.81  *   33.92  *   17.93  *
* Conv. Total (cfs)      *2749762.0  * Conv. (cfs)           *866315.9  *1750427.0  *133019.0  *
* Length Wtd. (ft)       *  667.14  * Wetted Per. (ft)       *  687.36  *  157.01  *   96.10  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.40  *    0.75  *    0.40  *
* Alpha                  *    3.55  * Stream Power (lb/ft s) *    0.59  *    5.18  *    0.64  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   * 2375.87  *11838.17  * 4541.08  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  468.55  *  478.55  *  865.20  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
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* E.G. Elev (ft)         *  783.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  783.05  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  764.74  * Flow Area (sq ft)      *13253.21  * 5316.34  * 1853.23  *
* E.G. Slope (ft/ft)     *0.000370  * Area (sq ft)           *18717.72  * 5316.34  * 2956.73  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *20954.88  *37870.34  * 3174.78  *
* Top Width (ft)         * 2573.65  * Top Width (ft)         * 1943.35  *  146.06  *  484.24  *
* Vel Total (ft/s)       *    3.04  * Avg. Vel. (ft/s)       *    1.58  *    7.12  *    1.71  *
* Max Chl Dpth (ft)      *   47.14  * Hydr. Depth (ft)       *   19.29  *   36.40  *   20.41  *
* Conv. Total (cfs)      *3222823.0  * Conv. (cfs)            *1089256.0  *1968538.0  *165028.3  *
* Length Wtd. (ft)       *  662.56  * Wetted Per. (ft)       *  687.36  *  157.01  *   96.10  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.45  *    0.78  *    0.45  *
* Alpha                  *    3.47  * Stream Power (lb/ft s) *    0.70  *    5.57  *    0.76  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 3231.04  *12619.36  * 6201.35  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *  578.89  *  479.96  * 1196.34  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  786.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  786.04  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  766.72  * Flow Area (sq ft)      *15308.21  * 5753.19  * 2124.86  *
* E.G. Slope (ft/ft)     *0.000379  * Area (sq ft)           *24751.90  * 5753.19  * 4626.94  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *26966.44  *43717.88  * 4035.68  *
* Top Width (ft)         * 2819.58  * Top Width (ft)         * 2064.37  *  146.06  *  609.15  *
* Vel Total (ft/s)       *    3.22  * Avg. Vel. (ft/s)       *    1.76  *    7.60  *    1.90  *
* Max Chl Dpth (ft)      *   50.13  * Hydr. Depth (ft)       *   22.28  *   39.39  *   23.40  *
* Conv. Total (cfs)      *3837794.0  * Conv. (cfs)            *1385059.0  *2245453.0  *207282.1  *
* Length Wtd. (ft)       *  650.13  * Wetted Per. (ft)       *  687.36  *  157.01  *   96.10  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.53  *    0.87  *    0.52  *
* Alpha                  *    3.38  * Stream Power (lb/ft s) *    0.93  *    6.59  *    0.99  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   * 4957.55  *13851.31  * 9587.10  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *  750.90  *  482.05  * 1528.65  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  775.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.130  *   0.042  *   0.120  *
* W.S. Elev (ft)         *  775.12  * Reach Len. (ft)        *  129.85  *  799.39  *  606.97  *
* Crit W.S. (ft)         *  759.91  * Flow Area (sq ft)      * 7805.55  * 4158.27  * 1151.73  *
* E.G. Slope (ft/ft)     *0.000428  * Area (sq ft)           * 9147.07  * 4158.27  * 1151.73  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 9320.25  *27027.39  * 1652.36  *
* Top Width (ft)         * 1146.73  * Top Width (ft)         *  918.18  *  146.06  *   82.49  *
* Vel Total (ft/s)       *    2.90  * Avg. Vel. (ft/s)       *    1.19  *    6.50  *    1.43  *
* Max Chl Dpth (ft)      *   39.21  * Hydr. Depth (ft)       *   11.36  *   28.47  *   13.96  *
* Conv. Total (cfs)      *1837767.0  * Conv. (cfs)            *450748.4  *1307106.0  * 79912.0  *
* Length Wtd. (ft)       *  694.74  * Wetted Per. (ft)       *  687.36  *  157.01  *   86.83  *
* Min Ch El (ft)         *  735.91  * Shear (lb/sq ft)       *    0.30  *    0.71  *    0.35  *
* Alpha                  *    3.63  * Stream Power (lb/ft s) *    0.36  *    4.59  *    0.51  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *  781.24  * 9127.92  * 1548.41  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  135.18  *  453.98  *  266.84  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 13.803

INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data num= 301

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830.24	12.48	829.25	22.02	828.55	24.85	828.3	49.22	826.39
74.45	826.08	100.35	826.07	113.53	825.71	130.53	818.16	137.59	814.67
150.1	809	161.01	804.58	189.71	795.36	193.84	794.1	216.85	789.42
223.09	788.07	250.78	785.54	276.48	783.89	304.24	782.96	310.95	782.18
314.24	781.74	320.45	781.86	365.24	782.57	365.31	782.57	378.6	782.49
382.98	782.43	432.29	781.71	453.16	781.45	458.23	781.69	465.34	781.89
467	782.02	474.29	782.64	477.09	782.64	481.43	782.63	484.09	782.51
492.25	781.98	495.26	782.17	500.94	782.35	504.68	782.24	516.03	781.39
528.73	781.41	536.63	781.32	556.84	782.04	565.18	782.33	568.44	782.46
580.02	782.6	597.54	782.88	621.99	782.71	625.03	783.12	629.41	783.41
644.61	784.62	650.34	784.35	658.96	783.47	663.4	782.95	673.39	782.47
685.78	782.23	716.92	780.85	748.31	780.63	789	780.67	798.37	780.68
802.99	780.6	815.3	780.86	843.76	780.7	859.39	780.59	892.56	780.47
904.8	780.43	911.05	777.72	914.21	776.05	914.91	775.88	924.73	773.49
928.48	772.52	930.3	777.14	931.41	782.07	939.36	781.72	967.36	780.35
976.12	780.35	995.39	780.39	1010.39	780.31	1028.78	780.2	1034.92	780.25
1076.55	779.94	1093.55	779.92	1112.43	780.11	1117.62	780.17	1126.7	780.82
1132.84	781.26	1154.15	780.75	1155.36	780.71	1162.82	780.55	1173.43	780.43
1203.02	780.62	1205.23	780.57	1215.51	780.07	1225.11	779.79	1227.16	779.79
1231.45	779.93	1243.38	780.02	1262.48	779.84	1266.89	780.02	1271.85	780.27
1273.59	780.27	1302.86	780.09	1313.91	779.74	1331.46	779.4	1335.87	779.28
1337.84	779.24	1339.98	779.18	1341.33	779.12	1344.75	779.04	1344.76	779.04
1348.04	778.97	1349.88	778.95	1367.25	766.27	1367.27	766.25	1370.75	763.72
1373.96	760.92	1377.37	757.76	1380.54	755.06	1385.56	754.45	1388.73	754.19
1399.19	753.35	1406.66	749.62	1410.81	748.07	1414.87	746.93	1416.49	744.88
1417.13	744.13	1425	736.6	1440	735.59	1463	736.6	1473.97	744.1
1480.96	746.93	1486.7	749.45	1490.47	750.79	1496.41	752.9	1506.2	756.69
1516.23	757.08	1566.96	759.06	1575.37	759.15	1582.6	760.16	1594.72	761.83
1611.74	768.4	1614.96	769.94	1627.98	777.48	1629.92	778.49	1637.93	778.7
1639.03	778.7	1647.75	778.6	1656.63	778.91	1660.76	778.77	1681.3	778.93
1696.01	779.55	1707	779.54	1716.1	779.46	1721.77	779.27	1729.07	779.03
1750.4	778.4	1762.16	778.23	1770.35	778.33	1776.89	778.34	1777.42	778.34
1777.92	778.33	1778.8	777.86	1780.03	777.38	1781.18	777.38	1791	777.38
1800.48	777.38	1803.07	777.38	1804.39	777.85	1805.73	778.82	1811.65	778.76
1812.76	778.75	1812.96	778.64	1816.28	777.35	1818.43	777.35	1821.8	777.35
1826.63	777.37	1828.03	777.38	1828.65	777.38	1831.25	777.38	1837.02	777.66
1841.39	778.22	1845.31	778.32	1851.48	778.16	1854.43	777.94	1856.37	777.86
1860.39	777.61	1865.68	777.43	1865.76	777.43	1869.12	778.03	1874.73	778.81
1876.72	779.22	1882.66	780.16	1897.25	782.72	1900.74	783.3	1902.15	783.54
1907.53	784.16	1914.89	784.56	1918.4	784.85	1928.49	784.93	1929.69	785.03
1933.54	784.97	1949.28	785.22	1949.84	785.22	1949.9	785.22	1949.96	785.21
1968.65	783.48	1977.07	782.43	1986.84	780.87	1996.06	779.3	2017.29	778.85
2023.63	778.59	2038.27	780.86	2042.6	781.64	2073.55	782.8	2106.23	782.79
2135.42	782.72	2164.98	782.03	2230.37	781.01	2240.14	780.84	2252.06	780.51
2345.71	777.92	2353.35	777.5	2357.09	777.3	2388.67	775.51	2393.57	775.43
2394.4	775.42	2396.88	775.38	2431.99	775.99	2434.65	775.97	2436.58	776.06
2452.38	776.57	2479.13	777.53	2490.21	777.76	2525.37	778.22	2541.32	778.37
2544.23	778.37	2546.72	778.37	2548.75	778.33	2551.01	778.24	2580.73	777.74
2592.44	777.12	2600.79	776.78	2613.6	776.28	2622.86	775.87	2625.19	775.08
2627.55	774.34	2643.56	774.34	2644.76	774.34	2691.19	774.33	2694.71	774.33
2697.99	774.33	2729.33	774.33	2732.72	774.33	2765.81	774.33	2821.01	774.33
2912.25	774.33	2914.99	774.33	2918.09	774.33	2927.21	774.33	2927.45	774.33
2929.74	775.13	2929.78	775.14	2930.01	775.16	2941.37	776.63	2946.43	777.23
2961.5	778.51	2964.31	778.61	2974.23	778.56	2975.76	778.55	2987.91	778.65
2998.93	778.74	3002.91	778.56	3022.64	778.18	3039.17	780.86	3050.83	783.07
3065.91	783.09	3067.64	783.09	3068.7	783.06	3082.22	782.52	3091.83	782.76
3099.99	782.86	3104.4	784.02	3129.81	790.83	3135.99	792.32	3148.51	796.66
3151.27	797.59	3157.03	799.93	3164.13	802.98	3194.95	815.48	3200.54	817.76
3203.91	819.57	3219.81	827.09	3267.52	847.78	3291.03	850.21	3292.52	850.36
3292.89	850.4	3318.59	857.7	3322.01	858.71	3369.04	876.64	3400.59	888.57
3401.5	888.71								

Manning's n Values num= 5

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11 1399.19    .038  1506.2     .11    1707     .05 3091.83     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1399.19  1506.2            256.4  531.51  319.21             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1302.86   800.5       F
    1700  3401.5     800       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
     600     700     800     900     940     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  762.47  * Reach Len. (ft)        *  256.40  *  531.51  *  319.21  *
* Crit W.S. (ft)         *  749.81  * Flow Area (sq ft)      *  186.93  * 2042.27  *  346.62  *
* E.G. Slope (ft/ft)     *0.000564  * Area (sq ft)           *  186.93  * 2042.27  *  346.62  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  203.39  *12724.59  *  272.02  *
* Top Width (ft)         *  224.21  * Top Width (ft)         *   27.01  *  107.01  *   90.19  *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *    1.09  *    6.23  *    0.78  *
* Max Chl Dpth (ft)      *   26.88  * Hydr. Depth (ft)       *    6.92  *   19.08  *    3.84  *
* Conv. Total (cfs)      *556040.4  * Conv. (cfs)            *  8567.6  *536014.3  * 11458.5  *
* Length Wtd. (ft)       *  521.70  * Wetted Per. (ft)       *   29.91  *  117.44  *   90.54  *
* Min Ch El (ft)         *  735.59  * Shear (lb/sq ft)       *    0.22  *    0.61  *    0.13  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.24  *    3.81  *    0.11  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  111.81  * 4168.48  *  161.95  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   24.41  *  352.27  *   44.05  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  766.46  * Reach Len. (ft)        *  256.40  *  531.51  *  319.21  *
* Crit W.S. (ft)         *  753.35  * Flow Area (sq ft)      *  304.51  * 2468.65  *  726.53  *
* E.G. Slope (ft/ft)     *0.000663  * Area (sq ft)           *  304.51  * 2468.65  *  726.53  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  435.93  *18926.36  *  937.71  *
* Top Width (ft)         *  239.72  * Top Width (ft)         *   32.20  *  107.01  *  100.51  *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)       *    1.43  *    7.67  *    1.29  *
* Max Chl Dpth (ft)      *   30.87  * Hydr. Depth (ft)       *    9.46  *   23.07  *    7.23  *
* Conv. Total (cfs)      *788587.3  * Conv. (cfs)            * 16934.6  *735225.8  * 36426.9  *
* Length Wtd. (ft)       *  511.23  * Wetted Per. (ft)       *   36.45  *  117.44  *  101.60  *
* Min Ch El (ft)         *  735.59  * Shear (lb/sq ft)       *    0.35  *    0.87  *    0.30  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.49  *    6.67  *    0.38  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   *  247.48  * 5712.61  *  358.60  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   46.64  *  391.16  *   68.59  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  769.15  * Reach Len. (ft)        *  256.40  *  531.51  *  319.21  *
* Crit W.S. (ft)         *  755.75  * Flow Area (sq ft)      *  396.02  * 2756.32  * 1005.95  *
* E.G. Slope (ft/ft)     *0.000740  * Area (sq ft)           *  396.02  * 2756.32  * 1005.95  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  659.80  *24031.23  * 1628.98  *
* Top Width (ft)         *  249.99  * Top Width (ft)         *   35.88  *  107.01  *  107.10  *
* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *    1.67  *    8.72  *    1.62  *
* Max Chl Dpth (ft)      *   33.56  * Hydr. Depth (ft)       *   11.04  *   25.76  *    9.39  *
* Conv. Total (cfs)      *967643.4  * Conv. (cfs)            * 24257.2  *883497.7  * 59888.6  *
* Length Wtd. (ft)       *  505.34  * Wetted Per. (ft)       *   41.01  *  117.44  *  108.73  *
* Min Ch El (ft)         *  735.59  * Shear (lb/sq ft)       *    0.45  *    1.08  *    0.43  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.74  *    9.45  *    0.69  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *  383.14  * 7006.95  *  641.22  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   64.85  *  418.79  *  135.40  *
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

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*****************************************************************************************
* E.G. Elev (ft)         *  773.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.36  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  772.17  * Reach Len. (ft)        *  256.40  *  531.51  *  319.21  *
* Crit W.S. (ft)         *  758.31  * Flow Area (sq ft)      *  510.65  * 3079.58  * 1338.12  *
* E.G. Slope (ft/ft)     *0.000816  * Area (sq ft)           *  510.65  * 3079.58  * 1338.12  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  978.90  *30369.15  * 2651.95  *
* Top Width (ft)         *  259.63  * Top Width (ft)         *   40.02  *  107.01  *  112.61  *
* Vel Total (ft/s)       *    6.90  * Avg. Vel. (ft/s)       *    1.92  *    9.86  *    1.98  *
* Max Chl Dpth (ft)      *   36.58  * Hydr. Depth (ft)       *   12.76  *   28.78  *   11.88  *
* Conv. Total (cfs)      *1189928.0  * Conv. (cfs)            * 34259.6  *1062856.0  * 92812.5  *
* Length Wtd. (ft)       *  499.64  * Wetted Per. (ft)       *   46.14  *  117.44  *  115.01  *
* Min Ch El (ft)         *  735.59  * Shear (lb/sq ft)       *    0.56  *    1.34  *    0.59  *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *    1.08  *   13.18  *    1.18  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   *  605.74  * 8345.14  * 1161.24  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *   98.05  *  441.34  *  209.51  *
*****************************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

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*****************************************************************************************
* E.G. Elev (ft)         *  777.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.70  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  775.90  * Reach Len. (ft)        *  256.40  *  531.51  *  319.21  *
* Crit W.S. (ft)         *  761.54  * Flow Area (sq ft)      *  669.44  * 3478.69  * 1770.12  *
* E.G. Slope (ft/ft)     *0.000888  * Area (sq ft)           *  669.44  * 3478.69  * 2261.11  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 1471.34  *38800.80  * 4227.86  *
* Top Width (ft)         *  629.43  * Top Width (ft)         *   45.13  *  107.01  *  477.29  *
* Vel Total (ft/s)       *    7.52  * Avg. Vel. (ft/s)       *    2.20  *   11.15  *    2.39  *
* Max Chl Dpth (ft)      *   40.31  * Hydr. Depth (ft)       *   14.83  *   32.51  *   14.87  *
* Conv. Total (cfs)      *1493487.0  * Conv. (cfs)            * 49380.3  *1302213.0  *141893.4  *
* Length Wtd. (ft)       *  493.96  * Wetted Per. (ft)       *   52.46  *  117.44  *  122.45  *
* Min Ch El (ft)         *  735.59  * Shear (lb/sq ft)       *    0.71  *    1.64  *    0.80  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    1.55  *   18.31  *    1.91  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   * 1348.97  *10504.16  * 2746.66  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *  295.06  *  469.22  *  541.34  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

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*****************************************************************************************
* E.G. Elev (ft)         *  780.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.03  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  778.49  * Reach Len. (ft)        *  256.40  *  531.51  *  319.21  *
* Crit W.S. (ft)         *  763.82  * Flow Area (sq ft)      *  791.20  * 3756.48  * 2085.06  *
* E.G. Slope (ft/ft)     *0.000971  * Area (sq ft)           *  791.20  * 3756.48  * 3894.48  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 1926.58  *46120.77  * 5642.65  *
* Top Width (ft)         * 1051.12  * Top Width (ft)         *   48.68  *  107.01  *  895.43  *
* Vel Total (ft/s)       *    8.09  * Avg. Vel. (ft/s)       *    2.44  *   12.28  *    2.71  *
* Max Chl Dpth (ft)      *   42.90  * Hydr. Depth (ft)       *   16.25  *   35.10  *   16.84  *
* Conv. Total (cfs)      *1723007.0  * Conv. (cfs)            * 61827.4  *1480097.0  *181082.6  *
* Length Wtd. (ft)       *  490.98  * Wetted Per. (ft)       *   56.86  *  117.44  *  127.90  *
* Min Ch El (ft)         *  735.59  * Shear (lb/sq ft)       *    0.84  *    1.94  *    0.99  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    2.05  *   23.81  *    2.67  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   * 2353.27  *11758.24  * 4500.73  *
* C & E Loss (ft)        *    0.32  * Cum SA (acres)         *  466.58  *  476.22  *  856.64  *
*****************************************************************************************
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Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	782.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.	0.110	0.038	0.110
W.S. Elev (ft)	780.36	Reach Len. (ft)	256.40	531.51	319.21
Crit W.S. (ft)	765.62	Flow Area (sq ft)	924.18	3956.40	2418.41
E.G. Slope (ft/ft)	0.001135	Area (sq ft)	992.51	3956.40	5953.81
Q Total (cfs)	62000.00	Flow (cfs)	1796.63	54364.32	5839.06
Top Width (ft)	1657.98	Top Width (ft)	349.50	107.01	1201.47
Vel Total (ft/s)	8.49	Avg. Vel. (ft/s)	1.94	13.74	2.41
Max Chl Dpth (ft)	44.77	Hydr. Depth (ft)	9.59	36.97	12.48
Conv. Total (cfs)	1840346.0	Conv. (cfs)	53329.2	1613696.0	173320.8
Length Wtd. (ft)	492.36	Wetted Per. (ft)	104.68	117.44	197.90
Min Ch El (ft)	735.59	Shear (lb/sq ft)	0.63	2.39	0.87
Alpha	2.30	Stream Power (lb/ft s)	1.22	32.80	2.09
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	3201.66	12534.28	6139.27
C & E Loss (ft)	0.45	Cum SA (acres)	575.48	477.63	1184.60

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	785.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.00	Wt. n-Val.	0.110	0.038	0.110
W.S. Elev (ft)	782.93	Reach Len. (ft)	256.40	531.51	319.21
Crit W.S. (ft)	768.11	Flow Area (sq ft)	1171.73	4231.39	2916.44
E.G. Slope (ft/ft)	0.001241	Area (sq ft)	2905.57	4231.39	9319.95
Q Total (cfs)	74720.00	Flow (cfs)	2790.36	63587.11	8342.53
Top Width (ft)	2599.40	Top Width (ft)	994.70	107.01	1497.69
Vel Total (ft/s)	8.98	Avg. Vel. (ft/s)	2.38	15.03	2.86
Max Chl Dpth (ft)	47.34	Hydr. Depth (ft)	12.16	39.54	15.05
Conv. Total (cfs)	2120943.0	Conv. (cfs)	79204.8	1804933.0	236804.5
Length Wtd. (ft)	486.76	Wetted Per. (ft)	104.68	117.44	197.90
Min Ch El (ft)	735.59	Shear (lb/sq ft)	0.87	2.79	1.14
Alpha	2.40	Stream Power (lb/ft s)	2.07	41.95	3.27
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	4916.33	13759.69	9489.93
C & E Loss (ft)	0.54	Cum SA (acres)	746.34	479.73	1513.97

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	775.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.49	Wt. n-Val.	0.110	0.038	0.110
W.S. Elev (ft)	773.59	Reach Len. (ft)	256.40	531.51	319.21
Crit W.S. (ft)	759.71	Flow Area (sq ft)	569.08	3232.10	1500.37
E.G. Slope (ft/ft)	0.000852	Area (sq ft)	569.08	3232.10	1500.37
Q Total (cfs)	38000.00	Flow (cfs)	1157.49	33617.88	3224.63
Top Width (ft)	264.05	Top Width (ft)	41.97	107.01	115.07
Vel Total (ft/s)	7.17	Avg. Vel. (ft/s)	2.03	10.40	2.15
Max Chl Dpth (ft)	38.00	Hydr. Depth (ft)	13.56	30.20	13.04
Conv. Total (cfs)	1302197.0	Conv. (cfs)	39665.4	1152029.0	110502.6
Length Wtd. (ft)	497.30	Wetted Per. (ft)	48.55	117.44	117.85
Min Ch El (ft)	735.59	Shear (lb/sq ft)	0.62	1.46	0.68
Alpha	1.87	Stream Power (lb/ft s)	1.27	15.22	1.45
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	766.76	9060.11	1529.94
C & E Loss (ft)	0.21	Cum SA (acres)	133.75	451.65	265.46

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 13.702

INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data num= 310

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	810.13	25.29	812.49	40.07	815.94	50.38	818.85	60.12	820.45
64.46	821.23	69.53	821.35	87.9	821.59	98.36	821.88	103.98	822.59
113.43	824.17	117.71	824.26	126.81	824.65	127.79	824.69	128.68	824.79
133.6	825.54	135.15	825.52	138.1	825.49	140.82	825.56	141.53	825.57
149.82	826.99	164.85	826.38	200.6	826	213.2	825.77	231.78	825.48
241.66	823.61	258.52	820.25	258.95	819.59	263.22	812.09	276.34	810.69
289.19	809.27	297.94	803.77	306.05	798.46	317.55	794.51	332.43	789.08
338.24	788.27	348.07	787.07	351.12	785.86	369.87	785.09	394.2	784.25
404.75	783.33	410.86	783.09	416.67	782.67	427.45	781.49	436.19	781.28
455.06	781.89	464.45	781.97	478.19	781.83	528.33	781.73	540.37	781.67
544.5	781.7	548.53	781.23	554.14	780.61	567.34	779.16	575.83	779.86
580.39	780.24	582.91	780.46	588.45	781.04	591.86	781.02	596.17	780.99
604.6	780.3	604.98	780.26	605.71	780.22	617.51	779.55	642.07	780.87
643.68	781	644.18	781.23	645.13	781.68	661.53	789.13	665.51	789.28
675.54	788.71	710.18	788.67	733.07	788.22	736.42	788.62	740.67	788.72
748.92	788.55	758.63	783.38	761.81	781.27	784.49	780.56	819.37	780.11
873.61	779.78	884.7	779.7	887.85	779.65	891.52	779.51	927.13	778.17
936.61	777.87	943.15	773.91	951.66	769.21	972.62	758.89	976.92	756.78
977.31	756.56	977.96	756.3	994.11	749.67	994.6	749.72	994.93	749.44
995.04	749.27	998.71	744.1	1005	736.38	1025	735.38	1045	736.38
1052.69	743.66	1053.32	744.11	1060.18	749.04	1072.62	752.31	1077.88	753.69
1086.85	755.99	1092.23	756.18	1095.92	756.29	1096.53	756.31	1100.83	757.22
1104.34	758.01	1117.86	758.03	1127.54	757.76	1130.92	757.84	1131.78	757.87
1139.21	757.95	1217.81	758.39	1252.76	758.58	1263.92	758.7	1271.32	758.65
1281.68	758.92	1303.63	759.19	1322.61	760.97	1327.91	761.5	1356.98	768.08
1361.62	769.02	1379.17	774.53	1389.35	777.44	1391.69	778.24	1394.44	778.48
1406.51	779.49	1411.84	779.46	1421.61	779.44	1445.79	781.8	1456.69	782.64
1458.6	782.72	1467.5	782.87	1476.14	783.47	1484.03	784.35	1488.79	776.38
1490.36	774.66	1496.26	778.86	1498.43	780.2	1499.17	780.6	1501.22	781.67
1515.18	788.15	1518.17	788.26	1532.71	788.17	1536.03	788.06	1544.32	788.12
1554.4	787.95	1557.81	787.33	1567.31	786.13	1567.59	786.1	1568.8	785.1
1574.34	780.53	1574.72	780.26	1575.48	779.87	1585.98	774.4	1593.35	776.87
1599.93	779.14	1606.59	782.93	1609.16	784.36	1615.34	784.42	1623.65	784.49
1628.3	783.65	1646.87	780.65	1652.33	779.41	1661.37	778.75	1677.63	777.11
1686.56	776.2	1692.86	775.79	1693.57	775.72	1695.63	775.46	1722.06	775.46
1722.11	775.46	1722.18	775.46	1722.3	775.46	1722.55	775.45	1723.19	774.61
1728.95	774.43	1730.52	774.81	1732.97	775.3	1738.7	775.53	1759.89	776.39
1768.05	776.78	1788.32	777.74	1823.28	778.57	1849.32	778.91	1870.9	779.65
1880.76	779.74	1901.55	779.45	1924.32	779.25	1992.72	778.95	1993.67	778.94
1994.2	778.92	1994.61	778.89	1995.53	778.84	1996.33	778.79	1997.66	778.72
1998.19	778.69	2047.71	775.98	2048.85	775.91	2049	775.91	2052.54	775.7
2054.85	774.59	2055.42	774.27	2066.69	774.27	2138.62	774.28	2152.48	774.28
2201.79	774.28	2206.36	774.28	2209.79	774.28	2210.6	774.28	2216.96	774.29
2232.67	774.31	2249.95	774.31	2292.85	774.34	2332.37	774.34	2335.31	774.34
2349.97	774.34	2355.43	777.92	2355.49	777.97	2368.43	779.28	2376.81	779.55
2386.18	780.2	2401.49	781.32	2406.67	781.75	2414.75	781.79	2417.68	781.77
2452.06	779.4	2458.57	779.08	2467	778.73	2495.57	779.15	2496.33	779.17
2499.22	779.26	2507.64	779.69	2508.87	779.75	2509.2	779.77	2509.32	779.77
2509.45	779.77	2520.31	779.78	2520.62	779.78	2520.78	779.78	2539.29	779.62
2539.67	779.61	2544.57	779.57	2555.48	778.97	2572.53	778.45	2585.64	778.16
2615.41	778.48	2644.7	777.82	2655.04	777.57	2662.58	777.35	2666.77	776.73
2681.14	776.12	2692.3	775.6	2692.9	774.99	2693.56	774.27	2704.7	774.27
2715.2	774.27	2741.56	774.27	2742.97	774.27	2745.7	774.27	2745.87	774.27
2755.9	774.27	2792.55	774.27	2799.54	774.27	2802.68	774.27	2807.83	774.27
2810.58	774.27	2816.17	774.27	2819.82	774.27	2864.8	774.24	2876.3	774.23
2877.3	774.53	2879.89	775.05	2881.37	775.09	2895.17	774.99	2896.2	774.98
2896.25	774.95	2896.4	774.85	2897.34	774.23	2898.96	774.23	2904.63	774.23
2907.74	774.98	2915.08	777.66	2915.89	777.88	2928.54	782.14	2934.15	782.13
2944.82	782.14	2955.32	781.56	2960.38	781.3	2964.02	781.55	2965.62	781.67
2982	789.99	3000.72	799.51	3003.87	801.12	3006.63	802.63	3016.09	807.24
3026.46	812.86	3031.74	815.18	3036.63	817.17	3062.56	829.11	3099.35	845.66
3116.4	849.35	3124.63	851.14	3180.07	875.78	3182.75	876.92	3201.1	878.95

Manning's n Values num= 7

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11  936.61    .038 1104.34     .11 1421.61     .05 2349.97     .09
  2715.2     .05 2965.62     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        936.61 1104.34           470.86  454.21  336.42             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   747.8  800.17       F
    1500  3201.1     800       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************
     675     725     805    1485    1545     805    1545    1615     784

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  762.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.53  * Wt. n-Val.             *          *   0.038  *   0.110  *
* W.S. Elev (ft)          *  762.18  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)          *  749.57  * Flow Area (sq ft)      *          * 2086.09  *  806.76  *
* E.G. Slope (ft/ft)      *0.000725  * Area (sq ft)           *          * 2086.09  *  806.76  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *          *12516.12  *  683.88  *
* Top Width (ft)          *  364.96  * Top Width (ft)         *          *  138.40  *  226.56  *
* Vel Total (ft/s)        *    4.56  * Avg. Vel. (ft/s)       *          *    6.00  *    0.85  *
* Max Chl Dpth (ft)       *   26.80  * Hydr. Depth (ft)       *          *   15.07  *    3.56  *
* Conv. Total (cfs)       *490216.2  * Conv. (cfs)            *          *464818.5  * 25397.7  *
* Length Wtd. (ft)        *  448.02  * Wetted Per. (ft)       *          *  153.36  *  226.76  *
* Min Ch El (ft)          *  735.38  * Shear (lb/sq ft)       *          *    0.62  *    0.16  *
* Alpha                   *    1.64  * Stream Power (lb/ft s) *          *    3.69  *    0.14  *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)   *  111.26  * 4143.29  *  157.73  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   24.33  *  350.77  *   42.89  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  766.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.62  * Wt. n-Val.             *          *   0.038  *   0.110  *
* W.S. Elev (ft)          *  766.27  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)          *  753.91  * Flow Area (sq ft)      *          * 2669.58  * 1771.13  *
* E.G. Slope (ft/ft)      *0.000707  * Area (sq ft)           *          * 2669.58  * 1771.13  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             *          *17924.04  * 2375.96  *
* Top Width (ft)          *  391.35  * Top Width (ft)         *          *  146.71  *  244.65  *
* Vel Total (ft/s)        *    4.57  * Avg. Vel. (ft/s)       *          *    6.71  *    1.34  *
* Max Chl Dpth (ft)       *   30.89  * Hydr. Depth (ft)       *          *   18.20  *    7.24  *
* Conv. Total (cfs)       *763619.2  * Conv. (cfs)            *          *674243.6  * 89375.6  *
* Length Wtd. (ft)        *  440.89  * Wetted Per. (ft)       *          *  162.63  *  245.30  *
* Min Ch El (ft)          *  735.38  * Shear (lb/sq ft)       *          *    0.72  *    0.32  *
* Alpha                   *    1.91  * Stream Power (lb/ft s) *          *    4.86  *    0.43  *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)   *  246.58  * 5681.27  *  349.45  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   46.54  *  389.61  *   67.32  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  769.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.69  * Wt. n-Val.             *          *   0.038  *   0.110  *
* W.S. Elev (ft)          *  769.05  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)          *  756.86  * Flow Area (sq ft)      *          * 3085.27  * 2468.53  *
* E.G. Slope (ft/ft)      *0.000711  * Area (sq ft)           *          * 3085.27  * 2468.53  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             *          *22315.26  * 4004.74  *
* Top Width (ft)          *  409.73  * Top Width (ft)         *          *  152.36  *  257.38  *
* Vel Total (ft/s)        *    4.74  * Avg. Vel. (ft/s)       *          *    7.23  *    1.62  *
* Max Chl Dpth (ft)       *   33.67  * Hydr. Depth (ft)       *          *   20.25  *    9.59  *
* Conv. Total (cfs)       *986865.2  * Conv. (cfs)            *          *836707.9  *150157.3  *
* Length Wtd. (ft)        *  437.01  * Wetted Per. (ft)       *          *  168.92  *  258.33  *
* Min Ch El (ft)          *  735.38  * Shear (lb/sq ft)       *          *    0.81  *    0.42  *
* Alpha                   *    1.99  * Stream Power (lb/ft s) *          *    5.87  *    0.69  *
* Frctn Loss (ft)         *    0.30  * Cum Volume (acre-ft)   *  381.97  * 6971.31  *  628.49  *
```

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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   64.74  *  417.21  *  134.07  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  772.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *          *   0.038  *   0.110  *
* W.S. Elev (ft)         *  772.20  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)         *  760.19  * Flow Area (sq ft)      *          * 3573.73  * 3294.13  *
* E.G. Slope (ft/ft)     *0.000707  * Area (sq ft)           *          * 3573.73  * 3294.13  *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *27711.51  * 6288.50  *
* Top Width (ft)         *  425.49  * Top Width (ft)         *          *  158.09  *  267.40  *
* Vel Total (ft/s)       *    4.95  * Avg. Vel. (ft/s)       *          *    7.75  *    1.91  *
* Max Chl Dpth (ft)      *   36.82  * Hydr. Depth (ft)       *          *   22.61  *   12.32  *
* Conv. Total (cfs)      *1278720.0  * Conv. (cfs)            *          *1042214.0  *236506.6  *
* Length Wtd. (ft)       *  433.43  * Wetted Per. (ft)       *          *  175.46  *  268.84  *
* Min Ch El (ft)         *  735.38  * Shear (lb/sq ft)       *          *    0.90  *    0.54  *
* Alpha                  *    2.03  * Stream Power (lb/ft s) *          *    6.97  *    1.03  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  604.24  * 8304.55  * 1144.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   97.94  *  439.72  *  208.11  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  776.95  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *          *   0.038  *   0.110  *
* W.S. Elev (ft)         *  776.10  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)         *  762.68  * Flow Area (sq ft)      *          * 4204.16  * 4362.45  *
* E.G. Slope (ft/ft)     *0.000691  * Area (sq ft)           *          * 4204.16  * 5325.20  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *          *34890.96  * 9609.04  *
* Top Width (ft)         * 1046.14  * Top Width (ft)         *          *  164.81  *  881.33  *
* Vel Total (ft/s)       *    5.19  * Avg. Vel. (ft/s)       *          *    8.30  *    2.20  *
* Max Chl Dpth (ft)      *   40.72  * Hydr. Depth (ft)       *          *   25.51  *   15.56  *
* Conv. Total (cfs)      *1692986.0  * Conv. (cfs)            *          *1327414.0  *365572.2  *
* Length Wtd. (ft)       *  430.26  * Wetted Per. (ft)       *          *  183.23  *  282.34  *
* Min Ch El (ft)         *  735.38  * Shear (lb/sq ft)       *          *    0.99  *    0.67  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *          *    8.21  *    1.47  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   * 1347.00  *10457.29  * 2718.86  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  294.93  *  467.56  *  536.36  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  779.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *  0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  778.83  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)         *  764.44  * Flow Area (sq ft)      *   13.59  * 4660.30  * 5143.16  *
* E.G. Slope (ft/ft)     *0.000705  * Area (sq ft)           *   13.59  * 4660.30  * 8081.63  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *    3.07  *41331.88  *12355.05  *
* Top Width (ft)         * 1409.43  * Top Width (ft)         *   27.14  *  167.73  * 1214.56  *
* Vel Total (ft/s)       *    5.47  * Avg. Vel. (ft/s)       *    0.23  *    8.87  *    2.40  *
* Max Chl Dpth (ft)      *   43.45  * Hydr. Depth (ft)       *    0.50  *   27.78  *   17.47  *
* Conv. Total (cfs)      *2022184.0  * Conv. (cfs)            *   115.8  *1556727.0  *465341.5  *
* Length Wtd. (ft)       *  429.37  * Wetted Per. (ft)       *   27.16  *  186.65  *  296.70  *
* Min Ch El (ft)         *  735.38  * Shear (lb/sq ft)       *    0.02  *    1.10  *    0.76  *
* Alpha                  *    2.07  * Stream Power (lb/ft s) *    0.00  *    9.75  *    1.83  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   * 2350.90  *11706.89  * 4456.85  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  466.36  *  474.55  *  848.90  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
```

```
* E.G. Elev (ft)         *  782.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.              *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  780.97  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)         *  765.78  * Flow Area (sq ft)      *  207.63  * 5019.01  * 5821.75  *
* E.G. Slope (ft/ft)     *0.000722  * Area (sq ft)           *  277.28  * 5019.01  *11229.14  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *   87.70  *47328.40  *14583.90  *
* Top Width (ft)         * 1997.70  * Top Width (ft)         *  249.26  *  167.73  * 1580.70  *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)       *    0.42  *    9.43  *    2.51  *
* Max Chl Dpth (ft)      *   45.59  * Hydr. Depth (ft)       *    1.26  *   29.92  *   17.48  *
* Conv. Total (cfs)      *2307582.0  * Conv. (cfs)           *  3264.1  *1761519.0  *542799.2  *
* Length Wtd. (ft)       *  428.52  * Wetted Per. (ft)       *  165.37  *  186.65  *  335.45  *
* Min Ch El (ft)         *  735.38  * Shear (lb/sq ft)       *    0.06  *    1.21  *    0.78  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.02  *   11.43  *    1.96  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 3197.93  *12479.52  * 6076.31  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  573.71  *  475.96  * 1174.40  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  784.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.              *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  783.73  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)         *  767.68  * Flow Area (sq ft)      *  692.90  * 5481.60  * 6792.22  *
* E.G. Slope (ft/ft)     *0.000736  * Area (sq ft)           * 1302.24  * 5481.60  *15817.64  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *  625.19  *55364.63  *18730.18  *
* Top Width (ft)         * 2312.44  * Top Width (ft)         *  428.14  *  167.73  * 1716.57  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *    0.90  *   10.10  *    2.76  *
* Max Chl Dpth (ft)      *   48.35  * Hydr. Depth (ft)       *    3.88  *   32.68  *   18.12  *
* Conv. Total (cfs)      *2753639.0  * Conv. (cfs)           * 23039.9  *2040340.0  *690259.3  *
* Length Wtd. (ft)       *  426.48  * Wetted Per. (ft)       *  179.41  *  186.65  *  378.90  *
* Min Ch El (ft)         *  735.38  * Shear (lb/sq ft)       *    0.18  *    1.35  *    0.82  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.16  *   13.63  *    2.27  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 4903.94  *13700.44  * 9397.82  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  742.15  *  478.05  * 1502.19  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  774.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.              *          *   0.038  *   0.110  *
* W.S. Elev (ft)         *  773.69  * Reach Len. (ft)        *  470.86  *  454.21  *  336.42  *
* Crit W.S. (ft)         *  761.26  * Flow Area (sq ft)      *          * 3811.37  * 3696.24  *
* E.G. Slope (ft/ft)     *0.000706  * Area (sq ft)           *          * 3811.37  * 3696.24  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *30477.48  * 7522.52  *
* Top Width (ft)         *  432.93  * Top Width (ft)         *          *  160.79  *  272.15  *
* Vel Total (ft/s)       *    5.06  * Avg. Vel. (ft/s)       *          *    8.00  *    2.04  *
* Max Chl Dpth (ft)      *   38.31  * Hydr. Depth (ft)       *          *   23.70  *   13.58  *
* Conv. Total (cfs)      *1429942.0  * Conv. (cfs)           *          *1146870.0  *283072.8  *
* Length Wtd. (ft)       *  432.01  * Wetted Per. (ft)       *          *  178.55  *  273.81  *
* Min Ch El (ft)         *  735.38  * Shear (lb/sq ft)       *          *    0.94  *    0.60  *
* Alpha                  *    2.03  * Stream Power (lb/ft s) *          *    7.53  *    1.21  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  765.09  * 9017.14  * 1510.90  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  133.63  *  450.02  *  264.04  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 13.616
```

```
INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data    num=     295
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  820.01    8.28  821.75   24.94  822.11   30.13  822.24    42.5  824.63
   51.05  825.72    56.4  825.78   68.71  826.04   73.78  826.96   79.07  827.85
   82.53  828.44   85.53  827.46   91.36  827.83   93.64  827.43   95.14  827.52
  102.58  828.08  102.87  827.95  137.99     826  151.86  825.24  157.22  824.97
  158.28  824.94  158.41  824.94  159.76  824.96   159.9  824.96  178.64   824.6
  195.16  824.24  201.74  823.95  208.69  823.68  217.38  823.26  224.41  822.84
  230.81   822.5  238.77  819.72   259.9  816.03  269.11  815.11  278.31  810.38
  287.49   805.8  296.89  810.41  298.52  810.89   304.4  802.41   309.1  794.84
  309.95   794.8     328  790.83  332.37  790.03  350.12  784.65  357.77  782.49
  360.69  782.12   370.4  781.27  384.56  776.93  391.22  775.25  396.18  775.69
  414.89  776.64  419.48  776.88  423.49  777.05  425.98  777.35   432.4  778.06
  436.03  778.04  440.13  778.03  446.92  776.83  451.01  776.05   456.1  772.91
  462.11  769.03  472.07  765.64  497.48  755.64  498.25  755.56  504.55  754.92
  511.03   754.4  514.88   754.1  519.24  752.37  525.12  751.02  529.85   749.3
  531.12   748.6  531.96  747.46  534.31  743.13     540   736.2     563   735.2
     584   736.2  590.61  743.15  595.12  747.24  596.05   748.1   611.3  751.84
  612.14   752.1  626.17   756.3  632.73  756.68   654.5  758.01  656.74  758.14
  658.51  758.16  660.17  758.31  708.15  757.73  715.12  757.66  727.57  757.37
  745.14  757.35  772.91  757.39  798.48  757.45  810.67  757.56  823.13  758.59
  824.03  758.66  825.08  758.95  844.22  765.31  858.46  772.71  863.17     775
  897.71  776.57  928.12  777.99  932.31  778.06  960.59  779.39  964.16  779.99
  969.83  781.08  978.15  783.24  989.24  782.79 1015.25  782.51 1022.56  782.58
 1025.36  782.54 1047.34  781.93 1049.03  781.92  1054.7  781.91 1069.01   781.8
 1081.46  781.88 1092.03  782.06 1145.01  781.97 1152.31  781.96 1157.53  782.07
 1161.67  782.06  1208.8  782.86 1211.25  782.89 1218.72  782.87 1258.72  783.12
  1277.7  783.19  1280.9  783.16 1286.57  783.03  1293.2   782.8 1321.93  782.14
 1328.54  782.12    1332  781.43  1336.3   781.1 1344.99  780.75 1354.73  780.35
 1373.94  779.84 1377.56   779.7  1379.3  779.27 1390.52  779.28 1399.42   778.7
 1411.38  777.54 1417.57  776.83 1428.82  775.54 1430.09  774.96 1432.15  774.27
 1452.38  774.27 1484.25  774.27 1484.53  774.46  1486.9  775.69 1489.35  776.19
 1497.04  777.61 1505.69   778.7 1505.85  778.72 1516.43  780.45 1525.32  781.31
 1529.31  781.93 1530.51  781.91 1550.45  781.87 1554.41  781.88 1560.85     782
 1564.64  782.01 1573.15  782.07  1585.1  781.71 1589.97  781.22 1595.84  780.92
 1604.59  780.69 1624.58  780.71 1625.19  780.72 1626.92  780.82 1657.43  781.59
 1667.81  781.75 1684.89  782.26 1695.37  782.58 1699.01  782.47 1710.35  781.34
 1710.58  781.34 1710.72  781.29  1735.1  776.34 1735.42  776.26 1737.73  775.73
 1737.89  775.67 1741.05  774.27 1796.63  774.27 1807.55  774.27 1810.04  775.62
 1813.18   777.5 1819.14  778.25  1824.1  778.65  1835.6  782.43 1839.49  783.65
  1846.3   783.7 1848.73  783.71 1852.85  783.61 1866.21  782.97 1878.61  782.36
  1881.5  782.11 1885.23  782.04 1894.14  781.64  1897.9  781.47 1899.52   781.3
 1909.41  780.42 1922.72  780.58 1923.19  780.56 1939.74  780.66 1940.55  780.65
 1942.35  780.67 1944.15  779.79 1946.61  778.56  1948.4   778.5 1948.73  778.49
 1950.04  778.47  1960.1  778.46 1969.11  778.45 1969.12  778.45 1969.14  778.45
 1973.68  780.36 1974.26  780.75 1976.29  780.68 1983.45  780.62 1990.59  780.57
 1990.79  780.58 1992.35   780.7 2000.17  781.31 2001.94  781.49 2015.95  782.89
 2016.85  783.09 2023.82  783.72 2026.04  783.94  2026.9  783.95 2029.96  784.02
 2031.36  784.33 2033.53  784.52 2052.06  786.36 2057.42  786.89 2059.12   786.3
 2068.91  782.31    2075  779.69 2077.36  778.62 2096.44  777.53 2100.71  777.38
 2126.46  777.57  2139.6  777.77  2143.7  777.62  2145.4  777.53 2153.98  777.04
 2156.15  776.12 2158.09  774.27 2181.09  774.27 2202.46  774.27 2208.11  774.27
 2331.73  774.27 2333.92  774.27 2342.07  774.27 2355.76  774.27 2358.36  774.27
 2358.38  774.27 2358.44  774.27 2360.27  774.52 2364.17  774.99 2365.71  774.57
 2367.58  774.27 2368.99  774.27 2388.39  774.24 2394.42  774.23 2399.37  775.19
 2399.61  775.24 2408.31   775.4 2425.21  777.55 2434.27   778.7  2467.6  779.19
 2486.41  779.59 2500.72  779.34 2501.01  779.33  2501.5  779.48 2501.54  779.49
 2519.25  784.32 2524.08  785.05 2572.16  792.61 2585.54  796.58 2598.25   800.4
 2610.29  804.48 2624.05  809.05  2660.6  823.03 2663.35  824.17 2680.06  832.35
 2700.83  842.31 2707.77  843.48 2734.41  847.88 2741.17  851.09 2753.29  856.64
 2772.34  865.62 2786.89  879.97 2790.78  882.43 2803.03  882.25 2822.88  883.95

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11  514.88    .038  626.17     .11  989.24     .06 1810.04     .09
 2181.09     .05 2486.41     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        514.88  626.17           241.33   243.3  261.38             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     970 2822.88     795       F
```

```
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
    1050    1090     800    1175    1295     800

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  762.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  761.89  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  748.83  * Flow Area (sq ft)      *  172.50  * 2031.98  *  863.75  *
* E.G. Slope (ft/ft)     *0.000581  * Area (sq ft)           *  172.50  * 2031.98  *  863.75  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  164.18  *12309.95  *  725.87  *
* Top Width (ft)         *  352.31  * Top Width (ft)         *   33.27  *  111.29  *  207.75  *
* Vel Total (ft/s)       *    4.30  * Avg. Vel. (ft/s)       *    0.95  *    6.06  *    0.84  *
* Max Chl Dpth (ft)      *   26.69  * Hydr. Depth (ft)       *    5.18  *   18.26  *    4.16  *
* Conv. Total (cfs)      *547526.4  * Conv. (cfs)            *  6810.2  *510607.8  * 30108.4  *
* Length Wtd. (ft)       *  243.93  * Wetted Per. (ft)       *   34.53  *  124.73  *  208.38  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.18  *    0.59  *    0.15  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.17  *    3.58  *    0.13  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  110.33  * 4121.82  *  151.28  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   24.15  *  349.47  *   41.21  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  766.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  765.91  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  753.20  * Flow Area (sq ft)      *  327.04  * 2479.98  * 1724.22  *
* E.G. Slope (ft/ft)     *0.000613  * Area (sq ft)           *  327.04  * 2479.98  * 1724.22  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  406.67  *17621.64  * 2271.68  *
* Top Width (ft)         *  374.11  * Top Width (ft)         *   43.61  *  111.29  *  219.21  *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)       *    1.24  *    7.11  *    1.32  *
* Max Chl Dpth (ft)      *   30.71  * Hydr. Depth (ft)       *    7.50  *   22.28  *    7.87  *
* Conv. Total (cfs)      *819881.8  * Conv. (cfs)            * 16424.8  *711707.6  * 91749.3  *
* Length Wtd. (ft)       *  244.59  * Wetted Per. (ft)       *   45.62  *  124.73  *  220.54  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.27  *    0.76  *    0.30  *
* Alpha                  *    2.19  * Stream Power (lb/ft s) *    0.34  *    5.41  *    0.39  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *  244.81  * 5654.42  *  335.95  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   46.31  *  388.27  *   65.53  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  769.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  768.63  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  755.65  * Flow Area (sq ft)      *  456.54  * 2782.73  * 2327.66  *
* E.G. Slope (ft/ft)     *0.000645  * Area (sq ft)           *  456.54  * 2782.73  * 2327.66  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  649.37  *21896.08  * 3774.55  *
* Top Width (ft)         *  387.33  * Top Width (ft)         *   51.60  *  111.29  *  224.44  *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)       *    1.42  *    7.87  *    1.62  *
* Max Chl Dpth (ft)      *   33.43  * Hydr. Depth (ft)       *    8.85  *   25.00  *   10.37  *
* Conv. Total (cfs)      *1036553.0  * Conv. (cfs)           * 25574.1  *862327.3  *148651.8  *
* Length Wtd. (ft)       *  244.98  * Wetted Per. (ft)       *   54.06  *  124.73  *  226.44  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.34  *    0.90  *    0.41  *
* Alpha                  *    2.32  * Stream Power (lb/ft s) *    0.48  *    7.07  *    0.67  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  379.51  * 6940.72  *  609.97  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   64.46  *  415.83  *  132.21  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  772.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  771.71  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
```

```
* Crit W.S. (ft)         *  759.06  * Flow Area (sq ft)      *  624.29  * 3125.28  * 3027.61  *
* E.G. Slope (ft/ft)     *0.000671  * Area (sq ft)           *  624.29  * 3125.28  * 3027.61  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1038.46  *27107.60  * 5853.94  *
* Top Width (ft)         *  398.58  * Top Width (ft)         *   56.92  *  111.29  *  230.37  *
* Vel Total (ft/s)       *    5.02  * Avg. Vel. (ft/s)       *    1.66  *    8.67  *    1.93  *
* Max Chl Dpth (ft)      *   36.51  * Hydr. Depth (ft)       *   10.97  *   28.08  *   13.14  *
* Conv. Total (cfs)      *1312472.0  * Conv. (cfs)           * 40086.7  *1046411.0  *225974.3  *
* Length Wtd. (ft)       *  245.35  * Wetted Per. (ft)       *   60.24  *  124.73  *  233.11  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.43  *    1.05  *    0.54  *
* Alpha                  *    2.41  * Stream Power (lb/ft s) *    0.72  *    9.10  *    1.05  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  600.86  * 8269.63  * 1119.86  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   97.63  *  438.32  *  206.19  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  776.63  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.12  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  775.51  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  761.89  * Flow Area (sq ft)      *  852.55  * 3548.21  * 3920.08  *
* E.G. Slope (ft/ft)     *0.000697  * Area (sq ft)           *  852.55  * 3548.21  * 4370.83  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 1648.94  *34133.64  * 8717.42  *
* Top Width (ft)         *  808.12  * Top Width (ft)         *   66.96  *  111.29  *  629.87  *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *    1.93  *    9.62  *    2.22  *
* Max Chl Dpth (ft)      *   40.31  * Hydr. Depth (ft)       *   12.73  *   31.88  *   15.79  *
* Conv. Total (cfs)      *1685574.0  * Conv. (cfs)           * 62458.5  *1292916.0  *330199.0  *
* Length Wtd. (ft)       *  245.70  * Wetted Per. (ft)       *   71.41  *  124.73  *  251.75  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.52  *    1.24  *    0.68  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *    1.00  *   11.91  *    1.51  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 1342.39  *10416.87  * 2681.42  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  294.57  *  466.12  *  530.53  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  779.44  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.38  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  778.05  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  763.76  * Flow Area (sq ft)      * 1103.18  * 3831.32  * 4622.14  *
* E.G. Slope (ft/ft)     *0.000781  * Area (sq ft)           * 1103.18  * 3831.32  * 6171.43  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 2055.59  *41052.58  *10581.83  *
* Top Width (ft)         * 1077.24  * Top Width (ft)         *  132.85  *  111.29  *  833.10  *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *    1.86  *   10.72  *    2.29  *
* Max Chl Dpth (ft)      *   42.85  * Hydr. Depth (ft)       *    8.30  *   34.43  *   15.12  *
* Conv. Total (cfs)      *1921706.0  * Conv. (cfs)           * 73574.9  *1469380.0  *378751.6  *
* Length Wtd. (ft)       *  245.81  * Wetted Per. (ft)       *  138.08  *  124.73  *  309.37  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.39  *    1.50  *    0.73  *
* Alpha                  *    2.82  * Stream Power (lb/ft s) *    0.73  *   16.04  *    1.67  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 2344.86  *11662.62  * 4401.81  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  465.50  *  473.09  *  841.00  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  781.67  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.58  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  780.09  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  765.25  * Flow Area (sq ft)      * 1382.84  * 4057.98  * 5285.72  *
* E.G. Slope (ft/ft)     *0.000837  * Area (sq ft)           * 1382.84  * 4057.98  * 8114.21  *
```

```
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 2416.89  *46773.75  *12809.37  *
* Top Width (ft)         * 1311.21  * Top Width (ft)         *  140.63  *  111.29  * 1059.29  *
* Vel Total (ft/s)       *    5.78  * Avg. Vel. (ft/s)       *    1.75  *   11.53  *    2.42  *
* Max Chl Dpth (ft)      *   44.89  * Hydr. Depth (ft)       *    9.83  *   36.46  *   15.61  *
* Conv. Total (cfs)      *2143514.0  * Conv. (cfs)            * 83558.6  *1617100.0  *442855.8  *
* Length Wtd. (ft)       *  245.97  * Wetted Per. (ft)       *  146.17  *  124.73  *  342.19  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.49  *    1.70  *    0.81  *
* Alpha                  *    3.04  * Stream Power (lb/ft s) *    0.86  *   19.59  *    1.96  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 3188.95  *12432.19  * 6001.62  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  571.61  *  474.50  * 1164.21  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  784.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.77  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  782.76  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  767.31  * Flow Area (sq ft)      * 1778.32  * 4355.25  * 6201.42  *
* E.G. Slope (ft/ft)     *0.000887  * Area (sq ft)           * 1778.32  * 4355.25  *11589.33  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 3506.44  *54180.43  *17033.12  *
* Top Width (ft)         * 1894.27  * Top Width (ft)         *  158.07  *  111.29  * 1624.90  *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *    1.97  *   12.44  *    2.75  *
* Max Chl Dpth (ft)      *   47.56  * Hydr. Depth (ft)       *   11.25  *   39.13  *   18.04  *
* Conv. Total (cfs)      *2509016.0  * Conv. (cfs)            *117742.5  *1819320.0  *571953.7  *
* Length Wtd. (ft)       *  246.23  * Wetted Per. (ft)       *  163.88  *  124.73  *  347.61  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.60  *    1.93  *    0.99  *
* Alpha                  *    3.11  * Stream Power (lb/ft s) *    1.18  *   24.05  *    2.71  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   * 4887.29  *13649.15  * 9291.99  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *  738.98  *  476.60  * 1489.29  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  774.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.110  *   0.038  *   0.110  *
* W.S. Elev (ft)         *  773.17  * Reach Len. (ft)        *  241.33  *  243.30  *  261.38  *
* Crit W.S. (ft)         *  760.32  * Flow Area (sq ft)      *  708.78  * 3287.26  * 3364.96  *
* E.G. Slope (ft/ft)     *0.000684  * Area (sq ft)           *  708.78  * 3287.26  * 3364.96  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 1257.64  *29761.06  * 6981.30  *
* Top Width (ft)         *  403.71  * Top Width (ft)         *   59.19  *  111.29  *  233.23  *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)       *    1.77  *    9.05  *    2.07  *
* Max Chl Dpth (ft)      *   37.97  * Hydr. Depth (ft)       *   11.97  *   29.54  *   14.43  *
* Conv. Total (cfs)      *1453494.0  * Conv. (cfs)            * 48104.6  *1138356.0  *267033.5  *
* Length Wtd. (ft)       *  245.51  * Wetted Per. (ft)       *   62.94  *  124.73  *  236.32  *
* Min Ch El (ft)         *  735.20  * Shear (lb/sq ft)       *    0.48  *    1.12  *    0.61  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    0.85  *   10.18  *    1.26  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *  761.26  * 8980.13  * 1483.63  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  133.31  *  448.60  *  262.09  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main              RS: 13.570

INPUT
Description: U/S of Zoo Bridge, Copied from D/S side.  Blocked obstructions are
             buildings.
```

```
Station Elevation Data    num=     202
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  827.08     .11  827.07      .5  827.05    1.72  826.96    1.73  826.97
   29.78  825.18   30.69  825.11   55.49  823.61   56.68  823.51   72.57  820.92
    84.4  820.14   90.45  819.03   93.12  818.76   99.29  818.55  102.14  818.39
  103.95  818.26  112.28   812.9  120.17  807.24  125.36  805.32   129.2  803.67
  136.21  799.89  153.76  790.31   169.6   782.8  183.17  775.85   190.5  776.41
  194.44  776.71  195.54  776.71  202.07  776.68  204.48  776.48  212.82  775.78
  216.63  773.23  225.43   767.4  237.64  762.57  245.15  759.69  248.29  759.09
   254.8  758.14  289.04  752.36  289.53  752.28  300.86  747.66  302.05  747.23
  303.55  746.38  309.65  742.46     315     736     337  735.08     358     736
  364.68  742.46   374.7   748.5  385.59  754.29  392.68   755.1  405.84   756.6
  411.65  757.16  432.84  759.72  436.55  760.22  443.39  761.95  466.36  766.96
  495.73  775.34  501.07  776.93  508.41  779.48  510.62  780.27  511.48  780.58
  518.15  781.86  527.16  788.72  536.51  791.24  541.42  794.34  553.72  795.88
   555.8  795.71  556.51  795.66  566.18  795.04  569.35  794.82  574.67  794.51
  587.74  793.65  593.42  793.33  605.11  792.57  614.79  791.94  623.77  791.44
  635.15  790.87  648.71   790.1  653.02  789.88  656.79  789.69   673.2  788.76
  676.26   788.6  678.92  788.46  698.03  787.37  699.58  787.28  700.94  787.21
  718.62  786.19  719.08  786.17  724.94  785.83  737.75  785.11  738.39  785.09
  761.52  783.99  763.18   783.9  764.96   783.8  787.62  782.71  797.47  782.39
   805.6  782.26  814.66  782.19  818.18   782.2   820.6  782.25  820.64  782.24
  828.15  780.14  837.08  779.91  848.32   778.9  848.55  778.87   848.7  778.85
  848.71  778.85  849.02  778.82  849.29  778.79  849.32  778.79  855.05  778.28
  858.78   778.2  858.86  778.19  858.97  778.18  859.15  778.17  867.81  778.04
   872.5  777.57  877.84  777.33  881.13  775.72  882.89  774.85   884.1  774.24
  894.21  774.24  896.14  774.24  973.27  774.24  991.16  774.24 1198.71  774.26
 1221.09  774.27  1236.9  774.26 1257.89  774.26 1264.12  774.26 1296.48  774.25
  1298.1  774.25 1318.23  774.25 1319.69  774.25 1322.24  775.76 1325.74  778.05
 1335.13  778.16 1343.39  778.25 1395.06  778.32 1402.73  778.32 1453.62  778.54
 1493.68  778.38 1504.57  778.37 1556.23  778.31 1560.87   778.3 1566.18  778.25
 1602.85  778.23 1632.63  778.23 1643.64  778.24 1665.54  777.34 1668.84  777.31
 1686.09  776.86 1697.41  776.59 1697.56  776.47 1702.29  774.27 1710.98  774.27
 1711.57  774.27 1712.51  774.27 1717.63  774.27 1760.71  774.27 1781.69  774.27
  1791.6  774.27 1807.16  774.27 1827.24  774.27 1836.33  774.27 1841.99  774.27
 1945.59  774.24  1953.7  774.24 1956.07   775.1 1962.44  777.41 1969.32  777.47
    1989  778.48  2001.6  779.33 2028.91  779.56 2039.45  779.64 2054.43  779.88
 2091.49  780.45 2100.84  780.69 2123.04  780.42 2123.06  780.42 2123.15  780.45
  2123.4  780.53 2128.27  782.21 2130.33  782.85 2134.46  783.42 2151.16  785.55
 2192.14  793.63 2192.15  793.63 2221.21  801.85 2229.41  803.95 2244.91  808.22
 2255.29  810.89  2290.3  823.35 2295.39  825.18 2297.23  826.06  2333.4  843.51
 2333.56  843.54 2367.55  851.19 2379.21  858.01 2384.04  860.62 2401.11  869.48
 2412.36  875.52 2417.52  876.45

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11  289.04    .038  385.59     .09  605.11     .05 1296.48      .1
 1702.29     .05 2123.04     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        289.04  385.59               65      65      65              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
     600 2417.52     790       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     780     900     795

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  762.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  761.62  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  748.75  * Flow Area (sq ft)      *  249.66  * 1944.69  *  230.11  *
* E.G. Slope (ft/ft)     *0.000591  * Area (sq ft)           *  249.66  * 1944.69  *  230.11  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  239.93  *12725.91  *  234.17  *
* Top Width (ft)         *  201.99  * Top Width (ft)         *   48.93  *   96.55  *   56.51  *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *    0.96  *    6.54  *    1.02  *
* Max Chl Dpth (ft)      *   26.54  * Hydr. Depth (ft)       *    5.10  *   20.14  *    4.07  *
* Conv. Total (cfs)      *542794.4  * Conv. (cfs)            *  9866.0  *523299.3  *  9629.1  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *   49.90  *  107.73  *   57.03  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.18  *    0.67  *    0.15  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.18  *    4.36  *    0.15  *
```

```
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  109.16  * 4110.72  *  148.00  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   23.93  *  348.89  *   40.42  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  765.43  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  752.43  * Flow Area (sq ft)      *  454.60  * 2312.41  *  477.82  *
* E.G. Slope (ft/ft)     *0.000734  * Area (sq ft)           *  454.60  * 2312.41  *  477.82  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  639.60  *18923.83  *  736.57  *
* Top Width (ft)         *  228.94  * Top Width (ft)         *   58.63  *   96.55  *   73.76  *
* Vel Total (ft/s)       *    6.26  * Avg. Vel. (ft/s)       *    1.41  *    8.18  *    1.54  *
* Max Chl Dpth (ft)      *   30.35  * Hydr. Depth (ft)       *    7.75  *   23.95  *    6.48  *
* Conv. Total (cfs)      *749194.4  * Conv. (cfs)            * 23605.2  *698405.1  * 27184.1  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *   60.32  *  107.73  *   74.70  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.35  *    0.98  *    0.29  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *    0.49  *    8.05  *    0.45  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  242.65  * 5641.04  *  329.35  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   46.02  *  387.69  *   64.65  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  769.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  767.97  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  754.79  * Flow Area (sq ft)      *  611.20  * 2557.16  *  678.98  *
* E.G. Slope (ft/ft)     *0.000843  * Area (sq ft)           *  611.20  * 2557.16  *  678.98  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1049.53  *23975.54  * 1294.93  *
* Top Width (ft)         *  245.31  * Top Width (ft)         *   64.46  *   96.55  *   84.30  *
* Vel Total (ft/s)       *    6.84  * Avg. Vel. (ft/s)       *    1.72  *    9.38  *    1.91  *
* Max Chl Dpth (ft)      *   32.89  * Hydr. Depth (ft)       *    9.48  *   26.49  *    8.05  *
* Conv. Total (cfs)      *906665.7  * Conv. (cfs)            * 36154.0  *825904.1  * 44607.6  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *   66.70  *  107.73  *   85.54  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.48  *    1.25  *    0.42  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    0.83  *   11.71  *    0.80  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  376.55  * 6925.80  *  600.95  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   64.14  *  415.25  *  131.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  772.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  770.82  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  757.53  * Flow Area (sq ft)      *  801.60  * 2833.09  *  934.21  *
* E.G. Slope (ft/ft)     *0.000948  * Area (sq ft)           *  801.60  * 2833.09  *  934.21  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1664.51  *30169.85  * 2165.64  *
* Top Width (ft)         *  259.64  * Top Width (ft)         *   68.78  *   96.55  *   94.31  *
* Vel Total (ft/s)       *    7.44  * Avg. Vel. (ft/s)       *    2.08  *   10.65  *    2.32  *
* Max Chl Dpth (ft)      *   35.74  * Hydr. Depth (ft)       *   11.65  *   29.34  *    9.91  *
* Conv. Total (cfs)      *1104095.0  * Conv. (cfs)            * 54052.2  *979717.0  * 70325.7  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *   71.87  *  107.73  *   95.95  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.66  *    1.56  *    0.58  *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *    1.37  *   16.58  *    1.34  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  596.91  * 8252.99  * 1107.97  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   97.28  *  437.74  *  205.22  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  776.34  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    1.96  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  774.38  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  761.07  * Flow Area (sq ft)      * 1055.56  * 3176.23  * 1291.53  *
* E.G. Slope (ft/ft)     *0.001044  * Area (sq ft)           * 1055.56  * 3176.23  * 1374.27  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 2610.17  *38306.35  * 3583.48  *
* Top Width (ft)         *  949.37  * Top Width (ft)         *   74.13  *   96.55  *  778.70  *
* Vel Total (ft/s)       *    8.06  * Avg. Vel. (ft/s)       *    2.47  *   12.06  *    2.77  *
* Max Chl Dpth (ft)      *   39.30  * Hydr. Depth (ft)       *   14.24  *   32.90  *   12.10  *
* Conv. Total (cfs)      *1377023.0  * Conv. (cfs)           * 80770.0  *1185364.0  *110888.3  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *   78.29  *  107.73  *  108.91  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.88  *    1.92  *    0.77  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    2.17  *   23.18  *    2.15  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1337.11  *10398.09  * 2664.18  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  294.18  *  465.54  *  526.30  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  779.10  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.40  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  776.70  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  763.44  * Flow Area (sq ft)      * 1241.90  * 3400.70  * 1549.09  *
* E.G. Slope (ft/ft)     *0.001180  * Area (sq ft)           * 1241.90  * 3400.70  * 3211.98  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 3140.99  *45636.33  * 4912.68  *
* Top Width (ft)         * 1007.60  * Top Width (ft)         *  104.83  *   96.55  *  806.22  *
* Vel Total (ft/s)       *    8.67  * Avg. Vel. (ft/s)       *    2.53  *   13.42  *    3.17  *
* Max Chl Dpth (ft)      *   41.62  * Hydr. Depth (ft)       *   11.85  *   35.22  *   13.50  *
* Conv. Total (cfs)      *1562649.0  * Conv. (cfs)           * 91418.7  *1328247.0  *142983.7  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *  109.70  *  107.73  *  117.19  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.83  *    2.33  *    0.97  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *    2.11  *   31.22  *    3.09  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2338.37  *11642.42  * 4373.66  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  464.84  *  472.51  *  836.08  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  781.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.79  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  778.50  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  765.42  * Flow Area (sq ft)      * 1438.42  * 3574.31  * 1760.21  *
* E.G. Slope (ft/ft)     *0.001302  * Area (sq ft)           * 1438.42  * 3574.31  * 4801.37  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3747.87  *52064.63  * 6187.50  *
* Top Width (ft)         * 1398.27  * Top Width (ft)         *  111.05  *   96.55  * 1190.68  *
* Vel Total (ft/s)       *    9.15  * Avg. Vel. (ft/s)       *    2.61  *   14.57  *    3.52  *
* Max Chl Dpth (ft)      *   43.42  * Hydr. Depth (ft)       *   12.95  *   37.02  *   14.67  *
* Conv. Total (cfs)      *1718578.0  * Conv. (cfs)           *103887.2  *1443179.0  *171511.3  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *  116.35  *  107.73  *  122.77  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    1.00  *    2.70  *    1.16  *
* Alpha                  *    2.15  * Stream Power (lb/ft s) *    2.62  *   39.27  *    4.09  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 3181.14  *12410.88  * 5962.87  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  570.91  *  473.92  * 1157.46  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  784.09  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.41  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  780.68  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  768.28  * Flow Area (sq ft)      * 1684.88  * 3784.57  * 2028.33  *
* E.G. Slope (ft/ft)     *0.001501  * Area (sq ft)           * 1684.88  * 3784.57  * 7544.80  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 5099.95  *61500.05  * 8120.01  *
* Top Width (ft)         * 1560.76  * Top Width (ft)         *  115.30  *   96.55  * 1348.91  *
* Vel Total (ft/s)       *    9.97  * Avg. Vel. (ft/s)       *    3.03  *   16.25  *    4.00  *
```

```
* Max Chl Dpth (ft)      *   45.60  * Hydr. Depth (ft)       *   14.61  *   39.20  *   16.05  *
* Conv. Total (cfs)      *1928660.0  * Conv. (cfs)           *131638.9  *1587429.0  *209592.3  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *  121.13  *  107.73  *  129.54  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    1.30  *    3.29  *    1.47  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    3.95  *   53.49  *    5.87  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 4877.70  *13626.42  * 9234.58  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  738.23  *  476.02  * 1480.37  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  773.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.73  * Wt. n-Val.              *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  772.17  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  758.90  * Flow Area (sq ft)      *  895.47  * 2962.96  * 1064.23  *
* E.G. Slope (ft/ft)     *0.000996  * Area (sq ft)           *  895.47  * 2962.96  * 1064.23  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2007.01  *33324.69  * 2668.30  *
* Top Width (ft)         *  266.39  * Top Width (ft)         *   70.81  *   96.55  *   99.03  *
* Vel Total (ft/s)       *    7.72  * Avg. Vel. (ft/s)       *    2.24  *   11.25  *    2.51  *
* Max Chl Dpth (ft)      *   37.09  * Hydr. Depth (ft)       *   12.65  *   30.69  *   10.75  *
* Conv. Total (cfs)      *1203812.0  * Conv. (cfs)           * 63580.7  *1055702.0  * 84529.7  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *   74.31  *  107.73  *  100.86  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.75  *    1.71  *    0.66  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    1.68  *   19.24  *    1.65  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  756.81  * 8962.68  * 1470.34  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  132.95  *  448.02  *  261.09  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 13.564

INPUT
Description: Zoo Bridge
Distance from Upstream XS =      20
Deck/Roadway Width        =      25
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************
     100  818.35  809.35     555  795.85  786.85

Upstream Bridge Cross Section Data
Station Elevation Data     num=     202
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0  827.08     .11  827.07      .5  827.05    1.72  826.96    1.73  826.97
   29.78  825.18   30.69  825.11   55.49  823.61   56.68  823.51   72.57  820.92
    84.4  820.14   90.45  819.03   93.12  818.76   99.29  818.55  102.14  818.39
  103.95  818.26  112.28   812.9  120.17  807.24  125.36  805.32   129.2  803.67
  136.21  799.89  153.76  790.31   169.6   782.8  183.17  775.85   190.5  776.41
  194.44  776.71  195.54  776.71  202.07  776.68  204.48  776.48  212.82  775.78
  216.63  773.23  225.43   767.4  237.64  762.57  245.15  759.69  248.29  759.09
   254.8  758.14  289.04  752.36  289.53  752.28  300.86  747.66  302.05  747.23
  303.55  746.38  309.65  742.46     315     736     337  735.08     358     736
  364.68  742.46   374.7   748.5  385.59  754.29  392.68   755.1  405.84   756.6
  411.65  757.16  432.84  759.72  436.55  760.22  443.39  761.95  466.36  766.96
  495.73  775.34  501.07  776.93  508.41  779.48  510.62  780.27  511.48  780.58
  518.15  781.86  527.16  788.72  536.51  791.24  541.42  794.34  553.72  795.88
   555.8  795.71  556.51  795.66  566.18  795.04  569.35  794.82  574.67  794.51
  587.74  793.65  593.42  793.33  605.11  792.57  614.79  791.94  623.77  791.44
  635.15  790.87  648.71   790.1  653.02  789.88  656.79  789.69   673.2  788.76
  676.26   788.6  678.92  788.46  698.03  787.37  699.58  787.28  700.94  787.21
  718.62  786.19  719.08  786.17  724.94  785.83  737.75  785.11  738.39  785.09
  761.52  783.99  763.18   783.9  764.96   783.8  787.62  782.71  797.47  782.39
   805.6  782.26  814.66  782.19  818.18   782.2   820.6  782.25  820.64  782.24
```

```
  828.15  780.14  837.08  779.91  848.32   778.9  848.55  778.87   848.7  778.85
  848.71  778.85  849.02  778.82  849.29  778.79  849.32  778.79  855.05  778.28
  858.78   778.2  858.86  778.19  858.97  778.18  859.15  778.17  867.81  778.04
   872.5  777.57  877.84  777.33  881.13  775.72  882.89  774.85   884.1  774.24
  894.21  774.24  896.14  774.24  973.27  774.24  991.16  774.24 1198.71  774.26
 1221.09  774.27  1236.9  774.26 1257.89  774.26 1264.12  774.26 1296.48  774.25
  1298.1  774.25 1318.23  774.25 1319.69  774.25 1322.24  775.76 1325.74  778.05
 1335.13  778.16 1343.39  778.25 1395.06  778.32 1402.73  778.32 1453.62  778.54
 1493.68  778.38 1504.57  778.37 1556.23  778.31 1560.87   778.3 1566.18  778.25
 1602.85  778.23 1632.63  778.23 1643.64  778.24 1665.54  777.34 1668.84  777.31
 1686.09  776.86 1697.41  776.59 1697.56  776.47 1702.29  774.27 1710.98  774.27
 1711.57  774.27 1712.51  774.27 1717.63  774.27 1760.71  774.27 1781.69  774.27
  1791.6  774.27 1807.16  774.27 1827.24  774.27 1836.33  774.27 1841.99  774.27
 1945.59  774.24  1953.7  774.24 1956.07   775.1 1962.44  777.41 1969.32  777.47
    1989  778.48  2001.6  779.33 2028.91  779.56 2039.45  779.64 2054.43  779.88
 2091.49  780.45 2100.84  780.69 2123.04  780.42 2123.06  780.42 2123.15  780.45
  2123.4  780.53 2128.27  782.21 2130.33  782.85 2134.46  783.42 2151.16  785.55
 2192.14  793.63 2192.15  793.63 2221.21  801.85 2229.41  803.95 2244.91  808.22
 2255.29  810.89  2290.3  823.35 2295.39  825.18 2297.23  826.06  2333.4  843.51
 2333.56  843.54 2367.55  851.19 2379.21  858.01 2384.04  860.62 2401.11  869.48
 2412.36  875.52 2417.52  876.45

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11  289.04    .038  385.59     .09  605.11     .05 1296.48      .1
 1702.29     .05 2123.04     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
        289.04  385.59             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     600 2417.52     790        F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     780     900     795

Downstream  Deck/Roadway Coordinates
    num=          2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
     100  818.35  809.35     555  795.85  786.85

Downstream Bridge Cross Section Data
Station Elevation Data    num=     202
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  827.08     .11  827.07      .5  827.05    1.72  826.96    1.73  826.97
   29.78  825.18   30.69  825.11   55.49  823.61   56.68  823.51   72.57  820.92
    84.4  820.14   90.45  819.03   93.12  818.76   99.29  818.55  102.14  818.39
  103.95  818.26  112.28   812.9  120.17  807.24  125.36  805.32   129.2  803.67
  136.21  799.89  153.76  790.31   169.6   782.8  183.17  775.85   190.5  776.41
  194.44  776.71  195.54  776.71  202.07  776.68  204.48  776.48  212.82  775.78
  216.63  773.23  225.43   767.4  237.64  762.57  245.15  759.69  248.29  759.09
   254.8  758.14  289.04  752.36  289.53  752.28  300.86  747.66  302.05  747.23
  303.55  746.38  309.65  742.46     315     736     337  735.08     358     736
  364.68  742.46   374.7   748.5  385.59  754.29  392.68   755.1  405.84   756.6
  411.65  757.16  432.84  759.72  436.55  760.22  443.39  761.95  466.36  766.96
  495.73  775.34  501.07  776.93  508.41  779.48  510.62  780.27  511.48  780.58
  518.15  781.86  527.16  788.72  536.51  791.24  541.42  794.34  553.72  795.88
   555.8  795.71  556.51  795.66  566.18  795.04  569.35  794.82  574.67  794.51
  587.74  793.65  593.42  793.33  605.11  792.57  614.79  791.94  623.77  791.44
  635.15  790.87  648.71   790.1  653.02  789.88  656.79  789.69   673.2  788.76
  676.26   788.6  678.92  788.46  698.03  787.37  699.58  787.28  700.94  787.21
  718.62  786.19  719.08  786.17  724.94  785.83  737.75  785.11  738.39  785.09
  761.52  783.99  763.18   783.9  764.96   783.8  787.62  782.71  797.47  782.39
   805.6  782.26  814.66  782.19  818.18   782.2   820.6  782.25  820.64  782.24
  828.15  780.14  837.08  779.91  848.32   778.9  848.55  778.87   848.7  778.85
  848.71  778.85  849.02  778.82  849.29  778.79  849.32  778.79  855.05  778.28
  858.78   778.2  858.86  778.19  858.97  778.18  859.15  778.17  867.81  778.04
   872.5  777.57  877.84  777.33  881.13  775.72  882.89  774.85   884.1  774.24
  894.21  774.24  896.14  774.24  973.27  774.24  991.16  774.24 1198.71  774.26
 1221.09  774.27  1236.9  774.26 1257.89  774.26 1264.12  774.26 1296.48  774.25
  1298.1  774.25 1318.23  774.25 1319.69  774.25 1322.24  775.76 1325.74  778.05
 1335.13  778.16 1343.39  778.25 1395.06  778.32 1402.73  778.32 1453.62  778.54
```

```
 1493.68  778.38 1504.57  778.37 1556.23  778.31 1560.87   778.3 1566.18  778.25
 1602.85  778.23 1632.63  778.23 1643.64  778.24 1665.54  777.34 1668.84  777.31
 1686.09  776.86 1697.41  776.59 1697.56  776.47 1702.29  774.27 1710.98  774.27
 1711.57  774.27 1712.51  774.27 1717.63  774.27 1760.71  774.27 1781.69  774.27
  1791.6  774.27 1807.16  774.27 1827.24  774.27 1836.33  774.27 1841.99  774.27
 1945.59  774.24  1953.7  774.24 1956.07   775.1 1962.44  777.41 1969.32  777.47
    1989  778.48  2001.6  779.33 2028.91  779.56 2039.45  779.64 2054.43  779.88
 2091.49  780.45 2100.84  780.69 2123.04  780.42 2123.06  780.42 2123.15  780.45
  2123.4  780.53 2128.27  782.21 2130.33  782.85 2134.46  783.42 2151.16  785.55
 2192.14  793.63 2192.15  793.63 2221.21  801.85 2229.41  803.95 2244.91  808.22
 2255.29  810.89  2290.3  823.35 2295.39  825.18 2297.23  826.06  2333.4  843.51
 2333.56  843.54 2367.55  851.19 2379.21  858.01 2384.04  860.62 2401.11  869.48
 2412.36  875.52 2417.52  876.45

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .11  289.04    .038  385.59     .09  605.11     .05 1296.48      .1
 1702.29     .05 2123.04     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
        289.04  385.59            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     600 2417.52     790       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     780     900     795

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=     250    Downstream=     250
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     755       3     805
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     755       3     805

Pier Data
Pier Station     Upstream=     390    Downstream=     390
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     750       3     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     750       3     800

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Momentum                Cd   =    1.33
       Yarnell                 KVal =      .9
Selected Low Flow Methods = Momentum

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
```

```
        Add Friction component to Momentum
        Do not add Weight component to Momentum
        Class B flow critical depth computations use critical depth
            inside the bridge at the upstream end
        Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     762.26  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     761.62  * E.G. Elev (ft)         *     762.25  *     762.23  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     761.60  *     761.58  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     748.75  *     748.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.52  *      26.50  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.52  *       5.53  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2390.21  *    2386.76  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   25398.28  *   25359.07  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      12.21  *      12.20  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     227.52  *     227.33  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)       *   539282.4  *   538424.6  *
* Delta WS (ft)          *       0.05  * Top Width (ft)          *     195.80  *     195.69  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.53  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.39  *       0.39  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.17  *       2.18  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     766.40  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     765.43  * E.G. Elev (ft)         *     766.38  *     766.36  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     765.38  *     765.35  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     752.43  *     752.43  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      30.30  *      30.27  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.38  *       6.39  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3180.95  *    3175.13  *
* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   38243.85  *   38167.80  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      14.29  *      14.28  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     270.53  *     270.23  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)       *   738913.0  *   737422.3  *
* Delta WS (ft)          *       0.07  * Top Width (ft)          *     222.56  *     222.37  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.39  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.55  *       0.56  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       3.54  *       3.55  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     769.21  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     767.97  * E.G. Elev (ft)         *     769.19  *     769.17  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     767.88  *     767.86  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     754.75  *     754.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.80  *      32.78  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.00  *       7.01  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3760.10  *    3754.54  *
* Weir Submerg           *             * Froude # Chl           *       0.33  *       0.33  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   49272.71  *   49193.84  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      15.74  *      15.72  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     297.70  *     297.48  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)       *   888723.4  *   887261.5  *
* Delta WS (ft)          *       0.07  * Top Width (ft)          *     238.88  *     238.77  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       7.01  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.69  *       0.69  *
```

```
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       4.84  *       4.86  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     772.40  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     770.82  * E.G. Elev (ft)         *     772.38  *     772.36  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     770.70  *     770.67  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     757.53  *     757.53  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.62  *      35.59  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.64  *       7.65  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4452.82  *    4446.30  *
* Weir Submerg           *             * Froude # Chl           *       0.36  *       0.36  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   64153.27  *   64051.43  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      17.60  *      17.58  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     324.34  *     324.09  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  1073859.0  *  1072090.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *     253.01  *     252.88  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       7.65  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.86  *       0.86  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       6.56  *       6.59  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     776.34  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     774.38  * E.G. Elev (ft)         *     776.30  *     776.27  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     774.14  *     774.11  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     760.95  *     760.95  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.06  *      39.03  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.31  *       8.33  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5353.83  *    5344.77  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.39  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   86036.59  *   85879.09  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      19.81  *      19.79  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     356.89  *     356.57  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *  1323025.0  *  1320476.0  *
* Delta WS (ft)          *       0.17  * Top Width (ft)         *     270.26  *     270.09  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *       0.03  *       0.02  *
* BR Open Vel (ft/s)     *       8.33  * C & E Loss (ft)        *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.06  *       1.06  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       8.81  *       8.85  *
*****************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     779.10  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     776.70  * E.G. Elev (ft)         *     779.05  *     779.02  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     776.42  *     776.38  *
* Q Bridge (cfs)         *   53690.00  * Crit W.S. (ft)         *     763.32  *     763.32  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.34  *      41.30  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.97  *       8.99  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5986.66  *    5975.22  *
* Weir Submerg           *             * Froude # Chl           *       0.41  *       0.42  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  104079.20  *  103878.90  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      20.18  *      20.22  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     393.43  *     392.09  *
* Delta EG (ft)          *       0.17  * Conv. Total (cfs)      *  1500551.0  *  1497479.0  *
```

```
* Delta WS (ft)          *       0.19  * Top Width (ft)         *     296.69  *     295.52  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *       0.03  *       0.02  *
* BR Open Vel (ft/s)     *       8.99  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.22  *       1.22  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      10.91  *      10.99  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     781.29  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     778.50  * E.G. Elev (ft)         *     781.24  *     781.20  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     778.14  *     778.10  *
* Q Bridge (cfs)         *   62000.00  * Crit W.S. (ft)         *     765.32  *     765.32  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.06  *      43.02  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.50  *       9.52  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6527.91  *    6513.06  *
* Weir Submerg           *             * Froude # Chl           *       0.44  *       0.44  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  120009.80  *  119755.10  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      20.41  *      20.38  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     424.22  *     423.79  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *  1642894.0  *  1638884.0  *
* Delta WS (ft)          *       0.26  * Top Width (ft)         *     319.87  *     319.64  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *       0.04  *       0.03  *
* BR Open Vel (ft/s)     *       9.52  * C & E Loss (ft)        *       0.00  *       0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.37  *       1.37  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      12.99  *      13.07  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     784.09  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     780.68  * E.G. Elev (ft)         *     784.01  *     783.97  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     780.13  *     780.07  *
* Q Bridge (cfs)         *   74720.00  * Crit W.S. (ft)         *     768.11  *     768.11  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      45.05  *      44.99  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.42  *      10.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7173.55  *    7154.48  *
* Weir Submerg           *             * Froude # Chl           *       0.48  *       0.49  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  142561.20  *  142223.00  *
* Min El Weir Flow (ft)  *     790.01  * Hydr Depth (ft)        *      21.78  *      21.74  *
* Min El Prs (ft)        *     808.43  * W.P. Total (ft)        *     442.55  *     442.02  *
* Delta EG (ft)          *       0.27  * Conv. Total (cfs)      *  1819238.0  *  1813973.0  *
* Delta WS (ft)          *       0.37  * Top Width (ft)         *     329.42  *     329.15  *
* BR Open Area (sq ft)   *   13648.28  * Frctn Loss (ft)        *       0.04  *       0.03  *
* BR Open Vel (ft/s)     *      10.44  * C & E Loss (ft)        *       0.00  *       0.12  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.71  *       1.71  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      17.78  *      17.91  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     773.90  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     772.17  * E.G. Elev (ft)         *     773.89  *     773.87  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     772.02  *     771.99  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     758.93  *     758.93  *
```

* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 36.94	* 36.91 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 7.93	* 7.94 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 4791.62	* 4784.00 *
* Weir Submerg	*	* Froude # Chl	* 0.37	* 0.37 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 72135.05	* 72010.91 *
* Min El Weir Flow (ft)	* 790.01	* Hydr Depth (ft)	* 18.46	* 18.44 *
* Min El Prs (ft)	* 808.43	* W.P. Total (ft)	* 336.83	* 336.56 *
* Delta EG (ft)	* 0.09	* Conv. Total (cfs)	* 1166538.0	* 1164439.0 *
* Delta WS (ft)	* 0.10	* Top Width (ft)	* 259.64	* 259.49 *
* BR Open Area (sq ft)	* 13648.28	* Frctn Loss (ft)	*	* *
* BR Open Vel (ft/s)	* 7.94	* C & E Loss (ft)	*	* *
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.94	* 0.95 *
* Br Sel Method	* Momentum	* Power Total (lb/ft s)	* 7.47	* 7.51 *

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 13.558

INPUT
Description: D/S of Zoo Bridge. Blocked obstructions are buildings.
Station Elevation Data num= 202

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	827.08	.11	827.07	.5	827.05	1.72	826.96	1.73	826.97
29.78	825.18	30.69	825.11	55.49	823.61	56.68	823.51	72.57	820.92
84.4	820.14	90.45	819.03	93.12	818.76	99.29	818.55	102.14	818.39
103.95	818.26	112.28	812.9	120.17	807.24	125.36	805.32	129.2	803.67
136.21	799.89	153.76	790.31	169.6	782.8	183.17	775.85	190.5	776.41
194.44	776.71	195.54	776.71	202.07	776.68	204.48	776.48	212.82	775.78
216.63	773.23	225.43	767.4	237.64	762.57	245.15	759.69	248.29	759.09
254.8	758.14	289.04	752.36	289.53	752.28	300.86	747.66	302.05	747.23
303.55	746.38	309.65	742.46	315	736	337	735.08	358	736
364.68	742.46	374.7	748.5	385.59	754.29	392.68	755.1	405.84	756.6
411.65	757.16	432.84	759.72	436.55	760.22	443.39	761.95	466.36	766.96
495.73	775.34	501.07	776.93	508.41	779.48	510.62	780.27	511.48	780.58
518.15	781.86	527.16	788.72	536.51	791.24	541.42	794.34	553.72	795.88
555.8	795.71	556.51	795.66	566.18	795.04	569.35	794.82	574.67	794.51
587.74	793.65	593.42	793.33	605.11	792.57	614.79	791.94	623.77	791.44
635.15	790.87	648.71	790.1	653.02	789.88	656.79	789.69	673.2	788.76
676.26	788.6	678.92	788.46	698.03	787.37	699.58	787.28	700.94	787.21
718.62	786.19	719.08	786.17	724.94	785.83	737.75	785.11	738.39	785.09
761.52	783.99	763.18	783.9	764.96	783.8	787.62	782.71	797.47	782.39
805.6	782.26	814.66	782.19	818.18	782.2	820.6	782.25	820.64	782.24
828.15	780.14	837.08	779.91	848.32	778.9	848.55	778.87	848.7	778.85
848.71	778.85	849.02	778.82	849.29	778.79	849.32	778.79	855.05	778.28
858.78	778.2	858.86	778.19	858.97	778.18	859.15	778.17	867.81	778.04
872.5	777.57	877.84	777.33	881.13	775.72	882.89	774.85	884.1	774.24
894.21	774.24	896.14	774.24	973.27	774.24	991.16	774.24	1198.71	774.26
1221.09	774.27	1236.9	774.26	1257.89	774.26	1264.12	774.26	1296.48	774.25
1298.1	774.25	1318.23	774.25	1319.69	774.25	1322.24	775.76	1325.74	778.05
1335.13	778.16	1343.39	778.25	1395.06	778.32	1402.73	778.32	1453.62	778.54
1493.68	778.38	1504.57	778.37	1556.23	778.31	1560.87	778.3	1566.18	778.25
1602.85	778.23	1632.63	778.23	1643.64	778.24	1665.54	777.34	1668.84	777.31
1686.09	776.86	1697.41	776.59	1697.56	776.47	1702.29	774.27	1710.98	774.27
1711.57	774.27	1712.51	774.27	1717.63	774.27	1760.71	774.27	1781.69	774.27
1791.6	774.27	1807.16	774.27	1827.24	774.27	1836.33	774.27	1841.99	774.27
1945.59	774.24	1953.7	774.24	1956.07	775.1	1962.44	777.41	1969.32	777.47
1989	778.48	2001.6	779.33	2028.91	779.56	2039.45	779.64	2054.43	779.88
2091.49	780.45	2100.84	780.69	2123.04	780.42	2123.06	780.42	2123.15	780.45
2123.4	780.53	2128.27	782.21	2130.33	782.85	2134.46	783.42	2151.16	785.55
2192.14	793.63	2192.15	793.63	2221.21	801.85	2229.41	803.95	2244.91	808.22
2255.29	810.89	2290.3	823.35	2295.39	825.18	2297.23	826.06	2333.4	843.51
2333.56	843.54	2367.55	851.19	2379.21	858.01	2384.04	860.62	2401.11	869.48
2412.36	875.52	2417.52	876.45						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .11  289.04    .038  385.59     .09  605.11     .05 1296.48      .1
 1702.29     .05 2123.04     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         289.04  385.59          422.93  459.63  341.06             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
     600 2417.52     790       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     780     900     795

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  762.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.65  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)          *  761.57  * Reach Len. (ft)        *  422.93  *  459.63  *  341.06  *
* Crit W.S. (ft)          *  748.75  * Flow Area (sq ft)      *  247.15  * 1939.73  *  227.21  *
* E.G. Slope (ft/ft)      *0.000597  * Area (sq ft)           *  247.15  * 1939.73  *  227.21  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *  237.49  *12731.60  *  230.92  *
* Top Width (ft)          *  201.65  * Top Width (ft)         *   48.80  *   96.55  *   56.30  *
* Vel Total (ft/s)        *    5.47  * Avg. Vel. (ft/s)       *    0.96  *    6.56  *    1.02  *
* Max Chl Dpth (ft)       *   26.49  * Hydr. Depth (ft)       *    5.07  *   20.09  *    4.04  *
* Conv. Total (cfs)       *540246.6  * Conv. (cfs)            *  9719.8  *521075.9  *  9451.0  *
* Length Wtd. (ft)        *  457.55  * Wetted Per. (ft)       *   49.75  *  107.73  *   56.82  *
* Min Ch El (ft)          *  735.08  * Shear (lb/sq ft)       *    0.19  *    0.67  *    0.15  *
* Alpha                   *    1.39  * Stream Power (lb/ft s) *    0.18  *    4.40  *    0.15  *
* Frctn Loss (ft)         *    0.27  * Cum Volume (acre-ft)   *  108.80  * 4107.82  *  147.68  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   23.86  *  348.75  *   40.34  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  766.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.98  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)          *  765.36  * Reach Len. (ft)        *  422.93  *  459.63  *  341.06  *
* Crit W.S. (ft)          *  752.43  * Flow Area (sq ft)      *  450.45  * 2305.55  *  472.59  *
* E.G. Slope (ft/ft)      *0.000742  * Area (sq ft)           *  450.45  * 2305.55  *  472.59  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             *  634.76  *18935.83  *  729.41  *
* Top Width (ft)          *  228.44  * Top Width (ft)         *   58.45  *   96.55  *   73.44  *
* Vel Total (ft/s)        *    6.29  * Avg. Vel. (ft/s)       *    1.41  *    8.21  *    1.54  *
* Max Chl Dpth (ft)       *   30.28  * Hydr. Depth (ft)       *    7.71  *   23.88  *    6.44  *
* Conv. Total (cfs)       *745021.6  * Conv. (cfs)            * 23296.1  *694955.7  * 26769.8  *
* Length Wtd. (ft)        *  455.32  * Wetted Per. (ft)       *   60.13  *  107.73  *   74.36  *
* Min Ch El (ft)          *  735.08  * Shear (lb/sq ft)       *    0.35  *    0.99  *    0.29  *
* Alpha                   *    1.60  * Stream Power (lb/ft s) *    0.49  *    8.15  *    0.45  *
* Frctn Loss (ft)         *    0.33  * Cum Volume (acre-ft)   *  242.00  * 5637.59  *  328.67  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *   45.94  *  387.54  *   64.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  769.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.26  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)          *  767.89  * Reach Len. (ft)        *  422.93  *  459.63  *  341.06  *
* Crit W.S. (ft)          *  754.79  * Flow Area (sq ft)      *  606.39  * 2549.95  *  672.70  *
* E.G. Slope (ft/ft)      *0.000852  * Area (sq ft)           *  606.39  * 2549.95  *  672.70  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             * 1042.83  *23992.51  * 1284.66  *
* Top Width (ft)          *  244.94  * Top Width (ft)         *   64.35  *   96.55  *   84.03  *
* Vel Total (ft/s)        *    6.87  * Avg. Vel. (ft/s)       *    1.72  *    9.41  *    1.91  *
* Max Chl Dpth (ft)       *   32.81  * Hydr. Depth (ft)       *    9.42  *   26.41  *    8.00  *
* Conv. Total (cfs)       *901768.9  * Conv. (cfs)            * 35729.2  *822025.1  * 44014.6  *
* Length Wtd. (ft)        *  453.77  * Wetted Per. (ft)       *   66.56  *  107.73  *   85.27  *
* Min Ch El (ft)          *  735.08  * Shear (lb/sq ft)       *    0.48  *    1.26  *    0.42  *
* Alpha                   *    1.71  * Stream Power (lb/ft s) *    0.83  *   11.84  *    0.80  *
* Frctn Loss (ft)         *    0.37  * Cum Volume (acre-ft)   *  375.67  * 6922.00  *  599.98  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   64.05  *  415.11  *  131.16  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	772.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.	0.110	0.038	0.090
W.S. Elev (ft)	770.73	Reach Len. (ft)	422.93	459.63	341.06
Crit W.S. (ft)	757.53	Flow Area (sq ft)	795.32	2824.28	925.61
E.G. Slope (ft/ft)	0.000960	Area (sq ft)	795.32	2824.28	925.61
Q Total (cfs)	34000.00	Flow (cfs)	1655.29	30194.36	2150.35
Top Width (ft)	259.18	Top Width (ft)	68.64	96.55	93.99
Vel Total (ft/s)	7.48	Avg. Vel. (ft/s)	2.08	10.69	2.32
Max Chl Dpth (ft)	35.65	Hydr. Depth (ft)	11.59	29.25	9.85
Conv. Total (cfs)	1097483.0	Conv. (cfs)	53431.0	974641.2	69411.0
Length Wtd. (ft)	451.93	Wetted Per. (ft)	71.71	107.73	95.62
Min Ch El (ft)	735.08	Shear (lb/sq ft)	0.66	1.57	0.58
Alpha	1.82	Stream Power (lb/ft s)	1.38	16.79	1.35
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	595.76	8248.78	1106.64
C & E Loss (ft)	0.05	Cum SA (acres)	97.18	437.59	205.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	776.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.99	Wt. n-Val.	0.110	0.038	0.090
W.S. Elev (ft)	774.21	Reach Len. (ft)	422.93	459.63	341.06
Crit W.S. (ft)	761.07	Flow Area (sq ft)	1042.86	3159.66	1273.26
E.G. Slope (ft/ft)	0.001066	Area (sq ft)	1042.86	3159.66	1273.26
Q Total (cfs)	44500.00	Flow (cfs)	2590.91	38360.48	3548.62
Top Width (ft)	276.59	Top Width (ft)	73.87	96.55	106.17
Vel Total (ft/s)	8.13	Avg. Vel. (ft/s)	2.48	12.14	2.79
Max Chl Dpth (ft)	39.13	Hydr. Depth (ft)	14.12	32.73	11.99
Conv. Total (cfs)	1363148.0	Conv. (cfs)	79366.0	1175079.0	108703.2
Length Wtd. (ft)	450.05	Wetted Per. (ft)	77.99	107.73	108.28
Min Ch El (ft)	735.08	Shear (lb/sq ft)	0.89	1.95	0.78
Alpha	1.94	Stream Power (lb/ft s)	2.21	23.69	2.18
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	1335.60	10393.38	2662.33
C & E Loss (ft)	0.05	Cum SA (acres)	294.07	465.40	525.99

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	778.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.41	Wt. n-Val.	0.110	0.038	0.090
W.S. Elev (ft)	776.51	Reach Len. (ft)	422.93	459.63	341.06
Crit W.S. (ft)	763.44	Flow Area (sq ft)	1223.33	3382.37	1527.37
E.G. Slope (ft/ft)	0.001199	Area (sq ft)	1223.33	3382.37	3059.72
Q Total (cfs)	53690.00	Flow (cfs)	3255.11	45580.57	4854.32
Top Width (ft)	991.42	Top Width (ft)	94.94	96.55	799.93
Vel Total (ft/s)	8.75	Avg. Vel. (ft/s)	2.66	13.48	3.18
Max Chl Dpth (ft)	41.43	Hydr. Depth (ft)	12.89	35.03	13.39
Conv. Total (cfs)	1550533.0	Conv. (cfs)	94005.6	1316338.0	140189.7
Length Wtd. (ft)	448.95	Wetted Per. (ft)	99.75	107.73	116.52
Min Ch El (ft)	735.08	Shear (lb/sq ft)	0.92	2.35	0.98
Alpha	2.03	Stream Power (lb/ft s)	2.44	31.67	3.12
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	2336.60	11637.38	4370.72
C & E Loss (ft)	0.07	Cum SA (acres)	464.70	472.37	835.60

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	781.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.85	Wt. n-Val.	0.110	0.038	0.090
W.S. Elev (ft)	778.25	Reach Len. (ft)	422.93	459.63	341.06
Crit W.S. (ft)	765.42	Flow Area (sq ft)	1410.09	3549.63	1729.63

```
* E.G. Slope (ft/ft)     *0.001338  * Area (sq ft)           * 1410.09  * 3549.63  * 4519.83  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3688.59  *52191.53  * 6119.89  *
* Top Width (ft)         * 1179.56  * Top Width (ft)         *  110.55  *   96.55  *  972.46  *
* Vel Total (ft/s)       *    9.27  * Avg. Vel. (ft/s)       *    2.62  *   14.70  *    3.54  *
* Max Chl Dpth (ft)      *   43.17  * Hydr. Depth (ft)       *   12.76  *   36.76  *   14.50  *
* Conv. Total (cfs)      *1694711.0  * Conv. (cfs)            *100823.9  *1426606.0  *167281.2  *
* Length Wtd. (ft)       *  448.15  * Wetted Per. (ft)       *  115.79  *  107.73  *  121.99  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    1.02  *    2.75  *    1.18  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    2.66  *   40.48  *    4.19  *
* Frctn Loss (ft)        *    0.57  * Cum Volume (acre-ft)   * 3179.10  *12405.59  * 5959.03  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  570.75  *  473.78  * 1156.84  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  783.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.51  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  780.31  * Reach Len. (ft)        *  422.93  *  459.63  *  341.06  *
* Crit W.S. (ft)         *  768.28  * Flow Area (sq ft)      * 1642.64  * 3749.10  * 1982.14  *
* E.G. Slope (ft/ft)     *0.001559  * Area (sq ft)           * 1642.64  * 3749.10  * 7057.56  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 5004.22  *61697.96  * 8017.82  *
* Top Width (ft)         * 1518.77  * Top Width (ft)         *  114.58  *   96.55  * 1307.64  *
* Vel Total (ft/s)       *   10.13  * Avg. Vel. (ft/s)       *    3.05  *   16.46  *    4.05  *
* Max Chl Dpth (ft)      *   45.23  * Hydr. Depth (ft)       *   14.34  *   38.83  *   15.84  *
* Conv. Total (cfs)      *1892532.0  * Conv. (cfs)            *126748.5  *1562706.0  *203078.0  *
* Length Wtd. (ft)       *  446.78  * Wetted Per. (ft)       *  120.32  *  107.73  *  128.23  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    1.33  *    3.39  *    1.50  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    4.05  *   55.74  *    6.09  *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)   * 4875.33  *13620.84  * 9229.29  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  738.06  *  475.87  * 1479.63  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  773.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.75  * Wt. n-Val.             *   0.110  *   0.038  *   0.090  *
* W.S. Elev (ft)         *  772.07  * Reach Len. (ft)        *  422.93  *  459.63  *  341.06  *
* Crit W.S. (ft)         *  758.90  * Flow Area (sq ft)      *  888.14  * 2952.94  * 1053.98  *
* E.G. Slope (ft/ft)     *0.001010  * Area (sq ft)           *  888.14  * 2952.94  * 1053.98  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 1996.04  *33354.52  * 2649.44  *
* Top Width (ft)         *  265.87  * Top Width (ft)         *   70.65  *   96.55  *   98.66  *
* Vel Total (ft/s)       *    7.76  * Avg. Vel. (ft/s)       *    2.25  *   11.30  *    2.51  *
* Max Chl Dpth (ft)      *   36.99  * Hydr. Depth (ft)       *   12.57  *   30.58  *   10.68  *
* Conv. Total (cfs)      *1195969.0  * Conv. (cfs)            * 62821.0  *1049763.0  * 83385.6  *
* Length Wtd. (ft)       *  451.11  * Wetted Per. (ft)       *   74.12  *  107.73  *  100.48  *
* Min Ch El (ft)         *  735.08  * Shear (lb/sq ft)       *    0.76  *    1.73  *    0.66  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    1.70  *   19.51  *    1.66  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *  755.53  * 8958.27  * 1468.83  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  132.84  *  447.88  *  260.95  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 13.471

INPUT
Description:
Station Elevation Data    num=     168
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  817.31    10.4  817.62   16.41   817.9   25.37  819.67   51.24  813.45
   51.65  813.35    53.7  812.74   82.98  803.82   91.17  801.49   95.97  799.64
  138.54  784.67  165.38   773.3   172.4  770.22  175.44  770.84  183.47  772.38
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  193.24  773.78  193.55  773.82  193.75  773.82  201.15  773.79  202.01  773.62
  210.18  771.89  216.87  767.65  223.31  764.02  234.35  760.84   242.2  758.23
  254.94  758.93  256.11  758.96  257.03  758.92  297.54  757.24  314.73  755.96
  325.28  754.54   325.9  754.46  333.34  750.46  336.36  748.66  342.65  748.04
  352.06  746.89  355.39  744.91  359.06  742.46     368  735.83     385  734.83
     400  735.83  411.52  742.44     415  743.68  415.15   743.7   420.4  745.61
   426.2  749.06  426.69  749.35  431.89  752.59  436.28  754.65  445.96  756.52
  451.04   757.9   456.6  758.88  470.74  762.35   483.9  764.95  484.92  765.13
  486.18  765.52  499.08  767.53   516.3  774.32  516.82  774.59  517.78  774.69
  561.32  778.28  567.85  778.45  570.44  778.54  591.02  776.76  597.33  776.15
  598.23  775.96  603.41  774.28  630.59  774.28   646.7  774.28   667.6  774.28
  750.28  774.28  759.19  774.28  775.29  774.28  778.57  774.28  780.54  774.28
  782.31  774.28  784.34   774.5  785.56  774.59  791.83  776.89  791.96  776.95
  792.06  776.99  792.07  776.99  795.23  778.41  809.27   778.4  816.82  778.51
  844.64  778.43  891.79   778.5  941.05  778.64  955.58  778.62   994.5  778.53
 1020.35  778.47 1066.47  778.97 1080.23  778.94 1117.37  778.79  1178.9  778.44
 1179.26  778.44 1179.53  778.44 1191.17  778.42 1207.51  778.38  1209.6  777.19
 1213.39  775.13 1230.72  775.05 1231.52  775.08 1234.02   775.1 1235.35  774.66
 1236.33  774.26 1239.45  774.26 1246.13  774.26 1263.86  774.27 1317.64  774.28
 1318.49  774.55 1318.95  774.49  1319.2   774.5 1320.16  774.26 1340.36  774.26
 1531.98  774.29  1541.4  774.29    1547  774.29 1547.16  774.29 1576.01  774.28
 1579.65  774.28 1618.15  774.27 1623.71  774.27 1626.42  774.27 1627.55  774.27
 1631.41  774.27 1643.34  774.27 1657.28  774.27 1659.56  774.27  1671.7  774.27
 1673.98   774.8 1682.46  777.88 1687.63  777.85 1710.86  778.12 1718.12  778.25
 1744.05  778.46 1766.51  778.39 1788.17  778.49 1808.38  778.61  1825.7  778.88
 1862.71  779.44 1896.57  780.56 1920.45  781.21 1939.96  781.73  1960.1  781.89
 1967.07  781.88 1976.77  782.83 1980.82  783.22 1984.71  783.84 2001.88  786.62
 2026.86  792.67 2035.88  795.01 2041.82  796.52 2071.57  804.76 2097.65  813.59
 2101.85  815.33 2110.71   819.5 2120.27  824.25 2146.26     836 2161.84  843.02
 2183.49  848.07 2193.36  850.52 2210.96  859.42 2213.23  860.57 2213.65  860.76
 2245.24  876.12 2246.71  876.38 2247.04  876.43

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  325.28    .038  436.28      .1  561.32     .05  780.54      .1
  1209.6     .05  1960.1     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        325.28  436.28           855.58  863.82  556.84              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     570 2247.04     790       F

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)          *  761.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.60  * Wt. n-Val.             *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)          *  761.33  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)          *  749.57  * Flow Area (sq ft)      *  331.76  * 2048.78  *  105.15  *
* E.G. Slope (ft/ft)      *0.000594  * Area (sq ft)           *  331.76  * 2048.78  *  105.15  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *  233.16  *12880.99  *   85.86  *
* Top Width (ft)          *  233.94  * Top Width (ft)         *   92.64  *  111.00  *   30.31  *
* Vel Total (ft/s)        *    5.31  * Avg. Vel. (ft/s)       *    0.70  *    6.29  *    0.82  *
* Max Chl Dpth (ft)       *   26.50  * Hydr. Depth (ft)       *    3.58  *   18.46  *    3.47  *
* Conv. Total (cfs)       *541713.3  * Conv. (cfs)            *  9568.6  *528621.3  *  3523.4  *
* Length Wtd. (ft)        *  860.92  * Wetted Per. (ft)       *   93.33  *  120.88  *   31.05  *
* Min Ch El (ft)          *  734.83  * Shear (lb/sq ft)       *    0.13  *    0.63  *    0.13  *
* Alpha                   *    1.37  * Stream Power (lb/ft s) *    0.09  *    3.95  *    0.10  *
* Frctn Loss (ft)         *    0.39  * Cum Volume (acre-ft)   *  105.99  * 4086.78  *  146.38  *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)         *   23.17  *  347.65  *   40.00  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)          *  765.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.89  * Wt. n-Val.             *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)          *  765.09  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)          *  752.69  * Flow Area (sq ft)      *  703.89  * 2466.42  *  251.75  *
* E.G. Slope (ft/ft)      *0.000709  * Area (sq ft)           *  703.89  * 2466.42  *  251.75  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             *  824.18  *19181.43  *  294.39  *
* Top Width (ft)          *  263.31  * Top Width (ft)         *  103.87  *  111.00  *   48.43  *
* Vel Total (ft/s)        *    5.93  * Avg. Vel. (ft/s)       *    1.17  *    7.78  *    1.17  *
```

```
* Max Chl Dpth (ft)      *   30.26  * Hydr. Depth (ft)       *    6.78  *   22.22  *    5.20  *
* Conv. Total (cfs)      *762155.1  * Conv. (cfs)            * 30943.6  *720158.8  * 11052.8  *
* Length Wtd. (ft)       *  857.24  * Wetted Per. (ft)       *  105.23  *  120.88  *   49.57  *
* Min Ch El (ft)         *  734.83  * Shear (lb/sq ft)       *    0.30  *    0.90  *    0.22  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.35  *    7.03  *    0.26  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  236.39  * 5612.42  *  325.84  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   45.15  *  386.45  *   64.07  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  768.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.              *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)         *  767.61  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)         *  754.90  * Flow Area (sq ft)      *  970.62  * 2745.45  *  390.87  *
* E.G. Slope (ft/ft)     *0.000798  * Area (sq ft)           *  970.62  * 2745.45  *  390.87  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1447.00  *24326.79  *  546.21  *
* Top Width (ft)         *  282.33  * Top Width (ft)         *  108.33  *  111.00  *   63.00  *
* Vel Total (ft/s)       *    6.41  * Avg. Vel. (ft/s)       *    1.49  *    8.86  *    1.40  *
* Max Chl Dpth (ft)      *   32.78  * Hydr. Depth (ft)       *    8.96  *   24.73  *    6.20  *
* Conv. Total (cfs)      *931556.3  * Conv. (cfs)            * 51214.4  *861009.4  * 19332.4  *
* Length Wtd. (ft)       *  854.13  * Wetted Per. (ft)       *  110.35  *  120.88  *   64.36  *
* Min Ch El (ft)         *  734.83  * Shear (lb/sq ft)       *    0.44  *    1.13  *    0.30  *
* Alpha                  *    1.77  * Stream Power (lb/ft s) *    0.65  *   10.03  *    0.42  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   *  368.02  * 6894.06  *  595.82  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   63.21  *  414.01  *  130.58  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  771.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.41  * Wt. n-Val.              *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)         *  770.44  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)         *  757.28  * Flow Area (sq ft)      * 1284.24  * 3060.09  *  579.62  *
* E.G. Slope (ft/ft)     *0.000881  * Area (sq ft)           * 1284.24  * 3060.09  *  579.62  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2349.09  *30624.83  * 1026.08  *
* Top Width (ft)         *  295.60  * Top Width (ft)         *  114.41  *  111.00  *   70.19  *
* Vel Total (ft/s)       *    6.91  * Avg. Vel. (ft/s)       *    1.83  *   10.01  *    1.77  *
* Max Chl Dpth (ft)      *   35.61  * Hydr. Depth (ft)       *   11.22  *   27.57  *    8.26  *
* Conv. Total (cfs)      *1145371.0  * Conv. (cfs)            * 79134.8  *1031670.0  * 34566.0  *
* Length Wtd. (ft)       *  851.54  * Wetted Per. (ft)       *  117.31  *  120.88  *   72.09  *
* Min Ch El (ft)         *  734.83  * Shear (lb/sq ft)       *    0.60  *    1.39  *    0.44  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    1.10  *   13.94  *    0.78  *
* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)   *  585.67  * 8217.73  * 1100.75  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *   96.29  *  436.50  *  204.44  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  775.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.81  * Wt. n-Val.              *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)         *  773.87  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)         *  760.74  * Flow Area (sq ft)      * 1737.59  * 3440.35  *  834.95  *
* E.G. Slope (ft/ft)     *0.000988  * Area (sq ft)           * 1737.59  * 3440.35  *  834.95  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 3239.39  *39420.00  * 1840.61  *
* Top Width (ft)         *  351.11  * Top Width (ft)         *  161.24  *  111.00  *   78.87  *
* Vel Total (ft/s)       *    7.40  * Avg. Vel. (ft/s)       *    1.86  *   11.46  *    2.20  *
* Max Chl Dpth (ft)      *   39.04  * Hydr. Depth (ft)       *   10.78  *   30.99  *   10.59  *
* Conv. Total (cfs)      *1415680.0  * Conv. (cfs)            *103054.9  *1254070.0  * 58555.2  *
* Length Wtd. (ft)       *  843.51  * Wetted Per. (ft)       *  165.76  *  120.88  *   81.43  *
* Min Ch El (ft)         *  734.83  * Shear (lb/sq ft)       *    0.65  *    1.76  *    0.63  *
* Alpha                  *    2.13  * Stream Power (lb/ft s) *    1.21  *   20.12  *    1.39  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   * 1322.10  *10358.56  * 2654.08  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *  292.93  *  464.30  *  525.27  *
*****************************************************************************************************
```

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Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  778.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.17  * Wt. n-Val.             *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)         *  776.17  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)         *  762.98  * Flow Area (sq ft)      * 2115.72  * 3696.33  * 1034.95  *
* E.G. Slope (ft/ft)     *0.001091  * Area (sq ft)           * 2115.72  * 3696.33  * 2248.24  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 4617.85  *46695.21  * 2376.94  *
* Top Width (ft)         * 1036.27  * Top Width (ft)         *  166.68  *  111.00  *  758.59  *
* Vel Total (ft/s)       *    7.84  * Avg. Vel. (ft/s)       *    2.18  *   12.63  *    2.30  *
* Max Chl Dpth (ft)      *   41.34  * Hydr. Depth (ft)       *   12.69  *   33.30  *   10.40  *
* Conv. Total (cfs)      *1625139.0  * Conv. (cfs)           *139777.5  *1413414.0  * 71947.3  *
* Length Wtd. (ft)       *  838.75  * Wetted Per. (ft)       *  171.68  *  120.88  *  102.27  *
* Min Ch El (ft)         *  734.83  * Shear (lb/sq ft)       *    0.84  *    2.08  *    0.69  *
* Alpha                  *    2.27  * Stream Power (lb/ft s) *    1.83  *   26.32  *    1.58  *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   * 2320.39  *11600.04  * 4349.94  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *  463.43  *  471.27  *  829.49  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  780.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.50  * Wt. n-Val.             *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)         *  777.92  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)         *  764.89  * Flow Area (sq ft)      * 2411.03  * 3890.58  * 1227.64  *
* E.G. Slope (ft/ft)     *0.001194  * Area (sq ft)           * 2411.03  * 3890.58  * 3622.48  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 5901.92  *53185.43  * 2912.65  *
* Top Width (ft)         * 1104.81  * Top Width (ft)         *  170.82  *  111.00  *  823.00  *
* Vel Total (ft/s)       *    8.23  * Avg. Vel. (ft/s)       *    2.45  *   13.67  *    2.37  *
* Max Chl Dpth (ft)      *   43.09  * Hydr. Depth (ft)       *   14.11  *   35.05  *   10.17  *
* Conv. Total (cfs)      *1794490.0  * Conv. (cfs)           *170821.6  *1539367.0  * 84301.9  *
* Length Wtd. (ft)       *  835.28  * Wetted Per. (ft)       *  176.16  *  120.88  *  123.57  *
* Min Ch El (ft)         *  734.83  * Shear (lb/sq ft)       *    1.02  *    2.40  *    0.74  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *    2.50  *   32.79  *    1.76  *
* Frctn Loss (ft)        *    0.70  * Cum Volume (acre-ft)   * 3160.55  *12366.34  * 5927.15  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         *  569.38  *  472.68  * 1149.81  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*************************************************************************************************
* E.G. Elev (ft)         *  783.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.04  * Wt. n-Val.             *   0.120  *   0.038  *   0.100  *
* W.S. Elev (ft)         *  779.99  * Reach Len. (ft)        *  855.58  *  863.82  *  556.84  *
* Crit W.S. (ft)         *  767.40  * Flow Area (sq ft)      * 2768.83  * 4119.82  * 1498.94  *
* E.G. Slope (ft/ft)     *0.001371  * Area (sq ft)           * 2768.83  * 4119.82  * 6179.23  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 7809.35  *62700.42  * 4210.23  *
* Top Width (ft)         * 1729.72  * Top Width (ft)         *  175.69  *  111.00  * 1443.03  *
* Vel Total (ft/s)       *    8.91  * Avg. Vel. (ft/s)       *    2.82  *   15.22  *    2.81  *
* Max Chl Dpth (ft)      *   45.16  * Hydr. Depth (ft)       *   15.76  *   37.12  *   11.21  *
* Conv. Total (cfs)      *2018122.0  * Conv. (cfs)           *210923.8  *1693484.0  *113714.7  *
* Length Wtd. (ft)       *  830.60  * Wetted Per. (ft)       *  181.46  *  120.88  *  136.59  *
* Min Ch El (ft)         *  734.83  * Shear (lb/sq ft)       *    1.31  *    2.92  *    0.94  *
* Alpha                  *    2.47  * Stream Power (lb/ft s) *    3.68  *   44.39  *    2.64  *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   * 4853.91  *13579.32  * 9177.47  *
* C & E Loss (ft)        *    0.38  * Cum SA (acres)         *  736.65  *  474.78  * 1468.86  *
*************************************************************************************************
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Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	773.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.	0.120	0.038	0.100
W.S. Elev (ft)	771.77	Reach Len. (ft)	855.58	863.82	556.84
Crit W.S. (ft)	758.65	Flow Area (sq ft)	1444.60	3207.99	675.39
E.G. Slope (ft/ft)	0.000919	Area (sq ft)	1444.60	3207.99	675.39
Q Total (cfs)	38000.00	Flow (cfs)	2852.10	33839.27	1308.63
Top Width (ft)	310.94	Top Width (ft)	126.37	111.00	73.56
Vel Total (ft/s)	7.13	Avg. Vel. (ft/s)	1.97	10.55	1.94
Max Chl Dpth (ft)	36.94	Hydr. Depth (ft)	11.43	28.90	9.18
Conv. Total (cfs)	1253339.0	Conv. (cfs)	94069.7	1116108.0	43162.0
Length Wtd. (ft)	848.50	Wetted Per. (ft)	130.07	120.88	75.72
Min Ch El (ft)	734.83	Shear (lb/sq ft)	0.64	1.52	0.51
Alpha	1.96	Stream Power (lb/ft s)	1.26	16.07	0.99
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	744.21	8925.77	1462.05
C & E Loss (ft)	0.13	Cum SA (acres)	131.89	446.78	260.28

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 13.307

INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data num= 262

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	821.66	5.47	821.15	5.78	821.12	6.01	821.1	15.85	820.29
20.3	819.5	26.13	818.65	43.87	817.1	47.53	816.8	49.83	816.43
53.61	816.09	56.91	815.66	59.65	815.95	61.44	815.89	65.56	815.86
76.35	814.95	81.43	814.86	83.53	814.82	88.45	814.46	92.54	814.08
96.77	813.55	97.92	813.24	100.68	812.85	113	811.72	125.45	809.61
134.39	806.39	143.17	803.54	149.18	800.2	155.85	797.83	159.39	796.28
164.9	794.96	181.73	790.96	192.97	789.32	210.78	787.19	232.02	787.26
258.32	784.54	261.05	784.51	270.58	784.44	275.27	782.87	285.79	780.36
287.16	780.37	318.94	780.43	321.66	780.38	325.29	780.09	355.45	778.13
355.51	778.13	355.73	778.13	369.05	778.13	370.16	778.11	377.03	780.16
389.46	784	397.97	779.01	416.7	767.5	431.19	770.92	433.18	771.43
438.5	771.59	439.63	771.63	447.17	771.56	447.69	771.55	448.11	771.54
457.14	771.32	459.82	770.48	467	768.24	470.24	768.08	474.69	767.82
477.99	767.59	485.76	767.07	493.2	773.09	496.78	776.39	499.17	776.66
524.85	775.63	537.74	775.13	552.88	774.62	577	773.49	603.17	773.87
607.91	773.88	619.7	773.7	620.21	773.71	627.7	773.49	642.43	773.38
669.79	774.39	681	773.26	682.99	773.23	686.86	773.25	694.08	773.26
695.44	772.87	703.24	770.51	706.2	769.96	743.59	760.53	747.17	758.95
756.83	751.37	757.16	751.11	768.86	742.29	769.97	741.58	770.73	740.96
780	735.36	805	734.36	830	735.36	841.46	742.55	845.73	744.58
848.07	746.59	851.87	747.16	857.02	748.01	862.86	748.97	863.77	749.02
866.71	750.8	868.55	751.76	873.14	752.92	886.98	756.45	896.43	756.8
912.84	756.8	933.96	756.94	939.07	758.12	943.3	759.11	952.24	761.26
974.71	761.97	976.98	762.03	981.86	762.24	1011.81	763.84	1013.77	764.17
1015.52	764.74	1017.36	765.22	1023.07	766.59	1028.21	767.14	1033.02	766.52
1033.85	766.43	1034.2	766.46	1036.26	766.51	1038.9	766.57	1042.77	767.48
1045.88	768.05	1059.87	769.6	1061.18	769.68	1063.53	769.83	1065.35	770.08
1067.09	769.28	1077.61	766.07	1083.5	764.03	1091.78	763.68	1095.46	763.48
1110.87	764.14	1129.28	765.03	1149.21	766.59	1150.06	766.65	1150.22	766.75
1153.09	768.95	1182.71	769.37	1189.1	771.46	1191.2	772.18	1199.14	772.3
1211.49	772.48	1215.88	772.55	1229.78	772.33	1243.2	772.39	1267.26	772.41
1285.28	772.67	1320.79	772.78	1351.32	772.89	1362.73	772.94	1383.91	772.98
1389.06	773	1394.44	773.03	1413.67	773.07	1437.79	773.18	1441.02	773.19
1457.05	773.23	1484.17	773.25	1517.52	773.44	1564.01	773.18	1577.42	773.34
1588.74	773.1	1593.25	773.06	1597.64	773.02	1605.83	772.93	1626.87	772.74

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 1643.73  772.62 1662.73  772.43 1663.07  772.42 1664.02  772.41 1670.21  773.65
 1672.62  774.18 1680.71  774.22 1694.86  773.92 1697.52  773.79 1698.91  773.75
 1705.29  773.73 1732.71  773.93 1744.67  774.06 1778.38  775.17 1797.26  775.53
 1837.19  775.74 1846.31  775.72 1854.55   775.8 1859.91  775.86 1871.43  775.93
 1892.76   775.9  1898.5  776.01 1901.19  775.96 1905.77  775.89 1917.74  775.78
 1933.02  776.16 1957.07  776.64 1971.02  776.64  2033.9   776.6 2034.35  776.59
 2049.72  776.98 2060.71  776.82 2065.65  776.68 2078.22  776.22 2083.82  776.18
 2095.29   776.1 2103.55  776.06 2135.66  775.86 2147.69  775.79  2148.1  775.79
 2148.69  775.78 2151.23  775.78 2184.18   776.3 2194.47  776.22 2229.74  775.82
 2245.59  774.04 2246.67   773.9 2247.78  773.68 2254.76  771.42    2258  770.42
 2259.03  769.84 2269.21  772.23 2273.89  774.11 2285.63  774.09  2295.5  774.63
 2329.12  776.13  2355.6  777.09 2368.12  777.39 2421.98  778.09 2436.81  778.48
  2479.1  779.88 2496.37  780.43 2534.12  781.59 2539.44  781.74 2541.55  781.82
 2559.03  782.72  2564.7  783.11 2592.51  783.52 2597.31  783.55 2624.94  790.39
 2625.66  790.46 2627.07  791.07 2634.35  793.21 2674.91  804.41 2682.39  808.97
 2694.75  815.78 2705.55  821.98 2717.46  828.96 2760.03  849.72 2761.68  850.48
 2762.22  850.85 2762.97  851.09 2764.52  851.87 2787.37  863.21 2809.98  872.46
 2813.69  873.85 2819.89  874.37

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  743.59    .035  886.98      .1  1189.1     .06 1905.77     .08
 2592.51     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         743.59  886.98           455.65  701.29  971.46             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     650     790       F
    1235 2819.89     790       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    1235    1685     790    1050    1160     769

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  761.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  761.08  * Reach Len. (ft)        *  455.65  *  701.29  *  971.46  *
* Crit W.S. (ft)         *  746.38  * Flow Area (sq ft)      *    0.60  * 2545.55  *  237.98  *
* E.G. Slope (ft/ft)     *0.000352  * Area (sq ft)           *    0.60  * 2545.55  *  237.98  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *    0.06  *13042.25  *  157.70  *
* Top Width (ft)         *  210.09  * Top Width (ft)         *    2.19  *  143.39  *   64.52  *
* Vel Total (ft/s)       *    4.74  * Avg. Vel. (ft/s)       *    0.10  *    5.12  *    0.66  *
* Max Chl Dpth (ft)      *   26.72  * Hydr. Depth (ft)       *    0.28  *   17.75  *    3.69  *
* Conv. Total (cfs)      *703081.8  * Conv. (cfs)            *     3.1  *694679.3  *  8399.4  *
* Length Wtd. (ft)       *  704.29  * Wetted Per. (ft)       *    2.25  *  156.20  *   65.01  *
* Min Ch El (ft)         *  734.36  * Shear (lb/sq ft)       *    0.01  *    0.36  *    0.08  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *    0.00  *    1.84  *    0.05  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  102.72  * 4041.22  *  144.18  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   22.24  *  345.13  *   39.40  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  765.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  764.82  * Reach Len. (ft)        *  455.65  *  701.29  *  971.46  *
* Crit W.S. (ft)         *  749.89  * Flow Area (sq ft)      *   36.45  * 3081.35  *  628.72  *
* E.G. Slope (ft/ft)     *0.000427  * Area (sq ft)           *   36.45  * 3081.35  *  628.72  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *   15.19  *19731.54  *  553.27  *
* Top Width (ft)         *  289.23  * Top Width (ft)         *   17.00  *  143.39  *  128.84  *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)       *    0.42  *    6.40  *    0.88  *
* Max Chl Dpth (ft)      *   30.46  * Hydr. Depth (ft)       *    2.14  *   21.49  *    4.88  *
* Conv. Total (cfs)      *982616.5  * Conv. (cfs)            *   735.2  *955100.2  * 26781.1  *
* Length Wtd. (ft)       *  709.07  * Wetted Per. (ft)       *   17.53  *  156.20  *  129.54  *
* Min Ch El (ft)         *  734.36  * Shear (lb/sq ft)       *    0.06  *    0.53  *    0.13  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.02  *    3.37  *    0.11  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   *  229.12  * 5557.41  *  320.21  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   43.96  *  383.92  *   62.94  *
*********************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	768.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.120	0.035	0.100
W.S. Elev (ft)	767.32	Reach Len. (ft)	455.65	701.29	971.46
Crit W.S. (ft)	752.06	Flow Area (sq ft)	91.35	3439.84	973.09
E.G. Slope (ft/ft)	0.000482	Area (sq ft)	91.85	3439.84	973.09
Q Total (cfs)	26320.00	Flow (cfs)	54.95	25190.18	1074.88
Top Width (ft)	329.42	Top Width (ft)	30.93	143.39	155.10
Vel Total (ft/s)	5.84	Avg. Vel. (ft/s)	0.60	7.32	1.10
Max Chl Dpth (ft)	32.96	Hydr. Depth (ft)	3.39	23.99	6.27
Conv. Total (cfs)	1198854.0	Conv. (cfs)	2502.8	1147391.0	48959.7
Length Wtd. (ft)	712.45	Wetted Per. (ft)	27.76	156.20	156.18
Min Ch El (ft)	734.36	Shear (lb/sq ft)	0.10	0.66	0.19
Alpha	1.50	Stream Power (lb/ft s)	0.06	4.85	0.21
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	357.58	6832.73	587.10
C & E Loss (ft)	0.00	Cum SA (acres)	61.84	411.49	129.19

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	771.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.	0.120	0.035	0.100
W.S. Elev (ft)	770.12	Reach Len. (ft)	455.65	701.29	971.46
Crit W.S. (ft)	754.65	Flow Area (sq ft)	182.28	3841.35	1561.31
E.G. Slope (ft/ft)	0.000546	Area (sq ft)	259.40	3841.35	1561.55
Q Total (cfs)	34000.00	Flow (cfs)	146.36	32225.94	1627.70
Top Width (ft)	525.23	Top Width (ft)	82.14	143.39	299.70
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)	0.80	8.39	1.04
Max Chl Dpth (ft)	35.76	Hydr. Depth (ft)	4.77	26.79	5.24
Conv. Total (cfs)	1455103.0	Conv. (cfs)	6263.9	1379178.0	69660.8
Length Wtd. (ft)	715.29	Wetted Per. (ft)	39.43	156.20	300.08
Min Ch El (ft)	734.36	Shear (lb/sq ft)	0.16	0.84	0.18
Alpha	1.80	Stream Power (lb/ft s)	0.13	7.03	0.18
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	570.51	8149.30	1087.07
C & E Loss (ft)	0.05	Cum SA (acres)	94.36	433.97	202.07

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	774.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.	0.120	0.035	0.100
W.S. Elev (ft)	773.68	Reach Len. (ft)	455.65	701.29	971.46
Crit W.S. (ft)	757.72	Flow Area (sq ft)	348.32	4351.77	2694.51
E.G. Slope (ft/ft)	0.000562	Area (sq ft)	685.74	4351.77	2744.49
Q Total (cfs)	44500.00	Flow (cfs)	302.64	40245.41	3951.95
Top Width (ft)	716.52	Top Width (ft)	200.08	143.39	373.05
Vel Total (ft/s)	6.02	Avg. Vel. (ft/s)	0.87	9.25	1.47
Max Chl Dpth (ft)	39.32	Hydr. Depth (ft)	5.18	30.35	7.74
Conv. Total (cfs)	1877443.0	Conv. (cfs)	12768.3	1697943.0	166731.5
Length Wtd. (ft)	722.74	Wetted Per. (ft)	68.88	156.20	351.74
Min Ch El (ft)	734.36	Shear (lb/sq ft)	0.18	0.98	0.27
Alpha	2.14	Stream Power (lb/ft s)	0.15	9.04	0.39
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	1298.30	10281.30	2631.20
C & E Loss (ft)	0.09	Cum SA (acres)	289.38	461.78	522.38

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	777.44	Element	Left OB	Channel	Right OB

```
* Vel Head (ft)          *    1.36  * Wt. n-Val.             *   0.120  *   0.035  *   0.099  *
* W.S. Elev (ft)         *  776.08  * Reach Len. (ft)        *  455.65  *  701.29  *  971.46  *
* Crit W.S. (ft)         *  759.97  * Flow Area (sq ft)      *  563.89  * 4696.43  * 3531.04  *
* E.G. Slope (ft/ft)     *0.000591  * Area (sq ft)           * 1369.00  * 4696.43  * 3976.02  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *  555.51  *46880.98  * 6253.50  *
* Top Width (ft)         * 1252.61  * Top Width (ft)         *  323.71  *  143.39  *  785.51  *
* Vel Total (ft/s)       *    6.11  * Avg. Vel. (ft/s)       *    0.99  *    9.98  *    1.77  *
* Max Chl Dpth (ft)      *   41.72  * Hydr. Depth (ft)       *    6.03  *   32.75  *   10.15  *
* Conv. Total (cfs)      *2207956.0  * Conv. (cfs)           * 22845.0  *1927941.0  *257170.0  *
* Length Wtd. (ft)       *  727.28  * Wetted Per. (ft)       *   95.29  *  156.20  *  354.15  *
* Min Ch El (ft)         *  734.36  * Shear (lb/sq ft)       *    0.22  *    1.11  *    0.37  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    0.22  *   11.08  *    0.65  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   * 2286.17  *11516.82  * 4310.16  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  458.61  *  468.75  *  819.63  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  779.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.             *   0.120  *   0.035  *   0.098  *
* W.S. Elev (ft)         *  777.93  * Reach Len. (ft)        *  455.65  *  701.29  *  971.46  *
* Crit W.S. (ft)         *  761.26  * Flow Area (sq ft)      *  736.62  * 4961.07  * 4173.34  *
* E.G. Slope (ft/ft)     *0.000622  * Area (sq ft)           * 1995.57  * 4961.07  * 5778.70  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *  889.34  *52678.82  * 8431.84  *
* Top Width (ft)         * 1559.72  * Top Width (ft)         *  343.86  *  143.39  * 1072.47  *
* Vel Total (ft/s)       *    6.28  * Avg. Vel. (ft/s)       *    1.21  *   10.62  *    2.02  *
* Max Chl Dpth (ft)      *   43.57  * Hydr. Depth (ft)       *    7.87  *   34.60  *   11.99  *
* Conv. Total (cfs)      *2486154.0  * Conv. (cfs)           * 35661.7  *2112382.0  *338110.4  *
* Length Wtd. (ft)       *  730.25  * Wetted Per. (ft)       *   95.29  *  156.20  *  355.99  *
* Min Ch El (ft)         *  734.36  * Shear (lb/sq ft)       *    0.30  *    1.23  *    0.46  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    0.36  *   13.09  *    0.92  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   * 3117.28  *12278.57  * 5867.06  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  564.33  *  470.16  * 1137.70  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  781.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.             *   0.120  *   0.035  *   0.097  *
* W.S. Elev (ft)         *  780.09  * Reach Len. (ft)        *  455.65  *  701.29  *  971.46  *
* Crit W.S. (ft)         *  764.56  * Flow Area (sq ft)      *  939.50  * 5271.90  * 4927.75  *
* E.G. Slope (ft/ft)     *0.000694  * Area (sq ft)           * 2810.05  * 5271.90  * 8195.92  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 1409.52  *61594.55  *11715.92  *
* Top Width (ft)         * 1691.31  * Top Width (ft)         *  399.05  *  143.39  * 1148.87  *
* Vel Total (ft/s)       *    6.71  * Avg. Vel. (ft/s)       *    1.50  *   11.68  *    2.38  *
* Max Chl Dpth (ft)      *   45.73  * Hydr. Depth (ft)       *   10.04  *   36.77  *   14.16  *
* Conv. Total (cfs)      *2835655.0  * Conv. (cfs)           * 53492.0  *2337539.0  *444623.9  *
* Length Wtd. (ft)       *  733.36  * Wetted Per. (ft)       *   95.29  *  156.20  *  358.16  *
* Min Ch El (ft)         *  734.36  * Shear (lb/sq ft)       *    0.43  *    1.46  *    0.60  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *    0.64  *   17.09  *    1.42  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   * 4799.13  *13486.20  * 9085.59  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  731.01  *  472.26  * 1452.30  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  772.59  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  771.48  * Reach Len. (ft)        *  455.65  *  701.29  *  971.46  *
* Crit W.S. (ft)         *  755.87  * Flow Area (sq ft)      *  238.31  * 4036.41  * 1969.55  *
* E.G. Slope (ft/ft)     *0.000558  * Area (sq ft)           *  385.13  * 4036.41  * 1978.47  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  212.07  *35387.14  * 2400.79  *
* Top Width (ft)         *  565.70  * Top Width (ft)         *  108.70  *  143.39  *  313.61  *
* Vel Total (ft/s)       *    6.09  * Avg. Vel. (ft/s)       *    0.89  *    8.77  *    1.22  *
```

```
* Max Chl Dpth (ft)      *   37.12  * Hydr. Depth (ft)       *    5.47  *   28.15  *    6.52  *
* Conv. Total (cfs)      *1608463.0  * Conv. (cfs)            *  8976.5  *1497866.0  *101620.7  *
* Length Wtd. (ft)       *  718.10  * Wetted Per. (ft)       *   44.92  *  156.20  *  304.45  *
* Min Ch El (ft)         *  734.36  * Shear (lb/sq ft)       *    0.18  *    0.90  *    0.23  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    0.16  *    7.89  *    0.27  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *  726.24  * 8853.94  * 1445.09  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  129.58  *  444.26  *  257.80  *
*****************************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 13.174

INPUT
Description:
Station Elevation Data num= 231

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	821.27	2.42	821.65	3.36	821.72	8.08	822.86	11.42	822.84
25.7	823.01	33.39	821.4	40.29	819.8	41.77	819.46	45.13	817.74
47.63	816.75	55.05	815.59	56.83	815.35	62.51	813.86	63.21	813.68
68.6	813.84	72.67	814.19	93.49	811.33	117.58	809.17	121.96	809.81
133.01	810.04	134.72	810.04	135.36	809.67	142.69	805.15	152.11	803.72
152.98	803.7	161.93	802.11	179.07	799.86	183.67	798.91	187.84	797.5
193.33	796.12	198.93	794.02	206.38	792.73	208.67	792.44	216.74	790.85
219.45	790.9	234.43	787.75	249.61	783.32	260.1	778.37	262.71	777.28
266.75	776.95	283.4	775.93	295.57	768.78	299.36	766.16	306.48	768.2
318.75	771.67	323	771.95	324.61	772.08	331.77	772.29	331.95	772.3
338.8	771.39	340.82	771.11	348.61	768.04	348.99	767.89	350.56	767.74
359.99	766.81	364.3	767.62	369.55	768.52	377.01	772.2	384.71	776.05
389.56	775.89	424.73	775.93	438.91	775.64	454.16	775.18	487.34	775.11
499.85	774.98	513.37	773.84	521.95	772.78	529.95	771.4	547.4	768.61
557.91	765.46	559.43	764.95	564.42	763.44	571.09	761.45	584.02	764.97
584.44	765.09	585.65	765.45	601.9	770.39	623.69	773.84	629.43	774.75
635.34	774.9	658.09	775.64	672.87	775.08	681.98	774.84	702.9	775.08
712.52	775.25	724.84	774.78	739.68	774.52	768.74	774.56	772.59	774.64
779.17	774.59	799.29	773.89	809.37	773.29	834.83	771.9	858.1	770.94
881.73	770.51	913.06	769.59	916.27	769.52	917.78	769.46	951.22	768.98
981.99	768.1	984.78	768.05	986.26	768.01	988.6	767.14	1004.61	762.52
1012.58	762.28	1020.34	761.97	1070.3	760.18	1074.33	760.06	1075.21	760.02
1076.84	760.01	1078.3	760.01	1113.65	759.9	1127.04	759.3	1144.69	758.81
1158.34	759.4	1160.73	759.44	1166.98	758.96	1179.22	757.41	1193.75	756.44
1198.15	756.07	1205.88	755.6	1217.99	752.67	1225.49	750.86	1232.16	749.24
1242.72	748.35	1242.75	748.35	1242.81	748.31	1249.31	740.99	1255	735
1272	733.98	1285	735	1295.77	742.03	1297.65	743.81	1303.42	745.28
1308.62	748.51	1318.13	750.27	1321.6	750.91	1323.17	751.23	1326.94	752.32
1340.62	756.77	1343.89	757.57	1345.89	757.58	1368.7	758.14	1371.57	758.18
1387.92	758.41	1399.88	758.38	1428.28	757.98	1454.02	758.4	1465.28	758.51
1486.21	759.37	1509.5	759.74	1509.92	759.73	1510.93	759.82	1533.27	761.74
1543.46	763.28	1551.39	764.73	1554.8	764.79	1591.61	767.58	1595.34	767.93
1601.83	768.13	1606.09	768.14	1631.14	768.01	1669.98	767.62	1685.36	768.96
1688.05	769.23	1689.38	769.23	1703.18	769.25	1728.57	769.24	1730.83	769.24
1736.03	769.24	1737.37	769.3	1767.99	770.57	1789.1	770.15	1805.1	770.16
1831.92	768.54	1856.5	767.71	1883.58	766.96	1919.67	766.24	1945.42	765.78
1963.09	765.52	1992.06	766.09	2007.78	766.25	2011.2	766.34	2022.55	766.34
2036.01	764.99	2045.9	763.52	2050.55	763.64	2077.81	764.34	2080.36	764.59
2084.42	764.98	2098.39	766.99	2105.05	768.02	2107.66	767.85	2120.18	766.74
2121.53	766.48	2125.22	765.54	2126.39	765.24	2130.38	766.68	2133.76	767.91
2134.11	768.06	2136.32	768.4	2150.34	770.55	2157.42	770.9	2181.14	772
2208	773.29	2217.93	779.13	2228.37	784.3	2238	786.25	2241.01	786.84
2250.4	787.49	2271.46	788.74	2276.6	787.07	2281.1	785.59	2296.61	778.81
2298.53	777.97	2299.35	777.59	2299.97	777.64	2301.13	777.75	2340.76	780.29
2361.17	782.59	2364.22	782.86	2373.44	785.28	2425.37	799.2	2447.32	805.81
2477.43	815.47	2488.6	820.85	2504.63	829.39	2518.2	837.18	2537.41	847.46
2544.16	850.08								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	629.43	.15	1205.88	.035	1343.89	.1	1554.8	.05

```
 2098.39      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1205.88 1343.89            88.58  539.62  654.56             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     982     790       F
    1590 2544.16     790       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  761.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  760.54  * Reach Len. (ft)        *   88.58  *  539.62  *  654.56  *
* Crit W.S. (ft)         *  750.11  * Flow Area (sq ft)      *  232.60  * 2066.95  *  348.21  *
* E.G. Slope (ft/ft)     *0.000654  * Area (sq ft)           *  232.60  * 2066.95  *  348.21  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *   80.44  *12910.57  *  208.99  *
* Top Width (ft)         *  459.15  * Top Width (ft)         *  145.69  *  138.01  *  175.44  *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)       *    0.35  *    6.25  *    0.60  *
* Max Chl Dpth (ft)      *   26.56  * Hydr. Depth (ft)       *    1.60  *   14.98  *    1.98  *
* Conv. Total (cfs)      *515987.1  * Conv. (cfs)            *  3144.4  *504673.4  *  8169.3  *
* Length Wtd. (ft)       *  538.59  * Wetted Per. (ft)       *  145.92  *  149.86  *  175.52  *
* Min Ch El (ft)         *  733.98  * Shear (lb/sq ft)       *    0.07  *    0.56  *    0.08  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    0.02  *    3.52  *    0.05  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  101.50  * 4004.09  *  137.65  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   21.47  *  342.87  *   36.72  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  765.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  764.35  * Reach Len. (ft)        *   88.58  *  539.62  *  654.56  *
* Crit W.S. (ft)         *  753.60  * Flow Area (sq ft)      *  949.25  * 2592.45  * 1082.85  *
* E.G. Slope (ft/ft)     *0.000627  * Area (sq ft)           *  978.77  * 2592.45  * 1098.56  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  647.56  *18433.45  * 1218.98  *
* Top Width (ft)         *  608.97  * Top Width (ft)         *  227.94  *  138.01  *  243.02  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *    0.68  *    7.11  *    1.13  *
* Max Chl Dpth (ft)      *   30.37  * Hydr. Depth (ft)       *    4.57  *   18.78  *    5.27  *
* Conv. Total (cfs)      *810711.8  * Conv. (cfs)            * 25861.4  *736168.4  * 48682.0  *
* Length Wtd. (ft)       *  530.78  * Wetted Per. (ft)       *  208.13  *  149.86  *  205.76  *
* Min Ch El (ft)         *  733.98  * Shear (lb/sq ft)       *    0.18  *    0.68  *    0.21  *
* Alpha                  *    2.39  * Stream Power (lb/ft s) *    0.12  *    4.81  *    0.23  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  223.81  * 5511.74  *  300.95  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   42.68  *  381.66  *   58.79  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  767.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.94  * Reach Len. (ft)        *   88.58  *  539.62  *  654.56  *
* Crit W.S. (ft)         *  755.78  * Flow Area (sq ft)      * 1498.09  * 2949.58  * 1657.26  *
* E.G. Slope (ft/ft)     *0.000614  * Area (sq ft)           * 1604.30  * 2949.58  * 1947.85  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1331.89  *22628.08  * 2360.03  *
* Top Width (ft)         *  863.68  * Top Width (ft)         *  259.96  *  138.01  *  465.72  *
* Vel Total (ft/s)       *    4.31  * Avg. Vel. (ft/s)       *    0.89  *    7.67  *    1.42  *
* Max Chl Dpth (ft)      *   32.96  * Hydr. Depth (ft)       *    6.92  *   21.37  *    6.93  *
* Conv. Total (cfs)      *1061773.0  * Conv. (cfs)            * 53729.7  *912837.8  * 95205.8  *
* Length Wtd. (ft)       *  524.99  * Wetted Per. (ft)       *  217.46  *  149.86  *  239.70  *
* Min Ch El (ft)         *  733.98  * Shear (lb/sq ft)       *    0.26  *    0.76  *    0.27  *
* Alpha                  *    2.73  * Stream Power (lb/ft s) *    0.23  *    5.79  *    0.38  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  348.71  * 6781.30  *  554.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   60.32  *  409.22  *  122.27  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	770.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.150	0.035	0.097
W.S. Elev (ft)	769.84	Reach Len. (ft)	88.58	539.62	654.56
Crit W.S. (ft)	758.03	Flow Area (sq ft)	2140.74	3349.64	2368.89
E.G. Slope (ft/ft)	0.000595	Area (sq ft)	2535.28	3349.64	3718.60
Q Total (cfs)	34000.00	Flow (cfs)	2323.87	27534.79	4141.34
Top Width (ft)	1287.89	Top Width (ft)	408.23	138.01	741.65
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)	1.09	8.22	1.75
Max Chl Dpth (ft)	35.86	Hydr. Depth (ft)	9.56	24.27	9.63
Conv. Total (cfs)	1393333.0	Conv. (cfs)	95233.2	1128386.0	169713.5
Length Wtd. (ft)	519.36	Wetted Per. (ft)	224.95	149.86	246.58
Min Ch El (ft)	733.98	Shear (lb/sq ft)	0.35	0.83	0.36
Alpha	2.95	Stream Power (lb/ft s)	0.38	6.83	0.62
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	555.89	8091.42	1028.19
C & E Loss (ft)	0.01	Cum SA (acres)	91.80	431.71	190.46

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	774.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.	0.150	0.035	0.095
W.S. Elev (ft)	773.47	Reach Len. (ft)	88.58	539.62	654.56
Crit W.S. (ft)	761.58	Flow Area (sq ft)	2954.94	3851.55	3263.94
E.G. Slope (ft/ft)	0.000561	Area (sq ft)	4394.51	3851.55	6716.06
Q Total (cfs)	44500.00	Flow (cfs)	3861.22	33740.23	6898.55
Top Width (ft)	1599.03	Top Width (ft)	596.60	138.01	864.42
Vel Total (ft/s)	4.42	Avg. Vel. (ft/s)	1.31	8.76	2.11
Max Chl Dpth (ft)	39.49	Hydr. Depth (ft)	13.20	27.91	13.26
Conv. Total (cfs)	1878160.0	Conv. (cfs)	162966.1	1424035.0	291159.2
Length Wtd. (ft)	513.20	Wetted Per. (ft)	224.95	149.86	246.58
Min Ch El (ft)	733.98	Shear (lb/sq ft)	0.46	0.90	0.46
Alpha	3.02	Stream Power (lb/ft s)	0.60	7.89	0.98
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	1271.73	10215.27	2525.71
C & E Loss (ft)	0.01	Cum SA (acres)	285.21	459.52	508.58

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	776.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.150	0.035	0.094
W.S. Elev (ft)	775.90	Reach Len. (ft)	88.58	539.62	654.56
Crit W.S. (ft)	763.54	Flow Area (sq ft)	3497.49	4186.01	3860.37
E.G. Slope (ft/ft)	0.000575	Area (sq ft)	6131.71	4186.01	8815.89
Q Total (cfs)	53690.00	Flow (cfs)	5175.22	39229.41	9285.38
Top Width (ft)	1893.13	Top Width (ft)	886.58	138.01	868.54
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)	1.48	9.37	2.41
Max Chl Dpth (ft)	41.92	Hydr. Depth (ft)	15.62	30.33	15.69
Conv. Total (cfs)	2239111.0	Conv. (cfs)	215829.4	1636040.0	387241.5
Length Wtd. (ft)	509.93	Wetted Per. (ft)	224.95	149.86	246.58
Min Ch El (ft)	733.98	Shear (lb/sq ft)	0.56	1.00	0.56
Alpha	3.02	Stream Power (lb/ft s)	0.83	9.40	1.35
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	2246.94	11445.32	4167.52
C & E Loss (ft)	0.02	Cum SA (acres)	452.28	466.49	801.18

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	778.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.	0.150	0.035	0.093
W.S. Elev (ft)	777.75	Reach Len. (ft)	88.58	539.62	654.56
Crit W.S. (ft)	765.03	Flow Area (sq ft)	3911.39	4441.15	4315.36

```
* E.G. Slope (ft/ft)     *0.000599  * Area (sq ft)           * 7860.80  * 4441.15  *10424.68  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 6363.49  *44182.23  *11454.28  *
* Top Width (ft)         * 1956.05  * Top Width (ft)         *  944.28  *  138.01  *  873.75  *
* Vel Total (ft/s)       *    4.89  * Avg. Vel. (ft/s)       *    1.63  *    9.95  *    2.65  *
* Max Chl Dpth (ft)      *   43.77  * Hydr. Depth (ft)       *   17.47  *   32.18  *   17.53  *
* Conv. Total (cfs)      *2533754.0  * Conv. (cfs)            *260056.8  *1805595.0  *468102.0  *
* Length Wtd. (ft)       *  508.35  * Wetted Per. (ft)       *  224.95  *  149.86  *  246.58  *
* Min Ch El (ft)         *  733.98  * Shear (lb/sq ft)       *    0.65  *    1.11  *    0.65  *
* Alpha                  *    3.01  * Stream Power (lb/ft s) *    1.06  *   11.02  *    1.74  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 3065.73  *12202.89  * 5686.38  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  557.59  *  467.90  * 1115.99  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  781.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.             *   0.150  *   0.035  *   0.093  *
* W.S. Elev (ft)         *  779.90  * Reach Len. (ft)        *   88.58  *  539.62  *  654.56  *
* Crit W.S. (ft)         *  766.89  * Flow Area (sq ft)      * 4394.17  * 4738.76  * 4846.08  *
* E.G. Slope (ft/ft)     *0.000665  * Area (sq ft)           * 9902.33  * 4738.76  *12354.41  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 8141.18  *51873.42  *14705.39  *
* Top Width (ft)         * 2003.23  * Top Width (ft)         *  949.03  *  138.01  *  916.19  *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *    1.85  *   10.95  *    3.03  *
* Max Chl Dpth (ft)      *   45.92  * Hydr. Depth (ft)       *   19.63  *   34.34  *   19.69  *
* Conv. Total (cfs)      *2897751.0  * Conv. (cfs)            *315726.9  *2011727.0  *570296.6  *
* Length Wtd. (ft)       *  510.02  * Wetted Per. (ft)       *  224.95  *  149.86  *  246.58  *
* Min Ch El (ft)         *  733.98  * Shear (lb/sq ft)       *    0.81  *    1.31  *    0.82  *
* Alpha                  *    2.99  * Stream Power (lb/ft s) *    1.50  *   14.37  *    2.48  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   * 4732.64  *13405.62  * 8856.44  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  723.96  *  469.99  * 1429.27  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  772.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.150  *   0.035  *   0.096  *
* W.S. Elev (ft)         *  771.23  * Reach Len. (ft)        *   88.58  *  539.62  *  654.56  *
* Crit W.S. (ft)         *  759.59  * Flow Area (sq ft)      * 2452.11  * 3541.59  * 2711.19  *
* E.G. Slope (ft/ft)     *0.000586  * Area (sq ft)           * 3159.90  * 3541.59  * 4819.78  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2889.75  *29961.81  * 5148.44  *
* Top Width (ft)         * 1450.35  * Top Width (ft)         *  491.75  *  138.01  *  820.59  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    1.18  *    8.46  *    1.90  *
* Max Chl Dpth (ft)      *   37.25  * Hydr. Depth (ft)       *   10.95  *   25.66  *   11.02  *
* Conv. Total (cfs)      *1570384.0  * Conv. (cfs)            *119421.7  *1238199.0  *212763.8  *
* Length Wtd. (ft)       *  516.81  * Wetted Per. (ft)       *  224.95  *  149.86  *  246.58  *
* Min Ch El (ft)         *  733.98  * Shear (lb/sq ft)       *    0.40  *    0.86  *    0.40  *
* Alpha                  *    2.99  * Stream Power (lb/ft s) *    0.47  *    7.31  *    0.76  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  707.69  * 8792.94  * 1369.29  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  126.44  *  441.99  *  245.15  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 13.072

INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data    num=     225
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  819.36    1.81  819.11    8.98  817.59   17.89  817.13    33.8  813.93
   34.74  813.72   35.35  813.56   36.69   813.4   40.92  812.46   45.26   811.5
```

46	811.49	52.43	811.53	55.73	811.56	58.3	811.68	66.1	811.65
92.05	811.58	101.2	811.72	101.72	811.73	103.18	811.78	114.77	811.61
118.96	811.32	123.92	811.09	143.27	809.72	143.68	809.69	143.92	809.68
144.05	809.67	144.32	809.65	150.11	809.64	153.38	808.2	160.83	806.96
163.07	806.91	164.58	806.86	170.91	807.18	177.55	806.88	180.3	806.75
188.14	806.19	189.78	806.04	190.9	805.94	193.44	803.75	194.85	802.54
196.28	800.62	196.42	800.61	206.21	798.52	207.15	798.38	209.34	798.01
212.67	797.43	227.19	794.22	231.71	792.71	237.74	791.73	245.81	789.27
251.43	788.08	256.71	787.42	257.16	787.33	257.8	787	278.67	776.69
284.62	772.11	294.85	766.16	311.33	770.79	314.23	771.57	317.1	772
320.95	772.58	327.33	772.29	328.39	772.25	330.48	772	337.8	771.14
344.2	768.36	345.37	767.85	350.41	767.24	354.86	766.71	355.26	766.66
355.79	766.76	367.16	768.69	376.75	774.06	378.86	775.28	380.19	776.01
382.17	775.99	388.63	775.92	436.76	775.3	447.38	774.98	489.42	773.89
500.34	773.53	504.53	773.04	515.95	771.49	521.7	770.3	532.06	767.77
540.64	765.1	543.99	763.8	547.71	762.56	558.91	759.73	566.18	761.82
571.63	763.72	577.38	766.1	581.47	768.64	603.75	772.62	607.41	773.36
609.48	773.68	611.08	773.74	632.12	774.56	638.5	774.49	653.82	773.28
658.23	773	663.81	773.16	677.9	772.8	682.45	772.48	687.32	772.31
712.68	769.56	728.3	769.33	758.94	768.15	773.07	767.28	775.04	767.78
798.59	766.26	798.92	766.25	799.31	766.24	837.82	767.68	850.86	767.9
887.16	767.57	909.42	767.48	914.33	767.46	930.82	764.31	931.46	764.15
938.04	762.06	955.16	761	965.31	760.27	975.42	760.39	1001.34	759.99
1046.87	759.18	1067.31	759.25	1095.75	758.4	1112.65	757.86	1119.61	755.17
1126.54	752.28	1147.48	750.72	1148.68	750.58	1150.1	750.47	1164.24	748.88
1164.96	748.73	1165.73	748.57	1170.73	747.52	1175.57	747.28	1182.81	746.82
1185.47	743.53	1187.59	741	1195	734.68	1215	733.68	1235	734.68
1241.84	742.04	1244.2	743.31	1249.95	746.54	1253.77	748.14	1260.62	750.23
1268.12	752.28	1270.22	752.85	1277.73	753.21	1283.97	753.52	1285.57	753.85
1287.93	755.45	1293.14	760.47	1297.43	761.37	1317.58	767.85	1321.74	771.26
1328.39	776.49	1333.3	776.49	1340.45	776.52	1341.14	776.52	1357.4	776.05
1360.63	775.89	1411.1	775.05	1412.71	775.04	1430	775.18	1455.3	775.63
1471.25	775.66	1522.38	776.46	1522.98	776.46	1604.75	776.17	1625.54	776.33
1636.92	776.18	1667.35	775.85	1684.94	777.21	1696.24	778.29	1699.31	778.45
1706.48	778.83	1752.62	778.6	1763.12	778.52	1765.27	778.43	1793.47	776.8
1801.14	776.86	1827.24	777.26	1882.2	776.69	1884.9	776.67	1888.7	776.66
1894.98	776.61	1959.45	776.53	1986.89	776.5	1990.06	776.48	2063.6	775.95
2066.24	775.95	2117.2	775.77	2140.88	775.68	2142.14	775.68	2205.08	775.89
2215.98	775.97	2224.47	776.09	2230.63	776.15	2236.69	775.54	2243.5	774.8
2249.62	775.16	2259.79	775.84	2280.8	776.55	2294.67	777.03	2316.04	778.04
2326.76	777.5	2327.27	777.48	2327.83	777.49	2359.16	778.31	2377.24	778.54
2380.96	778.56	2382.91	778.93	2398.53	781.28	2403.03	780.9	2423.38	781.7
2450.65	784.19	2465.63	788.46	2475.21	791.29	2515.16	805.54	2537.4	813.46

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	609.48	.15	1112.65	.035	1297.43	.1	1411.1	.05
2359.16	.12								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1112.65	1297.43	262.67	444.07	621.31	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	909	790	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
40	150	825

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	760.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.150	0.035	
W.S. Elev (ft)	760.39	Reach Len. (ft)	262.67	444.07	621.31
Crit W.S. (ft)	748.26	Flow Area (sq ft)	149.09	2598.28	
E.G. Slope (ft/ft)	0.000451	Area (sq ft)	150.71	2598.28	
Q Total (cfs)	13200.00	Flow (cfs)	32.90	13167.10	
Top Width (ft)	334.12	Top Width (ft)	153.72	180.41	
Vel Total (ft/s)	4.80	Avg. Vel. (ft/s)	0.22	5.07	
Max Chl Dpth (ft)	26.71	Hydr. Depth (ft)	1.00	14.40	
Conv. Total (cfs)	621898.9	Conv. (cfs)	1550.1	620348.8	
Length Wtd. (ft)	442.94	Wetted Per. (ft)	148.86	194.83	
Min Ch El (ft)	733.68	Shear (lb/sq ft)	0.03	0.38	
Alpha	1.11	Stream Power (lb/ft s)	0.01	1.90	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	101.11	3975.20	135.03

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* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   21.16  *  340.89  *   35.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  764.18  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  752.24  * Flow Area (sq ft)      *  795.35  * 3295.86  *   12.25  *
* E.G. Slope (ft/ft)     *0.000477  * Area (sq ft)           *  865.84  * 3295.86  *   12.25  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  460.44  *19834.74  *    4.82  *
* Top Width (ft)         *  404.51  * Top Width (ft)         *  211.01  *  184.78  *    8.73  *
* Vel Total (ft/s)       *    4.95  * Avg. Vel. (ft/s)       *    0.58  *    6.02  *    0.39  *
* Max Chl Dpth (ft)      *   30.50  * Hydr. Depth (ft)       *    4.39  *   17.84  *    1.40  *
* Conv. Total (cfs)      *929461.4  * Conv. (cfs)            * 21081.9  *908158.8  *   220.7  *
* Length Wtd. (ft)       *  439.01  * Wetted Per. (ft)       *  181.71  *  199.33  *    9.17  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.13  *    0.49  *    0.04  *
* Alpha                  *    1.45  * Stream Power (lb/ft s) *    0.08  *    2.96  *    0.02  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *  221.94  * 5475.26  *  292.60  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   42.24  *  379.66  *   56.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.73  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  754.23  * Flow Area (sq ft)      * 1274.75  * 3767.51  *   44.65  *
* E.G. Slope (ft/ft)     *0.000497  * Area (sq ft)           * 1444.16  * 3767.51  *   44.65  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  983.97  *25308.41  *   27.62  *
* Top Width (ft)         *  463.91  * Top Width (ft)         *  262.46  *  184.78  *   16.66  *
* Vel Total (ft/s)       *    5.17  * Avg. Vel. (ft/s)       *    0.77  *    6.72  *    0.62  *
* Max Chl Dpth (ft)      *   33.05  * Hydr. Depth (ft)       *    6.55  *   20.39  *    2.68  *
* Conv. Total (cfs)      *1180300.0  * Conv. (cfs)           * 44125.5  *1134936.0  *  1238.6  *
* Length Wtd. (ft)       *  436.46  * Wetted Per. (ft)       *  195.16  *  199.33  *   17.50  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.20  *    0.59  *    0.08  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *    0.16  *    3.94  *    0.05  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *  345.61  * 6739.69  *  539.56  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   59.79  *  407.23  *  118.64  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  769.57  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  756.06  * Flow Area (sq ft)      * 1848.81  * 4293.24  *  101.84  *
* E.G. Slope (ft/ft)     *0.000518  * Area (sq ft)           * 2593.28  * 4293.24  *  101.84  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1808.92  *32100.56  *   90.52  *
* Top Width (ft)         *  714.51  * Top Width (ft)         *  507.48  *  184.78  *   22.25  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    0.98  *    7.48  *    0.89  *
* Max Chl Dpth (ft)      *   35.89  * Hydr. Depth (ft)       *    9.08  *   23.23  *    4.58  *
* Conv. Total (cfs)      *1494474.0  * Conv. (cfs)           * 79511.1  *1410984.0  *  3978.8  *
* Length Wtd. (ft)       *  434.55  * Wetted Per. (ft)       *  204.38  *  199.33  *   23.89  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.29  *    0.70  *    0.14  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.29  *    5.20  *    0.12  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *  550.68  * 8044.08  *  999.48  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   90.87  *  429.71  *  184.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  774.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  773.11  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  758.31  * Flow Area (sq ft)      * 2568.85  * 4946.55  *  188.23  *
* E.G. Slope (ft/ft)     *0.000529  * Area (sq ft)           * 4592.16  * 4946.55  *  188.23  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 3165.44  *41113.34  *  221.22  *
* Top Width (ft)         *  857.84  * Top Width (ft)         *  646.39  *  184.78  *   26.66  *
* Vel Total (ft/s)       *    5.78  * Avg. Vel. (ft/s)       *    1.23  *    8.31  *    1.18  *
* Max Chl Dpth (ft)      *   39.43  * Hydr. Depth (ft)       *   12.61  *   26.77  *    7.06  *
* Conv. Total (cfs)      *1933878.0  * Conv. (cfs)           *137563.6  *1786701.0  *  9613.9  *
* Length Wtd. (ft)       *  436.41  * Wetted Per. (ft)       *  204.38  *  199.33  *   29.54  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.42  *    0.82  *    0.21  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    0.51  *    6.82  *    0.25  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   * 1262.60  *10160.77  * 2473.83  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  283.95  *  457.52  *  501.88  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  776.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.18  * Wt. n-Val.             *   0.150  *   0.035  *   0.099  *
* W.S. Elev (ft)         *  775.42  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  760.22  * Flow Area (sq ft)      * 3040.05  * 5374.10  *  270.23  *
* E.G. Slope (ft/ft)     *0.000570  * Area (sq ft)           * 6247.39  * 5374.10  *  270.23  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 4349.55  *48988.39  *  352.06  *
* Top Width (ft)         * 1069.49  * Top Width (ft)         *  784.28  *  184.78  *  100.43  *
* Vel Total (ft/s)       *    6.18  * Avg. Vel. (ft/s)       *    1.43  *    9.12  *    1.30  *
* Max Chl Dpth (ft)      *   41.74  * Hydr. Depth (ft)       *   14.93  *   29.08  *    2.69  *
* Conv. Total (cfs)      *2248311.0  * Conv. (cfs)           *182140.8  *2051428.0  * 14742.8  *
* Length Wtd. (ft)       *  439.13  * Wetted Per. (ft)       *  204.38  *  199.33  *  104.16  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.53  *    0.96  *    0.09  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    0.76  *    8.75  *    0.12  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   * 2234.35  *11386.11  * 4099.25  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  450.58  *  464.49  *  793.90  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  778.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.             *   0.150  *   0.035  *   0.069  *
* W.S. Elev (ft)         *  777.21  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  761.96  * Flow Area (sq ft)      * 3403.82  * 5704.16  * 1220.17  *
* E.G. Slope (ft/ft)     *0.000603  * Area (sq ft)           * 7721.87  * 5704.16  * 1220.17  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 5399.51  *55633.53  *  966.97  *
* Top Width (ft)         * 1911.28  * Top Width (ft)         *  835.03  *  184.78  *  891.47  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *    1.59  *    9.75  *    0.79  *
* Max Chl Dpth (ft)      *   43.53  * Hydr. Depth (ft)       *   16.71  *   30.87  *    1.37  *
* Conv. Total (cfs)      *2524963.0  * Conv. (cfs)           *219896.0  *2265687.0  * 39379.9  *
* Length Wtd. (ft)       *  443.73  * Wetted Per. (ft)       *  204.38  *  199.33  *  895.75  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.63  *    1.08  *    0.05  *
* Alpha                  *    2.37  * Stream Power (lb/ft s) *    0.99  *   10.51  *    0.04  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   * 3049.88  *12140.05  * 5598.89  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  555.78  *  465.90  * 1102.73  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  780.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.38  * Wt. n-Val.             *   0.150  *   0.035  *   0.058  *
* W.S. Elev (ft)         *  779.52  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  764.07  * Flow Area (sq ft)      * 3873.48  * 6130.30  * 3540.12  *
* E.G. Slope (ft/ft)     *0.000606  * Area (sq ft)           * 9653.01  * 6130.30  * 3540.12  *
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* Q Total (cfs)          *74720.00  * Flow (cfs)             * 6715.21  *62897.63  * 5107.16  *
* Top Width (ft)         * 2113.86  * Top Width (ft)         *  839.70  *  184.78  * 1089.37  *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)       *    1.73  *   10.26  *    1.44  *
* Max Chl Dpth (ft)      *   45.84  * Hydr. Depth (ft)       *   19.02  *   33.18  *    3.25  *
* Conv. Total (cfs)      *3034959.0  * Conv. (cfs)           *272756.7  *2554761.0  *207441.4  *
* Length Wtd. (ft)       *  453.34  * Wetted Per. (ft)       *  204.38  *  199.33  * 1093.89  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.72  *    1.16  *    0.12  *
* Alpha                  *    2.93  * Stream Power (lb/ft s) *    1.24  *   11.94  *    0.18  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   * 4712.75  *13338.30  * 8737.02  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  722.14  *  467.99  * 1414.20  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  771.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.150  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  770.93  * Reach Len. (ft)        *  262.67  *  444.07  *  621.31  *
* Crit W.S. (ft)         *  756.97  * Flow Area (sq ft)      * 2125.67  * 4544.44  *  133.22  *
* E.G. Slope (ft/ft)     *0.000526  * Area (sq ft)           * 3309.49  * 4544.44  *  133.22  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2300.25  *35564.97  *  134.78  *
* Top Width (ft)         *  755.11  * Top Width (ft)         *  546.42  *  184.78  *   23.91  *
* Vel Total (ft/s)       *    5.59  * Avg. Vel. (ft/s)       *    1.08  *    7.83  *    1.01  *
* Max Chl Dpth (ft)      *   37.25  * Hydr. Depth (ft)       *   10.44  *   24.59  *    5.57  *
* Conv. Total (cfs)      *1657460.0  * Conv. (cfs)           *100330.8  *1551250.0  *  5878.7  *
* Length Wtd. (ft)       *  434.96  * Wetted Per. (ft)       *  204.38  *  199.33  *   26.03  *
* Min Ch El (ft)         *  733.68  * Shear (lb/sq ft)       *    0.34  *    0.75  *    0.17  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *    0.37  *    5.86  *    0.17  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *  701.12  * 8742.85  * 1332.07  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  125.38  *  440.00  *  238.81  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.988

INPUT
Description: Blocked obstructions are buildings.
Station Elevation Data    num=     231
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
**********************************************************************************
       0   811.71     2.43   811.75     6.64   811.82      9.9   811.55    20.19   811.77
   23.33   811.72    24.28   811.73    38.51   810.65    75.39   809.49    80.75   809.33
   84.25   809.07    86.36   809.12    98.98   809.06   107.38   808.85    112.1   808.79
  119.85   808.81   120.76   808.48   122.55   808.36   131.68   807.84   133.28   807.71
  146.79   807.03   152.89   806.17    157.3   805.54   168.75   803.41   174.52   802.65
  193.06   800.98   194.84   800.75   196.03   800.42      199    799.6    200.1   799.32
  207.78   797.79    214.4   796.21   215.91   795.77   222.79   793.79   235.64   789.01
  242.64   787.54   249.08   785.12   250.08   784.58    251.4   782.93   265.14   765.91
  284.87   768.59   296.91    770.4   303.51   771.36   306.62   771.86   309.97   772.01
  314.22   772.22   319.53   771.89   322.26   771.69   331.15   768.28   331.86   768.01
  334.31   767.37   344.46   765.05   347.04   765.14   356.87   765.54   357.41   765.47
  361.25   764.64   362.96   764.01   365.39   763.45   376.35   765.44   389.28   764.01
  395.41   763.51   404.58   763.13   418.73   762.79   430.08   762.65   440.95   761.93
  446.75   761.74   458.29   761.26   469.61   761.14   494.82   760.58   495.14   760.57
  504.98   760.49   513.26   760.13   522.88   759.71   536.65   758.18   561.66   757.19
  566.92   756.84   575.73   756.89   588.24   757.12   594.77   757.26    596.4   757.28
  608.97   757.51   622.69   757.79   650.04   758.02    658.8   757.89    671.4    753.7
   676.5    751.6   681.21   751.14    682.3   751.04   685.28   750.49   691.81    749.3
  692.33   749.17   693.54    749.1   708.08   747.97   718.97    742.5   720.95   741.72
  721.57   740.96      732   734.44     742   733.44      753   734.44   763.07   742.05
  769.19   745.23   772.72    747.2    782.8   747.53   782.93   747.53   782.99   747.54
   786.4   748.29   791.58   749.42   807.32   755.35   811.57   756.85   837.26   759.56
  839.21   759.75   840.02   760.21   850.44   766.12   850.94    766.2   856.84   767.84
  870.37   767.45   886.51   767.32   893.13   766.68   899.98   766.63   904.22   766.41
  909.57   766.23   964.33   766.91   985.73   767.23  1011.49   768.07  1035.79   768.64
 1045.91   768.89  1055.33   768.88  1091.06   769.41  1138.33   769.06  1148.09   769.46
 1153.66   769.66  1157.66    768.8  1160.24   768.47  1162.42    768.9  1167.28   769.79
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 1174.83   769.4 1191.13  769.71 1203.89  770.47 1277.26   771.4 1284.32  771.55
 1344.92  770.57 1361.36  770.17 1379.43   770.2  1412.3  770.26 1433.85  767.83
 1434.64  767.78 1435.12  767.87  1457.8  773.62 1471.99  773.74 1475.72  773.77
 1491.52  774.01 1524.73  774.89  1532.9  775.03 1547.28  775.54 1571.72  776.26
 1601.72   776.6 1634.61  776.97 1647.02  777.21 1653.41  777.31 1656.35  777.27
 1674.18  776.94  1679.4  776.93 1684.58  776.94 1687.77   776.7 1712.47  776.24
 1717.01  776.15 1725.94  776.07 1738.38  775.93 1754.39  775.63 1760.66  775.51
 1777.68  775.19 1783.29  775.08 1794.31  774.88  1803.8  774.76 1809.47  774.67
 1831.97  774.15 1832.48  774.14 1833.37  774.12 1839.84  774.02 1863.63  773.65
 1871.01  773.43 1875.75  773.34  1889.5  772.89 1890.85  772.85 1891.73  772.82
 1912.62  773.56 1928.29  773.99  1936.3  774.24 1958.29  774.83 1961.51  774.82
 2002.36  774.97 2010.64  774.99 2051.32  775.32 2053.06  775.32 2058.88  775.27
 2083.25  774.57 2094.26  774.31 2101.92  773.39 2108.02  772.62 2116.27  771.33
 2122.85  771.88 2130.74  772.75 2131.04  772.76 2132.21  772.77 2154.18  773.13
 2157.55  773.51 2173.15  774.14  2181.8  773.97 2206.55   773.5 2211.68  773.45
 2230.55  772.13 2234.84  772.25 2245.13  772.56 2273.84  773.45 2278.16  773.57
 2283.74  773.72 2317.26  775.52 2332.92   774.4 2334.56  774.42 2336.06  774.65
 2349.19  776.67 2360.03  776.93 2362.85     777  2367.9  776.98 2403.04  777.85
 2406.22  778.24 2414.62  780.05 2444.64  785.79 2474.09  793.04 2492.01  797.58
 2534.31  809.74

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .13   658.8    .035  811.57      .1  909.57     .05  2367.9     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         658.8  811.57           834.26  801.87  514.83             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     200     500     790       F
    1091    1650     780       T
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
************************
       0     110     825

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  760.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.57  * Wt. n-Val.             *   0.130  *   0.035  *   0.100  *
* W.S. Elev (ft)          *  759.96  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)          *  750.63  * Flow Area (sq ft)      *  311.22  * 2133.97  *   45.67  *
* E.G. Slope (ft/ft)      *0.000671  * Area (sq ft)           *  311.22  * 2133.97  *   45.67  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *  155.65  *13020.12  *   24.23  *
* Top Width (ft)          *  322.38  * Top Width (ft)         *  141.60  *  152.77  *   28.01  *
* Vel Total (ft/s)        *    5.30  * Avg. Vel. (ft/s)       *    0.50  *    6.10  *    0.53  *
* Max Chl Dpth (ft)       *   26.52  * Hydr. Depth (ft)       *    2.20  *   13.97  *    1.63  *
* Conv. Total (cfs)       *509639.0  * Conv. (cfs)            *  6009.5  *502694.0  *   935.4  *
* Length Wtd. (ft)        *  800.14  * Wetted Per. (ft)       *  141.73  *  163.27  *   28.21  *
* Min Ch El (ft)          *  733.44  * Shear (lb/sq ft)       *    0.09  *    0.55  *    0.07  *
* Alpha                   *    1.31  * Stream Power (lb/ft s) *    0.05  *    3.34  *    0.04  *
* Frctn Loss (ft)         *    0.41  * Cum Volume (acre-ft)   *   99.72  * 3951.08  *  134.70  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   20.27  *  339.19  *   35.20  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  764.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.75  * Wt. n-Val.             *   0.130  *   0.035  *   0.100  *
* W.S. Elev (ft)          *  763.71  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)          *  753.47  * Flow Area (sq ft)      *  901.25  * 2707.37  *  163.20  *
* E.G. Slope (ft/ft)      *0.000666  * Area (sq ft)           * 1095.84  * 2707.37  *  163.20  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             *  845.09  *19282.97  *  171.94  *
* Top Width (ft)          *  455.83  * Top Width (ft)         *  268.43  *  152.77  *   34.62  *
* Vel Total (ft/s)        *    5.38  * Avg. Vel. (ft/s)       *    0.94  *    7.12  *    1.05  *
* Max Chl Dpth (ft)       *   30.27  * Hydr. Depth (ft)       *    5.68  *   17.72  *    4.71  *
* Conv. Total (cfs)       *786849.0  * Conv. (cfs)            * 32756.4  *747427.9  *  6664.6  *
* Length Wtd. (ft)        *  794.49  * Wetted Per. (ft)       *  158.94  *  163.27  *   35.82  *
* Min Ch El (ft)          *  733.44  * Shear (lb/sq ft)       *    0.24  *    0.69  *    0.19  *
* Alpha                   *    1.67  * Stream Power (lb/ft s) *    0.22  *    4.91  *    0.20  *
* Frctn Loss (ft)         *    0.43  * Cum Volume (acre-ft)   *  216.02  * 5444.67  *  291.35  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *   40.79  *  377.94  *   56.59  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.130  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.23  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)         *  755.39  * Flow Area (sq ft)      * 1301.02  * 3091.96  *  255.98  *
* E.G. Slope (ft/ft)     *0.000685  * Area (sq ft)           * 1841.81  * 3091.96  *  255.98  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1580.42  *24403.85  *  335.73  *
* Top Width (ft)         *  514.35  * Top Width (ft)         *  322.10  *  152.77  *   39.47  *
* Vel Total (ft/s)       *    5.66  * Avg. Vel. (ft/s)       *    1.21  *    7.89  *    1.31  *
* Max Chl Dpth (ft)      *   32.79  * Hydr. Depth (ft)       *    8.19  *   20.24  *    6.48  *
* Conv. Total (cfs)      *1005868.0  * Conv. (cfs)           * 60398.9  *932639.0  * 12830.5  *
* Length Wtd. (ft)       *  790.47  * Wetted Per. (ft)       *  158.94  *  163.27  *   41.32  *
* Min Ch El (ft)         *  733.44  * Shear (lb/sq ft)       *    0.35  *    0.81  *    0.26  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    0.43  *    6.39  *    0.35  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *  335.70  * 6704.73  *  537.42  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   58.03  *  405.50  *  118.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.06  * Wt. n-Val.             *   0.130  *   0.035  *   0.084  *
* W.S. Elev (ft)         *  769.05  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)         *  757.63  * Flow Area (sq ft)      * 1749.53  * 3523.44  *  717.59  *
* E.G. Slope (ft/ft)     *0.000697  * Area (sq ft)           * 2800.08  * 3523.44  *  730.66  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2612.06  *30607.33  *  780.61  *
* Top Width (ft)         *  786.79  * Top Width (ft)         *  355.02  *  152.77  *  279.00  *
* Vel Total (ft/s)       *    5.68  * Avg. Vel. (ft/s)       *    1.49  *    8.69  *    1.09  *
* Max Chl Dpth (ft)      *   35.61  * Hydr. Depth (ft)       *   11.02  *   23.06  *    2.81  *
* Conv. Total (cfs)      *1288021.0  * Conv. (cfs)           * 98952.5  *1159497.0  * 29572.0  *
* Length Wtd. (ft)       *  786.00  * Wetted Per. (ft)       *  158.94  *  163.27  *  257.58  *
* Min Ch El (ft)         *  733.44  * Shear (lb/sq ft)       *    0.48  *    0.94  *    0.12  *
* Alpha                  *    2.11  * Stream Power (lb/ft s) *    0.71  *    8.16  *    0.13  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  534.42  * 8004.23  *  993.55  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   88.27  *  427.99  *  182.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  773.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.130  *   0.035  *   0.070  *
* W.S. Elev (ft)         *  772.76  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)         *  760.34  * Flow Area (sq ft)      * 2338.21  * 4089.77  * 1776.45  *
* E.G. Slope (ft/ft)     *0.000626  * Area (sq ft)           * 4193.16  * 4089.77  * 2704.30  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4016.03  *37204.02  * 3279.95  *
* Top Width (ft)         * 1249.02  * Top Width (ft)         *  399.19  *  152.77  *  697.06  *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)       *    1.72  *    9.10  *    1.85  *
* Max Chl Dpth (ft)      *   39.32  * Hydr. Depth (ft)       *   14.72  *   26.77  *    5.32  *
* Conv. Total (cfs)      *1777972.0  * Conv. (cfs)           *160458.3  *1486465.0  *131048.6  *
* Length Wtd. (ft)       *  775.38  * Wetted Per. (ft)       *  158.94  *  163.27  *  336.00  *
* Min Ch El (ft)         *  733.44  * Shear (lb/sq ft)       *    0.58  *    0.98  *    0.21  *
* Alpha                  *    2.37  * Stream Power (lb/ft s) *    0.99  *    8.91  *    0.38  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   * 1236.11  *10114.71  * 2453.20  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  280.80  *  455.80  *  496.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
```

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*****************************************************************************************
* E.G. Elev (ft)          *  776.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.11  * Wt. n-Val.              *   0.130  *   0.035  *   0.065  *
* W.S. Elev (ft)          *  775.22  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)          *  762.30  * Flow Area (sq ft)      * 2728.19  * 4464.94  * 3114.86  *
* E.G. Slope (ft/ft)      *0.000604  * Area (sq ft)           * 5175.93  * 4464.94  * 5018.27  *
* Q Total (cfs)           *53690.00  * Flow (cfs)             * 5097.51  *42269.50  * 6322.98  *
* Top Width (ft)          * 1811.82  * Top Width (ft)         *  401.17  *  152.77  * 1257.88  *
* Vel Total (ft/s)        *    5.21  * Avg. Vel. (ft/s)       *    1.87  *    9.47  *    2.03  *
* Max Chl Dpth (ft)       *   41.78  * Hydr. Depth (ft)       *   17.18  *   29.23  *    3.84  *
* Conv. Total (cfs)       *2185495.0  * Conv. (cfs)           *207498.3  *1720614.0  *257382.2  *
* Length Wtd. (ft)        *  765.27  * Wetted Per. (ft)       *  158.94  *  163.27  *  813.46  *
* Min Ch El (ft)          *  733.44  * Shear (lb/sq ft)       *    0.65  *    1.03  *    0.14  *
* Alpha                   *    2.63  * Stream Power (lb/ft s) *    1.21  *    9.75  *    0.29  *
* Frctn Loss (ft)         *    0.43  * Cum Volume (acre-ft)   * 2199.91  *11335.95  * 4061.53  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *  447.01  *  462.77  *  784.21  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  778.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.07  * Wt. n-Val.              *   0.130  *   0.035  *   0.062  *
* W.S. Elev (ft)          *  777.13  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)          *  763.73  * Flow Area (sq ft)      * 3031.68  * 4756.91  * 4845.59  *
* E.G. Slope (ft/ft)      *0.000571  * Area (sq ft)           * 5944.10  * 4756.91  * 7682.35  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             * 5913.74  *45712.12  *10374.15  *
* Top Width (ft)          * 2096.44  * Top Width (ft)         *  402.72  *  152.77  * 1540.96  *
* Vel Total (ft/s)        *    4.91  * Avg. Vel. (ft/s)       *    1.95  *    9.61  *    2.14  *
* Max Chl Dpth (ft)       *   43.69  * Hydr. Depth (ft)       *   19.09  *   31.14  *    4.90  *
* Conv. Total (cfs)       *2593533.0  * Conv. (cfs)           *247378.5  *1912192.0  *433962.9  *
* Length Wtd. (ft)        *  753.52  * Wetted Per. (ft)       *  158.94  *  163.27  *  992.11  *
* Min Ch El (ft)          *  733.44  * Shear (lb/sq ft)       *    0.68  *    1.04  *    0.17  *
* Alpha                   *    2.87  * Stream Power (lb/ft s) *    1.33  *    9.99  *    0.37  *
* Frctn Loss (ft)         *    0.41  * Cum Volume (acre-ft)   * 3008.68  *12086.72  * 5535.40  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  552.05  *  464.18  * 1085.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  780.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.07  * Wt. n-Val.              *   0.130  *   0.035  *   0.060  *
* W.S. Elev (ft)          *  779.47  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)          *  765.71  * Flow Area (sq ft)      * 3404.16  * 5115.24  * 7263.29  *
* E.G. Slope (ft/ft)      *0.000555  * Area (sq ft)           * 6890.92  * 5115.24  *11410.73  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             * 7068.40  *50837.30  *16814.30  *
* Top Width (ft)          * 2157.75  * Top Width (ft)         *  404.61  *  152.77  * 1600.37  *
* Vel Total (ft/s)        *    4.73  * Avg. Vel. (ft/s)       *    2.08  *    9.94  *    2.31  *
* Max Chl Dpth (ft)       *   46.03  * Hydr. Depth (ft)       *   21.44  *   33.48  *    6.97  *
* Conv. Total (cfs)       *3172158.0  * Conv. (cfs)           *300081.5  *2158244.0  *713833.4  *
* Length Wtd. (ft)        *  738.17  * Wetted Per. (ft)       *  158.94  *  163.27  * 1044.43  *
* Min Ch El (ft)          *  733.44  * Shear (lb/sq ft)       *    0.74  *    1.09  *    0.24  *
* Alpha                   *    3.07  * Stream Power (lb/ft s) *    1.54  *   10.79  *    0.56  *
* Frctn Loss (ft)         *    0.40  * Cum Volume (acre-ft)   * 4662.87  *13280.97  * 8630.39  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  718.39  *  466.27  * 1395.02  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  771.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.09  * Wt. n-Val.              *   0.130  *   0.035  *   0.076  *
* W.S. Elev (ft)          *  770.46  * Reach Len. (ft)        *  834.26  *  801.87  *  514.83  *
* Crit W.S. (ft)          *  758.86  * Flow Area (sq ft)      * 1973.10  * 3738.52  * 1106.72  *
* E.G. Slope (ft/ft)      *0.000678  * Area (sq ft)           * 3309.86  * 3738.52  * 1287.91  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             * 3147.54  *33316.32  * 1536.14  *
* Top Width (ft)          * 1010.09  * Top Width (ft)         *  369.20  *  152.77  *  488.12  *
```

```
* Vel Total (ft/s)       *    5.57  * Avg. Vel. (ft/s)       *    1.60  *    8.91  *    1.39  *
* Max Chl Dpth (ft)      *   37.02  * Hydr. Depth (ft)       *   12.43  *   24.47  *    3.96  *
* Conv. Total (cfs)      *1459766.0  * Conv. (cfs)            *120912.4  *1279843.0  * 59010.7  *
* Length Wtd. (ft)       *  782.19  * Wetted Per. (ft)       *  158.94  *  163.27  *  281.57  *
* Min Ch El (ft)         *  733.44  * Shear (lb/sq ft)       *    0.53  *    0.97  *    0.17  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    0.84  *    8.63  *    0.23  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  681.16  * 8700.63  * 1321.94  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  122.62  *  438.27  *  235.16  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 12.836

INPUT
Description: Blocked obstruction for tributary basin.
Station Elevation Data    num=     230
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  812.99   10.74  812.55   11.08  812.53    11.1  812.53   11.25  812.53
   42.83  810.41   89.27  806.18   98.25  805.29     102  805.02  113.51  803.96
  141.89  799.95   164.3  795.82  187.84  788.73  196.93   785.6  206.79  782.84
  226.63  778.23  230.48  777.14  241.22  775.52  251.81  773.47  255.11  773.23
  277.53  771.35  295.69  770.28  308.56  769.72  318.27  767.65  328.27  765.79
     353  771.14  353.64  771.18  354.05  771.21  355.29  771.29  362.29  771.74
   365.1  771.83  371.42  772.05   375.7  771.66  382.19  770.93  384.69  770.16
  388.23  769.07  392.93  768.49  393.95  768.34  394.67  768.28  409.24  767.23
   416.7  766.92  466.94  764.42  472.13  761.39  479.36   755.1   481.5   754.9
  488.94  754.38  495.29   752.5  503.27  750.32  518.71  746.12  530.04   741.3
  532.55  740.28     540     734     557  733.01     572     734  580.64  740.69
   589.9  743.63  590.05  743.66  592.43  743.92  604.39  745.14  618.69   746.6
  622.95   748.4  638.88  754.84  645.88  755.33  677.27   756.2  703.68  756.62
  723.79  757.15  746.79  758.11  767.32   758.9  776.24  759.07  788.31  759.37
  829.47  759.77  866.48  759.75  868.56  759.77     872  760.43  883.18  762.81
  889.93  764.45   896.1  767.18  911.22  768.69  928.11  771.03  943.16  773.75
  946.22  774.15  949.24     774  963.31  773.13  997.69  774.64  1014.2  775.24
 1077.53  775.79 1088.47  775.85 1089.53  775.87 1090.37  775.89 1090.85   775.9
 1091.96   775.9 1093.58   775.9 1165.68  775.71 1173.21  775.55 1182.96  775.35
 1187.01  775.26  1224.5  774.78 1226.08  774.77 1226.84  774.77 1229.36  774.32
  1230.7  774.08 1230.97  774.05 1246.55  771.94 1265.67  773.71 1275.36   774.2
 1287.11   774.5 1346.69  775.73 1397.41  775.48  1426.1   775.3 1459.07  774.72
 1485.62  774.35 1511.49  774.34 1513.82  774.09 1523.55   772.9 1524.75  773.18
 1540.09  775.15 1559.86  776.59 1561.75  776.74  1562.3  776.73 1564.21  776.67
 1574.04  776.39 1582.24  776.37 1594.94  776.28 1621.44  776.03 1623.37  776.02
 1628.59  776.04 1637.66  776.21 1649.98  776.52 1660.18  776.44 1666.62  776.44
 1676.56  776.16  1695.8  775.36 1715.31  774.38 1724.31  773.75 1731.24  773.28
 1754.26  771.96 1767.18  772.45 1786.77  773.47 1810.44  773.51  1863.2  773.27
 1882.55  772.93 1916.32  772.42 1923.73  772.33 1949.45   771.6 1964.48  771.39
 1987.48  771.58 1999.29  771.43 2005.57  771.55 2017.88  769.59 2032.39  765.86
  2037.2  764.87 2039.47   763.2 2045.47  761.04 2052.58  758.21 2057.58  756.23
 2062.73     755 2075.19  751.22 2081.63  750.03 2091.87  748.08 2096.15  747.15
 2099.16  747.15 2101.22  747.99 2106.93  749.41  2107.5  749.53 2112.17  750.72
 2117.28  750.82 2161.53  751.69 2170.85  751.59 2201.85     752 2210.51  752.11
 2214.46  752.15 2216.67  752.17 2256.09  752.11 2263.74  752.05 2273.01  752.32
 2284.95  752.54 2302.98  752.62 2304.11  752.63 2304.19  752.64 2304.72  752.62
 2318.38  752.86 2327.92  752.89 2328.49  752.76 2329.42  752.56 2342.66  749.62
 2346.51  748.82 2353.72  748.77 2356.86  748.75  2363.3   748.5 2366.01  748.38
 2370.39  748.16  2377.4  747.86 2377.56  747.85 2377.87  747.84 2386.49  748.55
 2392.38  749.03 2398.25  748.52 2409.04  749.19 2417.39  749.28 2431.46  751.67
 2435.17  751.52 2436.94  751.26 2441.57  751.48 2451.19  752.11 2461.08   752.3
 2463.67  752.61 2474.37  753.82 2474.52  753.84 2487.48  757.81 2507.84  765.42
 2510.95  766.73 2543.43  778.25  2551.9  781.62  2575.2   791.3 2596.88  801.49
 2597.82  801.88 2598.83  802.47  2605.7  805.91 2614.35  810.27 2615.44  810.65
 2630.91  817.27 2633.64  818.19 2650.89  822.27 2663.38  828.97 2673.55  833.64
 2692.25  838.74 2699.33  841.17 2701.46  841.62  2710.4  843.11 2713.79  843.59

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .12  488.94    .035  638.88     .12  949.24     .05 1987.48     .15
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        488.94  638.88           507.56  491.61  378.35             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
     200     375     790       T
  941.63 1609.03  790.72       T
    1650    2550     773       T

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)          *  760.08  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.43  * Wt. n-Val.              *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  759.65  * Reach Len. (ft)         *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *   59.15  * 2466.63  *  380.55  *
* E.G. Slope (ft/ft)      *0.000399  * Area (sq ft)            *   59.15  * 2466.63  * 3995.30  *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *   34.23  *13009.81  *  155.96  *
* Top Width (ft)          *  786.65  * Top Width (ft)          *   14.81  *  149.94  *  621.90  *
* Vel Total (ft/s)        *    4.54  * Avg. Vel. (ft/s)        *    0.58  *    5.27  *    0.41  *
* Max Chl Dpth (ft)       *   26.64  * Hydr. Depth (ft)        *    3.99  *   16.45  *    2.13  *
* Conv. Total (cfs)       *660580.7  * Conv. (cfs)             *  1712.8  *651063.0  *  7804.9  *
* Length Wtd. (ft)        *  490.96  * Wetted Per. (ft)        *   16.54  *  159.12  *  178.53  *
* Min Ch El (ft)          *  733.01  * Shear (lb/sq ft)        *    0.09  *    0.39  *    0.05  *
* Alpha                   *    1.33  * Stream Power (lb/ft s)   *    0.05  *    2.04  *    0.02  *
* Frctn Loss (ft)         *    0.17  * Cum Volume (acre-ft)     *   96.18  * 3908.73  *  110.82  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)           *   18.77  *  336.41  *   31.36  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)          *  763.99  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.59  * Wt. n-Val.              *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  763.40  * Reach Len. (ft)         *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  123.78  * 3027.86  * 1267.20  *
* E.G. Slope (ft/ft)      *0.000440  * Area (sq ft)            *  123.78  * 3027.86  * 6578.86  *
* Q Total (cfs)           *20300.00  * Flow (cfs)              *   98.28  *19222.92  *  978.81  *
* Top Width (ft)          *  880.11  * Top Width (ft)          *   20.24  *  149.94  *  709.93  *
* Vel Total (ft/s)        *    4.59  * Avg. Vel. (ft/s)        *    0.79  *    6.35  *    0.77  *
* Max Chl Dpth (ft)       *   30.39  * Hydr. Depth (ft)        *    6.11  *   20.19  *    5.14  *
* Conv. Total (cfs)       *967579.3  * Conv. (cfs)             *  4684.3  *916241.2  * 46653.8  *
* Length Wtd. (ft)        *  488.92  * Wetted Per. (ft)        *   23.17  *  159.12  *  247.17  *
* Min Ch El (ft)          *  733.01  * Shear (lb/sq ft)        *    0.15  *    0.52  *    0.14  *
* Alpha                   *    1.81  * Stream Power (lb/ft s)   *    0.12  *    3.32  *    0.11  *
* Frctn Loss (ft)         *    0.19  * Cum Volume (acre-ft)     *  204.34  * 5391.88  *  251.51  *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)           *   38.03  *  375.15  *   52.19  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)          *  766.63  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.73  * Wt. n-Val.              *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  765.90  * Reach Len. (ft)         *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  200.13  * 3403.84  * 1896.80  *
* E.G. Slope (ft/ft)      *0.000474  * Area (sq ft)            *  200.19  * 3403.84  * 8384.50  *
* Q Total (cfs)           *26320.00  * Flow (cfs)              *  127.59  *24245.02  * 1947.39  *
* Top Width (ft)          *  933.95  * Top Width (ft)          *   52.92  *  149.94  *  731.09  *
* Vel Total (ft/s)        *    4.78  * Avg. Vel. (ft/s)        *    0.64  *    7.12  *    1.03  *
* Max Chl Dpth (ft)       *   32.89  * Hydr. Depth (ft)        *    3.86  *   22.70  *    7.46  *
* Conv. Total (cfs)       *1208911.0  * Conv. (cfs)            *  5860.5  *1113605.0  * 89445.9  *
* Length Wtd. (ft)        *  487.46  * Wetted Per. (ft)        *   55.03  *  159.12  *  255.23  *
* Min Ch El (ft)          *  733.01  * Shear (lb/sq ft)        *    0.11  *    0.63  *    0.22  *
* Alpha                   *    2.04  * Stream Power (lb/ft s)   *    0.07  *    4.51  *    0.23  *
* Frctn Loss (ft)         *    0.20  * Cum Volume (acre-ft)     *  316.15  * 6644.94  *  486.36  *
* C & E Loss (ft)         *    0.12  * Cum SA (acres)           *   54.44  *  402.72  *  113.69  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)          *  769.59  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.88  * Wt. n-Val.              *   0.120  *   0.035  *   0.120  *
```

```
* W.S. Elev (ft)         *  768.72  * Reach Len. (ft)        *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  420.01  * 3825.67  * 2630.42  *
* E.G. Slope (ft/ft)     *0.000505  * Area (sq ft)           *  462.42  * 3825.67  *10485.07  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  301.76  *30391.61  * 3306.63  *
* Top Width (ft)         * 1044.10  * Top Width (ft)         *  126.37  *  149.94  *  767.80  *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *    0.72  *    7.94  *    1.26  *
* Max Chl Dpth (ft)      *   35.71  * Hydr. Depth (ft)       *    4.29  *   25.51  *    9.65  *
* Conv. Total (cfs)      *1513635.0  * Conv. (cfs)           * 13433.9  *1352994.0  *147207.0  *
* Length Wtd. (ft)       *  486.17  * Wetted Per. (ft)       *  101.17  *  159.12  *  273.77  *
* Min Ch El (ft)         *  733.01  * Shear (lb/sq ft)       *    0.13  *    0.76  *    0.30  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.09  *    6.02  *    0.38  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *  503.18  * 7936.59  *  927.27  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   83.66  *  425.20  *  176.39  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  773.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  772.37  * Reach Len. (ft)        *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  808.72  * 4372.84  * 3671.49  *
* E.G. Slope (ft/ft)     *0.000511  * Area (sq ft)           * 1076.70  * 4372.84  *13449.84  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  818.22  *38203.44  * 5478.34  *
* Top Width (ft)         * 1301.55  * Top Width (ft)         *  223.52  *  149.94  *  928.09  *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *    1.01  *    8.74  *    1.49  *
* Max Chl Dpth (ft)      *   39.36  * Hydr. Depth (ft)       *    7.10  *   29.16  *   12.38  *
* Conv. Total (cfs)      *1969305.0  * Conv. (cfs)           * 36209.7  *1690657.0  *242438.7  *
* Length Wtd. (ft)       *  484.79  * Wetted Per. (ft)       *  117.62  *  159.12  *  298.14  *
* Min Ch El (ft)         *  733.01  * Shear (lb/sq ft)       *    0.22  *    0.88  *    0.39  *
* Alpha                  *    2.61  * Stream Power (lb/ft s) *    0.22  *    7.65  *    0.59  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 1185.64  *10036.82  * 2357.74  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *  274.83  *  453.01  *  487.12  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  775.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.12  * Wt. n-Val.             *   0.120  *   0.035  *   0.118  *
* W.S. Elev (ft)         *  774.77  * Reach Len. (ft)        *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1082.76  * 4733.46  * 5770.49  *
* E.G. Slope (ft/ft)     *0.000526  * Area (sq ft)           * 1643.68  * 4733.46  *16164.51  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 1350.43  *44242.71  * 8096.86  *
* Top Width (ft)         * 1737.32  * Top Width (ft)         *  243.85  *  149.94  * 1343.54  *
* Vel Total (ft/s)       *    4.63  * Avg. Vel. (ft/s)       *    1.25  *    9.35  *    1.40  *
* Max Chl Dpth (ft)      *   41.76  * Hydr. Depth (ft)       *    9.50  *   31.57  *    5.11  *
* Conv. Total (cfs)      *2341346.0  * Conv. (cfs)           * 58890.5  *1929363.0  *353092.6  *
* Length Wtd. (ft)       *  482.06  * Wetted Per. (ft)       *  117.62  *  159.12  * 1139.30  *
* Min Ch El (ft)         *  733.01  * Shear (lb/sq ft)       *    0.30  *    0.98  *    0.17  *
* Alpha                  *    3.37  * Stream Power (lb/ft s) *    0.38  *    9.13  *    0.23  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   * 2134.61  *11251.29  * 3936.35  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         *  440.83  *  459.98  *  768.84  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  777.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.120  *   0.035  *   0.115  *
* W.S. Elev (ft)         *  776.61  * Reach Len. (ft)        *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1292.68  * 5009.71  * 7897.05  *
* E.G. Slope (ft/ft)     *0.000529  * Area (sq ft)           * 2102.58  * 5009.71  *19179.07  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 1820.50  *48791.84  *11387.66  *
* Top Width (ft)         * 2298.76  * Top Width (ft)         *  254.96  *  149.94  * 1893.85  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    1.41  *    9.74  *    1.44  *
* Max Chl Dpth (ft)      *   43.60  * Hydr. Depth (ft)       *   11.35  *   33.41  *    6.41  *
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```
* Conv. Total (cfs)      *2694728.0  * Conv. (cfs)            * 79124.8  *2120657.0  *494946.0  *
* Length Wtd. (ft)       *  478.09  * Wetted Per. (ft)        *  117.62  *  159.12  * 1243.37  *
* Min Ch El (ft)         *  733.01  * Shear (lb/sq ft)        *    0.36  *    1.04  *    0.21  *
* Alpha                  *    3.94  * Stream Power (lb/ft s) *    0.51  *   10.13  *    0.30  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 2931.63  *11996.83  * 5376.66  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *  545.75  *  461.39  * 1065.09  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  780.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.120  *   0.035  *   0.109  *
* W.S. Elev (ft)         *  778.92  * Reach Len. (ft)        *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1555.92  * 5356.12  *10737.63  *
* E.G. Slope (ft/ft)     *0.000534  * Area (sq ft)           * 2704.60  * 5356.12  *23575.67  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 2491.13  *54801.02  *17427.85  *
* Top Width (ft)         * 2321.47  * Top Width (ft)         *  265.29  *  149.94  * 1906.24  *
* Vel Total (ft/s)       *    4.23  * Avg. Vel. (ft/s)       *    1.60  *   10.23  *    1.62  *
* Max Chl Dpth (ft)      *   45.91  * Hydr. Depth (ft)       *   13.66  *   35.72  *    8.67  *
* Conv. Total (cfs)      *3232330.0  * Conv. (cfs)            *107764.2  *2370651.0  *753915.5  *
* Length Wtd. (ft)       *  472.32  * Wetted Per. (ft)        *  117.62  *  159.12  * 1250.09  *
* Min Ch El (ft)         *  733.01  * Shear (lb/sq ft)        *    0.44  *    1.12  *    0.29  *
* Alpha                  *    4.32  * Stream Power (lb/ft s) *    0.71  *   11.49  *    0.47  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 4570.99  *13184.59  * 8423.64  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *  711.97  *  463.48  * 1374.30  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  771.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  770.10  * Reach Len. (ft)        *  507.56  *  491.61  *  378.35  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  560.89  * 4033.60  * 3015.27  *
* E.G. Slope (ft/ft)     *0.000512  * Area (sq ft)           *  653.15  * 4033.60  *11563.50  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  472.63  *33444.27  * 4083.10  *
* Top Width (ft)         * 1090.78  * Top Width (ft)         *  152.50  *  149.94  *  788.33  *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)       *    0.84  *    8.29  *    1.35  *
* Max Chl Dpth (ft)      *   37.09  * Hydr. Depth (ft)       *    5.39  *   26.90  *   10.67  *
* Conv. Total (cfs)      *1679058.0  * Conv. (cfs)            * 20883.6  *1477760.0  *180414.6  *
* Length Wtd. (ft)       *  485.62  * Wetted Per. (ft)        *  107.57  *  159.12  *  283.88  *
* Min Ch El (ft)         *  733.01  * Shear (lb/sq ft)        *    0.17  *    0.81  *    0.34  *
* Alpha                  *    2.43  * Stream Power (lb/ft s) *    0.14  *    6.72  *    0.46  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *  643.21  * 8629.10  * 1245.99  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  117.63  *  435.49  *  227.61  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.743

INPUT
Description: Just U/S of 63rd St.  Drainage basin in ROB blocked D/S by road
             embankment.  Chnl corrected from surface to match 2-ft contours
             from 2D KCMO CADD files.  Interpolated Min Chnl Elev from 63rd St
             Bridge.
Station Elevation Data    num=     210
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  817.31   43.51  816.15   52.16  815.48   61.39  814.11   91.84  809.23
  105.49  807.37  124.34  805.86  138.85  804.48  186.51  799.26  191.33   798.7
  214.66  797.13  224.06  796.67  268.62  797.23     286     790     320     790
     465     780     570     776     615     774     635     774     650     772
  700.46  760.92   721.3  756.99  739.72  756.92  780.87  757.02  781.09  757.02
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  782.09  757.16  784.41     757   789.7  756.98     807     756     842     742
     852  733.74   876.5  732.74     901  733.74     911     742     928     754
     944     756  950.43  756.27  952.88  756.15  959.87  755.81  983.36  755.22
  995.75  755.24    1008     756    1072     758    1106     760    1156     770
    1202     774 1268.08  774.67 1290.04  774.43 1339.45  774.96 1356.17  775.06
 1360.97   775.1 1367.24  775.19  1387.4  774.87 1425.84  774.46 1451.13  775.25
 1487.76   775.9 1502.94  775.91 1552.37  775.29 1641.92  775.38 1657.57  775.31
  1710.7  775.03 1772.56   774.9 1801.84  774.96 1831.36  774.53 1874.68  774.74
 1998.63  774.73 2000.52  774.63 2018.68  774.63 2019.56  774.58 2040.16  774.51
 2042.74  774.53 2054.04  773.85  2075.1  772.92 2082.65  772.34    2084  772.29
 2106.84  772.44 2118.73  772.03 2139.52  771.17 2152.52  770.63 2165.82  770.03
 2165.88  770.02    2185  769.24 2203.98  770.86 2221.47  770.66 2238.84   771.3
 2260.52  771.59 2297.02  771.74  2307.6  771.73 2310.44   771.7  2342.8  771.03
 2352.09  770.35 2380.72  769.29 2410.23  765.77 2412.76  765.42 2418.12  763.88
 2428.67  761.27 2436.13  759.36 2440.48   758.2 2463.44  754.35    2471  753.87
 2480.59  753.18 2497.98  747.49 2504.92  746.11  2511.1  744.58  2514.5  744.03
 2518.87  743.99 2521.39  743.97 2526.83  743.86 2528.31  743.71 2533.05  743.42
 2536.44  744.24 2540.51   746.3 2547.81  749.58    2551  751.78 2562.05  751.98
  2580.1  752.31 2638.66  752.13    2650  752.09 2662.73  751.98 2673.27   751.7
 2702.72  751.73 2722.35  750.85 2730.39  750.25 2733.51  750.82 2756.63  750.46
  2759.2  750.51 2762.76  750.52 2795.13  751.09 2832.52  751.43 2846.59  751.15
 2847.46  751.13 2850.85  751.27 2863.26  753.69 2878.23  760.01 2881.98  761.63
 2895.75  768.41 2910.06  770.16 2912.61   770.4 2923.63  773.93 2927.83  774.68
 2932.51  774.59    2938  773.41 2946.98  772.52 2953.67   771.8 2956.17  771.38
 2967.59  770.66 2969.95   770.2 2977.76  769.97 3007.04  768.65 3023.04  769.76
 3036.23  770.24 3042.18  770.38 3058.93  769.43 3059.28  769.42 3059.61   769.4
 3059.78   769.4 3060.14   769.4 3098.42  770.21 3100.48  770.59 3120.15  774.33
 3122.54  774.21  3124.9  774.29 3152.69  774.89 3159.51  775.34 3163.88  775.29
  3201.9   776.2 3222.12  775.65 3259.84  777.29 3270.56  777.57 3274.55  777.79
 3286.04  778.39 3310.24   779.7 3314.12  779.78  3317.4  779.87 3322.49  780.14
 3339.36  781.35 3340.98  781.66 3343.45  781.82 3357.76  781.84 3364.49  782.14
 3396.98   783.9 3397.01   783.9 3426.74  783.41 3442.68  783.57 3463.02  784.62
 3482.59  786.94 3486.16  786.97 3500.01  788.59 3502.88  788.75 3526.58  790.01
 3533.94  790.41 3537.46  790.43 3555.49  791.04 3578.26  795.39 3588.36  795.65
 3600.55  800.13 3610.66  803.51 3625.56  808.38 3644.34  813.97 3653.39  816.81
 3661.34  819.04 3663.12  819.46 3671.24  821.55 3672.28  821.97 3674.09   822.7
    3687  827.41 3694.01  831.84  3694.8  831.99 3698.74  832.29 3700.61  832.64

Manning's n Values        num=       6
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0     .12      807     .03      944     .12 1268.08     .05 2418.12     .15
 3340.98     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           635    1202           182.13  187.55  243.97              .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 1255.51 1986.78  787.58       T
 1998.77  3233.9     773       T

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)          *  759.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.             *          *   0.032  *          *
* W.S. Elev (ft)          *  759.58  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 3053.04  *          *
* E.G. Slope (ft/ft)      *0.000306  * Area (sq ft)           *          * 3053.04  * 3630.14  *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)          *  833.12  * Top Width (ft)          *          *  391.20  *  441.92  *
* Vel Total (ft/s)        *    4.32  * Avg. Vel. (ft/s)        *          *    4.32  *          *
* Max Chl Dpth (ft)       *   26.84  * Hydr. Depth (ft)        *          *    7.80  *          *
* Conv. Total (cfs)       *754256.3  * Conv. (cfs)             *          *754256.3  *          *
* Length Wtd. (ft)        *  187.55  * Wetted Per. (ft)        *          *  404.22  *          *
* Min Ch El (ft)          *  732.74  * Shear (lb/sq ft)        *          *    0.14  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.62  *          *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)    *   95.83  * 3877.58  *   77.71  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   18.69  *  333.35  *   26.74  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)          *  763.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.30  * Wt. n-Val.             *          *   0.036  *          *
```

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* W.S. Elev (ft)         *  763.41  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4646.81  *          *
* E.G. Slope (ft/ft)     *0.000339  * Area (sq ft)           *          * 4646.81  * 5372.32  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  899.58  * Top Width (ft)         *          *  433.97  *  465.60  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *          *    4.37  *          *
* Max Chl Dpth (ft)      *   30.67  * Hydr. Depth (ft)       *          *   10.71  *          *
* Conv. Total (cfs)      *1101894.0  * Conv. (cfs)            *          *1101894.0  *          *
* Length Wtd. (ft)       *  187.55  * Wetted Per. (ft)       *          *  447.74  *          *
* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.96  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  203.62  * 5348.57  *  199.61  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   37.91  *  371.86  *   47.08  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.31  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *    0.038  *          *
* W.S. Elev (ft)         *  765.98  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5793.65  *          *
* E.G. Slope (ft/ft)     *0.000367  * Area (sq ft)           *          * 5793.65  * 6588.33  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  940.92  * Top Width (ft)         *          *  458.53  *  482.39  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *          *    4.54  *          *
* Max Chl Dpth (ft)      *   33.24  * Hydr. Depth (ft)       *          *   12.64  *          *
* Conv. Total (cfs)      *1373880.0  * Conv. (cfs)            *          *1373880.0  *          *
* Length Wtd. (ft)       *  187.55  * Wetted Per. (ft)       *          *  472.83  *          *
* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.28  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  314.98  * 6593.04  *  421.33  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   54.13  *  399.28  *  108.42  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  769.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *    0.041  *          *
* W.S. Elev (ft)         *  768.87  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 7156.35  *          *
* E.G. Slope (ft/ft)     *0.000393  * Area (sq ft)           *          * 7156.35  * 8025.01  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         * 1009.40  * Top Width (ft)         *          *  486.09  *  523.31  *
* Vel Total (ft/s)       *    4.75  * Avg. Vel. (ft/s)       *          *    4.75  *          *
* Max Chl Dpth (ft)      *   36.13  * Hydr. Depth (ft)       *          *   14.72  *          *
* Conv. Total (cfs)      *1714954.0  * Conv. (cfs)            *          *1714954.0  *          *
* Length Wtd. (ft)       *  187.55  * Wetted Per. (ft)       *          *  500.99  *          *
* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)       *          *    0.35  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.67  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  500.48  * 7874.62  *  846.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   82.92  *  421.61  *  170.78  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  772.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *    0.043  *          *
* W.S. Elev (ft)         *  772.60  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 9057.24  *          *
* E.G. Slope (ft/ft)     *0.000408  * Area (sq ft)           *          * 9057.24  *10877.57  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *44500.00  *          *
* Top Width (ft)         * 1545.37  * Top Width (ft)         *          *  540.35  * 1005.01  *
* Vel Total (ft/s)       *    4.91  * Avg. Vel. (ft/s)       *          *    4.91  *          *
* Max Chl Dpth (ft)      *   39.86  * Hydr. Depth (ft)       *          *   16.76  *          *
* Conv. Total (cfs)      *2202644.0  * Conv. (cfs)            *          *2202644.0  *          *
* Length Wtd. (ft)       *  187.55  * Wetted Per. (ft)       *          *  555.86  *          *
* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)       *          *    0.42  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.04  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1179.37  * 9961.03  * 2252.09  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  273.53  *  449.11  *  478.72  *
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*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  775.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.120  *   0.045  *   0.089  *
* W.S. Elev (ft)         *  775.06  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   33.90  *10435.53  * 2244.16  *
* E.G. Slope (ft/ft)     *0.000419  * Area (sq ft)           *   33.90  *10435.53  *13675.08  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *    7.23  *52531.22  * 1151.55  *
* Top Width (ft)         * 2285.48  * Top Width (ft)          *   43.88  *  567.00  * 1674.60  *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)        *    0.21  *    5.03  *    0.51  *
* Max Chl Dpth (ft)      *   42.32  * Hydr. Depth (ft)        *    0.77  *   18.40  *    1.84  *
* Conv. Total (cfs)      *2623943.0  * Conv. (cfs)            *   353.3  *2567311.0  * 56278.7  *
* Length Wtd. (ft)       *  189.12  * Wetted Per. (ft)        *   43.90  *  582.66  * 1232.20  *
* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)        *    0.02  *    0.47  *    0.05  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.00  *    2.36  *    0.02  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 2124.83  *11165.69  * 3806.76  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  439.16  *  455.93  *  755.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  777.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.120  *   0.046  *   0.088  *
* W.S. Elev (ft)         *  776.94  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  158.10  *11503.26  * 4645.33  *
* E.G. Slope (ft/ft)     *0.000410  * Area (sq ft)           *  158.10  *11503.26  *17358.55  *
* Q Total (cfs)          *62000.00  * Flow (cfs)              *   57.78  *58259.82  * 3682.40  *
* Top Width (ft)         * 2706.69  * Top Width (ft)          *   89.79  *  567.00  * 2049.89  *
* Vel Total (ft/s)       *    3.80  * Avg. Vel. (ft/s)        *    0.37  *    5.06  *    0.79  *
* Max Chl Dpth (ft)      *   44.20  * Hydr. Depth (ft)        *    1.76  *   20.29  *    3.52  *
* Conv. Total (cfs)      *3061623.0  * Conv. (cfs)            *  2853.2  *2876929.0  *181840.8  *
* Length Wtd. (ft)       *  192.03  * Wetted Per. (ft)        *   89.85  *  582.66  * 1328.86  *
* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)        *    0.05  *    0.51  *    0.09  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.02  *    2.56  *    0.07  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 2918.45  *11903.65  * 5217.99  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  543.74  *  457.34  * 1047.96  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  779.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.120  *   0.048  *   0.088  *
* W.S. Elev (ft)         *  779.29  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  440.92  *12833.21  * 7803.17  *
* E.G. Slope (ft/ft)     *0.000405  * Area (sq ft)           *  440.92  *12833.21  *22231.64  *
* Q Total (cfs)          *74720.00  * Flow (cfs)              *  223.92  *66085.52  * 8410.56  *
* Top Width (ft)         * 2819.03  * Top Width (ft)          *  151.36  *  567.00  * 2100.67  *
* Vel Total (ft/s)       *    3.55  * Avg. Vel. (ft/s)        *    0.51  *    5.15  *    1.08  *
* Max Chl Dpth (ft)      *   46.55  * Hydr. Depth (ft)        *    2.91  *   22.63  *    5.70  *
* Conv. Total (cfs)      *3714223.0  * Conv. (cfs)            * 11130.9  *3285016.0  *418076.8  *
* Length Wtd. (ft)       *  195.96  * Wetted Per. (ft)        *  151.47  *  582.66  * 1379.69  *
* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)        *    0.07  *    0.56  *    0.14  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.04  *    2.87  *    0.15  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 4552.66  *13081.95  * 8224.71  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  709.54  *  459.44  * 1356.90  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  770.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.042  *          *
* W.S. Elev (ft)         *  770.29  * Reach Len. (ft)        *  182.13  *  187.55  *  243.97  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 7855.95  *          *
* E.G. Slope (ft/ft)     *0.000402  * Area (sq ft)           *          * 7855.95  * 8878.55  *
* Q Total (cfs)          *38000.00  * Flow (cfs)              *          *38000.00  *          *
* Top Width (ft)         * 1220.26  * Top Width (ft)          *          *  501.53  *  718.74  *
* Vel Total (ft/s)       *    4.84  * Avg. Vel. (ft/s)        *          *    4.84  *          *
* Max Chl Dpth (ft)      *   37.55  * Hydr. Depth (ft)        *          *   15.66  *          *
* Conv. Total (cfs)      *1895468.0  * Conv. (cfs)            *          *1895468.0  *          *
* Length Wtd. (ft)       *  187.55  * Wetted Per. (ft)        *          *  516.70  *          *
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* Min Ch El (ft)         *  732.74  * Shear (lb/sq ft)       *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.85  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  639.40  * 8562.00  * 1157.22  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  116.74  *  431.81  *  221.07  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.708

INPUT
Description: Just U/S of 63rd St.  Bottom of Chn Elev from Bridge Plans.  Chnl
             & OBs corrected from surface to match 2-ft contours from 2D KCMO
             CADD files.
Station Elevation Data    num=     185
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  824.83     .09  824.83   18.95  825.91   51.52  825.34   60.53  825.09
     280     820     387     816     516     780     532     776     560     774
     600     774     603     772     629     762     647     760  707.27   756.6
  718.02  755.84  751.93  755.76  761.19  755.74     786     752     819     742
     829   733.7     850   732.7     872   733.7     882     742     902     752
  932.95  754.94  942.26  754.87  942.46  754.86  943.41  754.88  943.67  754.88
  945.99  754.98   978.1  756.45  980.27  756.59  1029.7  759.88 1045.86  760.47
 1053.08  761.84    1078     766 1111.32   772.7    1150     788    1207     788
    1447     780    1579     776    1915     774 2011.01  773.88 2047.26  773.51
 2057.46  773.45  2068.9  773.35 2088.29  773.33 2094.68  773.02 2097.55  773.31
 2130.72  773.04 2131.86  772.97 2150.76  772.93  2167.4  772.72 2169.15  772.81
 2180.16  772.48 2203.26  771.84 2211.63   771.9 2231.58  772.01 2235.73  771.98
 2237.87  771.96 2244.48  771.84 2265.59  771.57 2278.36  770.91 2280.59  770.89
 2283.04  770.84 2289.71  771.02 2307.69  770.79 2314.21  770.84 2320.38  770.62
 2338.33  770.79 2345.76  770.73 2353.23  770.86  2364.2  771.63  2384.7  771.66
 2394.46  770.76 2403.28  770.53  2422.2  771.66 2432.71  769.07 2435.27  769.02
 2436.25  769.01 2436.89  769.09 2437.44  769.07 2449.51  771.33 2466.15  771.73
 2469.41  771.54 2484.34  770.46 2501.52  770.69 2514.28  771.74 2520.92  771.71
 2529.08  771.14 2544.04  771.31 2545.37  771.47 2547.45  771.67 2555.96  771.63
 2576.32  771.54 2577.44  771.74 2579.68  772.07 2590.44  771.47 2611.99  771.18
 2618.52  771.23  2632.8  771.87 2645.35  770.68 2656.47  770.55 2658.83  770.57
 2660.69  770.33 2665.93  769.81 2673.73   767.8 2674.24  767.86 2674.54  767.82
  2676.1  767.87 2676.86   767.9 2692.46  770.46 2707.68  770.89 2710.81  771.19
 2711.24   771.1 2711.89  771.12 2719.33  771.73 2725.24  771.89 2733.73  771.77
 2770.62  771.37 2775.64  771.39 2781.82  771.38 2800.24  772.41 2817.39  772.66
 2837.93   771.4 2839.22  771.33 2847.56  771.57 2860.49  771.47 2874.21     770
 2874.48  769.97 2888.86  770.91 2891.69  770.69 2894.86  770.94 2929.38  771.74
  2930.5  771.68 2936.29  771.92  2940.9  772.31 2955.72  773.34 2981.86   771.7
 2991.97  771.65 2993.72  771.66 3010.09  772.15 3019.27  772.98 3026.74  773.02
  3031.6  772.31 3057.17  771.72 3070.82  771.54 3085.62  772.34  3102.6  772.89
 3106.98  773.22 3111.77  773.41 3129.59  774.11 3155.66  777.83 3172.85  776.66
 3178.75  777.37 3191.51  777.15 3193.15  777.08 3226.25  780.94 3239.83  783.27
  3267.1  784.86 3277.88  787.26 3280.36  786.63 3284.12  786.91 3313.81  788.87
 3315.37  788.48  3332.5  787.37  3342.9  787.65 3344.87  787.58 3350.14  791.12
 3357.99  796.18 3360.64  797.45 3364.77  799.16 3365.11  799.36 3366.59  799.93
 3368.03   800.2  3380.5  802.64 3382.79  803.92 3391.24  806.81 3393.08  806.81
 3395.66  806.98 3406.61  807.16 3418.72  807.48 3436.67  807.52 3436.92  807.47

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************************
       0     .05     516     .12  761.19     .03  932.95     .12    1150     .05
 3155.66     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           600    1150             94.03   96.79   47.47              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 2009.49  3185.6     773       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1550    1730     800

CROSS SECTION OUTPUT  Profile #2-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  759.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.             *          *   0.032  *          *
* W.S. Elev (ft)          *  759.52  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)          *  746.19  * Flow Area (sq ft)      *          * 3082.12  *          *
* E.G. Slope (ft/ft)      *0.000310  * Area (sq ft)           *          * 3082.12  *          *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)          *  368.83  * Top Width (ft)          *          *  368.83  *          *
* Vel Total (ft/s)        *    4.28  * Avg. Vel. (ft/s)        *          *    4.28  *          *
* Max Chl Dpth (ft)       *   26.82  * Hydr. Depth (ft)        *          *    8.36  *          *
* Conv. Total (cfs)       *749477.4  * Conv. (cfs)             *          *749477.4  *          *
* Length Wtd. (ft)        *   15.00  * Wetted Per. (ft)        *          *  379.38  *          *
* Min Ch El (ft)          *  732.70  * Shear (lb/sq ft)        *          *    0.16  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.67  *          *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    *   95.83  * 3864.38  *   67.54  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   18.69  *  331.72  *   25.50  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  763.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.             *          *   0.034  *          *
* W.S. Elev (ft)          *  763.35  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)          *  749.63  * Flow Area (sq ft)      *          * 4664.78  *          *
* E.G. Slope (ft/ft)      *0.000320  * Area (sq ft)           *          * 4664.78  *          *
* Q Total (cfs)           *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)          *  436.67  * Top Width (ft)          *          *  436.67  *          *
* Vel Total (ft/s)        *    4.35  * Avg. Vel. (ft/s)        *          *    4.35  *          *
* Max Chl Dpth (ft)       *   30.65  * Hydr. Depth (ft)        *          *   10.68  *          *
* Conv. Total (cfs)       *1135333.0  * Conv. (cfs)             *          *1135333.0  *          *
* Length Wtd. (ft)        *   15.00  * Wetted Per. (ft)        *          *  447.87  *          *
* Min Ch El (ft)          *  732.70  * Shear (lb/sq ft)        *          *    0.21  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.90  *          *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    *  203.62  * 5328.52  *  184.56  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   37.91  *  369.98  *   45.78  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  766.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.32  * Wt. n-Val.             *          *   0.036  *          *
* W.S. Elev (ft)          *  765.92  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)          *  752.03  * Flow Area (sq ft)      *          * 5813.66  *          *
* E.G. Slope (ft/ft)      *0.000334  * Area (sq ft)           *          * 5813.66  *          *
* Q Total (cfs)           *26320.00  * Flow (cfs)              *          *26320.00  *          *
* Top Width (ft)          *  458.72  * Top Width (ft)          *          *  458.72  *          *
* Vel Total (ft/s)        *    4.53  * Avg. Vel. (ft/s)        *          *    4.53  *          *
* Max Chl Dpth (ft)       *   33.22  * Hydr. Depth (ft)        *          *   12.67  *          *
* Conv. Total (cfs)       *1439802.0  * Conv. (cfs)             *          *1439802.0  *          *
* Length Wtd. (ft)        *   15.00  * Wetted Per. (ft)        *          *  470.61  *          *
* Min Ch El (ft)          *  732.70  * Shear (lb/sq ft)        *          *    0.26  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.17  *          *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    *  314.98  * 6568.05  *  402.88  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   54.13  *  397.31  *  107.07  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)          *  769.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)          *  768.80  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)          *  756.50  * Flow Area (sq ft)      *          * 7166.72  *          *
* E.G. Slope (ft/ft)      *0.000348  * Area (sq ft)           *          * 7166.72  *    7.39  *
* Q Total (cfs)           *34000.00  * Flow (cfs)              *          *34000.00  *          *
* Top Width (ft)          *  493.12  * Top Width (ft)          *          *  480.61  *   12.51  *
* Vel Total (ft/s)        *    4.74  * Avg. Vel. (ft/s)        *          *    4.74  *          *
* Max Chl Dpth (ft)       *   36.10  * Hydr. Depth (ft)        *          *   14.91  *          *
* Conv. Total (cfs)       *1822628.0  * Conv. (cfs)             *          *1822628.0  *          *
* Length Wtd. (ft)        *   15.00  * Wetted Per. (ft)        *          *  493.32  *          *
* Min Ch El (ft)          *  732.70  * Shear (lb/sq ft)        *          *    0.32  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.50  *          *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    *  500.48  * 7843.79  *  824.39  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   82.92  *  419.53  *  169.28  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

```
CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  772.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.041  *          *
* W.S. Elev (ft)         *  772.52  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  758.54  * Flow Area (sq ft)      *          * 9007.24  *          *
* E.G. Slope (ft/ft)     *0.000350  * Area (sq ft)           *          * 9007.24  * 1038.57  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *          *44500.00  *          *
* Top Width (ft)         * 1368.19  * Top Width (ft)         *          *  508.22  *  859.97  *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *          *    4.94  *          *
* Max Chl Dpth (ft)      *   39.82  * Hydr. Depth (ft)       *          *   17.72  *          *
* Conv. Total (cfs)      *2378530.0  * Conv. (cfs)            *          *2378530.0  *          *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *          *  522.05  *          *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)       *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.86  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1179.37  * 9922.15  * 2218.72  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  273.53  *  446.86  *  473.50  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  775.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.120  *   0.042  *   0.050  *
* W.S. Elev (ft)         *  774.99  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  759.98  * Flow Area (sq ft)      *   46.54  *10274.95  * 2342.55  *
* E.G. Slope (ft/ft)     *0.000345  * Area (sq ft)           *   46.54  *10274.95  * 3819.09  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *    9.71  *51847.52  * 1832.78  *
* Top Width (ft)         * 1958.32  * Top Width (ft)         *   53.88  *  517.11  * 1387.33  *
* Vel Total (ft/s)       *    4.24  * Avg. Vel. (ft/s)       *    0.21  *    5.05  *    0.78  *
* Max Chl Dpth (ft)      *   42.29  * Hydr. Depth (ft)       *    0.86  *   19.87  *    1.69  *
* Conv. Total (cfs)      *2888888.0  * Conv. (cfs)            *   522.4  *2789750.0  * 98615.8  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *   53.92  *  531.85  * 1389.44  *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)       *    0.02  *    0.42  *    0.04  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.00  *    2.10  *    0.03  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2124.66  *11121.11  * 3757.77  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  438.95  *  453.60  *  747.16  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  777.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.120  *   0.043  *   0.050  *
* W.S. Elev (ft)         *  776.90  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  761.00  * Flow Area (sq ft)      *  170.57  *11264.65  * 5032.93  *
* E.G. Slope (ft/ft)     *0.000318  * Area (sq ft)           *  170.57  *11264.65  * 6509.47  *
* Q Total (cfs)          *62000.00  * Flow (cfs)              *   67.03  *55747.42  * 6185.55  *
* Top Width (ft)         * 2018.66  * Top Width (ft)         *   71.59  *  521.93  * 1425.14  *
* Vel Total (ft/s)       *    3.76  * Avg. Vel. (ft/s)       *    0.39  *    4.95  *    1.23  *
* Max Chl Dpth (ft)      *   44.20  * Hydr. Depth (ft)       *    2.38  *   21.58  *    3.53  *
* Conv. Total (cfs)      *3479231.0  * Conv. (cfs)            *  3761.5  *3128358.0  *347112.2  *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *   71.77  *  537.03  * 1429.22  *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)       *    0.05  *    0.42  *    0.07  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.02  *    2.06  *    0.09  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2917.77  *11854.64  * 5151.15  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  543.41  *  455.00  * 1038.23  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  779.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.120  *   0.044  *   0.050  *
* W.S. Elev (ft)         *  779.27  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  762.29  * Flow Area (sq ft)      *  351.56  *12509.36  * 8601.67  *
* E.G. Slope (ft/ft)     *0.000288  * Area (sq ft)           *  351.56  *12509.36  *10078.21  *
* Q Total (cfs)          *74720.00  * Flow (cfs)              *  195.60  *60614.20  *13910.20  *
* Top Width (ft)         * 2169.74  * Top Width (ft)         *   81.07  *  527.92  * 1560.74  *
* Vel Total (ft/s)       *    3.48  * Avg. Vel. (ft/s)       *    0.56  *    4.85  *    1.62  *
* Max Chl Dpth (ft)      *   46.57  * Hydr. Depth (ft)       *    4.34  *   23.70  *    5.51  *
* Conv. Total (cfs)      *4404976.0  * Conv. (cfs)            * 11531.4  *3573395.0  *820049.5  *
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* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *   81.54  *  543.47  * 1569.86  *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)       *    0.08  *    0.41  *    0.10  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.04  *    2.00  *    0.16  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 4551.01  *13027.40  * 8134.23  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  709.06  *  457.08  * 1346.64  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  770.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *    0.039  *          *
* W.S. Elev (ft)         *  770.22  * Reach Len. (ft)        *   15.00  *   15.00  *   15.00  *
* Crit W.S. (ft)         *  757.39  * Flow Area (sq ft)      *          * 7855.32  *          *
* E.G. Slope (ft/ft)     *0.000352  * Area (sq ft)           *          * 7855.32  *   48.14  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  542.13  * Top Width (ft)         *          *  491.34  *   50.78  *
* Vel Total (ft/s)       *    4.84  * Avg. Vel. (ft/s)       *          *    4.84  *          *
* Max Chl Dpth (ft)      *   37.52  * Hydr. Depth (ft)       *          *   15.99  *          *
* Conv. Total (cfs)      *2026196.0  * Conv. (cfs)            *          *2026196.0  *          *
* Length Wtd. (ft)       *   15.00  * Wetted Per. (ft)       *          *  504.46  *          *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.65  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  639.40  * 8528.18  * 1132.22  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  116.74  *  429.68  *  218.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 12.700

INPUT
Description: 63rd St Bridge  B-23
Distance from Upstream XS =      15
Deck/Roadway Width        =      62
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
     270     820     814     368   816.8   810.8     810   801.6   795.6
    1172   789.3   783.3    1207     788     782

Upstream Bridge Cross Section Data
Station Elevation Data    num=     185
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  824.83     .09  824.83   18.95  825.91   51.52  825.34   60.53  825.09
     280     820     387     816     516     780     532     776     560     774
     600     774     603     772     629     762     647     760  707.27   756.6
  718.02  755.84  751.93  755.76  761.19  755.74     786     752     819     742
     829   733.7     850   732.7     872   733.7     882     742     902     752
  932.95  754.94  942.26  754.87  942.46  754.86  943.41  754.88  943.67  754.88
  945.99  754.98   978.1  756.45  980.27  756.59  1029.7  759.88 1045.86  760.47
 1053.08  761.84    1078     766 1111.32   772.7    1150     788    1207     788
    1447     780    1579     776    1915     774 2011.01  773.88 2047.26  773.51
 2057.46  773.45  2068.9  773.35 2088.29  773.33 2094.68  773.02 2097.55  773.31
 2130.72  773.04 2131.86  772.97 2150.76  772.93  2167.4  772.72 2169.15  772.81
 2180.16  772.48 2203.26  771.84 2211.63   771.9 2231.58  772.01 2235.73  771.98
 2237.87  771.96 2244.48  771.84 2265.59  771.57 2278.36  770.91 2280.59  770.89
 2283.04  770.84 2289.71  771.02 2307.69  770.79 2314.21  770.84 2320.38  770.62
 2338.33  770.79 2345.76  770.73 2353.23  770.86  2364.2  771.63  2384.7  771.66
 2394.46  770.76 2403.28  770.53  2422.2  771.66 2432.71  769.07 2435.27  769.02
 2436.25  769.01 2436.89  769.09 2437.44  769.07 2449.51  771.33 2466.15  771.73
 2469.41  771.54 2484.34  770.46 2501.52  770.69 2514.28  771.74 2520.92  771.71
 2529.08  771.14 2544.04  771.31 2545.37  771.47 2547.45  771.67 2555.96  771.63
 2576.32  771.54 2577.44  771.74 2579.68  772.07 2590.44  771.47 2611.99  771.18
 2618.52  771.23  2632.8  771.87 2645.35  770.68 2656.47  770.55 2658.83  770.57
 2660.69  770.33 2665.93  769.81 2673.73   767.8 2674.24  767.86 2674.54  767.82
  2676.1  767.87 2676.86   767.9 2692.46  770.46 2707.68  770.89 2710.81  771.19
 2711.24   771.1 2711.89  771.12 2719.33  771.73 2725.24  771.89 2733.73  771.77
```

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 2770.62  771.37 2775.64  771.39 2781.82  771.38 2800.24  772.41 2817.39  772.66
 2837.93   771.4 2839.22  771.33 2847.56  771.57 2860.49  771.47 2874.21     770
 2874.48  769.97 2888.86  770.91 2891.69  770.69 2894.86  770.94 2929.38  771.74
  2930.5  771.68 2936.29  771.92  2940.9  772.31 2955.72  773.34 2981.86   771.7
 2991.97  771.65 2993.72  771.66 3010.09  772.15 3019.27  772.98 3026.74  773.02
  3031.6  772.31 3057.17  771.72 3070.82  771.54 3085.62  772.34  3102.6  772.89
 3106.98  773.22 3111.77  773.41 3129.59  774.11 3155.66  777.83 3172.85  776.66
 3178.75  777.37 3191.51  777.15 3193.15  777.08 3226.25  780.94 3239.83  783.27
  3267.1  784.86 3277.88  787.26 3280.36  786.63 3284.12  786.91 3313.81  788.87
 3315.37  788.48  3332.5  787.37  3342.9  787.65 3344.87  787.58 3350.14  791.12
 3357.99  796.18 3360.64  797.45 3364.77  799.16 3365.11  799.36 3366.59  799.93
 3368.03   800.2  3380.5  802.64 3382.79  803.92 3391.24  806.81 3393.08  806.81
 3395.66  806.98 3406.61  807.16 3418.72  807.48 3436.67  807.52 3436.92  807.47

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     516     .12  761.19     .03  932.95     .12    1150     .05
 3155.66     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
           600    1150            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 2009.49  3185.6     773       T
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
************************
    1550    1730     800

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
     270     820     814     368   816.8   810.8     810   801.6   795.6
    1143   789.3   783.3    1178     788     782

Downstream Bridge Cross Section Data
Station Elevation Data    num=     161
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   826.3      12     826   36.02  822.84   49.43   822.6  105.78  821.01
     270     820     381     816     439     800     509     776     528     776
     560     772     584     764     631     760  645.25  758.66  665.72  758.04
  696.46  757.16  714.72  756.05  717.07  755.88   721.1  755.87  724.45  755.86
     740     754     762     742     772   733.7     803   732.7     834   733.7
     844     742     875     754  893.07  755.79  902.71  755.87  961.67  756.35
  973.63   756.9 1010.06  759.29 1023.92  760.21 1028.47  760.38 1061.82  766.68
 1072.37  767.62  1102.5  778.37    1121     788    1178     788    1418     780
    1628     776    1984     774 2074.74  773.28 2075.86  773.28 2076.97  773.27
 2101.86  773.03 2143.64  772.06 2152.77  772.48 2168.55  772.37 2187.31  771.73
 2199.73  769.36  2224.3  771.74 2233.61  771.66 2271.22  771.09 2288.83  770.85
 2301.53  770.87 2311.13     771 2311.15     771 2352.32  770.93 2356.69  770.83
 2358.49  770.94    2361  770.96 2387.06     771 2417.91  771.66 2420.03  771.66
 2420.33  771.67 2421.26  771.65 2431.09  771.66  2458.2  771.68 2458.41  771.68
 2500.69   771.4 2501.52  771.38 2502.81  771.37 2503.51  771.39 2544.52  771.04
 2559.39  771.61 2560.35  771.61 2560.74  771.61 2606.36  771.74 2607.05  771.73
 2607.69  771.73 2645.84  771.26 2646.71  771.29  2668.4  771.66 2669.16   771.6
 2673.76  771.71 2696.38  771.53 2698.77  771.56 2712.44   771.5 2734.18  771.54
 2737.55   771.5 2765.37  771.49 2769.77   771.5 2769.78   771.5 2770.81  771.47
 2773.27  771.47 2790.91  771.47 2807.65  771.26 2808.59  771.25 2811.27  771.17
 2814.62  771.24 2839.09   771.5 2859.15  770.13 2873.47  771.66  2880.1  771.67
 2884.47   771.4  2894.9  771.61 2914.65  771.76 2920.94  771.81 2927.37  771.88
 2936.12  772.03 2941.02  771.96 2972.27  771.91 2974.18   771.9 2979.29  771.92
 2984.51  771.59 2985.41  771.97 2986.94  772.13  3009.5  772.73  3024.1  773.58
 3025.15  773.46 3030.29  774.53 3031.82   774.6 3032.22  774.93 3033.77  774.95
 3055.92  777.75 3060.84  778.41 3067.12  778.61 3071.85  779.02 3075.04  779.48
  3078.1  779.73 3078.24  779.75 3078.53  779.79 3082.79  778.93 3083.32     779
 3084.59  779.23 3084.63  779.23 3089.56  780.19 3102.11  780.61 3125.17  781.38
 3143.83  781.34 3149.22  782.27 3180.78  782.97 3199.15  783.61 3200.89   783.8
 3204.38  784.14 3250.68  787.88 3269.09  790.02 3275.86     791 3294.48  792.52
 3296.77  792.75 3316.51  794.09 3318.32  794.26 3323.57  794.71 3337.17  796.94
 3342.95  797.53 3351.57  798.78 3358.75   801.8 3362.44  803.62 3369.45     807
 3380.54  813.01

Manning's n Values        num=       6
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     509     .12     740    .035     875     .12    1121     .05
  3009.5     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
           528    1121            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1981.38  3073.5     773       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1520    1700     800

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  5

Pier Data
Pier Station     Upstream=     520    Downstream=     480
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     770       5     807
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     770       5     807

Pier Data
Pier Station     Upstream=     650    Downstream=     610
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     803
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     803

Pier Data
Pier Station     Upstream=     780    Downstream=     740
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     745       5     798
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     745       5     798

Pier Data
Pier Station     Upstream=     910    Downstream=     870
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     745       5     798
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     745       5     798

Pier Data
Pier Station     Upstream=    1040    Downstream=    1000
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     789
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
       5     755       5     789

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     759.81  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     759.52  * E.G. Elev (ft)         *     759.80  *     759.76  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     759.50  *     759.51  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     746.21  *     743.85  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.80  *      26.81  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.39  *       4.05  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3007.92  *    3255.25  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   27409.54  *   32549.89  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *       8.40  *       8.99  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *     395.31  *     401.87  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  676181.8  *  733485.1  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     358.16  *     362.15  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.02  *       0.01  *
* BR Open Vel (ft/s)     *       4.39  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.18  *       0.16  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.79  *       0.66  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     763.65  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     763.35  * E.G. Elev (ft)         *     763.64  *     763.60  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     763.33  *     763.32  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     749.65  *     747.09  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      30.63  *      30.62  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.50  *       4.24  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4515.21  *    4785.78  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   42769.50  *   48819.58  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *      10.84  *      11.08  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *     482.66  *     498.24  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  967784.8  *  973226.2  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     416.44  *     432.11  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.03  *       0.01  *
* BR Open Vel (ft/s)     *       4.50  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.26  *       0.26  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.16  *       1.11  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     766.24  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     765.92  * E.G. Elev (ft)         *     766.23  *     766.19  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     765.89  *     765.88  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     752.01  *     749.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.19  *      33.18  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.69  *       4.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5610.22  *    5931.71  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   56727.32  *   63470.17  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *      12.80  *      12.92  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *     525.85  *     546.42  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  1187050.0  *  1156362.0  *
```

```
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     438.45  *     459.25  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.03  *       0.01  *
* BR Open Vel (ft/s)     *       4.69  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.33  *       0.35  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.54  *       1.56  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     769.15  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     768.80  * E.G. Elev (ft)         *     769.14  *     769.09  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     768.77  *     768.76  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     756.66  *     751.81  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.07  *      36.06  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.93  *       4.66  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6902.90  *    7293.17  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   76073.23  *   83749.50  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *      15.00  *      15.01  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *     571.57  *     596.77  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  1452867.0  *  1380087.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     460.34  *     485.83  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       4.93  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.41  *       0.46  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.03  *       2.16  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     772.90  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     772.52  * E.G. Elev (ft)         *     772.89  *     772.84  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     772.48  *     772.47  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     758.72  *     757.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.78  *      39.77  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.13  *       4.87  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8666.17  *    9138.34  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  106871.60  *  116048.20  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *      17.76  *      17.93  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *     630.04  *     651.59  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  1823861.0  *  1697359.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     487.96  *     509.74  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       5.13  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.51  *       0.60  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.62  *       2.93  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     775.37  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     774.99  * E.G. Elev (ft)         *     775.37  *     775.31  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     774.97  *     774.95  *
* Q Bridge (cfs)         *   51327.16  * Crit W.S. (ft)         *     760.09  *     759.28  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      42.27  *      42.25  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.39  *       4.30  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12242.39  *   12486.26  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  133291.80  *  143421.70  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *       6.33  *       7.11  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *    2098.32  *    1918.92  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  2188230.0  *  2006867.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *    1933.32  *    1755.70  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       5.17  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.22  *       0.29  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.96  *       1.25  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     777.24  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     776.90  * E.G. Elev (ft)         *     777.23  *     777.19  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     776.90  *     776.88  *
* Q Bridge (cfs)         *   53911.12  * Crit W.S. (ft)         *     761.09  *     760.42  *
```

```
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      44.20  *      44.18  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.86  *       3.85  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   16056.66  *   16104.92  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  160937.20  *  171325.50  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *       8.03  *       8.38  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *    2181.50  *    2101.52  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  2659121.0  *  2415834.0  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *    1998.58  *    1920.92  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       4.89  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.25  *       0.32  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.96  *       1.21  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     779.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     779.27  * E.G. Elev (ft)         *     779.56  *     779.52  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     779.28  *     779.27  *
* Q Bridge (cfs)         *   56731.11  * Crit W.S. (ft)         *     762.41  *     761.79  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.58  *      46.57  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.55  *       3.60  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   21036.63  *   20771.08  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.16  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  205838.00  *  216022.50  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *       9.80  *      10.25  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *    2355.47  *    2229.87  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  3420945.0  *  3098833.0  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *    2146.83  *    2025.49  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.03  *       0.01  *
* BR Open Vel (ft/s)     *       4.57  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.27  *       0.34  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.94  *       1.22  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     770.58  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     770.22  * E.G. Elev (ft)         *     770.57  *     770.52  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     770.18  *     770.17  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     757.47  *     752.86  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      37.48  *      37.47  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.03  *       4.76  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7561.91  *    7986.02  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   87035.56  *   95244.84  *
* Min El Weir Flow (ft)  *     773.01  * Hydr Depth (ft)        *      16.05  *      16.17  *
* Min El Prs (ft)        *     809.32  * W.P. Total (ft)        *     594.01  *     616.76  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  1590535.0  *  1498004.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     471.06  *     494.03  *
* BR Open Area (sq ft)   *   23116.71  * Frctn Loss (ft)        *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       5.03  * C & E Loss (ft)        *       0.01  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.52  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.28  *       2.48  *
*********************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.690

INPUT
Description: Just D/S of 63rd St.  Chnl & OBs corrected from surface to match
             2-ft contours from 2D KCMO CADD files.
Station Elevation Data    num=     161
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
       0   826.3      12     826   36.02  822.84   49.43   822.6  105.78  821.01
     270     820     381     816     439     800     509     776     528     776
     560     772     584     764     631     760  645.25  758.66  665.72  758.04
  696.46  757.16  714.72  756.05  717.07  755.88   721.1  755.87  724.45  755.86
     740     754     762     742     772   733.7     803   732.7     834   733.7
     844     742     875     754  893.07  755.79  902.71  755.87  961.67  756.35
  973.63   756.9 1010.06  759.29 1023.92  760.21 1028.47  760.38 1061.82  766.68
```

```
 1072.37  767.62  1102.5  778.37    1121     788    1178     788    1418     780
    1628     776    1984     774 2074.74  773.28 2075.86  773.28 2076.97  773.27
 2101.86  773.03 2143.64  772.06 2152.77  772.48 2168.55  772.37 2187.31  771.73
 2199.73  769.36  2224.3  771.74 2233.61  771.66 2271.22  771.09 2288.83  770.85
 2301.53  770.87 2311.13     771 2311.15     771 2352.32  770.93 2356.69  770.83
 2358.49  770.94    2361  770.96 2387.06     771 2417.91  771.66 2420.03  771.66
 2420.33  771.67 2421.26  771.65 2431.09  771.66  2458.2  771.68 2458.41  771.68
 2500.69   771.4 2501.52  771.38 2502.81  771.37 2503.51  771.39 2544.52  771.04
 2559.39  771.61 2560.35  771.61 2560.74  771.61 2606.36  771.74 2607.05  771.73
 2607.69  771.73 2645.84  771.26 2646.71  771.29  2668.4  771.66 2669.16   771.6
 2673.76  771.71 2696.38  771.53 2698.77  771.56 2712.44   771.5 2734.18  771.54
 2737.55   771.5 2765.37  771.49 2769.77   771.5 2769.78   771.5 2770.81  771.47
 2773.27  771.47 2790.91  771.47 2807.65  771.26 2808.59  771.25 2811.27  771.17
 2814.62  771.24 2839.09   771.5 2859.15  770.13 2873.47  771.66  2880.1  771.67
 2884.47   771.4  2894.9  771.61 2914.65  771.76 2920.94  771.81 2927.37  771.88
 2936.12  772.03 2941.02  771.96 2972.27  771.91 2974.18   771.9 2979.29  771.92
 2984.51  771.59 2985.41  771.97 2986.94  772.13  3009.5  772.73  3024.1  773.58
 3025.15  773.46 3030.29  774.53 3031.82   774.6 3032.22  774.93 3033.77  774.95
 3055.92  777.75 3060.84  778.41 3067.12  778.61 3071.85  779.02 3075.04  779.48
  3078.1  779.73 3078.24  779.75 3078.53  779.79 3082.79  778.93 3083.32     779
 3084.59  779.23 3084.63  779.23 3089.56  780.19 3102.11  780.61 3125.17  781.38
 3143.83  781.34 3149.22  782.27 3180.78  782.97 3199.15  783.61 3200.89   783.8
 3204.38  784.14 3250.68  787.88 3269.09  790.02 3275.86     791 3294.48  792.52
 3296.77  792.75 3316.51  794.09 3318.32  794.26 3323.57  794.71 3337.17  796.94
 3342.95  797.53 3351.57  798.78 3358.75   801.8 3362.44  803.62 3369.45     807
 3380.54  813.01

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .05     509     .12     740    .035     875     .12    1121     .05
  3009.5     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           528    1121           475.6  391.58   15.38             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1981.38  3073.5     773       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1520    1700     800

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *          *   0.037  *          *
* W.S. Elev (ft)         *  759.51  * Reach Len. (ft)        *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3326.33  *          *
* E.G. Slope (ft/ft)     *0.000270  * Area (sq ft)           *          * 3326.33  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  377.19  * Top Width (ft)          *          *  377.19  *          *
* Vel Total (ft/s)       *    3.97  * Avg. Vel. (ft/s)        *          *    3.97  *          *
* Max Chl Dpth (ft)      *   26.81  * Hydr. Depth (ft)        *          *    8.82  *          *
* Conv. Total (cfs)      *803596.6  * Conv. (cfs)             *          *803596.6  *          *
* Length Wtd. (ft)       *  391.58  * Wetted Per. (ft)        *          *  388.92  *          *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.57  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)    *   95.83  * 3857.38  *   67.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   18.69  *  330.91  *   25.50  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  763.33  * Reach Len. (ft)        *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4922.59  *          *
* E.G. Slope (ft/ft)     *0.000326  * Area (sq ft)           *          * 4922.59  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)         *  452.16  * Top Width (ft)          *          *  452.16  *          *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)        *          *    4.12  *          *
* Max Chl Dpth (ft)      *   30.63  * Hydr. Depth (ft)        *          *   10.89  *          *
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* Conv. Total (cfs)      *1123541.0  * Conv. (cfs)            *          *1123541.0  *          *
* Length Wtd. (ft)       *  391.58  * Wetted Per. (ft)        *          *  464.36  *          *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.89  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)    *  203.62  * 5318.12  *  184.56  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   37.91  *  369.03  *   45.78  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  766.17  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.              *          *   0.043  *          *
* W.S. Elev (ft)         *  765.89  * Reach Len. (ft)         *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          * 6120.34  *          *
* E.G. Slope (ft/ft)     *0.000365  * Area (sq ft)            *          * 6120.34  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *26320.00  *          *
* Top Width (ft)         *  479.28  * Top Width (ft)          *          *  479.28  *          *
* Vel Total (ft/s)       *    4.30  * Avg. Vel. (ft/s)        *          *    4.30  *          *
* Max Chl Dpth (ft)      *   33.19  * Hydr. Depth (ft)        *          *   12.77  *          *
* Conv. Total (cfs)      *1377086.0  * Conv. (cfs)            *          *1377086.0  *          *
* Length Wtd. (ft)       *  391.58  * Wetted Per. (ft)        *          *  492.05  *          *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.22  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)    *  314.98  * 6555.13  *  402.88  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   54.13  *  396.30  *  107.07  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  769.08  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.              *          *   0.045  *          *
* W.S. Elev (ft)         *  768.76  * Reach Len. (ft)         *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          * 7539.94  *          *
* E.G. Slope (ft/ft)     *0.000402  * Area (sq ft)            *          * 7539.94  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *34000.00  *          *
* Top Width (ft)         *  505.86  * Top Width (ft)          *          *  505.86  *          *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)        *          *    4.51  *          *
* Max Chl Dpth (ft)      *   36.06  * Hydr. Depth (ft)        *          *   14.91  *          *
* Conv. Total (cfs)      *1695916.0  * Conv. (cfs)            *          *1695916.0  *          *
* Length Wtd. (ft)       *  391.58  * Wetted Per. (ft)        *          *  519.40  *          *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *          *    0.36  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.64  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)    *  500.48  * 7827.89  *  824.38  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   82.92  *  418.47  *  169.28  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  772.82  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.              *          *   0.048  *          *
* W.S. Elev (ft)         *  772.48  * Reach Len. (ft)         *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          * 9460.15  *          *
* E.G. Slope (ft/ft)     *0.000424  * Area (sq ft)            *          * 9460.15  *  895.99  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *          *44500.00  *          *
* Top Width (ft)         * 1403.77  * Top Width (ft)          *          *  529.81  *  873.96  *
* Vel Total (ft/s)       *    4.70  * Avg. Vel. (ft/s)        *          *    4.70  *          *
* Max Chl Dpth (ft)      *   39.78  * Hydr. Depth (ft)        *          *   17.86  *          *
* Conv. Total (cfs)      *2162147.0  * Conv. (cfs)            *          *2162147.0  *          *
* Length Wtd. (ft)       *  391.32  * Wetted Per. (ft)        *          *  544.55  *          *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *          *    0.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.16  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)    * 1179.37  * 9902.21  * 2218.34  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  273.53  *  445.74  *  473.15  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
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         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  775.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.050  *   0.050  *
* W.S. Elev (ft)         *  774.95  * Reach Len. (ft)        *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *10803.37  * 2049.00  *
* E.G. Slope (ft/ft)     *0.000432  * Area (sq ft)           *          *10803.37  * 3413.97  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *          *51905.06  * 1784.94  *
* Top Width (ft)         * 1775.49  * Top Width (ft)          *          *  556.52  * 1218.97  *
* Vel Total (ft/s)       *    4.18  * Avg. Vel. (ft/s)        *          *    4.80  *    0.87  *
* Max Chl Dpth (ft)      *   42.25  * Hydr. Depth (ft)        *          *   19.41  *    1.68  *
* Conv. Total (cfs)      *2584344.0  * Conv. (cfs)            *          *2498427.0  * 85917.3  *
* Length Wtd. (ft)       *  371.54  * Wetted Per. (ft)        *          *  571.85  * 1219.91  *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *          *    0.51  *    0.05  *
* Alpha                  *    1.28  * Stream Power (lb/ft s)   *          *    2.45  *    0.04  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)     * 2124.62  *11098.35  * 3749.79  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)           *  438.90  *  452.44  *  744.28  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  777.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.114  *   0.051  *   0.050  *
* W.S. Elev (ft)         *  776.86  * Reach Len. (ft)        *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   17.50  *11884.83  * 4578.08  *
* E.G. Slope (ft/ft)     *0.000403  * Area (sq ft)           *   17.50  *11884.83  * 5943.05  *
* Q Total (cfs)          *62000.00  * Flow (cfs)              *    4.06  *55837.93  * 6158.01  *
* Top Width (ft)         * 1940.71  * Top Width (ft)          *   21.52  *  570.28  * 1348.91  *
* Vel Total (ft/s)       *    3.76  * Avg. Vel. (ft/s)        *    0.23  *    4.70  *    1.35  *
* Max Chl Dpth (ft)      *   44.16  * Hydr. Depth (ft)        *    0.81  *   20.84  *    3.39  *
* Conv. Total (cfs)      *3087355.0  * Conv. (cfs)            *   202.1  *2780508.0  *306644.5  *
* Length Wtd. (ft)       *  343.80  * Wetted Per. (ft)        *   21.66  *  586.00  * 1351.23  *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *    0.02  *    0.51  *    0.09  *
* Alpha                  *    1.42  * Stream Power (lb/ft s)   *    0.00  *    2.40  *    0.11  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)     * 2917.57  *11829.62  * 5137.32  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)           *  543.31  *  453.82  * 1035.15  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
*************************************************************************************************
* E.G. Elev (ft)         *  779.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.101  *   0.053  *   0.050  *
* W.S. Elev (ft)         *  779.23  * Reach Len. (ft)        *  475.60  *  391.58  *   15.38  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   76.68  *13243.86  * 7837.54  *
* E.G. Slope (ft/ft)     *0.000367  * Area (sq ft)           *   76.68  *13243.86  * 9202.50  *
* Q Total (cfs)          *74720.00  * Flow (cfs)              *   43.41  *60525.21  *14151.39  *
* Top Width (ft)         * 2043.04  * Top Width (ft)          *   28.43  *  576.16  * 1438.45  *
* Vel Total (ft/s)       *    3.53  * Avg. Vel. (ft/s)        *    0.57  *    4.57  *    1.81  *
* Max Chl Dpth (ft)      *   46.53  * Hydr. Depth (ft)        *    2.70  *   22.99  *    5.45  *
* Conv. Total (cfs)      *3898933.0  * Conv. (cfs)            *  2265.0  *3158240.0  *738427.6  *
* Length Wtd. (ft)       *  308.03  * Wetted Per. (ft)        *   28.97  *  592.36  * 1444.53  *
* Min Ch El (ft)         *  732.70  * Shear (lb/sq ft)        *    0.06  *    0.51  *    0.12  *
* Alpha                  *    1.41  * Stream Power (lb/ft s)   *    0.03  *    2.34  *    0.22  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)     * 4550.54  *12999.55  * 8112.79  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)           *  708.94  *  455.89  * 1343.32  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
*************************************************************************************************
* E.G. Elev (ft)         *  770.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.046  *          *
* W.S. Elev (ft)         *  770.18  * Reach Len. (ft)        *  475.60  *  391.58  *   15.38  *
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* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 8261.37  *          *
* E.G. Slope (ft/ft)      *0.000414  * Area (sq ft)           *          * 8261.37  *    5.22  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)          *  527.90  * Top Width (ft)          *          *  514.07  *   13.83  *
* Vel Total (ft/s)        *    4.60  * Avg. Vel. (ft/s)        *          *    4.60  *          *
* Max Chl Dpth (ft)       *   37.48  * Hydr. Depth (ft)        *          *   16.07  *          *
* Conv. Total (cfs)       *1867214.0  * Conv. (cfs)             *          *1867214.0  *          *
* Length Wtd. (ft)        *  391.58  * Wetted Per. (ft)        *          *  528.09  *          *
* Min Ch El (ft)          *  732.70  * Shear (lb/sq ft)        *          *    0.40  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.86  *          *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)    *  639.40  * 8510.77  * 1132.21  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  116.74  *  428.59  *  218.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.616

INPUT
Description: Chnl & ROB corrected from surface to match 2-ft contours from 2D
             KCMO CADD files.  Min Chnl Elev interpolated from 63rd St Bridge &
             Grade Control Structure.  Blocked and ineffective areas on ROB
             added to control flow over road.
Station Elevation Data    num=     158
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   802.4   24.21  801.97   28.58  801.93   34.45  801.91   49.31  800.83
    53.4  800.45   69.34  799.31   93.69  794.85  192.45  785.74  207.99  784.78
  231.31  783.08  292.41  781.68  310.72  779.97   385.7  777.44  528.24  776.65
  535.26  775.68  553.32  777.23  556.15  777.51  556.43  777.53   556.5  777.54
     577     776     603     760  629.57  754.61     635     752     657     740
     667   733.6     686  732.63     705   733.6     715     740     725     746
     743     752     762     754  809.13  755.21  815.07  755.15  825.57  755.37
  867.61  755.78  909.92  755.33   923.3  755.31  963.53  756.15  978.74  756.77
  999.63   757.5 1030.74  758.22 1034.55  758.23 1082.02  761.72 1113.82  763.98
    1164  773.37    1202     788    1210     788    1244     786    1364     780
    1715     776    2035     774  2109.3  772.86 2111.37  773.18 2112.77  773.16
 2113.19  773.16 2114.23  773.13  2116.7  772.59 2124.62  773.04  2173.5  771.91
 2182.02   772.3 2189.98  771.33 2192.15  772.24 2211.03  771.59  2252.9  770.07
 2266.11  771.31  2308.5  770.94 2322.71  770.73 2325.57  770.69 2327.63  770.69
 2330.35  770.73    2365     770    2450     769    2470     769 2531.18  769.99
 2532.39  769.91 2533.44  769.92 2587.29  770.17 2589.21  770.17 2590.06  770.37
 2592.09  770.57 2604.02  769.98 2624.11  770.35 2632.17  770.37 2638.47  770.54
 2645.61  769.92 2650.42  770.21 2690.21  769.84 2692.29  769.82 2692.32  769.82
 2702.95  769.92  2707.5  769.79 2709.17  769.87 2714.51  770.55 2726.98   770.8
 2740.89  771.17 2745.06  771.15 2749.15  771.16 2763.46  771.23 2783.79  771.17
 2803.06  771.16 2803.69  771.14 2818.21  771.26 2820.97   771.3  2827.5  771.27
 2839.06  771.16 2839.31  771.16 2856.12  771.38 2858.69  771.44 2859.06  771.29
 2861.03  771.23 2914.35  771.22 2916.34  771.74 2919.27  771.31 2922.28  771.74
 2943.96  771.91 2957.61  772.02 2961.68  772.06 2963.05  772.09 2966.08  772.04
 2968.54  770.92 2972.38  769.69 2974.06  770.01 2979.24  769.81 2990.12  770.18
 2994.46  770.05  2997.7  772.01 3004.41  773.83  3005.2  773.83 3016.44  774.19
 3024.26  774.57 3033.82  774.68 3041.71  774.83    3043  774.77  3045.9  775.06
 3055.18  775.94 3076.89  778.09 3085.32  779.16 3095.33  780.05 3099.77  779.95
 3118.47  780.43 3143.41  780.46 3166.57  781.23 3205.43  782.84 3220.46  783.37
  3240.1  785.52 3240.17  785.53 3240.94   785.6 3271.61  788.28 3284.09   789.7
 3298.03  791.18 3300.88  793.25 3306.88  794.99 3309.48   796.9 3313.36  798.65
 3318.75  800.66 3335.96  799.51 3338.29  799.35

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .05  528.24      .1  629.57    .035     762      .1    1202     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           577    1202           141.92  421.02   11.63              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 2031.66 3084.76     772       T
Blocked Obstructions     num=       2
```

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   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
     380     470     795    2200    3000     771

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  759.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.083  *          *
* W.S. Elev (ft)         *  759.23  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3205.05  *          *
* E.G. Slope (ft/ft)     *0.003842  * Area (sq ft)           *          * 3205.05  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  441.28  * Top Width (ft)         *          *  441.28  *          *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *          *    4.12  *          *
* Max Chl Dpth (ft)      *   26.60  * Hydr. Depth (ft)       *          *    7.26  *          *
* Conv. Total (cfs)      *212958.1  * Conv. (cfs)            *          *212958.1  *          *
* Length Wtd. (ft)       *  421.02  * Wetted Per. (ft)       *          *  452.04  *          *
* Min Ch El (ft)         *  732.63  * Shear (lb/sq ft)       *          *    1.70  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    7.00  *          *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *   95.83  * 3828.02  *   67.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   18.69  *  327.23  *   25.50  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  763.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.085  *          *
* W.S. Elev (ft)         *  763.06  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5016.14  *          *
* E.G. Slope (ft/ft)     *0.002559  * Area (sq ft)           *          * 5016.14  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  502.79  * Top Width (ft)         *          *  502.79  *          *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *          *    4.05  *          *
* Max Chl Dpth (ft)      *   30.43  * Hydr. Depth (ft)       *          *    9.98  *          *
* Conv. Total (cfs)      *401292.0  * Conv. (cfs)            *          *401292.0  *          *
* Length Wtd. (ft)       *  421.02  * Wetted Per. (ft)       *          *  514.63  *          *
* Min Ch El (ft)         *  732.63  * Shear (lb/sq ft)       *          *    1.56  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.30  *          *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *  203.62  * 5273.45  *  184.56  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   37.91  *  364.74  *   45.78  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  765.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *          *   0.086  *          *
* W.S. Elev (ft)         *  765.61  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 6341.80  *          *
* E.G. Slope (ft/ft)     *0.002146  * Area (sq ft)           *          * 6341.80  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  528.67  * Top Width (ft)         *          *  528.67  *          *
* Vel Total (ft/s)       *    4.15  * Avg. Vel. (ft/s)       *          *    4.15  *          *
* Max Chl Dpth (ft)      *   32.98  * Hydr. Depth (ft)       *          *   12.00  *          *
* Conv. Total (cfs)      *568193.9  * Conv. (cfs)            *          *568193.9  *          *
* Length Wtd. (ft)       *  421.02  * Wetted Per. (ft)       *          *  541.42  *          *
* Min Ch El (ft)         *  732.63  * Shear (lb/sq ft)       *          *    1.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.51  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *  314.98  * 6499.12  *  402.88  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   54.13  *  391.77  *  107.07  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  768.78  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.29  * Wt. n-Val.              *          *   0.086  *          *
* W.S. Elev (ft)         *  768.49  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 7890.37  *          *
* E.G. Slope (ft/ft)     *0.001843  * Area (sq ft)           *          * 7890.37  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  548.71  * Top Width (ft)         *          *  548.71  *          *
* Vel Total (ft/s)       *    4.31  * Avg. Vel. (ft/s)       *          *    4.31  *          *
* Max Chl Dpth (ft)      *   35.86  * Hydr. Depth (ft)       *          *   14.38  *          *
* Conv. Total (cfs)      *791966.5  * Conv. (cfs)            *          *791966.5  *          *
* Length Wtd. (ft)       *  421.02  * Wetted Per. (ft)       *          *  562.53  *          *
* Min Ch El (ft)         *  732.63  * Shear (lb/sq ft)       *          *    1.61  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.95  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *  500.48  * 7758.54  *  824.38  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   82.92  *  413.73  *  169.28  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  772.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.              *          *   0.087  *   0.060  *
* W.S. Elev (ft)         *  772.22  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 9984.51  *  175.18  *
* E.G. Slope (ft/ft)     *0.001555  * Area (sq ft)           *          * 9984.51  *  875.10  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *44439.34  *   60.66  *
* Top Width (ft)         * 1409.70  * Top Width (ft)         *          *  574.69  *  835.01  *
* Vel Total (ft/s)       *    4.38  * Avg. Vel. (ft/s)       *          *    4.45  *    0.35  *
* Max Chl Dpth (ft)      *   39.59  * Hydr. Depth (ft)       *          *   17.37  *    0.21  *
* Conv. Total (cfs)      *1128646.0  * Conv. (cfs)            *          *1127107.0  *  1538.4  *
* Length Wtd. (ft)       *  420.74  * Wetted Per. (ft)       *          *  589.92  *  835.99  *
* Min Ch El (ft)         *  732.63  * Shear (lb/sq ft)       *          *    1.64  *    0.02  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *          *    7.31  *    0.01  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   * 1179.37  * 9814.81  * 2218.03  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  273.53  *  440.77  *  472.85  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  775.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.              *          *   0.087  *   0.060  *
* W.S. Elev (ft)         *  774.74  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *11456.83  * 2560.55  *
* E.G. Slope (ft/ft)     *0.001284  * Area (sq ft)           *          *11456.83  * 3262.54  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *          *49753.52  * 3936.48  *
* Top Width (ft)         * 1709.88  * Top Width (ft)         *          *  588.53  * 1121.35  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *          *    4.34  *    1.54  *
* Max Chl Dpth (ft)      *   42.11  * Hydr. Depth (ft)       *          *   19.47  *    2.28  *
* Conv. Total (cfs)      *1498574.0  * Conv. (cfs)            *          *1388700.0  *109873.3  *
* Length Wtd. (ft)       *  392.44  * Wetted Per. (ft)       *          *  604.83  * 1122.69  *
* Min Ch El (ft)         *  732.63  * Shear (lb/sq ft)       *          *    1.52  *    0.18  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *          *    6.59  *    0.28  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 2124.62  *10998.29  * 3748.61  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  438.90  *  447.29  *  743.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  776.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.              *   0.100  *   0.087  *   0.060  *
* W.S. Elev (ft)         *  776.71  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   13.51  *12618.61  * 5079.50  *
* E.G. Slope (ft/ft)     *0.001054  * Area (sq ft)           *   13.51  *12618.61  * 5781.49  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *    3.92  *52404.17  * 9591.92  *
```

```
* Top Width (ft)          * 2043.85  * Top Width (ft)          *   38.37  *  595.66  * 1409.82  *
* Vel Total (ft/s)        *    3.50  * Avg. Vel. (ft/s)        *    0.29  *    4.15  *    1.89  *
* Max Chl Dpth (ft)       *   44.08  * Hydr. Depth (ft)        *    0.35  *   21.18  *    3.60  *
* Conv. Total (cfs)       *1909674.0  * Conv. (cfs)            *   120.6  *1614111.0  *295442.5  *
* Length Wtd. (ft)        *  360.66  * Wetted Per. (ft)        *   38.51  *  612.69  * 1411.26  *
* Min Ch El (ft)          *  732.63  * Shear (lb/sq ft)        *    0.02  *    1.36  *    0.24  *
* Alpha                   *    1.23  * Stream Power (lb/ft s) *    0.01  *    5.63  *    0.45  *
* Frctn Loss (ft)         *    0.26  * Cum Volume (acre-ft)   * 2917.40  *11719.48  * 5135.25  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  542.98  *  448.58  * 1034.66  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  779.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.20  * Wt. n-Val.              *   0.065  *   0.087  *   0.060  *
* W.S. Elev (ft)          *  779.12  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  290.31  *14066.39  * 8772.94  *
* E.G. Slope (ft/ft)      *0.000831  * Area (sq ft)           *  290.31  *14066.39  * 9474.94  *
* Q Total (cfs)           *74720.00  * Flow (cfs)              *  316.63  *55285.05  *19118.32  *
* Top Width (ft)          * 2397.23  * Top Width (ft)          *  151.19  *  601.94  * 1644.10  *
* Vel Total (ft/s)        *    3.23  * Avg. Vel. (ft/s)        *    1.09  *    3.93  *    2.18  *
* Max Chl Dpth (ft)       *   46.49  * Hydr. Depth (ft)        *    1.92  *   23.37  *    5.34  *
* Conv. Total (cfs)       *2591237.0  * Conv. (cfs)            * 10980.5  *1917247.0  *663009.8  *
* Length Wtd. (ft)        *  320.89  * Wetted Per. (ft)        *  155.06  *  619.42  * 1645.69  *
* Min Ch El (ft)          *  732.63  * Shear (lb/sq ft)        *    0.10  *    1.18  *    0.28  *
* Alpha                   *    1.21  * Stream Power (lb/ft s) *    0.11  *    4.63  *    0.60  *
* Frctn Loss (ft)         *    0.19  * Cum Volume (acre-ft)   * 4548.54  *12876.80  * 8109.49  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  707.96  *  450.59  * 1342.77  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  770.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.30  * Wt. n-Val.              *          *   0.086  *          *
* W.S. Elev (ft)          *  769.91  * Reach Len. (ft)        *  141.92  *  421.02  *   11.63  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 8674.82  *          *
* E.G. Slope (ft/ft)      *0.001731  * Area (sq ft)           *          * 8674.82  *          *
* Q Total (cfs)           *38000.00  * Flow (cfs)              *          *38000.00  *          *
* Top Width (ft)          *  558.58  * Top Width (ft)          *          *  558.58  *          *
* Vel Total (ft/s)        *    4.38  * Avg. Vel. (ft/s)        *          *    4.38  *          *
* Max Chl Dpth (ft)       *   37.28  * Hydr. Depth (ft)        *          *   15.53  *          *
* Conv. Total (cfs)       *913448.6  * Conv. (cfs)            *          *913448.6  *          *
* Length Wtd. (ft)        *  421.02  * Wetted Per. (ft)        *          *  572.94  *          *
* Min Ch El (ft)          *  732.63  * Shear (lb/sq ft)        *          *    1.64  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.17  *          *
* Frctn Loss (ft)         *    0.43  * Cum Volume (acre-ft)   *  639.40  * 8434.65  * 1132.21  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  116.74  *  423.77  *  218.90  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.536

INPUT
Description: Chnl & ROB corrected from surface to match 2-ft contours from 2D
             KCMO CADD files.  Min Chnl Elev interpolated from 63rd St Bridge &
             Grade Control Structure.  Blocked and ineffective areas on ROB
             added to control flow over road.  Left ineffective areas placed
             during unconfined calibration to define consistent flow corridors
             between buildings.
Station Elevation Data    num=     150
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  805.07   34.82   803.2   57.39  802.11   68.39  801.29   93.16  796.67
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   121.4  790.92  140.26  787.01  148.11  784.86   162.3  782.48  243.45  779.64
  244.51  779.61  311.25  778.46  312.07  778.44  357.52  776.21  366.53  776.07
   407.1  775.44  446.86  775.15  448.57  775.14  539.61  774.44  551.93  774.36
  594.17  773.82  616.38  773.67   657.7  773.81  692.73  774.07  730.81  772.15
  786.98  772.63  828.82  773.18  877.94  772.35  892.02  772.38     998     768
    1020     760    1032     756    1076     750    1092     746    1101     740
    1111   733.5  1127.5  732.56    1146   733.5    1156     740    1179     752
    1204     754 1206.26  753.96 1233.47  753.97    1270     754 1326.59  756.63
 1339.53  757.27  1353.7  760.04    1403     780    1415     784    1419   784.1
    1423     784    1454     780    1496     778    1612     774    1694   773.4
    1776     774    2115     774    2230     772 2317.15  770.36 2318.78  770.37
 2323.35  770.45 2324.55  770.53 2334.32  770.19    2340     770 2365.26  769.22
 2370.81  769.72 2377.94  770.13 2386.93  769.44 2407.06  770.15 2412.85  770.21
 2457.17  769.19 2472.17  769.69 2479.41  769.16 2520.51  767.53 2535.58  766.76
 2564.41  766.83 2577.17  766.28 2589.46  766.54 2620.83  767.02  2634.9  766.78
 2664.35  765.74 2670.89   765.5 2723.55  765.62 2734.58  764.84 2744.21  764.94
 2772.97  765.03 2790.44     765 2850.77  765.74 2880.38  766.13 2893.05  765.18
 2905.42  765.59 2906.63  765.55 2917.15  766.08 2920.86  766.54 2927.17  767.83
 2934.21  770.26 2942.12  770.48 2954.35  770.95 2960.18  770.97 3000.39  770.86
 3005.72  770.85  3005.9  770.85 3009.88  770.88 3025.82  771.11 3029.55  771.09
 3034.88  771.27 3044.06   767.4 3044.21  767.57 3045.82  767.29 3059.41  767.52
 3060.46  768.33 3065.42  768.61 3089.71  769.14 3109.52   770.1 3122.84  769.96
  3133.3  770.37 3139.52  771.21  3147.8  771.51 3174.14  773.62 3191.83  774.11
 3205.65  774.32 3208.29  774.33  3210.9  774.41 3226.94  775.18 3243.89  776.06
 3254.69  777.05 3289.09  780.29 3311.93  780.91 3316.23  781.02 3322.93  781.26
 3360.16  781.32 3403.34  783.19 3414.23  783.29 3421.74  783.26 3432.72  784.12
 3443.15  784.92 3443.18  784.92 3471.75  788.35 3473.68  788.52 3475.35   788.7
  3477.1  789.85 3484.21  793.83 3490.91  796.54 3491.74  797.12 3492.57  797.22
 3496.89   799.5 3501.73  800.76 3507.07  802.14 3512.56  803.53 3513.36   803.6

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  828.82     .08    1076    .035    1204     .12    1415     .12
    2340     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        892.02    1415             31.3  440.72   13.48              .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
      88     250     783       F
     575     875     783       F
 2111.44 3237.44     772       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     580     870     795    2200    3200     771

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  759.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)         *  758.68  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  746.72  * Flow Area (sq ft)      *          * 2870.14  *          *
* E.G. Slope (ft/ft)     *0.000534  * Area (sq ft)           *          * 2870.14  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  322.76  * Top Width (ft)         *          *  322.76  *          *
* Vel Total (ft/s)       *    4.60  * Avg. Vel. (ft/s)       *          *    4.60  *          *
* Max Chl Dpth (ft)      *   26.12  * Hydr. Depth (ft)       *          *    8.89  *          *
* Conv. Total (cfs)      *571170.2  * Conv. (cfs)            *          *571170.2  *          *
* Length Wtd. (ft)       *  440.72  * Wetted Per. (ft)       *          *  333.05  *          *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.32  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *   95.83  * 3798.66  *   67.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   18.69  *  323.54  *   25.50  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  762.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *   0.042  *          *
* W.S. Elev (ft)         *  762.49  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  750.50  * Flow Area (sq ft)      *          * 4149.66  *          *
```

```
* E.G. Slope (ft/ft)     *0.000566  * Area (sq ft)           *          * 4149.66  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  346.58  * Top Width (ft)         *          *  346.58  *          *
* Vel Total (ft/s)       *    4.89  * Avg. Vel. (ft/s)       *          *    4.89  *          *
* Max Chl Dpth (ft)      *   29.93  * Hydr. Depth (ft)       *          *   11.97  *          *
* Conv. Total (cfs)      *853056.7  * Conv. (cfs)            *          *853056.7  *          *
* Length Wtd. (ft)       *  440.72  * Wetted Per. (ft)       *          *  358.13  *          *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *          *    0.41  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.00  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *  203.62  * 5229.15  *  184.56  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   37.91  *  360.63  *   45.78  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.044  *          *
* W.S. Elev (ft)         *  765.01  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  754.88  * Flow Area (sq ft)      *          * 5040.24  *          *
* E.G. Slope (ft/ft)     *0.000605  * Area (sq ft)           *          * 5040.24  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  359.74  * Top Width (ft)         *          *  359.74  *          *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *          *    5.22  *          *
* Max Chl Dpth (ft)      *   32.45  * Hydr. Depth (ft)       *          *   14.01  *          *
* Conv. Total (cfs)      *1070371.0  * Conv. (cfs)            *          *1070371.0  *          *
* Length Wtd. (ft)       *  440.72  * Wetted Per. (ft)       *          *  372.23  *          *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *          *    0.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.67  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  314.98  * 6444.11  *  402.88  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   54.13  *  387.48  *  107.07  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  767.84  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  756.50  * Flow Area (sq ft)      *          * 6081.75  *          *
* E.G. Slope (ft/ft)     *0.000641  * Area (sq ft)           *          * 6081.75  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  374.55  * Top Width (ft)         *          *  374.55  *          *
* Vel Total (ft/s)       *    5.59  * Avg. Vel. (ft/s)       *          *    5.59  *          *
* Max Chl Dpth (ft)      *   35.28  * Hydr. Depth (ft)       *          *   16.24  *          *
* Conv. Total (cfs)      *1342589.0  * Conv. (cfs)            *          *1342589.0  *          *
* Length Wtd. (ft)       *  440.72  * Wetted Per. (ft)       *          *  388.09  *          *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *          *    0.63  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.51  *          *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   *  500.48  * 7691.01  *  824.38  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   82.92  *  409.27  *  169.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  772.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.047  *          *
* W.S. Elev (ft)         *  771.57  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  758.15  * Flow Area (sq ft)      *          * 7647.96  *          *
* E.G. Slope (ft/ft)     *0.000670  * Area (sq ft)           *          * 7647.96  *  492.71  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *44500.00  *          *
* Top Width (ft)         * 1365.87  * Top Width (ft)         *          *  470.45  *  895.42  *
* Vel Total (ft/s)       *    5.82  * Avg. Vel. (ft/s)       *          *    5.82  *          *
* Max Chl Dpth (ft)      *   39.01  * Hydr. Depth (ft)       *          *   16.26  *          *
* Conv. Total (cfs)      *1719750.0  * Conv. (cfs)            *          *1719750.0  *          *
* Length Wtd. (ft)       *  439.97  * Wetted Per. (ft)       *          *  484.81  *          *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *          *    0.66  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.84  *          *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   * 1179.37  * 9729.60  * 2217.84  *
```

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* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  273.53  *  435.72  *  472.62  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  774.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.080  *   0.049  *   0.063  *
* W.S. Elev (ft)         *  774.21  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  759.35  * Flow Area (sq ft)      *   32.28  * 8946.21  * 3263.96  *
* E.G. Slope (ft/ft)     *0.000596  * Area (sq ft)           *   42.04  * 8946.21  * 3263.96  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *   21.52  *50123.18  * 3545.30  *
* Top Width (ft)         * 2128.09  * Top Width (ft)         *   38.60  *  496.69  * 1592.80  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *    0.67  *    5.60  *    1.09  *
* Max Chl Dpth (ft)      *   41.65  * Hydr. Depth (ft)       *    1.13  *   18.01  *    2.05  *
* Conv. Total (cfs)      *2198819.0  * Conv. (cfs)            *   881.5  *2052743.0  *145194.1  *
* Length Wtd. (ft)       *  406.61  * Wetted Per. (ft)       *   28.60  *  511.58  * 1593.00  *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *    0.04  *    0.65  *    0.08  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.03  *    3.65  *    0.08  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   * 2124.55  *10899.69  * 3747.74  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  438.83  *  442.05  *  743.50  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  776.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.077  *   0.050  *   0.069  *
* W.S. Elev (ft)         *  776.28  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  760.37  * Flow Area (sq ft)      *  337.90  * 9980.35  * 6685.31  *
* E.G. Slope (ft/ft)     *0.000517  * Area (sq ft)           *  368.37  * 9980.35  * 6685.31  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *  210.91  *53244.38  * 8544.71  *
* Top Width (ft)         * 2448.41  * Top Width (ft)         *  246.02  *  501.80  * 1700.59  *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)       *    0.62  *    5.33  *    1.28  *
* Max Chl Dpth (ft)      *   43.72  * Hydr. Depth (ft)       *    1.43  *   19.89  *    3.93  *
* Conv. Total (cfs)      *2726369.0  * Conv. (cfs)            *  9274.6  *2341352.0  *375742.6  *
* Length Wtd. (ft)       *  369.26  * Wetted Per. (ft)       *  236.03  *  517.10  * 1700.89  *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *    0.05  *    0.62  *    0.13  *
* Alpha                  *    1.86  * Stream Power (lb/ft s) *    0.03  *    3.32  *    0.16  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   * 2916.78  *11610.27  * 5133.59  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  542.52  *  443.28  * 1034.25  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  779.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.076  *   0.051  *   0.072  *
* W.S. Elev (ft)         *  778.80  * Reach Len. (ft)        *   31.30  *  440.72  *   13.48  *
* Crit W.S. (ft)         *  761.78  * Flow Area (sq ft)      *  999.20  *11251.78  *11091.12  *
* E.G. Slope (ft/ft)     *0.000443  * Area (sq ft)           * 1054.85  *11251.78  *11091.12  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *  943.16  *57201.75  *16575.08  *
* Top Width (ft)         * 2612.83  * Top Width (ft)         *  310.66  *  508.02  * 1794.16  *
* Vel Total (ft/s)       *    3.20  * Avg. Vel. (ft/s)       *    0.94  *    5.08  *    1.49  *
* Max Chl Dpth (ft)      *   46.24  * Hydr. Depth (ft)       *    3.32  *   22.15  *    6.18  *
* Conv. Total (cfs)      *3549351.0  * Conv. (cfs)            * 44802.1  *2717199.0  *787349.8  *
* Length Wtd. (ft)       *  326.04  * Wetted Per. (ft)       *  300.73  *  523.81  * 1794.62  *
* Min Ch El (ft)         *  732.56  * Shear (lb/sq ft)       *    0.09  *    0.59  *    0.17  *
* Alpha                  *    1.98  * Stream Power (lb/ft s) *    0.09  *    3.02  *    0.26  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 4546.35  *12754.44  * 8106.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  707.21  *  445.23  * 1342.31  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	769.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.046	
W.S. Elev (ft)	769.25	Reach Len. (ft)	31.30	440.72	13.48
Crit W.S. (ft)	757.21	Flow Area (sq ft)		6628.16	
E.G. Slope (ft/ft)	0.000664	Area (sq ft)		6628.16	
Q Total (cfs)	38000.00	Flow (cfs)		38000.00	
Top Width (ft)	408.57	Top Width (ft)		408.57	
Vel Total (ft/s)	5.73	Avg. Vel. (ft/s)		5.73	
Max Chl Dpth (ft)	36.69	Hydr. Depth (ft)		16.22	
Conv. Total (cfs)	1474541.0	Conv. (cfs)		1474541.0	
Length Wtd. (ft)	440.72	Wetted Per. (ft)		422.44	
Min Ch El (ft)	732.56	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)		3.73	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	639.40	8360.69	1132.21
C & E Loss (ft)	0.03	Cum SA (acres)	116.74	419.10	218.90

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 12.453

INPUT
Description: Chnl & ROB corrected from surface to match 2-ft contours from 2D KCMO CADD files. Min Chnl Elev interpolated from 63rd St Bridge & Grade Control Structure. Blocked and ineffective areas on ROB added to control flow over road. Left ineffective areas placed during unconfined calibration to define consistent flow corridors between buildings.

Station Elevation Data num= 160

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	805.34	1.21	805.27	11.27	804.78	34.32	803.07	69.85	800.49
87.27	796.87	114.42	789.45	163.35	781.22	224.15	779.1	245.96	778.37
296.91	777.5	346.23	776.06	354.1	775.67	362.84	775.53	413.5	774.94
429.47	774.82	492.69	774.32	530.46	774.08	582.65	773.42	644.93	773.61
649.83	773.65	653.91	773.63	710.08	774.03	769.94	774.6	779.91	774.58
785.43	774.53	826.91	775.17	876.94	774.44	926.68	774.51	935.19	774.29
1005.72	771.33	1055.12	770.82	1058.81	770.97	1061.26	771.01	1114.48	770.52
1122.32	770.77	1125.3	770.68	1177.53	770.74	1181.94	770.67	1225.82	769.25
1257.43	769.09	1420	770	1456	760	1513	750	1520.75	747.51
1543	740	1553	733.5	1573	732.48	1593	733.5	1603	740
1615	752	1672	754	1693	760	1723	770	1730	771.3
1850	771	1875	771.6	2063	770	2110	768	2175	764
2211.48	762	2213.13	761.97	2213.88	761.95	2225.72	761.9	2248.99	762.46
2251.93	762.72	2282.53	764.57	2291.29	763.92	2302.3	764.52	2315.5	765.05
2322.58	765.13	2360.68	765.16	2365.05	765.14	2365.61	765.14	2366.14	765.13
2388.55	763.44	2399.89	762.63	2400.49	762.6	2404.79	762.39	2435.68	761.2
2438.7	761.05	2501.08	760.11	2501.47	760.13	2501.85	760.1	2535.58	760.09
2539.21	759.72	2547.82	759.59	2575.63	760.16	2598.86	760.05	2627.27	758.68
2642.88	758.74	2646.44	758.88	2647.36	758.92	2649.1	758.82	2677.71	758.85
2694.14	759.28	2724.41	759.6	2744.31	760.9	2748.86	761.13	2750.04	761.1
2757.06	760.28	2761.84	760.1	2763.26	759.97	2787.31	759.5	2796.92	759.46
2805.74	759.61	2808.62	760.08	2814.51	762.01	2821.72	765.13	2825.59	766.48
2835.35	770.24	2843.28	770.57	2852.99	770.83	2885.31	770.74	2906.18	770.8
2909.64	770.83	2912.28	770.97	2912.38	770.97	2922.27	771.42	2926.86	771.41
2930.13	768.21	2955.46	771.72	2973.93	771.93	3001.05	769.98	3014.37	770.37
3019.6	772.71	3040.75	773.04	3054.63	773.22	3065.82	773.03	3066.54	773.39
3071.84	773.53	3090.87	774.17	3102.19	775.32	3122.37	776.12	3145.48	777.36
3172.22	779.82	3181.54	780.27	3189.33	780.99	3197.78	781.41	3208.62	781.7
3223.99	782.28	3249.61	782.7	3267.94	783.14	3277.93	783.24	3281.62	783.22
3283.98	783.24	3298.63	783.31	3306.73	783.45	3316.24	783.39	3337.26	783.57
3337.78	783.61	3338.09	783.63	3338.44	783.87	3349.61	795.02	3350.38	795.8
3351.48	796.43	3367.27	803.04	3367.85	803.3	3374.24	805.28	3380.24	807.31

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	876.94	.08	1420	.035	1615	.12	2175	.06

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1420    1723            124.9  511.25   16.82            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
   70.84     250     783       F
     565     865     783       F
    1730 3095.27     772       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     560     860     795    1900    2850     771

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.037  *          *
* W.S. Elev (ft)         *  758.32  * Reach Len. (ft)        *  124.90  *  511.25  *   16.82  *
* Crit W.S. (ft)         *  745.89  * Flow Area (sq ft)      *          * 2524.60  *          *
* E.G. Slope (ft/ft)     *0.000594  * Area (sq ft)           *          * 2524.60  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  221.58  * Top Width (ft)         *          *  221.58  *          *
* Vel Total (ft/s)       *    5.23  * Avg. Vel. (ft/s)       *          *    5.23  *          *
* Max Chl Dpth (ft)      *   25.84  * Hydr. Depth (ft)       *          *   11.39  *          *
* Conv. Total (cfs)      *541452.3  * Conv. (cfs)            *          *541452.3  *          *
* Length Wtd. (ft)       *  511.25  * Wetted Per. (ft)       *          *  233.44  *          *
* Min Ch El (ft)         *  732.48  * Shear (lb/sq ft)       *          *    0.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.10  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *   95.83  * 3771.37  *   67.54  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   18.69  *  320.79  *   25.50  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)         *  762.01  * Reach Len. (ft)        *  124.90  *  511.25  *   16.82  *
* Crit W.S. (ft)         *  749.31  * Flow Area (sq ft)      *          * 3398.08  *          *
* E.G. Slope (ft/ft)     *0.000706  * Area (sq ft)           *          * 3398.08  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  250.25  * Top Width (ft)         *          *  250.25  *          *
* Vel Total (ft/s)       *    5.97  * Avg. Vel. (ft/s)       *          *    5.97  *          *
* Max Chl Dpth (ft)      *   29.53  * Hydr. Depth (ft)       *          *   13.58  *          *
* Conv. Total (cfs)      *764076.6  * Conv. (cfs)            *          *764076.6  *          *
* Length Wtd. (ft)       *  511.25  * Wetted Per. (ft)       *          *  263.09  *          *
* Min Ch El (ft)         *  732.48  * Shear (lb/sq ft)       *          *    0.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.40  *          *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *  203.62  * 5190.97  *  184.56  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   37.91  *  357.62  *   45.78  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *          *   0.039  *          *
* W.S. Elev (ft)         *  764.44  * Reach Len. (ft)        *  124.90  *  511.25  *   16.82  *
* Crit W.S. (ft)         *  751.89  * Flow Area (sq ft)      *          * 4026.99  *          *
* E.G. Slope (ft/ft)     *0.000781  * Area (sq ft)           *          * 4026.99  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  266.32  * Top Width (ft)         *          *  266.32  *          *
* Vel Total (ft/s)       *    6.54  * Avg. Vel. (ft/s)       *          *    6.54  *          *
* Max Chl Dpth (ft)      *   31.96  * Hydr. Depth (ft)       *          *   15.12  *          *
* Conv. Total (cfs)      *942003.8  * Conv. (cfs)            *          *942003.8  *          *
* Length Wtd. (ft)       *  511.25  * Wetted Per. (ft)       *          *  279.89  *          *
* Min Ch El (ft)         *  732.48  * Shear (lb/sq ft)       *          *    0.70  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.58  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  314.98  * 6398.25  *  402.88  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *   54.13  *  384.31  *  107.07  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	767.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.		0.040	
W.S. Elev (ft)	767.19	Reach Len. (ft)	124.90	511.25	16.82
Crit W.S. (ft)	755.38	Flow Area (sq ft)		4784.32	
E.G. Slope (ft/ft)	0.000848	Area (sq ft)		4784.32	
Q Total (cfs)	34000.00	Flow (cfs)		34000.00	
Top Width (ft)	284.47	Top Width (ft)		284.47	
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.11	
Max Chl Dpth (ft)	34.71	Hydr. Depth (ft)		16.82	
Conv. Total (cfs)	1167582.0	Conv. (cfs)		1167582.0	
Length Wtd. (ft)	511.25	Wetted Per. (ft)		298.86	
Min Ch El (ft)	732.48	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)		6.02	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	500.48	7636.04	824.38
C & E Loss (ft)	0.13	Cum SA (acres)	82.92	405.94	169.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	771.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.	0.080	0.041	0.120
W.S. Elev (ft)	770.84	Reach Len. (ft)	124.90	511.25	16.82
Crit W.S. (ft)	757.59	Flow Area (sq ft)	317.09	5863.81	1.90
E.G. Slope (ft/ft)	0.000847	Area (sq ft)	317.09	5863.81	48.22
Q Total (cfs)	44500.00	Flow (cfs)	163.47	44336.16	0.38
Top Width (ft)	758.31	Top Width (ft)	342.92	303.00	112.40
Vel Total (ft/s)	7.20	Avg. Vel. (ft/s)	0.52	7.56	0.20
Max Chl Dpth (ft)	38.36	Hydr. Depth (ft)	0.92	19.35	0.42
Conv. Total (cfs)	1529058.0	Conv. (cfs)	5616.8	1523428.0	13.1
Length Wtd. (ft)	510.54	Wetted Per. (ft)	342.95	318.23	4.61
Min Ch El (ft)	732.48	Shear (lb/sq ft)	0.05	0.97	0.02
Alpha	1.10	Stream Power (lb/ft s)	0.03	7.37	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	1179.26	9661.25	2217.76
C & E Loss (ft)	0.16	Cum SA (acres)	273.41	431.81	472.47

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	774.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.080	0.041	0.072
W.S. Elev (ft)	773.64	Reach Len. (ft)	124.90	511.25	16.82
Crit W.S. (ft)	759.31	Flow Area (sq ft)	1528.54	6713.20	3448.71
E.G. Slope (ft/ft)	0.000677	Area (sq ft)	1528.54	6713.20	3448.71
Q Total (cfs)	53690.00	Flow (cfs)	1622.69	48615.73	3451.58
Top Width (ft)	2124.66	Top Width (ft)	469.42	303.00	1352.24
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)	1.06	7.24	1.00
Max Chl Dpth (ft)	41.16	Hydr. Depth (ft)	3.26	22.16	2.55
Conv. Total (cfs)	2063445.0	Conv. (cfs)	62364.1	1868428.0	132653.1
Length Wtd. (ft)	467.95	Wetted Per. (ft)	469.51	318.23	1354.85
Min Ch El (ft)	732.48	Shear (lb/sq ft)	0.14	0.89	0.11
Alpha	2.26	Stream Power (lb/ft s)	0.15	6.46	0.11
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	2123.98	10820.47	3746.70
C & E Loss (ft)	0.13	Cum SA (acres)	438.65	438.00	743.05

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	776.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.080	0.042	0.072
W.S. Elev (ft)	775.88	Reach Len. (ft)	124.90	511.25	16.82

```
* Crit W.S. (ft)         *  760.64  * Flow Area (sq ft)      * 2963.98  * 7391.18  * 6522.13  *
* E.G. Slope (ft/ft)     *0.000531  * Area (sq ft)           * 2970.14  * 7391.18  * 6522.13  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3488.82  *49860.52  * 8650.66  *
* Top Width (ft)         * 2466.54  * Top Width (ft)         *  770.17  *  303.00  * 1393.36  *
* Vel Total (ft/s)       *    3.67  * Avg. Vel. (ft/s)       *    1.18  *    6.75  *    1.33  *
* Max Chl Dpth (ft)      *   43.40  * Hydr. Depth (ft)       *    3.87  *   24.39  *    4.68  *
* Conv. Total (cfs)      *2690933.0  * Conv. (cfs)           *151422.3  *2164053.0  *375457.1  *
* Length Wtd. (ft)       *  426.69  * Wetted Per. (ft)       *  767.47  *  318.23  * 1396.05  *
* Min Ch El (ft)         *  732.48  * Shear (lb/sq ft)       *    0.13  *    0.77  *    0.15  *
* Alpha                  *    2.74  * Stream Power (lb/ft s) *    0.15  *    5.19  *    0.21  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 2915.58  *11522.39  * 5131.55  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *  542.15  *  439.21  * 1033.77  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  778.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.079  *   0.042  *   0.072  *
* W.S. Elev (ft)         *  778.52  * Reach Len. (ft)        *  124.90  *  511.25  *   16.82  *
* Crit W.S. (ft)         *  762.55  * Flow Area (sq ft)      * 5110.02  * 8191.71  *10267.17  *
* E.G. Slope (ft/ft)     *0.000417  * Area (sq ft)           * 5130.50  * 8191.71  *10267.17  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 6882.17  *51799.33  *16038.50  *
* Top Width (ft)         * 2616.77  * Top Width (ft)         *  878.64  *  303.00  * 1435.13  *
* Vel Total (ft/s)       *    3.17  * Avg. Vel. (ft/s)       *    1.35  *    6.32  *    1.56  *
* Max Chl Dpth (ft)      *   46.04  * Hydr. Depth (ft)       *    5.91  *   27.04  *    7.15  *
* Conv. Total (cfs)      *3657387.0  * Conv. (cfs)           *336867.6  *2535469.0  *785050.9  *
* Length Wtd. (ft)       *  380.26  * Wetted Per. (ft)       *  869.97  *  318.23  * 1437.91  *
* Min Ch El (ft)         *  732.48  * Shear (lb/sq ft)       *    0.15  *    0.67  *    0.19  *
* Alpha                  *    2.83  * Stream Power (lb/ft s) *    0.21  *    4.24  *    0.29  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 4544.13  *12656.08  * 8103.44  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  706.78  *  441.13  * 1341.81  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  769.39  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  768.55  * Reach Len. (ft)        *  124.90  *  511.25  *   16.82  *
* Crit W.S. (ft)         *  756.27  * Flow Area (sq ft)      *          * 5177.61  *          *
* E.G. Slope (ft/ft)     *0.000869  * Area (sq ft)           *          * 5177.61  *    0.49  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  296.28  * Top Width (ft)         *          *  293.45  *    2.83  *
* Vel Total (ft/s)       *    7.34  * Avg. Vel. (ft/s)       *          *    7.34  *          *
* Max Chl Dpth (ft)      *   36.07  * Hydr. Depth (ft)       *          *   17.64  *          *
* Conv. Total (cfs)      *1289113.0  * Conv. (cfs)           *          *1289113.0  *          *
* Length Wtd. (ft)       *  511.25  * Wetted Per. (ft)       *          *  308.25  *          *
* Min Ch El (ft)         *  732.48  * Shear (lb/sq ft)       *          *    0.91  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.69  *          *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  639.40  * 8300.97  * 1132.21  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  116.74  *  415.55  *  218.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.356

INPUT
Description: Chnl & ROB corrected from surface to match 2-ft contours from 2D
             KCMO CADD files.  Min Chnl Elev interpolated from 63rd St Bridge &
             Grade Control Structure.   Blocked and ineffective areas on ROB
             added to control flow over road.   Left ineffective areas placed
             during unconfined calibration to define consistent flow corridors
```

between buildings. American Cyanide buildings removed.

Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	801.13	10.83	799.84	86.86	785.22	147.09	778.56	184.39	776.79
250.95	774.45	267.94	774.37	310.23	774.34	372.22	773.76	379.94	773.73
454.29	773.63	482.86	773.45	495.5	773.28	510.21	773.33	577.6	773.87
635.48	773.58	659.46	773.75	684.55	773.99	866.53	773.53	885.34	773.37
930.56	773.57	943.73	773.6	961.31	773.38	996.32	773.14	1005.55	773.15
1090.86	773.21	1095.04	773.23	1141.25	773.35	1156.76	773.37	1247.75	774.67
1302.67	775.4	1331.86	775.01	1361.7	773.83	1432.29	774.1	1530.93	772.68
1569.68	772.75	1592.19	772.47	1675.76	763.82	1716.87	760.72	1738.87	758.67
1768.96	754.7	1771.29	754.68	1798.86	754.72	1815.89	754.63	1838.73	754.72
1858.91	754.38	1890.96	750.02	1895.9	749.35	1897.77	748.82	1904.85	747.27
1912.32	742.03	1915	740	1930	733.4	1958	732.39	1982	733.4
1992.56	739.52	2005.38	752.96	2016.07	754.09	2030.06	753.68	2041.13	753.36
2056.52	753.67	2071.06	753.92	2094.92	756.51	2105.76	757.71	2115.03	759.02
2119.47	759.83	2127.83	760.24	2145.97	761.07	2152.4	761.43	2158.59	761.69
2171.3	762.06	2180.1	762.03	2205.44	762.23	2228.84	761.65	2229.44	761.61
2252.03	759.23	2252.05	759.23	2254.79	759.1	2289.17	757.48	2289.36	757.47
2320.69	756.94	2330.77	756.67	2343.77	757.28	2354.76	756.51	2363.18	756.43
2373.43	755.62	2379.87	754.88	2421.92	753.84	2428.68	754.69	2434.51	754.61
2442.92	755.34	2461.17	754.87	2461.96	754.82	2469.87	755.29	2479.06	754.53
2482.72	754.39	2497.64	754.79	2497.88	754.79	2508.11	754.98	2516.63	754.9
2523.65	755.74	2537.6	756.39	2554.14	757.44	2567.37	757.8	2572.17	757.74
2586.97	757.77	2595.88	758.24	2598.3	758.19	2610.34	758.71	2632.53	758.73
2646.62	759.45	2651.61	760.18	2655.18	760.49	2663.86	763.31	2668.17	765.23
2674.82	767.69	2687.27	770.49	2697.93	770.78	2713.35	770.74	2727.79	770.78
2750.79	770.93	2757.22	771.26	2765.17	771.61	2778.2	771.58	2779.64	770.17
2790.84	771.72	2837.19	772.24	2846.95	771.53	2851.8	771.67	2853.71	772.52
2872.77	772.82	2880.55	772.92	2896.01	773.35	2902.36	773.84	2919.05	773.89
2920.32	774	2923.82	774.23	2945.98	776.49	2992.35	778.38	2994.39	778.43
2997	778.47	3017.42	779.43	3030.95	780.66	3032.76	780.82	3038.04	780.49
3038.69	780.49	3039.93	780.53	3051.05	781.09	3066.32	782.2	3089.39	782.48
3090.71	782.51	3092.91	782.63	3102.89	783.14	3114.92	783.18	3117.61	783.21
3124.94	783.61	3129.38	783.1	3133.74	783.07	3136.16	783.09	3151.01	783.72
3162.17	783.85	3167.4	783.91	3175.79	792.24	3194.79	810.74	3197.63	811.36
3199.14	807.15	3200.43	807.59	3211	810.68				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	1592.19	.12	1858.91	.035	2005.38	.12	2152.4	.05
2727.79	.06								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1592.19	2152.4	97.23	538.26	518.35	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
60	250	783	F
525	825	783	F
2152.4	2827.03	772	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
530	820	795	2152.4	2700	769

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	758.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.038	
W.S. Elev (ft)	758.20	Reach Len. (ft)	97.23	538.26	518.35
Crit W.S. (ft)	743.89	Flow Area (sq ft)		3240.72	
E.G. Slope (ft/ft)	0.000370	Area (sq ft)		3240.72	
Q Total (cfs)	13200.00	Flow (cfs)		13200.00	
Top Width (ft)	366.85	Top Width (ft)		366.85	
Vel Total (ft/s)	4.07	Avg. Vel. (ft/s)		4.07	
Max Chl Dpth (ft)	25.81	Hydr. Depth (ft)		8.83	
Conv. Total (cfs)	685925.6	Conv. (cfs)		685925.6	
Length Wtd. (ft)	525.25	Wetted Per. (ft)		379.15	
Min Ch El (ft)	732.39	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.80	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	95.83	3737.54	67.54
C & E Loss (ft)	0.03	Cum SA (acres)	18.69	317.33	25.50

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	762.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.041	
W.S. Elev (ft)	761.92	Reach Len. (ft)	97.23	538.26	518.35
Crit W.S. (ft)	747.07	Flow Area (sq ft)		4749.52	
E.G. Slope (ft/ft)	0.000419	Area (sq ft)		4749.52	
Q Total (cfs)	20300.00	Flow (cfs)		20300.00	
Top Width (ft)	451.49	Top Width (ft)		451.49	
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.27	
Max Chl Dpth (ft)	29.53	Hydr. Depth (ft)		10.52	
Conv. Total (cfs)	991236.3	Conv. (cfs)		991236.3	
Length Wtd. (ft)	513.20	Wetted Per. (ft)		464.62	
Min Ch El (ft)	732.39	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.14	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	203.62	5143.16	184.56
C & E Loss (ft)	0.04	Cum SA (acres)	37.91	353.50	45.78

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	764.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.043	
W.S. Elev (ft)	764.39	Reach Len. (ft)	97.23	538.26	518.35
Crit W.S. (ft)	749.65	Flow Area (sq ft)		5903.54	
E.G. Slope (ft/ft)	0.000456	Area (sq ft)		5903.54	
Q Total (cfs)	26320.00	Flow (cfs)		26320.00	
Top Width (ft)	482.16	Top Width (ft)		482.16	
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)		4.46	
Max Chl Dpth (ft)	32.00	Hydr. Depth (ft)		12.24	
Conv. Total (cfs)	1232910.0	Conv. (cfs)		1232910.0	
Length Wtd. (ft)	506.76	Wetted Per. (ft)		497.86	
Min Ch El (ft)	732.39	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		1.50	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	314.98	6339.97	402.88
C & E Loss (ft)	0.06	Cum SA (acres)	54.13	379.92	107.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	767.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.046	
W.S. Elev (ft)	767.18	Reach Len. (ft)	97.23	538.26	518.35
Crit W.S. (ft)	755.35	Flow Area (sq ft)		7286.98	
E.G. Slope (ft/ft)	0.000487	Area (sq ft)		7286.98	
Q Total (cfs)	34000.00	Flow (cfs)		34000.00	
Top Width (ft)	509.13	Top Width (ft)		509.13	
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)		4.67	
Max Chl Dpth (ft)	34.79	Hydr. Depth (ft)		14.31	
Conv. Total (cfs)	1540588.0	Conv. (cfs)		1540588.0	
Length Wtd. (ft)	500.69	Wetted Per. (ft)		527.76	
Min Ch El (ft)	732.39	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		1.96	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	500.48	7565.21	824.38
C & E Loss (ft)	0.07	Cum SA (acres)	82.92	401.28	169.28

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	771.24	Element	Left OB	Channel	Right OB

```
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.049  *          *
* W.S. Elev (ft)         *  770.88  * Reach Len. (ft)        *   97.23  *  538.26  *  518.35  *
* Crit W.S. (ft)         *  756.89  * Flow Area (sq ft)      *          * 9237.45  *          *
* E.G. Slope (ft/ft)     *0.000494  * Area (sq ft)           *          * 9237.45  * 1011.74  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *44500.00  *          *
* Top Width (ft)         * 1142.02  * Top Width (ft)         *          *  544.88  *  597.14  *
* Vel Total (ft/s)       *    4.82  * Avg. Vel. (ft/s)       *          *    4.82  *          *
* Max Chl Dpth (ft)      *   38.49  * Hydr. Depth (ft)       *          *   16.95  *          *
* Conv. Total (cfs)      *2002085.0  * Conv. (cfs)            *          *2002085.0  *          *
* Length Wtd. (ft)       *  494.58  * Wetted Per. (ft)       *          *  565.52  *          *
* Min Ch El (ft)         *  732.39  * Shear (lb/sq ft)       *          *    0.50  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.43  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 1178.80  * 9572.63  * 2217.56  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  272.92  *  426.84  *  472.33  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  774.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.075  *   0.051  *   0.050  *
* W.S. Elev (ft)         *  773.71  * Reach Len. (ft)        *   97.23  *  538.26  *  518.35  *
* Crit W.S. (ft)         *  758.08  * Flow Area (sq ft)      *  246.52  *10809.09  * 2946.22  *
* E.G. Slope (ft/ft)     *0.000416  * Area (sq ft)           *  248.08  *10809.09  * 2946.22  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *   61.15  *48992.59  * 4636.26  *
* Top Width (ft)         * 1937.62  * Top Width (ft)         *  629.13  *  560.21  *  748.28  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    0.25  *    4.53  *    1.57  *
* Max Chl Dpth (ft)      *   41.32  * Hydr. Depth (ft)       *    0.40  *   19.29  *    3.94  *
* Conv. Total (cfs)      *2632368.0  * Conv. (cfs)            *  2998.2  *2402058.0  *227311.3  *
* Length Wtd. (ft)       *  491.74  * Wetted Per. (ft)       *  619.14  *  580.93  *  749.39  *
* Min Ch El (ft)         *  732.39  * Shear (lb/sq ft)       *    0.01  *    0.48  *    0.10  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    0.00  *    2.19  *    0.16  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   * 2121.44  *10717.65  * 3745.47  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  437.08  *  432.94  *  742.64  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  776.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.075  *   0.052  *   0.051  *
* W.S. Elev (ft)         *  775.93  * Reach Len. (ft)        *   97.23  *  538.26  *  518.35  *
* Crit W.S. (ft)         *  759.10  * Flow Area (sq ft)      * 2300.62  *12049.90  * 4664.54  *
* E.G. Slope (ft/ft)     *0.000357  * Area (sq ft)           * 2353.91  *12049.90  * 4664.54  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 1460.26  *51850.95  * 8688.79  *
* Top Width (ft)         * 2441.47  * Top Width (ft)         * 1093.21  *  560.21  *  788.05  *
* Vel Total (ft/s)       *    3.26  * Avg. Vel. (ft/s)       *    0.63  *    4.30  *    1.86  *
* Max Chl Dpth (ft)      *   43.54  * Hydr. Depth (ft)       *    2.21  *   21.51  *    5.92  *
* Conv. Total (cfs)      *3283286.0  * Conv. (cfs)            * 77330.0  *2745830.0  *460125.6  *
* Length Wtd. (ft)       *  481.50  * Wetted Per. (ft)       * 1042.25  *  580.93  *  789.25  *
* Min Ch El (ft)         *  732.39  * Shear (lb/sq ft)       *    0.05  *    0.46  *    0.13  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.03  *    1.99  *    0.25  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   * 2907.94  *11408.30  * 5129.39  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  539.48  *  434.14  * 1033.35  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
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* E.G. Elev (ft)         *  778.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.075  *   0.054  *   0.051  *
* W.S. Elev (ft)         *  778.55  * Reach Len. (ft)        *   97.23  *  538.26  *  518.35  *
* Crit W.S. (ft)         *  760.55  * Flow Area (sq ft)      * 5038.34  *13521.51  * 6800.08  *
* E.G. Slope (ft/ft)     *0.000304  * Area (sq ft)           * 5312.35  *13521.51  * 6800.08  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 4977.14  *55455.85  *14287.01  *
* Top Width (ft)         * 2561.50  * Top Width (ft)         * 1154.94  *  560.21  *  846.35  *
* Vel Total (ft/s)       *    2.95  * Avg. Vel. (ft/s)       *    0.99  *    4.10  *    2.10  *
* Max Chl Dpth (ft)      *   46.16  * Hydr. Depth (ft)       *    4.83  *   24.14  *    8.03  *
* Conv. Total (cfs)      *4285043.0  * Conv. (cfs)           *285429.0  *3180283.0  *819331.3  *
* Length Wtd. (ft)       *  464.61  * Wetted Per. (ft)       * 1042.25  *  580.93  *  847.63  *
* Min Ch El (ft)         *  732.39  * Shear (lb/sq ft)       *    0.09  *    0.44  *    0.15  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    0.09  *    1.81  *    0.32  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 4529.16  *12528.66  * 8100.15  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  703.87  *  436.06  * 1341.37  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  768.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.047  *          *
* W.S. Elev (ft)         *  768.56  * Reach Len. (ft)        *   97.23  *  538.26  *  518.35  *
* Crit W.S. (ft)         *  755.96  * Flow Area (sq ft)      *          * 7999.80  *          *
* E.G. Slope (ft/ft)     *0.000496  * Area (sq ft)           *          * 7999.80  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  522.48  * Top Width (ft)         *          *  522.48  *          *
* Vel Total (ft/s)       *    4.75  * Avg. Vel. (ft/s)       *          *    4.75  *          *
* Max Chl Dpth (ft)      *   36.17  * Hydr. Depth (ft)       *          *   15.31  *          *
* Conv. Total (cfs)      *1705537.0  * Conv. (cfs)           *          *1705537.0  *          *
* Length Wtd. (ft)       *  498.12  * Wetted Per. (ft)       *          *  542.56  *          *
* Min Ch El (ft)         *  732.39  * Shear (lb/sq ft)       *          *    0.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.17  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *  639.40  * 8223.64  * 1132.21  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  116.74  *  410.76  *  218.90  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.254

INPUT
Description:
Station Elevation Data    num=     180
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  802.74   24.48  802.71   25.98  802.33   27.51     802   51.65  796.23
   74.07  792.19   77.36  791.48   79.59   789.3   88.52  779.89   99.69  780.08
  101.54  780.24  109.06  781.06  115.99  781.05   123.5  780.33  124.21  780.27
  133.64  777.85  143.82  775.83   153.2  775.09   164.9  776.43  202.64  774.97
  226.31  774.54  282.61  774.49  325.41  774.22  376.68  774.08  420.66  773.38
  452.14  773.14  478.15  773.01  481.78  773.75  483.31  774.03  574.12  774.06
  575.04  774.17  641.19  774.16  674.37  773.55  730.77     774  738.36  773.48
  874.15  773.28  881.11  774.47  881.24  774.47  909.18  773.73  911.63  773.78
  945.79  773.68  948.59  773.61   978.7  773.26 1064.41  773.32 1094.92  773.19
 1099.75  773.56 1103.44  773.57 1116.33  773.38 1119.22  773.38 1134.17  773.04
  1145.4   773.1 1152.93  772.98 1165.68  773.66 1198.59  770.55 1228.55  770.38
 1231.94  771.29 1232.45  771.46 1234.12  771.49 1239.83  771.77 1243.15  771.83
 1258.52  772.58  1301.9  773.48 1349.57  773.95  1349.8  773.96 1355.07  774.04
 1355.44  774.04 1355.79  774.05 1363.81  772.82 1365.68  772.76 1368.87   772.6
 1431.02  772.94 1617.53   773.2 1618.24  773.19 1649.73  772.42  1671.5  772.45
 1679.61  772.72 1690.02  772.41  1703.7  773.22 1712.32  773.41  1719.1  773.77
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 1735.75  774.29 1753.36  774.15  1760.5  774.31 1767.89  774.25 1777.58  774.49
 1820.74  774.55 1823.24  774.46 1833.29  773.74 1844.94  771.78 1846.45  771.68
 1866.03  771.62 1873.44  771.41 1881.77  771.44 1892.98  769.96 1902.33  769.07
 1903.96  768.81 1905.55  768.59 1911.84  767.44 1918.58  766.01 1920.02  765.62
 1957.16  756.94 1983.24  755.06 1991.77  754.69  1995.3  754.17 2007.35  753.15
 2020.12  753.46 2040.19  753.21 2057.04  753.24 2066.99  753.45 2089.63   753.6
 2120.78   754.4 2148.63  754.36 2159.97  754.56 2171.88  751.96 2183.26  751.27
 2190.15  751.27 2213.46   751.7 2217.39  751.76 2222.32  751.74 2224.35  750.77
 2232.65  744.95 2247.39  739.53    2253     733    2272  732.08    2291     733
 2298.22  739.53 2306.35  741.53 2313.61  741.36 2319.91  745.89 2320.94  746.88
 2329.27  748.99 2333.25  751.64 2339.79  755.62 2340.65  755.74 2340.77  755.75
 2344.06  755.97 2360.47  756.83 2395.95  758.67 2419.76  759.35 2420.83  759.82
 2447.42   772.4 2448.61  772.95  2471.7  773.82 2492.56  774.14 2509.18  775.46
 2511.43  775.26 2514.22  774.91 2528.56  778.08  2536.2  778.61 2541.21  780.68
 2543.74   781.6 2546.43  782.08  2560.6  783.68 2566.64  784.16 2571.82  785.68
 2578.99  788.08 2594.37  792.77 2605.68  800.62 2621.88  811.68 2629.53   817.2
 2634.34  817.94 2639.07  818.88 2640.93  820.45 2649.62  825.72 2656.46  825.72
 2662.67  823.89 2664.64  823.75 2674.87   821.4 2678.01  820.47 2684.28  821.49
 2688.71  822.54 2705.56  823.06 2709.05  823.24 2709.77  823.25 2733.85  829.51
 2747.71  834.92 2748.83  835.29 2764.52  838.58  2766.5  839.54 2768.56  839.72

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075 1649.73     .12 2222.32    .035 2339.79     .12  2471.7     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2222.32 2339.79            61.29  342.83  435.02             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      88     300     783       F
     545     855     783       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     550     850     795    1400    1600     795

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  758.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.54  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  757.67  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)          *  746.00  * Flow Area (sq ft)      * 1086.35  * 2045.03  *   35.40  *
* E.G. Slope (ft/ft)      *0.000520  * Area (sq ft)           * 1086.35  * 2045.03  *   35.40  *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *  778.43  *12411.84  *    9.73  *
* Top Width (ft)          *  422.54  * Top Width (ft)         *  268.27  *  117.47  *   36.80  *
* Vel Total (ft/s)        *    4.17  * Avg. Vel. (ft/s)       *    0.72  *    6.07  *    0.27  *
* Max Chl Dpth (ft)       *   25.59  * Hydr. Depth (ft)       *    4.05  *   17.41  *    0.96  *
* Conv. Total (cfs)       *578710.3  * Conv. (cfs)            * 34127.8  *544155.8  *   426.6  *
* Length Wtd. (ft)        *  334.30  * Wetted Per. (ft)       *  268.83  *  130.33  *   36.86  *
* Min Ch El (ft)          *  732.08  * Shear (lb/sq ft)       *    0.13  *    0.51  *    0.03  *
* Alpha                   *    2.00  * Stream Power (lb/ft s) *    0.09  *    3.09  *    0.01  *
* Frctn Loss (ft)         *    0.21  * Cum Volume (acre-ft)   *   94.62  * 3704.88  *   67.33  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *   18.39  *  314.34  *   25.29  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  761.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.72  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  761.19  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)          *  749.28  * Flow Area (sq ft)      * 2059.65  * 2459.56  *  279.61  *
* E.G. Slope (ft/ft)      *0.000579  * Area (sq ft)           * 2059.65  * 2459.56  *  279.61  *
* Q Total (cfs)           *20300.00  * Flow (cfs)             * 2298.35  *17816.51  *  185.14  *
* Top Width (ft)          *  484.78  * Top Width (ft)         *  283.37  *  117.47  *   83.95  *
* Vel Total (ft/s)        *    4.23  * Avg. Vel. (ft/s)       *    1.12  *    7.24  *    0.66  *
* Max Chl Dpth (ft)       *   29.11  * Hydr. Depth (ft)       *    7.27  *   20.94  *    3.33  *
* Conv. Total (cfs)       *843320.4  * Conv. (cfs)            * 95480.1  *740149.1  *  7691.1  *
* Length Wtd. (ft)        *  327.38  * Wetted Per. (ft)       *  284.34  *  130.33  *   84.45  *
* Min Ch El (ft)          *  732.08  * Shear (lb/sq ft)       *    0.26  *    0.68  *    0.12  *
* Alpha                   *    2.58  * Stream Power (lb/ft s) *    0.29  *    4.95  *    0.08  *
* Frctn Loss (ft)         *    0.23  * Cum Volume (acre-ft)   *  201.32  * 5098.62  *  182.90  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *   37.59  *  349.98  *   45.28  *
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*****************************************************************************************
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  763.51  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)         *  751.55  * Flow Area (sq ft)      * 2728.46  * 2732.04  *  480.01  *
* E.G. Slope (ft/ft)     *0.000630  * Area (sq ft)           * 2728.46  * 2732.04  *  480.01  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 3739.14  *22125.18  *  455.68  *
* Top Width (ft)         *  499.61  * Top Width (ft)         *  293.29  *  117.47  *   88.85  *
* Vel Total (ft/s)       *    4.43  * Avg. Vel. (ft/s)       *    1.37  *    8.10  *    0.95  *
* Max Chl Dpth (ft)      *   31.43  * Hydr. Depth (ft)       *    9.30  *   23.26  *    5.40  *
* Conv. Total (cfs)      *1048982.0  * Conv. (cfs)           *149023.1  *881797.4  * 18161.3  *
* Length Wtd. (ft)       *  324.11  * Wetted Per. (ft)       *  294.53  *  130.33  *   89.87  *
* Min Ch El (ft)         *  732.08  * Shear (lb/sq ft)       *    0.36  *    0.82  *    0.21  *
* Alpha                  *    2.82  * Stream Power (lb/ft s) *    0.50  *    6.67  *    0.20  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *  311.94  * 6286.62  *  400.03  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   53.80  *  376.22  *  106.54  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  766.15  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)         *  755.00  * Flow Area (sq ft)      * 3515.88  * 3041.50  *  721.41  *
* E.G. Slope (ft/ft)     *0.000673  * Area (sq ft)           * 3515.88  * 3041.50  *  721.41  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 5752.20  *27358.81  *  888.99  *
* Top Width (ft)         *  516.28  * Top Width (ft)         *  304.39  *  117.47  *   94.42  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    1.64  *    9.00  *    1.23  *
* Max Chl Dpth (ft)      *   34.07  * Hydr. Depth (ft)       *   11.55  *   25.89  *    7.64  *
* Conv. Total (cfs)      *1310446.0  * Conv. (cfs)           *221704.5  *1054478.0  * 34263.8  *
* Length Wtd. (ft)       *  320.47  * Wetted Per. (ft)       *  305.95  *  130.33  *   96.03  *
* Min Ch El (ft)         *  732.08  * Shear (lb/sq ft)       *    0.48  *    0.98  *    0.32  *
* Alpha                  *    3.01  * Stream Power (lb/ft s) *    0.79  *    8.82  *    0.39  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *  496.56  * 7501.39  *  820.09  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   82.58  *  397.41  *  168.72  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  769.71  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)         *  757.91  * Flow Area (sq ft)      * 4632.24  * 3459.45  * 1070.72  *
* E.G. Slope (ft/ft)     *0.000682  * Area (sq ft)           * 4632.24  * 3459.45  * 1070.72  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 8741.16  *34124.18  * 1634.66  *
* Top Width (ft)         *  546.09  * Top Width (ft)         *  326.68  *  117.47  *  101.94  *
* Vel Total (ft/s)       *    4.86  * Avg. Vel. (ft/s)       *    1.89  *    9.86  *    1.53  *
* Max Chl Dpth (ft)      *   37.63  * Hydr. Depth (ft)       *   14.18  *   29.45  *   10.50  *
* Conv. Total (cfs)      *1704251.0  * Conv. (cfs)           *334767.2  *1306880.0  * 62603.9  *
* Length Wtd. (ft)       *  316.69  * Wetted Per. (ft)       *  328.54  *  130.33  *  104.35  *
* Min Ch El (ft)         *  732.08  * Shear (lb/sq ft)       *    0.60  *    1.13  *    0.44  *
* Alpha                  *    3.20  * Stream Power (lb/ft s) *    1.13  *   11.14  *    0.67  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   * 1173.63  * 9494.18  * 2205.16  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  272.55  *  422.74  *  468.17  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
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*****************************************************************************************
* E.G. Elev (ft)          *  773.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.36  * Wt. n-Val.              *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  772.27  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)          *  759.88  * Flow Area (sq ft)      * 5604.70  * 3760.85  * 1339.22  *
* E.G. Slope (ft/ft)      *0.000723  * Area (sq ft)           * 5604.70  * 3760.85  * 1339.22  *
* Q Total (cfs)           *53690.00  * Flow (cfs)             *10949.08  *40386.35  * 2354.58  *
* Top Width (ft)          *  677.00  * Top Width (ft)         *  452.17  *  117.47  *  107.36  *
* Vel Total (ft/s)        *    5.02  * Avg. Vel. (ft/s)       *    1.95  *   10.74  *    1.76  *
* Max Chl Dpth (ft)       *   40.19  * Hydr. Depth (ft)       *   12.40  *   32.02  *   12.47  *
* Conv. Total (cfs)       *1996912.0  * Conv. (cfs)           *407233.0  *1502104.0  * 87574.6  *
* Length Wtd. (ft)        *  315.64  * Wetted Per. (ft)       *  454.43  *  130.33  *  110.35  *
* Min Ch El (ft)          *  732.08  * Shear (lb/sq ft)       *    0.56  *    1.30  *    0.55  *
* Alpha                   *    3.48  * Stream Power (lb/ft s) *    1.09  *   13.98  *    0.96  *
* Frctn Loss (ft)         *    0.28  * Cum Volume (acre-ft)   * 2114.90  *10627.63  * 3719.97  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         *  435.87  *  428.75  *  737.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  775.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.46  * Wt. n-Val.              *   0.118  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  774.35  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)          *  761.30  * Flow Area (sq ft)      * 7351.22  * 4005.02  * 1595.25  *
* E.G. Slope (ft/ft)      *0.000736  * Area (sq ft)           * 7357.92  * 4005.02  * 1595.25  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             *13982.36  *45258.79  * 2758.86  *
* Top Width (ft)          * 1632.52  * Top Width (ft)         * 1359.62  *  117.47  *  155.43  *
* Vel Total (ft/s)        *    4.79  * Avg. Vel. (ft/s)       *    1.90  *   11.30  *    1.73  *
* Max Chl Dpth (ft)       *   42.27  * Hydr. Depth (ft)       *    5.45  *   34.09  *   10.26  *
* Conv. Total (cfs)       *2285182.0  * Conv. (cfs)           *515358.6  *1668138.0  *101685.5  *
* Length Wtd. (ft)        *  313.35  * Wetted Per. (ft)       * 1355.28  *  130.33  *  158.60  *
* Min Ch El (ft)          *  732.08  * Shear (lb/sq ft)       *    0.25  *    1.41  *    0.46  *
* Alpha                   *    4.11  * Stream Power (lb/ft s) *    0.47  *   15.96  *    0.80  *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)   * 2897.10  *11309.11  * 5092.14  *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)         *  536.74  *  429.95  * 1027.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  778.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.56  * Wt. n-Val.              *   0.111  *   0.035  *   0.118  *
* W.S. Elev (ft)          *  776.85  * Reach Len. (ft)        *   61.29  *  342.83  *  435.02  *
* Crit W.S. (ft)          *  763.29  * Flow Area (sq ft)      *10874.26  * 4298.76  * 2027.89  *
* E.G. Slope (ft/ft)      *0.000756  * Area (sq ft)           *11201.11  * 4298.76  * 2027.89  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *19155.64  *51612.25  * 3952.11  *
* Top Width (ft)          * 1884.33  * Top Width (ft)         * 1583.65  *  117.47  *  183.21  *
* Vel Total (ft/s)        *    4.34  * Avg. Vel. (ft/s)       *    1.76  *   12.01  *    1.95  *
* Max Chl Dpth (ft)       *   44.77  * Hydr. Depth (ft)       *    7.70  *   36.59  *   11.07  *
* Conv. Total (cfs)       *2717357.0  * Conv. (cfs)           *696637.0  *1876993.0  *143727.1  *
* Length Wtd. (ft)        *  304.84  * Wetted Per. (ft)       * 1423.00  *  130.33  *  186.67  *
* Min Ch El (ft)          *  732.08  * Shear (lb/sq ft)       *    0.36  *    1.56  *    0.51  *
* Alpha                   *    5.33  * Stream Power (lb/ft s) *    0.64  *   18.69  *    1.00  *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)   * 4510.73  *12418.56  * 8047.62  *
* C & E Loss (ft)         *    0.10  * Cum SA (acres)         *  700.81  *  431.87  * 1335.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
```

* E.G. Elev (ft)	* 768.55	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 1.09	* Wt. n-Val.	* 0.120	* 0.035	* 0.120 *
* W.S. Elev (ft)	* 767.46	* Reach Len. (ft)	* 61.29	* 342.83	* 435.02 *
* Crit W.S. (ft)	* 756.23	* Flow Area (sq ft)	* 3920.31	* 3196.01	* 847.42 *
* E.G. Slope (ft/ft)	*0.000686	* Area (sq ft)	* 3920.31	* 3196.01	* 847.42 *
* Q Total (cfs)	*38000.00	* Flow (cfs)	* 6865.14	*29986.04	* 1148.82 *
* Top Width (ft)	* 525.28	* Top Width (ft)	* 310.61	* 117.47	* 97.20 *
* Vel Total (ft/s)	* 4.77	* Avg. Vel. (ft/s)	* 1.75	* 9.38	* 1.36 *
* Max Chl Dpth (ft)	* 35.38	* Hydr. Depth (ft)	* 12.62	* 27.21	* 8.72 *
* Conv. Total (cfs)	*1451334.0	* Conv. (cfs)	*262200.1	*1145257.0	* 43876.9 *
* Length Wtd. (ft)	* 318.89	* Wetted Per. (ft)	* 312.30	* 130.33	* 99.11 *
* Min Ch El (ft)	* 732.08	* Shear (lb/sq ft)	* 0.54	* 1.05	* 0.37 *
* Alpha	* 3.08	* Stream Power (lb/ft s)	* 0.94	* 9.85	* 0.50 *
* Frctn Loss (ft)	* 0.27	* Cum Volume (acre-ft)	* 635.03	* 8154.47	* 1127.17 *
* C & E Loss (ft)	* 0.06	* Cum SA (acres)	* 116.39	* 406.80	* 218.32 *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 12.189

INPUT
Description: Location of Historic Byram's Ford. Critical location for channel velocities.
Station Elevation Data num= 209

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	802.97	25.49	802.08	51.34	802.14	63.38	802.5	74.41	796.54
82.39	793.02	94.56	791.05	108.56	788.48	119.26	782.95	123.21	781.1
134.93	781.4	137.28	781.39	150.32	781.44	157.57	780.48	178.74	775.68
189.54	774.66	190.03	774.63	203.31	776.23	248.38	775.55	277.47	774.58
309.94	774.32	322.46	774.04	343.31	774.24	362.83	774.06	374.36	773.79
393.02	773.65	417.22	773.8	417.54	773.79	476.18	773.85	495.9	773.58
501.15	773.6	503.21	773.47	551.08	773.13	552.03	773.26	559.48	774.15
614.94	774.06	647.96	774.17	717.58	773.81	764.94	773.95	770.46	773.79
789.91	773.8	792.3	773.59	798.67	772.86	802.31	773	829.21	772.74
836.94	773.05	841.07	773.36	845.22	773.37	853.35	773.61	908.6	773.92
909.76	773.91	934.91	774.13	948.27	773.79	949.3	773.79	960.12	773.53
963.36	773.54	994.44	772.97	1011.96	772.91	1020.74	772.63	1031.51	772.67
1034.32	772.6	1096.75	772.76	1127.87	773.01	1128.21	773.02	1133.63	773.07
1142.11	772.93	1143.81	772.86	1151.22	772.13	1164.81	771.45	1196.84	771.51
1217.96	771.13	1221.83	771.11	1231.25	771.56	1246.67	771.94	1259.97	772.69
1272.15	772.73	1303.08	772.37	1312.32	772.93	1330.59	773.2	1353.93	774.15
1393.99	774.16	1398.15	774.31	1401.98	774.18	1412.14	773.6	1621.12	773.05
1629.81	773.74	1633.26	773.74	1644.06	773.41	1666.01	772.41	1679.5	772.44
1684.48	772.57	1710.99	772.63	1712.42	772.65	1746.02	774.31	1749.07	774.54
1770.29	773.27	1772.71	773.09	1799.74	772.97	1845.61	774.32	1845.88	774.29
1849.74	774.39	1856.36	774.41	1877.8	774.81	1877.95	774.8	1878.4	774.78
1893.41	773.93	1902.41	772.93	1908.86	772.67	1915.49	770.51	1917.35	770.33
1929.14	771.03	1930.02	771.03	1933.32	771.71	1944.41	771.91	1944.9	771.89
1947.04	771.83	1977.51	772.34	1977.63	772.34	1979.93	772.46	2005.28	771.92
2014.19	771.29	2016.46	771.08	2028.14	769.34	2030.74	769.19	2046.04	766.47
2053.17	764.92	2058.17	763.96	2068.68	761.68	2069.6	761.47	2086.35	761.88
2102.36	758.35	2111.8	756.55	2119.39	755.49	2140.02	752.26	2143.05	751.95
2144.1	751.84	2148.39	750.63	2151.48	749.94	2157.44	747.69	2160.1	747.51
2162.96	747.13	2173.42	746.09	2176.53	745.71	2178.29	743.84	2182.02	739.29
2189	733	2205	731.89	2220	733	2227.59	739.53	2237.18	742.43
2241.31	743.84	2249.62	746.05	2250.82	746.4	2263.89	754.23	2266.89	754.32
2282.34	755.25	2288.06	755.61	2307.6	755.48	2317.04	755.62	2318.28	755.6
2336.85	755.74	2346.15	754.82	2348.97	754.92	2356.79	754.61	2363.36	754.8
2367.65	754.68	2368.86	754.69	2378.4	755.23	2380.39	755.26	2384.77	755.55
2389.58	756.14	2392.05	756.33	2397.24	756.9	2409.44	757.66	2420.82	758.17
2429.92	759.17	2439.61	762.1	2446.32	764.26	2452.08	767.01	2453.26	767.53
2472.03	776.26	2493.16	778.57	2515.9	778.55	2522.06	777.85	2525.75	777.5
2543.28	778.97	2556.96	779.41	2564.48	779.82	2571.83	780.04	2582.63	780.61
2584.31	781.02	2585.38	781.26	2592.95	782.87	2599.16	785.18	2599.54	785.33
2600.01	785.58	2608.33	788.54	2608.88	788.65	2617.74	791.89	2623.18	792.4
2627.33	793.11	2629.59	794.05	2633.13	795.9	2645.54	802.68	2652.96	807.43
2658.2	811.26	2660.33	812.6	2668.56	819.1	2673.46	819.58		

```
Manning's n Values         num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0    .075 1621.12     .12  2144.1    .035 2263.89     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2144.1 2263.89           214.33  489.02  358.12             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     150     400     783       F
     610     900     783       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     700     820     795    1400    1600     795

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  757.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  757.24  * Reach Len. (ft)        *  214.33  *  489.02  *  358.12  *
* Crit W.S. (ft)         *  747.79  * Flow Area (sq ft)      *  101.06  * 1873.38  *  259.13  *
* E.G. Slope (ft/ft)     *0.000774  * Area (sq ft)           *  101.06  * 1873.38  *  259.13  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *   68.86  *12995.93  *  135.21  *
* Top Width (ft)         *  294.49  * Top Width (ft)         *   35.91  *  119.79  *  138.79  *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *    0.68  *    6.94  *    0.52  *
* Max Chl Dpth (ft)      *   25.35  * Hydr. Depth (ft)       *    2.81  *   15.64  *    1.87  *
* Conv. Total (cfs)      *474501.8  * Conv. (cfs)            *  2475.3  *467166.2  *  4860.2  *
* Length Wtd. (ft)       *  485.56  * Wetted Per. (ft)       *   36.32  *  131.60  *  139.00  *
* Min Ch El (ft)         *  731.89  * Shear (lb/sq ft)       *    0.13  *    0.69  *    0.09  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.09  *    4.77  *    0.05  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   *   93.78  * 3689.46  *   65.86  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   18.17  *  313.41  *   24.41  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  761.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  760.60  * Reach Len. (ft)        *  214.33  *  489.02  *  358.12  *
* Crit W.S. (ft)         *  750.90  * Flow Area (sq ft)      *  249.47  * 2275.71  *  797.99  *
* E.G. Slope (ft/ft)     *0.000885  * Area (sq ft)           *  249.47  * 2275.71  *  797.99  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  259.10  *19220.80  *  820.10  *
* Top Width (ft)         *  342.47  * Top Width (ft)         *   51.93  *  119.79  *  170.75  *
* Vel Total (ft/s)       *    6.11  * Avg. Vel. (ft/s)       *    1.04  *    8.45  *    1.03  *
* Max Chl Dpth (ft)      *   28.71  * Hydr. Depth (ft)       *    4.80  *   19.00  *    4.67  *
* Conv. Total (cfs)      *682362.4  * Conv. (cfs)            *  8709.3  *646086.3  * 27566.8  *
* Length Wtd. (ft)       *  477.93  * Wetted Per. (ft)       *   52.69  *  131.60  *  171.25  *
* Min Ch El (ft)         *  731.89  * Shear (lb/sq ft)       *    0.26  *    0.96  *    0.26  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    0.27  *    8.07  *    0.26  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  199.70  * 5079.98  *  177.52  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *   37.36  *  349.05  *   44.01  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  764.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.32  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  762.76  * Reach Len. (ft)        *  214.33  *  489.02  *  358.12  *
* Crit W.S. (ft)         *  753.00  * Flow Area (sq ft)      *  392.64  * 2534.85  * 1175.08  *
* E.G. Slope (ft/ft)     *0.000986  * Area (sq ft)           *  392.64  * 2534.85  * 1175.08  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  435.63  *24280.25  * 1604.13  *
* Top Width (ft)         *  377.97  * Top Width (ft)         *   80.40  *  119.79  *  177.77  *
* Vel Total (ft/s)       *    6.42  * Avg. Vel. (ft/s)       *    1.11  *    9.58  *    1.37  *
* Max Chl Dpth (ft)      *   30.87  * Hydr. Depth (ft)       *    4.88  *   21.16  *    6.61  *
* Conv. Total (cfs)      *838269.5  * Conv. (cfs)            * 13874.4  *773305.1  * 51090.1  *
* Length Wtd. (ft)       *  473.19  * Wetted Per. (ft)       *   81.45  *  131.60  *  178.60  *
* Min Ch El (ft)         *  731.89  * Shear (lb/sq ft)       *    0.30  *    1.19  *    0.40  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.33  *   11.36  *    0.55  *
```

```
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   *  309.74  * 6265.89  *  391.76  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *   53.54  *  375.28  *  105.21  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  766.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.60  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  765.24  * Reach Len. (ft)        *  214.33  *  489.02  *  358.12  *
* Crit W.S. (ft)         *  755.45  * Flow Area (sq ft)      *  606.99  * 2832.34  * 1625.66  *
* E.G. Slope (ft/ft)     *0.001065  * Area (sq ft)           *  606.99  * 2832.34  * 1625.66  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  852.12  *30358.70  * 2789.19  *
* Top Width (ft)         *  396.70  * Top Width (ft)         *   92.42  *  119.79  *  184.49  *
* Vel Total (ft/s)       *    6.71  * Avg. Vel. (ft/s)       *    1.40  *   10.72  *    1.72  *
* Max Chl Dpth (ft)      *   33.35  * Hydr. Depth (ft)       *    6.57  *   23.64  *    8.81  *
* Conv. Total (cfs)      *1042004.0  * Conv. (cfs)           * 26114.9  *930408.1  * 85480.6  *
* Length Wtd. (ft)       *  467.91  * Wetted Per. (ft)       *   93.72  *  131.60  *  185.78  *
* Min Ch El (ft)         *  731.89  * Shear (lb/sq ft)       *    0.43  *    1.43  *    0.58  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.60  *   15.33  *    1.00  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   *  493.66  * 7478.28  *  808.37  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *   82.30  *  396.47  *  167.32  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  770.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.85  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  768.70  * Reach Len. (ft)        *  214.33  *  489.02  *  358.12  *
* Crit W.S. (ft)         *  758.80  * Flow Area (sq ft)      *  956.13  * 3246.02  * 2275.43  *
* E.G. Slope (ft/ft)     *0.001067  * Area (sq ft)           *  956.13  * 3246.02  * 2275.43  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 1612.93  *38135.88  * 4751.20  *
* Top Width (ft)         *  422.26  * Top Width (ft)         *  110.59  *  119.79  *  191.88  *
* Vel Total (ft/s)       *    6.87  * Avg. Vel. (ft/s)       *    1.69  *   11.75  *    2.09  *
* Max Chl Dpth (ft)      *   36.81  * Hydr. Depth (ft)       *    8.65  *   27.10  *   11.86  *
* Conv. Total (cfs)      *1362623.0  * Conv. (cfs)           * 49389.1  *1167749.0  *145485.1  *
* Length Wtd. (ft)       *  462.01  * Wetted Per. (ft)       *  112.22  *  131.60  *  193.93  *
* Min Ch El (ft)         *  731.89  * Shear (lb/sq ft)       *    0.57  *    1.64  *    0.78  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *    0.96  *   19.30  *    1.63  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 1169.70  * 9467.79  * 2188.46  *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)         *  272.24  *  421.81  *  466.70  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  773.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.09  * Wt. n-Val.             *   0.120  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  771.20  * Reach Len. (ft)        *  214.33  *  489.02  *  358.12  *
* Crit W.S. (ft)         *  760.90  * Flow Area (sq ft)      * 1264.33  * 3545.38  * 2761.66  *
* E.G. Slope (ft/ft)     *0.001099  * Area (sq ft)           * 1264.33  * 3545.38  * 2761.66  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 2330.01  *44833.46  * 6526.53  *
* Top Width (ft)         *  472.78  * Top Width (ft)         *  155.74  *  119.79  *  197.25  *
* Vel Total (ft/s)       *    7.09  * Avg. Vel. (ft/s)       *    1.84  *   12.65  *    2.36  *
* Max Chl Dpth (ft)      *   39.31  * Hydr. Depth (ft)       *    8.12  *   29.60  *   14.00  *
* Conv. Total (cfs)      *1619916.0  * Conv. (cfs)           * 70300.2  *1352700.0  *196916.2  *
* Length Wtd. (ft)       *  458.77  * Wetted Per. (ft)       *  157.70  *  131.60  *  199.86  *
* Min Ch El (ft)         *  731.89  * Shear (lb/sq ft)       *    0.55  *    1.85  *    0.95  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    1.01  *   23.36  *    2.24  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   * 2110.07  *10598.88  * 3699.49  *
* C & E Loss (ft)        *    0.34  * Cum SA (acres)         *  435.44  *  427.82  *  736.03  *
*****************************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	775.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.39	Wt. n-Val.	0.118	0.035	0.120
W.S. Elev (ft)	773.05	Reach Len. (ft)	214.33	489.02	358.12
Crit W.S. (ft)	762.67	Flow Area (sq ft)	1881.98	3766.84	3130.00
E.G. Slope (ft/ft)	0.001172	Area (sq ft)	1885.55	3766.84	3130.00
Q Total (cfs)	62000.00	Flow (cfs)	2584.80	51229.04	8186.17
Top Width (ft)	994.09	Top Width (ft)	673.07	119.79	201.23
Vel Total (ft/s)	7.06	Avg. Vel. (ft/s)	1.37	13.60	2.62
Max Chl Dpth (ft)	41.16	Hydr. Depth (ft)	2.87	31.45	15.55
Conv. Total (cfs)	1811061.0	Conv. (cfs)	75503.8	1496434.0	239123.3
Length Wtd. (ft)	457.71	Wetted Per. (ft)	658.70	131.60	204.24
Min Ch El (ft)	731.89	Shear (lb/sq ft)	0.21	2.09	1.12
Alpha	3.08	Stream Power (lb/ft s)	0.29	28.48	2.93
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	2890.60	11278.53	5068.55
C & E Loss (ft)	0.40	Cum SA (acres)	535.31	429.02	1025.95

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	778.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.57	Wt. n-Val.	0.103	0.035	0.120
W.S. Elev (ft)	775.46	Reach Len. (ft)	214.33	489.02	358.12
Crit W.S. (ft)	764.89	Flow Area (sq ft)	4482.00	4055.87	3621.79
E.G. Slope (ft/ft)	0.001201	Area (sq ft)	4948.35	4055.87	3621.79
Q Total (cfs)	74720.00	Flow (cfs)	5698.16	58648.03	10373.81
Top Width (ft)	1914.99	Top Width (ft)	1588.78	119.79	206.42
Vel Total (ft/s)	6.14	Avg. Vel. (ft/s)	1.27	14.46	2.86
Max Chl Dpth (ft)	43.57	Hydr. Depth (ft)	3.57	33.86	17.55
Conv. Total (cfs)	2156519.0	Conv. (cfs)	164456.4	1692661.0	299402.0
Length Wtd. (ft)	448.35	Wetted Per. (ft)	1260.45	131.60	209.96
Min Ch El (ft)	731.89	Shear (lb/sq ft)	0.27	2.31	1.29
Alpha	4.38	Stream Power (lb/ft s)	0.34	33.40	3.70
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	4499.36	12385.69	8019.41
C & E Loss (ft)	0.43	Cum SA (acres)	698.58	430.94	1333.30

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	768.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.	0.120	0.035	0.120
W.S. Elev (ft)	766.50	Reach Len. (ft)	214.33	489.02	358.12
Crit W.S. (ft)	756.95	Flow Area (sq ft)	726.68	2982.78	1858.99
E.G. Slope (ft/ft)	0.001085	Area (sq ft)	726.68	2982.78	1858.99
Q Total (cfs)	38000.00	Flow (cfs)	1114.29	33401.70	3484.01
Top Width (ft)	405.14	Top Width (ft)	98.23	119.79	187.12
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)	1.53	11.20	1.87
Max Chl Dpth (ft)	34.61	Hydr. Depth (ft)	7.40	24.90	9.93
Conv. Total (cfs)	1153842.0	Conv. (cfs)	33834.6	1014218.0	105789.3
Length Wtd. (ft)	465.54	Wetted Per. (ft)	99.66	131.60	188.69
Min Ch El (ft)	731.89	Shear (lb/sq ft)	0.49	1.53	0.67
Alpha	2.38	Stream Power (lb/ft s)	0.76	17.19	1.25
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	631.76	8130.16	1113.65

```
* C & E Loss (ft)        *    0.28  * Cum SA (acres)         *  116.10  *  405.87  *  216.90  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.096

INPUT
Description:
Station Elevation Data    num=     153
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  799.08    8.96  799.67   10.51  799.68   25.31  799.25   27.18  799.42
   31.67  799.22   36.92  799.23   46.46  798.89   57.48  798.26   59.07  797.92
   59.22  797.88    61.1  797.17   87.06  797.53   97.04   797.2  101.47  795.77
  120.68  789.28   131.5  787.17  148.35  782.16  176.36  782.18  183.49  781.08
  188.23  780.63   195.8  780.12  197.95  779.92  203.63  779.71  227.41  779.15
  227.93  779.05  228.04  779.05  229.68  778.92  240.99  777.52  248.46  777.04
  257.29  776.91  272.79  776.28  274.39  776.45  277.37  776.39  281.04  776.49
  325.21  775.68  460.19  775.74  553.87  775.55  581.98  775.09  585.69  775.07
  594.89  774.49  596.43  774.34  620.61  774.35  621.91  774.33   623.1  774.34
   630.7   774.3  671.12   774.7  671.83  774.73  710.88   778.2  716.03  778.57
  725.55  776.31  744.24   776.4  753.74  777.04  796.07  777.65  799.05     778
  818.54  778.09  826.19  778.45  831.66  778.38  838.38  777.65  858.33  775.18
  904.89  774.07  923.81  773.42  967.18   773.7  967.92  773.59  971.69  772.97
  996.66  772.97  997.27  773.06 1003.17  773.73 1061.58  773.17 1138.17  773.54
 1204.59  773.45 1347.41  774.04 1405.33  773.46 1461.95  773.67 1538.92  773.25
 1542.41  773.31 1587.91  773.09 1591.32  771.98 1595.97  770.96 1597.58  770.57
 1597.98  770.46 1617.29  764.43 1618.57  763.57 1626.09   759.4 1626.82  759.33
 1655.01  756.22 1663.92  753.61 1668.21  752.99  1690.5  749.82 1690.95  749.75
 1691.11  749.74  1691.4   749.7 1707.48  745.61 1717.52  741.08 1721.71  739.02
    1730   732.6    1748  731.61    1767   732.6 1775.78  739.02 1797.43  746.87
 1803.14  749.05 1818.36  754.32 1829.58  754.43 1874.77  754.88 1879.34  754.76
 1946.59  754.55 1986.77  755.04 2076.59  754.74 2081.98  754.62 2148.72  754.81
 2184.52  756.88 2189.07  757.01 2223.15  760.07 2223.83  760.18 2227.16   760.9
 2228.28  761.31 2228.82  761.53 2232.62  763.16 2234.45   763.8 2242.48  766.37
 2246.86  767.06 2258.57  768.66 2261.29  768.73 2291.65  770.07 2316.49  771.39
 2322.59   771.5  2343.7  772.58 2374.17  774.56 2374.67  774.58 2387.03  774.42
 2409.97  778.41 2441.21  779.63 2465.15  779.57  2474.7  778.74 2481.38  779.83
 2483.34  780.18 2494.38   781.3 2501.02  784.31 2506.59  787.14  2512.8  792.94
 2516.28  796.02 2520.52  800.29 2523.61  803.76 2525.62  805.68 2527.58  806.76
 2531.36  809.37 2542.04  816.99 2543.39  817.28 2548.08  819.62 2562.81  820.32
 2565.61  820.71 2573.28  821.55 2585.98   822.2

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .075 1538.92      .1 1655.01    .035 1818.36     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1655.01 1818.36           290.65  224.59  136.24             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     200     540     783        F
     675     950     783        F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
     340     540     795     710     820     795

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  757.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  757.09  * Reach Len. (ft)        *  290.65  *  224.59  *  136.24  *
* Crit W.S. (ft)         *  745.68  * Flow Area (sq ft)      *    3.46  * 2259.01  *  822.60  *
* E.G. Slope (ft/ft)     *0.000578  * Area (sq ft)           *    3.46  * 2259.01  *  822.60  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *    0.71  *12783.53  *  415.76  *
* Top Width (ft)         *  542.91  * Top Width (ft)         *    7.92  *  163.35  *  371.64  *
```

```
* Vel Total (ft/s)       *    4.28  * Avg. Vel. (ft/s)       *    0.20  *    5.66  *    0.51  *
* Max Chl Dpth (ft)      *   25.48  * Hydr. Depth (ft)       *    0.44  *   13.83  *    2.21  *
* Conv. Total (cfs)      *549183.3  * Conv. (cfs)            *    29.5  *531856.1  * 17297.8  *
* Length Wtd. (ft)       *  222.43  * Wetted Per. (ft)       *    7.97  *  172.98  *  371.72  *
* Min Ch El (ft)         *  731.61  * Shear (lb/sq ft)       *    0.02  *    0.47  *    0.08  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.00  *    2.67  *    0.04  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *   93.53  * 3666.26  *   61.41  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   18.07  *  311.82  *   22.31  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.              *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  760.59  * Reach Len. (ft)        *  290.65  *  224.59  *  136.24  *
* Crit W.S. (ft)         *  749.10  * Flow Area (sq ft)      *   81.58  * 2830.41  * 2189.94  *
* E.G. Slope (ft/ft)     *0.000557  * Area (sq ft)           *   81.58  * 2830.41  * 2189.94  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *   53.91  *18282.54  * 1963.56  *
* Top Width (ft)         *  601.79  * Top Width (ft)         *   31.07  *  163.35  *  407.37  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *    0.66  *    6.46  *    0.90  *
* Max Chl Dpth (ft)      *   28.98  * Hydr. Depth (ft)       *    2.63  *   17.33  *    5.38  *
* Conv. Total (cfs)      *859945.8  * Conv. (cfs)            *  2283.6  *774482.3  * 83179.9  *
* Length Wtd. (ft)       *  216.54  * Wetted Per. (ft)       *   31.55  *  172.98  *  407.64  *
* Min Ch El (ft)         *  731.61  * Shear (lb/sq ft)       *    0.09  *    0.57  *    0.19  *
* Alpha                  *    2.38  * Stream Power (lb/ft s) *    0.06  *    3.68  *    0.17  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  198.88  * 5051.32  *  165.24  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   37.15  *  347.46  *   41.63  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  763.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.              *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  762.87  * Reach Len. (ft)        *  290.65  *  224.59  *  136.24  *
* Crit W.S. (ft)         *  751.63  * Flow Area (sq ft)      *  156.92  * 3202.00  * 3124.48  *
* E.G. Slope (ft/ft)     *0.000566  * Area (sq ft)           *  156.92  * 3202.00  * 3124.48  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  147.37  *22632.42  * 3540.21  *
* Top Width (ft)         *  612.10  * Top Width (ft)         *   35.17  *  163.35  *  413.58  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    0.94  *    7.07  *    1.13  *
* Max Chl Dpth (ft)      *   31.26  * Hydr. Depth (ft)       *    4.46  *   19.60  *    7.55  *
* Conv. Total (cfs)      *1106247.0  * Conv. (cfs)            *  6194.2  *951255.5  *148797.3  *
* Length Wtd. (ft)       *  212.81  * Wetted Per. (ft)       *   36.24  *  172.98  *  414.26  *
* Min Ch El (ft)         *  731.61  * Shear (lb/sq ft)       *    0.15  *    0.65  *    0.27  *
* Alpha                  *    2.62  * Stream Power (lb/ft s) *    0.14  *    4.62  *    0.30  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  308.39  * 6233.69  *  374.09  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   53.25  *  373.69  *  102.78  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  766.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.              *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  765.47  * Reach Len. (ft)        *  290.65  *  224.59  *  136.24  *
* Crit W.S. (ft)         *  754.09  * Flow Area (sq ft)      *  255.11  * 3627.88  * 4212.46  *
* E.G. Slope (ft/ft)     *0.000569  * Area (sq ft)           *  255.11  * 3627.88  * 4212.46  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  297.53  *27938.52  * 5763.95  *
* Top Width (ft)         *  625.73  * Top Width (ft)         *   41.06  *  163.35  *  421.32  *
* Vel Total (ft/s)       *    4.20  * Avg. Vel. (ft/s)       *    1.17  *    7.70  *    1.37  *
* Max Chl Dpth (ft)      *   33.86  * Hydr. Depth (ft)       *    6.21  *   22.21  *   10.00  *
* Conv. Total (cfs)      *1425474.0  * Conv. (cfs)            * 12474.2  *1171342.0  *241657.5  *
* Length Wtd. (ft)       *  209.26  * Wetted Per. (ft)       *   42.74  *  172.98  *  422.43  *
* Min Ch El (ft)         *  731.61  * Shear (lb/sq ft)       *    0.21  *    0.74  *    0.35  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    0.25  *    5.74  *    0.48  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  491.54  * 7442.02  *  784.37  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   81.97  *  394.88  *  164.83  *
**********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	769.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.	0.100	0.035	0.120
W.S. Elev (ft)	769.06	Reach Len. (ft)	290.65	224.59	136.24
Crit W.S. (ft)	757.54	Flow Area (sq ft)	422.89	4213.46	5758.12
E.G. Slope (ft/ft)	0.000539	Area (sq ft)	422.89	4213.46	5758.12
Q Total (cfs)	44500.00	Flow (cfs)	569.97	34897.92	9032.11
Top Width (ft)	666.27	Top Width (ft)	52.54	163.35	450.37
Vel Total (ft/s)	4.28	Avg. Vel. (ft/s)	1.35	8.28	1.57
Max Chl Dpth (ft)	37.45	Hydr. Depth (ft)	8.05	25.79	12.79
Conv. Total (cfs)	1916703.0	Conv. (cfs)	24549.8	1503122.0	389030.7
Length Wtd. (ft)	205.70	Wetted Per. (ft)	54.76	172.98	451.80
Min Ch El (ft)	731.61	Shear (lb/sq ft)	0.26	0.82	0.43
Alpha	2.96	Stream Power (lb/ft s)	0.35	6.79	0.67
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	1166.31	9425.92	2155.43
C & E Loss (ft)	0.03	Cum SA (acres)	271.84	420.22	464.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	772.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.	0.100	0.035	0.120
W.S. Elev (ft)	771.65	Reach Len. (ft)	290.65	224.59	136.24
Crit W.S. (ft)	759.17	Flow Area (sq ft)	570.22	4636.03	6995.06
E.G. Slope (ft/ft)	0.000547	Area (sq ft)	570.22	4636.03	6995.06
Q Total (cfs)	53690.00	Flow (cfs)	845.04	41217.63	11627.33
Top Width (ft)	732.59	Top Width (ft)	62.16	163.35	507.07
Vel Total (ft/s)	4.40	Avg. Vel. (ft/s)	1.48	8.89	1.66
Max Chl Dpth (ft)	40.04	Hydr. Depth (ft)	9.17	28.38	13.79
Conv. Total (cfs)	2296064.0	Conv. (cfs)	36138.2	1762681.0	497245.3
Length Wtd. (ft)	204.37	Wetted Per. (ft)	64.74	172.98	508.56
Min Ch El (ft)	731.61	Shear (lb/sq ft)	0.30	0.91	0.47
Alpha	3.17	Stream Power (lb/ft s)	0.45	8.13	0.78
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2105.56	10552.95	3659.39
C & E Loss (ft)	0.03	Cum SA (acres)	434.91	426.23	733.13

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	774.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.	0.100	0.035	0.120
W.S. Elev (ft)	773.61	Reach Len. (ft)	290.65	224.59	136.24
Crit W.S. (ft)	760.49	Flow Area (sq ft)	795.50	4957.46	8028.45
E.G. Slope (ft/ft)	0.000566	Area (sq ft)	798.89	4957.46	8028.45
Q Total (cfs)	62000.00	Flow (cfs)	858.00	46891.05	14250.95
Top Width (ft)	1242.47	Top Width (ft)	537.88	163.35	541.24
Vel Total (ft/s)	4.50	Avg. Vel. (ft/s)	1.08	9.46	1.78
Max Chl Dpth (ft)	42.00	Hydr. Depth (ft)	1.57	30.35	14.83
Conv. Total (cfs)	2606132.0	Conv. (cfs)	36065.4	1971036.0	599029.9
Length Wtd. (ft)	202.40	Wetted Per. (ft)	508.95	172.98	542.78
Min Ch El (ft)	731.61	Shear (lb/sq ft)	0.06	1.01	0.52
Alpha	3.38	Stream Power (lb/ft s)	0.06	9.58	0.93
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	2884.00	11229.56	5022.68
C & E Loss (ft)	0.03	Cum SA (acres)	532.33	427.43	1022.90

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	777.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.	0.088	0.035	0.120
W.S. Elev (ft)	776.10	Reach Len. (ft)	290.65	224.59	136.24
Crit W.S. (ft)	762.16	Flow Area (sq ft)	2690.59	5363.16	9430.57

```
* E.G. Slope (ft/ft)     *0.000574  * Area (sq ft)           * 2892.38  * 5363.16  * 9430.57  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 2927.61  *53837.09  *17955.30  *
* Top Width (ft)         * 1730.48  * Top Width (ft)         *  988.82  *  163.35  *  578.31  *
* Vel Total (ft/s)       *    4.27  * Avg. Vel. (ft/s)       *    1.09  *   10.04  *    1.90  *
* Max Chl Dpth (ft)      *   44.49  * Hydr. Depth (ft)       *    3.20  *   32.83  *   16.31  *
* Conv. Total (cfs)      *3118791.0  * Conv. (cfs)            *122197.4  *2247144.0  *749448.8  *
* Length Wtd. (ft)       *  203.11  * Wetted Per. (ft)       *  843.47  *  172.98  *  580.03  *
* Min Ch El (ft)         *  731.61  * Shear (lb/sq ft)       *    0.11  *    1.11  *    0.58  *
* Alpha                  *    4.03  * Stream Power (lb/ft s) *    0.12  *   11.15  *    1.11  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   * 4480.07  *12332.81  * 7965.76  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  692.24  *  429.35  * 1330.07  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  767.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  766.79  * Reach Len. (ft)        *  290.65  *  224.59  *  136.24  *
* Crit W.S. (ft)         *  756.09  * Flow Area (sq ft)      *  311.81  * 3842.43  * 4768.83  *
* E.G. Slope (ft/ft)     *0.000564  * Area (sq ft)           *  311.81  * 3842.43  * 4768.83  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  387.74  *30616.33  * 6995.93  *
* Top Width (ft)         *  635.39  * Top Width (ft)         *   45.27  *  163.35  *  426.77  *
* Vel Total (ft/s)       *    4.26  * Avg. Vel. (ft/s)       *    1.24  *    7.97  *    1.47  *
* Max Chl Dpth (ft)      *   35.18  * Hydr. Depth (ft)       *    6.89  *   23.52  *   11.17  *
* Conv. Total (cfs)      *1599941.0  * Conv. (cfs)            * 16325.3  *1289061.0  *294554.8  *
* Length Wtd. (ft)       *  207.75  * Wetted Per. (ft)       *   47.14  *  172.98  *  428.06  *
* Min Ch El (ft)         *  731.61  * Shear (lb/sq ft)       *    0.23  *    0.78  *    0.39  *
* Alpha                  *    2.84  * Stream Power (lb/ft s) *    0.29  *    6.23  *    0.58  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  629.21  * 8091.85  * 1086.41  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  115.75  *  404.28  *  214.38  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 12.054

INPUT
Description:
Station Elevation Data    num=     141
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  791.86    41.3  790.23   45.93  789.95   61.08  789.37   83.63  789.03
  109.84  789.16     119  787.75  133.43  785.11  144.07  784.67  155.91  781.29
  165.09  782.52  183.93   782.5  191.44  781.19   196.2  780.84  203.71  780.03
  213.51  780.08  218.75  779.88  220.84  779.71  226.29  779.74  236.02  778.72
  268.44  778.41  268.62   778.4  268.82   778.4  268.96  778.45  277.41  781.65
  327.99  781.78  346.77   781.6  348.16  781.66  349.68  781.59     366  781.54
  462.92  779.18  469.96   779.4  518.79  779.35  521.87  776.64  522.32  776.23
  533.19  775.07  533.41  775.07  544.42  774.91  596.73  774.83  604.48  774.61
  625.85  774.62  667.11  774.29  689.26  773.43  713.43  773.42  734.92  773.76
  772.78  773.54  782.55  773.28  827.51  772.91  834.62  772.56  844.22  772.27
  895.55  771.86  938.13  771.89  980.87  771.65 1026.76  771.79 1031.67  771.91
 1089.42  771.98 1090.05  772.01 1112.69  772.03 1119.97  772.29 1168.77  772.55
 1243.46  772.45 1285.87   772.6 1317.18  772.49 1340.42  772.67 1407.03  772.49
 1430.65  772.76 1489.32  772.23 1496.47  770.07  1496.6  770.02  1515.1  765.31
  1519.1  764.27 1532.26  758.78 1540.22  755.76 1545.07  754.45 1558.67  750.97
 1567.15  749.35 1570.27   748.9 1584.77  739.02    1593   732.5    1608  731.48
    1626   732.5 1634.78  739.02  1649.2  745.67 1650.38  745.82 1663.67  747.69
 1664.46  748.13 1677.42  753.89  1685.6  754.12 1686.59  754.18 1686.87  754.19
 1697.16  754.73 1703.96  754.97 1731.93  755.28 1816.69   755.4 1885.45  755.03
 1916.12  754.59  1953.9  754.82 1982.55  754.69 2010.36  753.23 2057.57  754.95
 2093.26  757.67 2099.96  759.67 2102.04  759.81 2111.45  758.76 2112.77  758.78
 2113.68   758.6 2115.39  758.32 2145.72   759.7 2155.61  760.27 2163.29   761.9
  2169.2  763.69 2177.89  765.78 2187.84  768.37 2195.57  768.74 2200.41  768.79
 2232.88  770.07 2235.34  770.08 2236.44  770.12 2278.26  773.18  2315.9   774.6
 2329.94  775.28 2335.42  776.67 2348.47  779.72 2380.88   780.1 2405.06  779.96
 2413.82  779.69 2415.83  780.14 2427.86  782.55 2432.44  784.45 2439.62  787.14
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 2441.92  788.84 2452.01  796.02  2452.4  796.28 2452.84  796.48 2467.12  803.83
 2467.51  804.06 2474.69  813.97 2477.87  818.25 2484.43  818.51 2489.61  818.84
 2503.47  820.72

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0    .075 1340.42      .1 1570.27    .035 1677.42     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1570.27  1685.6           280.44  239.41  168.68             .1       .3
Ineffective Flow     num=        3
   Sta L   Sta R    Elev  Permanent
     100     640     783       F
     765     965     783       F
    1090    1320     783       F
Blocked Obstructions     num=        3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     250     500     795     770     960     795    1130    1300     795

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  756.66  * Reach Len. (ft)        *  280.44  *  239.41  *  168.68  *
* Crit W.S. (ft)         *  746.43  * Flow Area (sq ft)      *  141.11  * 1807.11  *  694.94  *
* E.G. Slope (ft/ft)     *0.000746  * Area (sq ft)           *  141.11  * 1807.11  *  694.94  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *  149.70  *12707.50  *  342.79  *
* Top Width (ft)         *  542.23  * Top Width (ft)         *   32.43  *  115.33  *  394.47  *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)       *    1.06  *    7.03  *    0.49  *
* Max Chl Dpth (ft)      *   25.18  * Hydr. Depth (ft)       *    4.35  *   15.67  *    1.76  *
* Conv. Total (cfs)      *483211.9  * Conv. (cfs)            *  5480.1  *465183.1  * 12548.7  *
* Length Wtd. (ft)       *  237.96  * Wetted Per. (ft)       *   33.40  *  125.81  *  394.63  *
* Min Ch El (ft)         *  731.48  * Shear (lb/sq ft)       *    0.20  *    0.67  *    0.08  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.21  *    4.71  *    0.04  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *   93.04  * 3655.78  *   59.04  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   17.93  *  311.10  *   21.11  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  760.10  * Reach Len. (ft)        *  280.44  *  239.41  *  168.68  *
* Crit W.S. (ft)         *  749.94  * Flow Area (sq ft)      *  268.01  * 2203.67  * 2148.55  *
* E.G. Slope (ft/ft)     *0.000785  * Area (sq ft)           *  268.01  * 2203.67  * 2148.55  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  379.19  *17860.55  * 2060.27  *
* Top Width (ft)         *  623.63  * Top Width (ft)         *   41.18  *  115.33  *  467.12  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *    1.41  *    8.10  *    0.96  *
* Max Chl Dpth (ft)      *   28.62  * Hydr. Depth (ft)       *    6.51  *   19.11  *    4.60  *
* Conv. Total (cfs)      *724350.6  * Conv. (cfs)            * 13530.2  *637305.3  * 73515.0  *
* Length Wtd. (ft)       *  232.96  * Wetted Per. (ft)       *   42.80  *  125.81  *  467.76  *
* Min Ch El (ft)         *  731.48  * Shear (lb/sq ft)       *    0.31  *    0.86  *    0.23  *
* Alpha                  *    3.00  * Stream Power (lb/ft s) *    0.43  *    6.96  *    0.22  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  197.72  * 5038.34  *  158.45  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   36.91  *  346.74  *   40.26  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  762.37  * Reach Len. (ft)        *  280.44  *  239.41  *  168.68  *
* Crit W.S. (ft)         *  752.25  * Flow Area (sq ft)      *  367.33  * 2464.62  * 3221.93  *
* E.G. Slope (ft/ft)     *0.000809  * Area (sq ft)           *  367.33  * 2464.62  * 3221.93  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  597.35  *21684.96  * 4037.69  *
* Top Width (ft)         *  641.16  * Top Width (ft)         *   46.61  *  115.33  *  479.23  *
* Vel Total (ft/s)       *    4.35  * Avg. Vel. (ft/s)       *    1.63  *    8.80  *    1.25  *
* Max Chl Dpth (ft)      *   30.89  * Hydr. Depth (ft)       *    7.88  *   21.37  *    6.72  *
```

```
* Conv. Total (cfs)      *925265.6  * Conv. (cfs)            * 20999.6  *762323.2  *141942.7  *
* Length Wtd. (ft)       *  229.79  * Wetted Per. (ft)        *   48.67  *  125.81  *  480.11  *
* Min Ch El (ft)         *  731.48  * Shear (lb/sq ft)        *    0.38  *    0.99  *    0.34  *
* Alpha                  *    3.39  * Stream Power (lb/ft s) *    0.62  *    8.71  *    0.42  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  306.64  * 6219.08  *  364.16  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   52.98  *  372.97  *  101.38  *
**********************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

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**********************************************************************************************
* E.G. Elev (ft)         *  766.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.100  *   0.036  *   0.120  *
* W.S. Elev (ft)         *  764.99  * Reach Len. (ft)        *  280.44  *  239.41  *  168.68  *
* Crit W.S. (ft)         *  756.52  * Flow Area (sq ft)      *  497.99  * 2766.69  * 4489.17  *
* E.G. Slope (ft/ft)     *0.000812  * Area (sq ft)           *  497.99  * 2766.69  * 4489.17  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  900.20  *26165.87  * 6933.93  *
* Top Width (ft)         *  658.23  * Top Width (ft)         *   53.92  *  115.33  *  488.98  *
* Vel Total (ft/s)       *    4.38  * Avg. Vel. (ft/s)       *    1.81  *    9.46  *    1.54  *
* Max Chl Dpth (ft)      *   33.51  * Hydr. Depth (ft)       *    9.24  *   23.99  *    9.18  *
* Conv. Total (cfs)      *1193065.0  * Conv. (cfs)            * 31588.0  *918164.3  *243312.7  *
* Length Wtd. (ft)       *  226.76  * Wetted Per. (ft)        *   56.46  *  125.81  *  490.22  *
* Min Ch El (ft)         *  731.48  * Shear (lb/sq ft)        *    0.45  *    1.12  *    0.46  *
* Alpha                  *    3.61  * Stream Power (lb/ft s) *    0.81  *   10.55  *    0.72  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  489.02  * 7425.53  *  770.77  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   81.66  *  394.17  *  163.41  *
**********************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

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**********************************************************************************************
* E.G. Elev (ft)         *  769.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *   0.100  *   0.036  *   0.120  *
* W.S. Elev (ft)         *  768.64  * Reach Len. (ft)        *  280.44  *  239.41  *  168.68  *
* Crit W.S. (ft)         *  759.16  * Flow Area (sq ft)      *  721.21  * 3188.22  * 6303.50  *
* E.G. Slope (ft/ft)     *0.000752  * Area (sq ft)           *  721.21  * 3188.22  * 6303.50  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 1375.42  *31673.18  *11451.39  *
* Top Width (ft)         *  691.46  * Top Width (ft)         *   68.25  *  115.33  *  507.88  *
* Vel Total (ft/s)       *    4.36  * Avg. Vel. (ft/s)       *    1.91  *    9.93  *    1.82  *
* Max Chl Dpth (ft)      *   37.16  * Hydr. Depth (ft)       *   10.57  *   27.64  *   12.41  *
* Conv. Total (cfs)      *1622414.0  * Conv. (cfs)            * 50146.1  *1154764.0  *417503.4  *
* Length Wtd. (ft)       *  223.93  * Wetted Per. (ft)        *   71.25  *  125.81  *  509.55  *
* Min Ch El (ft)         *  731.48  * Shear (lb/sq ft)        *    0.48  *    1.19  *    0.58  *
* Alpha                  *    3.75  * Stream Power (lb/ft s) *    0.91  *   11.82  *    1.06  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 1162.49  * 9406.84  * 2136.57  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  271.44  *  419.50  *  462.56  *
**********************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

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**********************************************************************************************
* E.G. Elev (ft)         *  772.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.100  *   0.036  *   0.120  *
* W.S. Elev (ft)         *  771.23  * Reach Len. (ft)        *  280.44  *  239.41  *  168.68  *
* Crit W.S. (ft)         *  760.99  * Flow Area (sq ft)      *  910.98  * 3487.41  * 7709.49  *
* E.G. Slope (ft/ft)     *0.000760  * Area (sq ft)           *  910.98  * 3487.41  * 7709.49  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 1873.65  *36833.70  *14982.65  *
* Top Width (ft)         *  759.05  * Top Width (ft)         *   77.65  *  115.33  *  566.07  *
* Vel Total (ft/s)       *    4.43  * Avg. Vel. (ft/s)       *    2.06  *   10.56  *    1.94  *
* Max Chl Dpth (ft)      *   39.75  * Hydr. Depth (ft)       *   11.73  *   30.24  *   13.62  *
* Conv. Total (cfs)      *1946987.0  * Conv. (cfs)            * 67945.0  *1335719.0  *543323.2  *
* Length Wtd. (ft)       *  222.61  * Wetted Per. (ft)        *   81.01  *  125.81  *  567.80  *
* Min Ch El (ft)         *  731.48  * Shear (lb/sq ft)        *    0.53  *    1.32  *    0.64  *
* Alpha                  *    3.95  * Stream Power (lb/ft s) *    1.10  *   13.90  *    1.25  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 2100.62  *10532.01  * 3636.39  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  434.44  *  425.51  *  731.45  *
**********************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	774.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.35	Wt. n-Val.	0.098	0.036	0.120
W.S. Elev (ft)	773.16	Reach Len. (ft)	280.44	239.41	168.68
Crit W.S. (ft)	762.26	Flow Area (sq ft)	1334.57	3709.76	8826.23
E.G. Slope (ft/ft)	0.000800	Area (sq ft)	1396.20	3709.76	8826.23
Q Total (cfs)	62000.00	Flow (cfs)	1530.18	41786.08	18683.75
Top Width (ft)	1148.02	Top Width (ft)	440.27	115.33	592.42
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)	1.15	11.26	2.12
Max Chl Dpth (ft)	41.68	Hydr. Depth (ft)	3.56	32.17	14.90
Conv. Total (cfs)	2191463.0	Conv. (cfs)	54085.8	1476978.0	660398.9
Length Wtd. (ft)	221.11	Wetted Per. (ft)	378.78	125.81	594.22
Min Ch El (ft)	731.48	Shear (lb/sq ft)	0.18	1.47	0.74
Alpha	4.35	Stream Power (lb/ft s)	0.20	16.60	1.57
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	2876.67	11207.21	4996.32
C & E Loss (ft)	0.07	Cum SA (acres)	529.07	426.71	1021.13

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	777.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.44	Wt. n-Val.	0.094	0.036	0.120
W.S. Elev (ft)	775.63	Reach Len. (ft)	280.44	239.41	168.68
Crit W.S. (ft)	763.94	Flow Area (sq ft)	2490.41	3994.63	10365.69
E.G. Slope (ft/ft)	0.000819	Area (sq ft)	2815.39	3994.63	10365.69
Q Total (cfs)	74720.00	Flow (cfs)	3705.78	47684.44	23329.78
Top Width (ft)	1443.41	Top Width (ft)	682.35	115.33	645.73
Vel Total (ft/s)	4.43	Avg. Vel. (ft/s)	1.49	11.94	2.25
Max Chl Dpth (ft)	44.15	Hydr. Depth (ft)	4.98	34.64	16.05
Conv. Total (cfs)	2610895.0	Conv. (cfs)	129488.8	1666208.0	815198.3
Length Wtd. (ft)	221.09	Wetted Per. (ft)	503.80	125.81	647.62
Min Ch El (ft)	731.48	Shear (lb/sq ft)	0.25	1.62	0.82
Alpha	4.71	Stream Power (lb/ft s)	0.38	19.38	1.84
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	4461.03	12308.69	7934.80
C & E Loss (ft)	0.09	Cum SA (acres)	686.66	428.63	1328.16

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	767.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.100	0.036	0.120
W.S. Elev (ft)	766.31	Reach Len. (ft)	280.44	239.41	168.68
Crit W.S. (ft)	757.74	Flow Area (sq ft)	573.11	2920.01	5142.86
E.G. Slope (ft/ft)	0.000802	Area (sq ft)	573.11	2920.01	5142.86
Q Total (cfs)	38000.00	Flow (cfs)	1063.95	28359.91	8576.14
Top Width (ft)	668.79	Top Width (ft)	59.12	115.33	494.34
Vel Total (ft/s)	4.40	Avg. Vel. (ft/s)	1.86	9.71	1.67
Max Chl Dpth (ft)	34.83	Hydr. Depth (ft)	9.69	25.32	10.40
Conv. Total (cfs)	1342182.0	Conv. (cfs)	37579.4	1001688.0	302914.1
Length Wtd. (ft)	225.59	Wetted Per. (ft)	61.82	125.81	495.74
Min Ch El (ft)	731.48	Shear (lb/sq ft)	0.46	1.16	0.52
Alpha	3.67	Stream Power (lb/ft s)	0.86	11.28	0.87
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	626.25	8074.41	1070.91
C & E Loss (ft)	0.04	Cum SA (acres)	115.40	403.56	212.94

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 12.010

INPUT

Description:
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	817.17	57.5	810.85	174.46	797.53	272.51	788.59	275.28	788.25
296.37	786.5	297.53	786.33	307.39	785.63	307.78	785.59	308.03	785.56
309.39	785.45	322.22	784.13	324.95	784.02	331.22	783.6	340.85	783.44
344.45	783.31	347.96	783.26	366.7	782.72	370.97	782.66	394.04	781.22
402.96	780.48	406.34	780.14	411.26	779.43	419.57	778.74	419.87	778.73
420.51	778.69	423.12	778.63	423.37	778.62	428.56	778.33	444.59	777.22
454.58	776.7	459.06	776.82	462.12	776.65	462.35	776.63	495.76	776.15
688.06	774.85	689.95	774.87	763.81	774.49	958.73	772.55	998.38	772.39
1014.02	772.48	1017.79	772.3	1037.27	772.24	1040.9	772.1	1355.83	769.78
1356.08	769.77	1358.06	769.77	1358.2	769.76	1376.65	769.63	1378.97	769.57
1389.31	769.52	1392.3	769.61	1515.13	768.94	1551.99	769.07	1591.21	768.74
1604.4	768.3	1622.36	768.12	1637.01	768.4	1671.5	768.12	1672.58	769.04
1674.61	770.66	1683.15	770.02	1686.94	769.82	1690.21	769.66	1705.57	769.99
1706.2	769.98	1715.41	764.59	1722.4	761.16	1732.47	755.3	1752.06	750.9
1753.08	750.72	1755.18	750.29	1756.08	750.17	1761.93	750.17	1764.26	749.88
1774.1	749.88	1780.49	745.51	1785.68	740.29	1786.1	739.82	1787.02	739.02
1795	732.3	1810	731.34	1826	732.3	1834.11	739.02	1838.59	740.9
1841.68	742.27	1841.86	742.31	1852.63	744.82	1861.93	749.28	1869.45	752.71
1882.04	753.33	1882.81	753.37	1891.11	753.95	1894.94	754.1	1973.61	754.66
2050.08	754.47	2075.07	754.05	2087.85	753.64	2128.18	753.34	2153.7	754.62
2164.17	754.59	2174.58	754.76	2188.91	751.86	2219.54	752.78	2249.77	755.09
2258.07	755.85	2276.07	758.18	2290.13	760.49	2295.32	761.89	2312.1	765.22
2337.3	766.5	2341.83	766.55	2352.34	766.82	2371.97	767.62	2389.79	768.74
2399.6	768.73	2400.81	768.77	2401.79	768.74	2401.94	768.76	2402.24	768.79
2404.21	768.79	2407.56	768.96	2411.48	768.98	2417.08	769.3	2421.16	769.45
2443.37	770.75	2445.76	771.06	2468.06	768.24	2469.86	767.94	2478.48	768.42
2481.52	768.66	2487.22	770.9	2493.72	773.01	2497.21	773.12	2536.49	776.44
2537.79	776.57	2553.88	780.05	2557.37	780.74	2569.51	780.72	2587.36	780.98
2623.57	780.22	2625.93	780.62	2631.68	781.68	2632.9	781.95	2642.92	783.03
2650.73	786.02	2653.49	787.14	2656.58	790.28	2662.81	796.02	2665.36	798.22
2672.09	804.43	2674.82	805.15	2683.6	807.13	2686.3	809.88	2690.32	811.6
2695.06	815.49	2696.8	815.5	2699.94	816.31	2700.57	816.42	2715.82	818.35
2717.66	818.68	2722.45	819.46	2728.79	820.26				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	1604.4	.1	1761.93	.035	1869.45	.12

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1774.1	1894.94	244.12	251.69	255.37	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
200	945	783	F
1065	1270	783	F
1370	1610	783	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
530	800	795	1070	1265	795	1420	1600	795

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	757.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.	0.054	0.035	0.120
W.S. Elev (ft)	756.50	Reach Len. (ft)	244.12	251.69	255.37
Crit W.S. (ft)	746.65	Flow Area (sq ft)	208.93	1719.92	888.94
E.G. Slope (ft/ft)	0.000794	Area (sq ft)	208.93	1719.92	888.94
Q Total (cfs)	13200.00	Flow (cfs)	471.96	12170.30	557.74
Top Width (ft)	532.64	Top Width (ft)	43.68	120.84	368.12
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)	2.26	7.08	0.63
Max Chl Dpth (ft)	25.16	Hydr. Depth (ft)	4.78	14.23	2.41
Conv. Total (cfs)	468470.8	Conv. (cfs)	16750.1	431926.4	19794.3
Length Wtd. (ft)	251.72	Wetted Per. (ft)	44.58	132.57	368.63
Min Ch El (ft)	731.34	Shear (lb/sq ft)	0.23	0.64	0.12
Alpha	2.11	Stream Power (lb/ft s)	0.52	4.55	0.07
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	91.92	3646.09	55.97
C & E Loss (ft)	0.01	Cum SA (acres)	17.69	310.45	19.64

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	760.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.057	0.036	0.120
W.S. Elev (ft)	759.99	Reach Len. (ft)	244.12	251.69	255.37
Crit W.S. (ft)	750.40	Flow Area (sq ft)	372.11	2142.28	2220.07
E.G. Slope (ft/ft)	0.000803	Area (sq ft)	372.11	2142.28	2220.07
Q Total (cfs)	20300.00	Flow (cfs)	1047.81	16781.46	2470.73
Top Width (ft)	562.68	Top Width (ft)	49.69	120.84	392.15
Vel Total (ft/s)	4.29	Avg. Vel. (ft/s)	2.82	7.83	1.11
Max Chl Dpth (ft)	28.65	Hydr. Depth (ft)	7.49	17.73	5.66
Conv. Total (cfs)	716514.6	Conv. (cfs)	36983.7	592323.3	87207.6
Length Wtd. (ft)	251.95	Wetted Per. (ft)	51.53	132.57	392.92
Min Ch El (ft)	731.34	Shear (lb/sq ft)	0.36	0.81	0.28
Alpha	2.79	Stream Power (lb/ft s)	1.02	6.34	0.32
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	195.66	5026.40	149.99
C & E Loss (ft)	0.01	Cum SA (acres)	36.62	346.09	38.60

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	763.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.	0.059	0.036	0.120
W.S. Elev (ft)	762.26	Reach Len. (ft)	244.12	251.69	255.37
Crit W.S. (ft)	753.98	Flow Area (sq ft)	489.68	2416.91	3123.38
E.G. Slope (ft/ft)	0.000831	Area (sq ft)	489.68	2416.91	3123.38
Q Total (cfs)	26320.00	Flow (cfs)	1548.44	20407.19	4364.37
Top Width (ft)	577.05	Top Width (ft)	53.95	120.84	402.26
Vel Total (ft/s)	4.36	Avg. Vel. (ft/s)	3.16	8.44	1.40
Max Chl Dpth (ft)	30.92	Hydr. Depth (ft)	9.08	20.00	7.76
Conv. Total (cfs)	913001.5	Conv. (cfs)	53713.2	707894.9	151393.4
Length Wtd. (ft)	252.09	Wetted Per. (ft)	56.36	132.57	403.30
Min Ch El (ft)	731.34	Shear (lb/sq ft)	0.45	0.95	0.40
Alpha	2.95	Stream Power (lb/ft s)	1.43	7.99	0.56
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	303.88	6205.66	351.88
C & E Loss (ft)	0.01	Cum SA (acres)	52.66	372.33	99.67

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	765.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.	0.060	0.037	0.120
W.S. Elev (ft)	764.89	Reach Len. (ft)	244.12	251.69	255.37
Crit W.S. (ft)	756.92	Flow Area (sq ft)	638.37	2734.27	4197.21
E.G. Slope (ft/ft)	0.000843	Area (sq ft)	638.37	2734.27	4197.21
Q Total (cfs)	34000.00	Flow (cfs)	2223.16	24738.96	7037.88
Top Width (ft)	595.54	Top Width (ft)	59.20	120.84	415.49
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)	3.48	9.05	1.68
Max Chl Dpth (ft)	33.55	Hydr. Depth (ft)	10.78	22.63	10.10
Conv. Total (cfs)	1170871.0	Conv. (cfs)	76559.7	851944.7	242366.1
Length Wtd. (ft)	252.22	Wetted Per. (ft)	62.23	132.57	416.79
Min Ch El (ft)	731.34	Shear (lb/sq ft)	0.54	1.09	0.53
Alpha	3.02	Stream Power (lb/ft s)	1.88	9.82	0.89
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	485.37	7410.41	753.95
C & E Loss (ft)	0.02	Cum SA (acres)	81.29	393.52	161.66

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	769.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.	0.062	0.037	0.120
W.S. Elev (ft)	768.53	Reach Len. (ft)	244.12	251.69	255.37
Crit W.S. (ft)	758.94	Flow Area (sq ft)	883.13	3174.43	5848.87
E.G. Slope (ft/ft)	0.000813	Area (sq ft)	885.29	3174.43	5848.87
Q Total (cfs)	44500.00	Flow (cfs)	3279.59	30491.73	10728.68
Top Width (ft)	763.94	Top Width (ft)	137.41	120.84	505.69

```
* Vel Total (ft/s)       *    4.49  * Avg. Vel. (ft/s)       *    3.71  *    9.61  *    1.83  *
* Max Chl Dpth (ft)      *   37.19  * Hydr. Depth (ft)       *    6.93  *   26.27  *   11.57  *
* Conv. Total (cfs)      *1560927.0  * Conv. (cfs)           *115038.1  *1069559.0  *376330.3  *
* Length Wtd. (ft)       *  252.34  * Wetted Per. (ft)       *  131.58  *  132.57  *  507.15  *
* Min Ch El (ft)         *  731.34  * Shear (lb/sq ft)       *    0.34  *    1.22  *    0.59  *
* Alpha                  *    3.22  * Stream Power (lb/ft s) *    1.26  *   11.67  *    1.07  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 1157.32  * 9389.36  * 2113.04  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  270.78  *  418.85  *  460.60  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  772.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.12  * Wt. n-Val.             *   0.060  *   0.038  *   0.120  *
* W.S. Elev (ft)         *  771.12  * Reach Len. (ft)        *  244.12  *  251.69  *  255.37  *
* Crit W.S. (ft)         *  760.42  * Flow Area (sq ft)      * 1365.43  * 3487.18  * 7295.75  *
* E.G. Slope (ft/ft)     *0.000839  * Area (sq ft)           * 1475.05  * 3487.18  * 7295.75  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 3971.21  *35807.32  *13911.47  *
* Top Width (ft)         * 1042.90  * Top Width (ft)         *  329.10  *  120.84  *  592.96  *
* Vel Total (ft/s)       *    4.42  * Avg. Vel. (ft/s)       *    2.91  *   10.27  *    1.91  *
* Max Chl Dpth (ft)      *   39.78  * Hydr. Depth (ft)       *    5.17  *   28.86  *   12.30  *
* Conv. Total (cfs)      *1853707.0  * Conv. (cfs)           *137110.5  *1236287.0  *480309.0  *
* Length Wtd. (ft)       *  252.43  * Wetted Per. (ft)       *  269.46  *  132.57  *  595.13  *
* Min Ch El (ft)         *  731.34  * Shear (lb/sq ft)       *    0.27  *    1.38  *    0.64  *
* Alpha                  *    3.68  * Stream Power (lb/ft s) *    0.77  *   14.15  *    1.22  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 2092.94  *10512.84  * 3607.34  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  433.13  *  424.86  *  729.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  774.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.10  * Wt. n-Val.             *   0.065  *   0.038  *   0.120  *
* W.S. Elev (ft)         *  773.16  * Reach Len. (ft)        *  244.12  *  251.69  *  255.37  *
* Crit W.S. (ft)         *  761.63  * Flow Area (sq ft)      * 2001.27  * 3733.51  * 8511.17  *
* E.G. Slope (ft/ft)     *0.000808  * Area (sq ft)           * 2260.85  * 3733.51  * 8511.17  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 5473.03  *39071.63  *17455.34  *
* Top Width (ft)         * 1225.08  * Top Width (ft)         *  501.52  *  120.84  *  602.73  *
* Vel Total (ft/s)       *    4.35  * Avg. Vel. (ft/s)       *    2.73  *   10.47  *    2.05  *
* Max Chl Dpth (ft)      *   41.82  * Hydr. Depth (ft)       *    5.21  *   30.90  *   14.12  *
* Conv. Total (cfs)      *2181013.0  * Conv. (cfs)           *192528.3  *1374447.0  *614037.2  *
* Length Wtd. (ft)       *  252.44  * Wetted Per. (ft)       *  389.47  *  132.57  *  605.20  *
* Min Ch El (ft)         *  731.34  * Shear (lb/sq ft)       *    0.26  *    1.42  *    0.71  *
* Alpha                  *    3.74  * Stream Power (lb/ft s) *    0.71  *   14.87  *    1.46  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 2864.90  *11186.76  * 4962.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  526.04  *  426.06  * 1018.81  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  776.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.             *   0.070  *   0.038  *   0.120  *
* W.S. Elev (ft)         *  775.67  * Reach Len. (ft)        *  244.12  *  251.69  *  255.37  *
* Crit W.S. (ft)         *  763.22  * Flow Area (sq ft)      * 2964.87  * 4036.67  *10060.48  *
* E.G. Slope (ft/ft)     *0.000807  * Area (sq ft)           * 3716.44  * 4036.67  *10060.48  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 8272.56  *44117.13  *22330.31  *
* Top Width (ft)         * 1352.35  * Top Width (ft)         *  599.10  *  120.84  *  632.41  *
* Vel Total (ft/s)       *    4.38  * Avg. Vel. (ft/s)       *    2.79  *   10.93  *    2.22  *
* Max Chl Dpth (ft)      *   44.33  * Hydr. Depth (ft)       *    7.72  *   33.41  *   15.91  *
* Conv. Total (cfs)      *2629511.0  * Conv. (cfs)           *291124.0  *1552550.0  *785837.8  *
* Length Wtd. (ft)       *  252.37  * Wetted Per. (ft)       *  389.47  *  132.57  *  634.99  *
* Min Ch El (ft)         *  731.34  * Shear (lb/sq ft)       *    0.38  *    1.53  *    0.80  *
* Alpha                  *    3.80  * Stream Power (lb/ft s) *    1.07  *   16.78  *    1.77  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 4440.01  *12286.62  * 7895.25  *
```

```
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  682.54  *  427.98  * 1325.69  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  767.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.             *   0.061  *   0.037  *   0.120  *
* W.S. Elev (ft)         *  766.21  * Reach Len. (ft)        *  244.12  *  251.69  *  255.37  *
* Crit W.S. (ft)         *  757.76  * Flow Area (sq ft)      *  718.22  * 2894.21  * 4758.77  *
* E.G. Slope (ft/ft)     *0.000845  * Area (sq ft)           *  718.22  * 2894.21  * 4758.77  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2605.93  *26992.91  * 8401.15  *
* Top Width (ft)         *  619.01  * Top Width (ft)         *   61.46  *  120.84  *  436.71  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    3.63  *    9.33  *    1.77  *
* Max Chl Dpth (ft)      *   34.87  * Hydr. Depth (ft)       *   11.69  *   23.95  *   10.90  *
* Conv. Total (cfs)      *1307356.0  * Conv. (cfs)            * 89654.8  *928666.8  *289034.1  *
* Length Wtd. (ft)       *  252.27  * Wetted Per. (ft)       *   64.85  *  132.57  *  438.06  *
* Min Ch El (ft)         *  731.34  * Shear (lb/sq ft)       *    0.58  *    1.15  *    0.57  *
* Alpha                  *    3.08  * Stream Power (lb/ft s) *    2.12  *   10.74  *    1.01  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *  622.10  * 8058.44  * 1051.74  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  115.01  *  402.91  *  211.13  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.965

INPUT
Description:
Station Elevation Data    num=     191
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  815.58   13.34   814.3   16.48  814.04   18.58  813.96    21.5  813.99
   37.58  812.95   47.69   811.9    52.6   811.6   59.01  810.97   72.73  808.82
   76.13  808.64   77.75  808.41   82.39  807.91   84.85  807.37  113.12  805.78
  117.02  805.42  124.27     804  128.06  803.47  169.78  798.93  173.63  798.69
  191.13  797.96  195.11  797.65  200.44  797.63  206.14  797.38  211.71  797.65
  216.89  796.93  223.75  796.29  238.45  793.83  244.33   792.6  254.72  790.18
  287.17  785.61  296.79  784.09  333.66  781.34  336.73  781.03  347.35  781.23
  347.64  781.24  347.81  781.21  353.76  780.26  354.15  780.14  367.02  780.96
  373.69  780.94  379.83  781.69  386.85   781.7  393.41  780.43   422.8  778.63
  435.29  777.27  485.08  776.57  501.85  774.85  526.31  774.84  537.43  775.76
  538.81   775.8  546.23  775.73  575.09  776.16  614.01  775.65  624.51  775.26
  628.13  775.35  640.31  775.15  669.49  775.15  683.03   774.9   705.3  774.89
  717.55  774.57  728.54  774.58  743.16  774.14  748.05  774.32  785.17  774.16
  799.62  774.71   804.8  774.73   817.6  774.49  894.41  774.79  924.22  774.63
 1020.51  773.65 1044.73     773  1046.3  773.06 1059.55  772.75 1083.09  772.73
 1093.52  773.35 1094.19  773.37 1130.65     773 1177.28  773.48 1203.97  773.52
 1208.12  773.35 1249.92  773.22  1333.1  774.11 1339.84  773.33 1344.31  772.71
 1374.24   772.6 1399.18  772.33 1456.31   772.4 1468.08  772.69 1480.26   772.7
 1532.23  773.57 1588.81  773.59 1607.56  773.23 1620.98  772.49 1623.03  772.74
 1625.89  773.15 1648.94  772.71 1651.16   772.7 1651.99  772.82 1659.16  773.18
 1701.72  773.78 1726.33  773.51 1733.17  773.33 1739.86  773.44 1765.15  772.52
 1765.78   772.5 1769.84  772.16 1776.64  771.92 1776.85  771.85 1785.84  768.86
 1797.18  764.59 1807.44  758.15 1816.08  752.26 1831.32  749.87 1852.38  739.02
    1860   732.2    1873   731.2    1886   732.2 1894.24  739.02 1903.49  741.98
  1904.8  742.45 1906.05  742.78 1918.86  745.55 1933.34  753.52 1934.06  753.96
 1943.71  753.91 1987.58  753.68 2025.23  753.78 2074.09  753.53 2075.27  753.54
 2096.08  756.25 2126.09  755.67 2145.69  751.86 2177.28  751.75 2218.82   752.4
 2234.85  753.23 2263.38  755.24 2290.66  756.75 2312.01   757.6 2312.95  757.73
 2333.25  760.97 2350.45  763.17 2354.56  763.38 2393.05   767.7 2409.06  769.01
 2410.05  769.11 2439.34   772.6 2447.99  772.98 2455.27  773.48 2455.43   773.5
 2456.19  773.55  2456.4  773.57 2458.46  773.72 2470.07   774.4  2488.4  775.97
 2512.92  776.87 2514.74  777.56 2527.31  781.86 2529.85  781.93    2530  781.93
 2530.68  781.96 2530.92  781.96 2531.08  781.97 2531.25  781.97 2536.79  782.14
 2537.46  782.16  2537.6  782.17 2539.37  782.22 2539.84  782.24 2542.01  782.31
 2550.54  782.57 2550.65  782.57 2554.65   782.7 2577.83  781.71 2581.48  781.58
 2598.84   780.2 2608.84  782.72 2615.61  783.23  2616.4  783.34    2623  786.42
```

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 2628.64  790.08 2630.29  789.97 2633.97  789.82 2635.07  790.44 2645.63  796.16
 2650.04  798.08 2655.23  800.17 2658.33  807.04 2658.97  808.45 2659.48  808.47
 2661.16   808.3

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .12   422.8    .075 1659.16      .1 1776.85    .035 1934.06     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1776.85 1934.06           207.53  206.17   206.1             .1       .3
Ineffective Flow     num=        3
   Sta L   Sta R    Elev  Permanent
     200    1020     783       F
    1135    1325     783       F
    1440    1660     783       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     450     490     790     575     720     790     920    1020     790
    1450    1560     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  756.21  * Reach Len. (ft)        *  207.53  *  206.17  *  206.10  *
* Crit W.S. (ft)         *  747.27  * Flow Area (sq ft)      *          * 1734.81  *  861.84  *
* E.G. Slope (ft/ft)     *0.000979  * Area (sq ft)           *          * 1734.81  *  861.84  *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *12583.71  *  616.29  *
* Top Width (ft)         *  468.14  * Top Width (ft)         *          *  123.77  *  344.37  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *          *    7.25  *    0.72  *
* Max Chl Dpth (ft)      *   25.01  * Hydr. Depth (ft)       *          *   14.02  *    2.50  *
* Conv. Total (cfs)      *421777.2  * Conv. (cfs)            *          *402084.9  * 19692.3  *
* Length Wtd. (ft)       *  206.17  * Wetted Per. (ft)       *          *  136.00  *  345.04  *
* Min Ch El (ft)         *  731.20  * Shear (lb/sq ft)       *          *    0.78  *    0.15  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *          *    5.66  *    0.11  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *   91.33  * 3636.11  *   50.84  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   17.56  *  309.75  *   17.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  759.65  * Reach Len. (ft)        *  207.53  *  206.17  *  206.10  *
* Crit W.S. (ft)         *  750.76  * Flow Area (sq ft)      *          * 2169.33  * 2151.82  *
* E.G. Slope (ft/ft)     *0.000978  * Area (sq ft)           *          * 2169.33  * 2151.82  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *17706.63  * 2593.37  *
* Top Width (ft)         *  519.91  * Top Width (ft)         *          *  129.01  *  390.91  *
* Vel Total (ft/s)       *    4.70  * Avg. Vel. (ft/s)       *          *    8.16  *    1.21  *
* Max Chl Dpth (ft)      *   28.45  * Hydr. Depth (ft)       *          *   16.82  *    5.50  *
* Conv. Total (cfs)      *649276.0  * Conv. (cfs)            *          *566329.4  * 82946.6  *
* Length Wtd. (ft)       *  206.16  * Wetted Per. (ft)       *          *  142.27  *  391.77  *
* Min Ch El (ft)         *  731.20  * Shear (lb/sq ft)       *          *    0.93  *    0.34  *
* Alpha                  *    2.64  * Stream Power (lb/ft s) *          *    7.60  *    0.40  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  194.61  * 5013.94  *  137.18  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   36.48  *  345.37  *   36.31  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  761.88  * Reach Len. (ft)        *  207.53  *  206.17  *  206.10  *
* Crit W.S. (ft)         *  753.59  * Flow Area (sq ft)      *          * 2461.72  * 3042.03  *
* E.G. Slope (ft/ft)     *0.001006  * Area (sq ft)           *          * 2461.72  * 3042.03  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *21754.47  * 4565.53  *
* Top Width (ft)         *  538.90  * Top Width (ft)         *          *  132.57  *  406.33  *
```

```
* Vel Total (ft/s)       *    4.78  * Avg. Vel. (ft/s)       *          *    8.84  *    1.50  *
* Max Chl Dpth (ft)      *   30.68  * Hydr. Depth (ft)       *          *   18.57  *    7.49  *
* Conv. Total (cfs)      *829647.8  * Conv. (cfs)            *          *685735.1  *143912.8  *
* Length Wtd. (ft)       *  206.16  * Wetted Per. (ft)       *          *  146.47  *  407.36  *
* Min Ch El (ft)         *  731.20  * Shear (lb/sq ft)       *          *    1.06  *    0.47  *
* Alpha                  *    2.84  * Stream Power (lb/ft s) *          *    9.33  *    0.70  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  302.51  * 6191.57  *  333.80  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   52.51  *  371.59  *   97.30  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.              *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  764.48  * Reach Len. (ft)        *  207.53  *  206.17  *  206.10  *
* Crit W.S. (ft)         *  756.66  * Flow Area (sq ft)      *          * 2811.40  * 4127.38  *
* E.G. Slope (ft/ft)     *0.001015  * Area (sq ft)           *          * 2811.40  * 4127.38  *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *26664.52  * 7335.48  *
* Top Width (ft)         *  567.01  * Top Width (ft)         *          *  136.71  *  430.31  *
* Vel Total (ft/s)       *    4.90  * Avg. Vel. (ft/s)       *          *    9.48  *    1.78  *
* Max Chl Dpth (ft)      *   33.28  * Hydr. Depth (ft)       *          *   20.57  *    9.59  *
* Conv. Total (cfs)      *1067439.0  * Conv. (cfs)            *          *837139.8  *230299.3  *
* Length Wtd. (ft)       *  206.15  * Wetted Per. (ft)       *          *  151.36  *  431.49  *
* Min Ch El (ft)         *  731.20  * Shear (lb/sq ft)       *          *    1.18  *    0.61  *
* Alpha                  *    2.97  * Stream Power (lb/ft s) *          *   11.16  *    1.08  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  483.58  * 7394.39  *  729.55  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   81.13  *  392.77  *  159.18  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  769.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.              *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  768.20  * Reach Len. (ft)        *  207.53  *  206.17  *  206.10  *
* Crit W.S. (ft)         *  758.97  * Flow Area (sq ft)      *          * 3337.47  * 5788.82  *
* E.G. Slope (ft/ft)     *0.000942  * Area (sq ft)           *          * 3337.47  * 5788.82  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *          *32707.58  *11792.42  *
* Top Width (ft)         *  611.54  * Top Width (ft)         *          *  146.46  *  465.08  *
* Vel Total (ft/s)       *    4.88  * Avg. Vel. (ft/s)       *          *    9.80  *    2.04  *
* Max Chl Dpth (ft)      *   37.00  * Hydr. Depth (ft)       *          *   22.79  *   12.45  *
* Conv. Total (cfs)      *1449931.0  * Conv. (cfs)            *          *1065702.0  *384229.3  *
* Length Wtd. (ft)       *  206.15  * Wetted Per. (ft)       *          *  161.80  *  466.45  *
* Min Ch El (ft)         *  731.20  * Shear (lb/sq ft)       *          *    1.21  *    0.73  *
* Alpha                  *    3.02  * Stream Power (lb/ft s) *          *   11.89  *    1.49  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 1154.84  * 9370.54  * 2078.93  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  270.39  *  418.08  *  457.76  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  772.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.15  * Wt. n-Val.              *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  770.86  * Reach Len. (ft)        *  207.53  *  206.17  *  206.10  *
* Crit W.S. (ft)         *  760.53  * Flow Area (sq ft)      *          * 3736.92  * 7062.16  *
* E.G. Slope (ft/ft)     *0.000929  * Area (sq ft)           *          * 3736.92  * 7062.16  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *          *37949.18  *15740.82  *
* Top Width (ft)         *  644.87  * Top Width (ft)         *          *  154.22  *  490.65  *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)       *          *   10.16  *    2.23  *
* Max Chl Dpth (ft)      *   39.66  * Hydr. Depth (ft)       *          *   24.23  *   14.39  *
* Conv. Total (cfs)      *1761299.0  * Conv. (cfs)            *          *1244922.0  *516377.2  *
* Length Wtd. (ft)       *  206.15  * Wetted Per. (ft)       *          *  170.01  *  492.17  *
* Min Ch El (ft)         *  731.20  * Shear (lb/sq ft)       *          *    1.28  *    0.83  *
* Alpha                  *    3.01  * Stream Power (lb/ft s) *          *   12.95  *    1.86  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 2088.80  *10491.97  * 3565.25  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  432.21  *  424.07  *  726.03  *
*****************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	774.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.	0.080	0.035	0.120
W.S. Elev (ft)	772.79	Reach Len. (ft)	207.53	206.17	206.10
Crit W.S. (ft)	761.75	Flow Area (sq ft)	39.01	4038.86	8025.01
E.G. Slope (ft/ft)	0.000939	Area (sq ft)	44.53	4038.86	8025.01
Q Total (cfs)	62000.00	Flow (cfs)	10.43	42896.61	19092.96
Top Width (ft)	832.63	Top Width (ft)	165.89	157.21	509.53
Vel Total (ft/s)	5.12	Avg. Vel. (ft/s)	0.27	10.62	2.38
Max Chl Dpth (ft)	41.59	Hydr. Depth (ft)	0.28	25.69	15.75
Conv. Total (cfs)	2023207.0	Conv. (cfs)	340.3	1399818.0	623048.6
Length Wtd. (ft)	206.16	Wetted Per. (ft)	141.36	173.15	511.15
Min Ch El (ft)	731.20	Shear (lb/sq ft)	0.02	1.37	0.92
Alpha	3.04	Stream Power (lb/ft s)	0.00	14.52	2.19
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	2858.44	11164.30	4914.28
C & E Loss (ft)	0.07	Cum SA (acres)	524.17	425.26	1015.55

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	776.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.	0.080	0.035	0.120
W.S. Elev (ft)	775.15	Reach Len. (ft)	207.53	206.17	206.10
Crit W.S. (ft)	763.18	Flow Area (sq ft)	741.44	4409.96	9272.50
E.G. Slope (ft/ft)	0.000968	Area (sq ft)	1419.60	4409.96	9272.50
Q Total (cfs)	74720.00	Flow (cfs)	707.39	50423.43	23589.18
Top Width (ft)	1579.86	Top Width (ft)	877.92	157.21	544.73
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)	0.95	11.43	2.54
Max Chl Dpth (ft)	43.95	Hydr. Depth (ft)	2.14	28.05	17.02
Conv. Total (cfs)	2401610.0	Conv. (cfs)	22736.7	1620682.0	758190.8
Length Wtd. (ft)	206.18	Wetted Per. (ft)	348.52	173.15	546.44
Min Ch El (ft)	731.20	Shear (lb/sq ft)	0.13	1.54	1.03
Alpha	3.36	Stream Power (lb/ft s)	0.12	17.60	2.61
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	4425.61	12262.22	7838.58
C & E Loss (ft)	0.09	Cum SA (acres)	678.40	427.18	1322.24

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	766.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	765.82	Reach Len. (ft)	207.53	206.17	206.10
Crit W.S. (ft)	757.72	Flow Area (sq ft)		2996.85	4712.09
E.G. Slope (ft/ft)	0.001006	Area (sq ft)		2996.85	4712.09
Q Total (cfs)	38000.00	Flow (cfs)		29057.62	8942.38
Top Width (ft)	582.40	Top Width (ft)		140.15	442.25
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)		9.70	1.90
Max Chl Dpth (ft)	34.62	Hydr. Depth (ft)		21.38	10.65
Conv. Total (cfs)	1198308.0	Conv. (cfs)		916315.4	281992.8
Length Wtd. (ft)	206.15	Wetted Per. (ft)		155.06	443.50
Min Ch El (ft)	731.20	Shear (lb/sq ft)		1.21	0.67
Alpha	2.99	Stream Power (lb/ft s)		11.77	1.27
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	620.08	8041.42	1023.97
C & E Loss (ft)	0.08	Cum SA (acres)	114.84	402.16	208.56

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.925

```
INPUT
Description:
Station Elevation Data    num=     200
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0   821.02    15.42   819.31    17.04   819.19    51.18   814.74    54.81   814.19
   59.16   811.97    66.57   807.86       96   805.56   100.21   805.16   104.22   805.05
  113.94   803.27   119.73   801.93   126.24   801.54   136.16   801.15   144.34   797.24
  150.31   793.06   155.87   792.55   178.93   790.87   180.33   790.82   204.36   781.72
  236.94   779.38   260.56   779.09   270.69   776.61   278.07   774.97   284.78   777.38
  291.18    779.4   298.86   780.07   304.04   780.38   309.23   780.29    323.8   780.43
  327.45    779.6   329.87    779.1    348.2   779.75   362.85   776.91   367.24   776.84
  374.73   776.54   381.54   776.64   430.25   776.68   494.45    775.5   496.21   774.95
  497.79   774.52    511.3   773.35   535.75   773.34   543.13   773.66   573.85   773.83
  574.35   773.84   697.93   774.27   758.06   774.24   787.97   773.97   811.78   774.31
  887.54   774.23   934.51   773.57   936.15   773.45   946.05   773.03   947.24   772.96
  960.88   773.91   968.26   773.83   977.75   773.53   986.24    773.6  1023.47   772.43
 1024.07   772.42  1046.58   772.24  1051.08   772.07  1058.77   771.56  1061.55   771.28
 1062.24    771.2  1068.32   771.29  1069.69   771.39  1090.09   771.38  1108.42   772.63
  1134.3   773.06  1136.44   773.12  1243.56   773.32  1320.93   772.89  1324.32   772.95
 1336.57   772.89  1351.03   773.09   1382.4   773.01  1386.74   772.83  1407.08      773
 1427.44   772.96  1448.42   773.19  1490.62   774.49  1497.04   774.44   1502.6   772.44
 1504.73   771.52  1540.41   771.91  1547.61   771.73  1612.52   771.68  1620.52   771.91
 1630.15   769.36  1631.03    769.6  1636.29   771.11     1651   770.89  1657.11   769.62
 1662.93   770.94  1669.58    770.9  1719.89   769.55  1726.21   769.56  1732.48   769.09
 1736.81   769.07  1747.86   768.43  1755.23   767.82   1757.9   767.71  1770.02   767.52
 1773.39   767.53  1782.18   767.34  1795.65   767.06  1803.65   761.28  1807.54    758.2
  1819.7   752.27  1823.88   749.87  1853.62   744.28  1858.34   740.75  1860.45   739.02
    1868    732.1     1882   731.08     1897    732.1   1905.1   739.02  1908.59   740.11
 1914.51    742.2  1921.08   744.14  1926.22   745.55  1927.12   745.82  1934.99   747.92
 1939.31   750.05  1942.04   751.25  1942.75   751.32  1944.69   751.55  1950.84   752.89
 1958.61   753.91  1958.82   753.89  1959.01   753.88  1959.95   753.91  1960.26   753.92
 1964.96   753.74  1965.34   753.73  1993.51   753.98  2053.72   753.28  2066.94    753.3
 2086.51   750.48  2144.07   750.61  2201.64   750.51  2208.45   750.63  2209.78   750.63
 2279.13   752.97  2302.52   757.85  2309.05   757.92  2320.23   758.37  2339.72   759.43
  2376.8   762.01  2381.69   762.28  2389.19   763.03  2406.11   767.75  2408.47   768.32
 2435.43   776.05  2444.89   779.72  2465.76   779.82  2492.09    778.8  2511.53   777.28
 2522.81   781.57  2532.01   784.74  2532.75   785.37  2534.45   787.19  2540.31   793.09
 2541.92   794.87  2548.86   801.65  2549.67   802.34  2550.36      803  2550.65   803.09
 2559.24   803.98  2560.53   803.42   2561.7   802.99  2563.77   802.33  2564.75   801.89
 2567.82   800.08   2571.6   800.27  2572.44   800.05  2573.21   800.26  2574.08   800.42
  2578.1    800.8  2582.94   802.88  2584.23    803.5  2584.85   803.72  2594.01   805.81
 2596.86   807.81  2599.61   808.48   2604.8   810.97  2612.84   812.45  2614.56   812.86
 2620.99   813.93  2625.59   814.27  2630.77   814.95   2641.5   815.35  2642.33   815.46
 2647.43   815.79  2651.03   816.19  2656.96   816.52  2659.84   816.54  2661.16   816.59

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15   348.2    .075 1612.52      .1 1795.65    .035 1958.61     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1795.65 1958.61           314.31  326.33   301.6              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     200    1040     780       F
    1200    1400     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     380     555     790     630     670     790     930     995     790
    1235    1375     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  756.19  * Reach Len. (ft)        *  314.31  *  326.33  *  301.60  *
* Crit W.S. (ft)         *  747.17  * Flow Area (sq ft)      *          * 1922.43  * 1382.77  *
* E.G. Slope (ft/ft)     *0.000772  * Area (sq ft)           *          * 1922.43  * 1382.77  *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *11979.19  * 1220.81  *
* Top Width (ft)         *  482.91  * Top Width (ft)         *          *  146.95  *  335.96  *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *          *    6.23  *    0.88  *
* Max Chl Dpth (ft)      *   25.11  * Hydr. Depth (ft)       *          *   13.08  *    4.12  *
* Conv. Total (cfs)      *474928.2  * Conv. (cfs)            *          *431004.2  * 43924.0  *
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```
* Length Wtd. (ft)       *  324.65  * Wetted Per. (ft)       *          *  158.41  *  336.55  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)       *          *    0.59  *    0.20  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *          *    3.65  *    0.17  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *   91.33  * 3627.45  *   45.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   17.56  *  309.10  *   15.94  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.30  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  759.65  * Reach Len. (ft)        *  314.31  *  326.33  *  301.60  *
* Crit W.S. (ft)         *  750.43  * Flow Area (sq ft)      *          * 2442.42  * 2609.74  *
* E.G. Slope (ft/ft)     *0.000753  * Area (sq ft)           *          * 2442.42  * 2609.74  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *17125.47  * 3174.53  *
* Top Width (ft)         *  537.21  * Top Width (ft)         *          *  152.90  *  384.30  *
* Vel Total (ft/s)       *    4.02  * Avg. Vel. (ft/s)       *          *    7.01  *    1.22  *
* Max Chl Dpth (ft)      *   28.57  * Hydr. Depth (ft)       *          *   15.97  *    6.79  *
* Conv. Total (cfs)      *740010.4  * Conv. (cfs)            *          *624287.2  *115723.3  *
* Length Wtd. (ft)       *  323.26  * Wetted Per. (ft)       *          *  165.33  *  385.11  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)       *          *    0.69  *    0.32  *
* Alpha                  *    2.58  * Stream Power (lb/ft s) *          *    4.87  *    0.39  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  194.61  * 5003.03  *  125.91  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   36.48  *  344.70  *   34.47  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  762.63  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  761.89  * Reach Len. (ft)        *  314.31  *  326.33  *  301.60  *
* Crit W.S. (ft)         *  753.29  * Flow Area (sq ft)      *          * 2787.49  * 3504.96  *
* E.G. Slope (ft/ft)     *0.000774  * Area (sq ft)           *          * 2787.49  * 3504.96  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *21331.58  * 4988.42  *
* Top Width (ft)         *  572.24  * Top Width (ft)         *          *  155.80  *  416.44  *
* Vel Total (ft/s)       *    4.18  * Avg. Vel. (ft/s)       *          *    7.65  *    1.42  *
* Max Chl Dpth (ft)      *   30.81  * Hydr. Depth (ft)       *          *   17.89  *    8.42  *
* Conv. Total (cfs)      *946152.3  * Conv. (cfs)            *          *766828.4  *179323.9  *
* Length Wtd. (ft)       *  322.54  * Wetted Per. (ft)       *          *  169.00  *  417.32  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)       *          *    0.80  *    0.41  *
* Alpha                  *    2.73  * Stream Power (lb/ft s) *          *    6.10  *    0.58  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   *  302.51  * 6179.15  *  318.32  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   52.51  *  370.91  *   95.36  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  765.32  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  764.50  * Reach Len. (ft)        *  314.31  *  326.33  *  301.60  *
* Crit W.S. (ft)         *  755.57  * Flow Area (sq ft)      *          * 3198.54  * 4624.69  *
* E.G. Slope (ft/ft)     *0.000772  * Area (sq ft)           *          * 3198.54  * 4624.69  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *26331.24  * 7668.76  *
* Top Width (ft)         *  595.25  * Top Width (ft)         *          *  159.41  *  435.84  *
* Vel Total (ft/s)       *    4.35  * Avg. Vel. (ft/s)       *          *    8.23  *    1.66  *
* Max Chl Dpth (ft)      *   33.42  * Hydr. Depth (ft)       *          *   20.06  *   10.61  *
* Conv. Total (cfs)      *1223882.0  * Conv. (cfs)            *          *947833.2  *276048.8  *
* Length Wtd. (ft)       *  321.78  * Wetted Per. (ft)       *          *  173.45  *  436.97  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)       *          *    0.89  *    0.51  *
* Alpha                  *    2.81  * Stream Power (lb/ft s) *          *    7.31  *    0.85  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   *  483.58  * 7380.17  *  708.84  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   81.13  *  392.07  *  157.13  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
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         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  769.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  768.21  * Reach Len. (ft)        *  314.31  *  326.33  *  301.60  *
* Crit W.S. (ft)         *  757.46  * Flow Area (sq ft)      *   32.07  * 3799.28  * 6268.33  *
* E.G. Slope (ft/ft)     *0.000693  * Area (sq ft)           *   32.07  * 3799.28  * 6268.33  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *    9.98  *32682.85  *11807.17  *
* Top Width (ft)         *  657.51  * Top Width (ft)         *   45.14  *  162.96  *  449.41  *
* Vel Total (ft/s)       *    4.41  * Avg. Vel. (ft/s)       *    0.31  *    8.60  *    1.88  *
* Max Chl Dpth (ft)      *   37.13  * Hydr. Depth (ft)       *    0.71  *   23.31  *   13.95  *
* Conv. Total (cfs)      *1690981.0  * Conv. (cfs)           *   379.4  *1241934.0  *448667.6  *
* Length Wtd. (ft)       *  320.92  * Wetted Per. (ft)       *   45.17  *  177.83  *  451.04  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)       *    0.03  *    0.92  *    0.60  *
* Alpha                  *    2.85  * Stream Power (lb/ft s) *    0.01  *    7.95  *    1.13  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   * 1154.76  * 9353.66  * 2050.41  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  270.28  *  417.35  *  455.59  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  771.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  770.86  * Reach Len. (ft)        *  314.31  *  326.33  *  301.60  *
* Crit W.S. (ft)         *  758.76  * Flow Area (sq ft)      *  254.06  * 4230.43  * 7469.74  *
* E.G. Slope (ft/ft)     *0.000664  * Area (sq ft)           *  254.06  * 4230.43  * 7469.74  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *  145.59  *38277.62  *15266.79  *
* Top Width (ft)         *  768.42  * Top Width (ft)         *  146.75  *  162.96  *  458.71  *
* Vel Total (ft/s)       *    4.49  * Avg. Vel. (ft/s)       *    0.57  *    9.05  *    2.04  *
* Max Chl Dpth (ft)      *   39.78  * Hydr. Depth (ft)       *    1.73  *   25.96  *   16.28  *
* Conv. Total (cfs)      *2083784.0  * Conv. (cfs)           *   5650.6  *1485608.0  *592525.3  *
* Length Wtd. (ft)       *  320.45  * Wetted Per. (ft)       *  147.51  *  177.83  *  460.71  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)       *    0.07  *    0.99  *    0.67  *
* Alpha                  *    2.95  * Stream Power (lb/ft s) *    0.04  *    8.92  *    1.37  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 2088.20  *10473.12  * 3530.87  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  431.86  *  423.32  *  723.79  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  773.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *   0.096  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  772.80  * Reach Len. (ft)        *  314.31  *  326.33  *  301.60  *
* Crit W.S. (ft)         *  760.06  * Flow Area (sq ft)      *  789.45  * 4546.43  * 8365.77  *
* E.G. Slope (ft/ft)     *0.000664  * Area (sq ft)           *  798.80  * 4546.43  * 8365.77  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *  599.97  *43150.29  *18249.74  *
* Top Width (ft)         * 1029.01  * Top Width (ft)         *  400.58  *  162.96  *  465.47  *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)       *    0.76  *    9.49  *    2.18  *
* Max Chl Dpth (ft)      *   41.72  * Hydr. Depth (ft)       *    2.12  *   27.90  *   17.97  *
* Conv. Total (cfs)      *2406880.0  * Conv. (cfs)           * 23291.1  *1675122.0  *708466.7  *
* Length Wtd. (ft)       *  320.12  * Wetted Per. (ft)       *  373.71  *  177.83  *  467.74  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)       *    0.09  *    1.06  *    0.74  *
* Alpha                  *    3.13  * Stream Power (lb/ft s) *    0.07  *   10.05  *    1.62  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 2856.43  *11143.99  * 4875.51  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  522.82  *  424.50  * 1013.25  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	776.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.	0.089	0.035	0.120
W.S. Elev (ft)	775.20	Reach Len. (ft)	314.31	326.33	301.60
Crit W.S. (ft)	761.73	Flow Area (sq ft)	2028.08	4938.00	9494.31
E.G. Slope (ft/ft)	0.000676	Area (sq ft)	2629.14	4938.00	9494.31
Q Total (cfs)	74720.00	Flow (cfs)	2248.23	49998.10	22473.66
Top Width (ft)	1634.12	Top Width (ft)	997.31	162.96	473.85
Vel Total (ft/s)	4.54	Avg. Vel. (ft/s)	1.11	10.13	2.37
Max Chl Dpth (ft)	44.12	Hydr. Depth (ft)	3.65	30.30	20.04
Conv. Total (cfs)	2872973.0	Conv. (cfs)	86444.2	1922420.0	864109.0
Length Wtd. (ft)	319.72	Wetted Per. (ft)	557.25	177.83	476.46
Min Ch El (ft)	731.08	Shear (lb/sq ft)	0.15	1.17	0.84
Alpha	3.41	Stream Power (lb/ft s)	0.17	11.87	1.99
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	4415.97	12240.10	7794.18
C & E Loss (ft)	0.09	Cum SA (acres)	673.93	426.42	1319.83

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	766.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.035	0.120
W.S. Elev (ft)	765.84	Reach Len. (ft)	314.31	326.33	301.60
Crit W.S. (ft)	756.34	Flow Area (sq ft)		3413.68	5212.72
E.G. Slope (ft/ft)	0.000756	Area (sq ft)		3413.68	5212.72
Q Total (cfs)	38000.00	Flow (cfs)		28801.85	9198.16
Top Width (ft)	601.92	Top Width (ft)		161.27	440.65
Vel Total (ft/s)	4.41	Avg. Vel. (ft/s)		8.44	1.76
Max Chl Dpth (ft)	34.76	Hydr. Depth (ft)		21.17	11.83
Conv. Total (cfs)	1381704.0	Conv. (cfs)		1047253.0	334450.8
Length Wtd. (ft)	321.44	Wetted Per. (ft)		175.74	441.96
Min Ch El (ft)	731.08	Shear (lb/sq ft)		0.92	0.56
Alpha	2.82	Stream Power (lb/ft s)		7.74	0.98
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	620.08	8026.25	1000.49
C & E Loss (ft)	0.07	Cum SA (acres)	114.84	401.45	206.47

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.871

INPUT
Description:
Station Elevation Data num= 208

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	813.4	10.96	811.87	12.73	811.6	13.53	811.51	44.24	805.59
55.66	803.74	64.78	801.87	71.86	800.96	73.96	800.55	75.57	799.93
89.27	796.07	96.47	793.23	106.57	790.95	113.12	789.78	120.6	788.05
133	787.01	143.19	785.35	159.37	784.86	167.59	785	188.47	784.27
195.52	783.34	202.32	782.24	208.88	781.96	215.41	781.41	225.91	781.16
232.84	780.62	266.5	779.2	301.42	778.23	306.11	774.84	309.22	771.92
312.22	770.55	321.19	775.2	321.91	775.39	334.34	777.09	346.28	779.48
349.98	779.8	356.82	780.3	357.24	780.34	364.05	780.33	372.1	779.34
382.27	778.52	385.65	778.34	387.69	778.27	407.87	776.9	413.74	776.75
426.09	776.2	490.8	775.19	503.25	775.18	596.47	773.6	596.71	773.6
605.24	773.28	606.2	773.28	620.66	772.51	621.17	772.5	621.59	772.5
647.41	771.59	671.29	771.58	674.49	771.95	677.2	772.05	689.17	772.8
697.36	772.87	723.05	773.42	746.73	773.63	779.12	773	800.59	772.87
801.82	772.84	896.93	772.4	923.78	771.87	928.55	771.85	937.52	771.56

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   948.3  770.55  950.89  770.38  962.41  772.05 1027.58   770.6 1105.68  770.05
 1163.24  770.03  1177.2  769.79 1181.79   769.9 1189.96  768.23 1190.58  768.12
 1224.58  767.79 1232.98  768.85 1236.39  769.21 1238.01  769.57 1244.48  771.14
 1261.53  771.58  1292.9  771.57 1321.56  772.85 1327.87  772.82 1329.31  772.56
 1348.17   772.1  1351.2   772.1 1351.62  772.09 1398.73  772.02 1451.57  771.71
 1488.47  772.02 1510.11  772.46 1516.03  772.78  1519.5  772.89 1532.53  772.94
 1560.93  773.43 1562.33  773.51 1568.72  773.77 1605.03  773.37 1660.28  773.21
 1699.98   772.5 1717.02  772.36 1722.32   772.2 1727.97  771.87 1736.19   772.2
 1747.69  772.11 1751.98  771.44 1753.16  771.28 1758.38  771.35 1768.55  771.66
 1813.23  771.44 1831.28  771.67 1838.58  772.17 1840.07   772.2 1840.32   772.2
 1850.42  771.89 1855.69  771.89 1857.44  771.84 1881.22     772 1896.73   771.8
 1926.94  771.72 1929.42  771.68 1939.24  771.28 1939.35  771.27 1939.91  771.26
 1949.26  771.26 2017.09  771.79 2021.15  771.81 2022.96  771.79 2024.59  771.71
 2033.62  770.82 2052.37  762.93 2055.12  761.74 2066.35  756.38 2071.16     754
  2093.9  748.12 2099.49  743.64 2100.29  743.05 2105.29  740.18 2108.12  739.02
    2116   731.9    2129   730.9    2142   731.9 2150.83  739.02 2163.34  743.58
 2170.55  747.32 2184.36  746.73 2186.75  746.65 2191.65  749.74 2196.62  752.61
 2216.74   754.1 2236.29  752.92 2261.32  751.16 2262.86  751.03 2268.22  750.94
 2335.13  751.52 2364.66  753.41 2366.65  753.42 2374.66  753.57 2379.02  753.79
 2380.61  753.82  2392.6   755.9 2393.39  756.09 2405.96  758.89 2424.32  762.05
 2428.49  762.69 2437.48  764.47 2456.51  767.76 2465.36  768.99  2484.1  775.27
 2509.84  776.58 2537.92   775.5 2543.31  774.79 2554.29  772.59  2567.6  776.94
 2573.04  778.86 2577.98  780.22 2582.51  780.29 2588.35  781.07 2592.09  781.37
 2593.79  781.69 2595.83  782.15 2601.85  783.39 2606.39  787.25 2613.62   794.9
 2619.31  797.06 2630.12  800.64 2631.45  801.01 2632.03  801.12 2633.58  801.53
  2634.1  801.61 2637.96  802.57 2642.07  804.04 2645.48  805.58 2645.74  805.61
 2659.86  807.41 2669.47   808.4 2672.24  808.51  2696.2   811.9  2726.6  813.04
 2729.46   813.1 2736.41  813.35 2746.58  814.06

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  382.27    .075 1838.58      .1 2033.62    .035 2196.62     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2033.62 2196.62            456.7  490.33  484.77             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     250    1070     780       F
    1250    1450     780       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     420     600     790    1570    1610     790

CROSS SECTION OUTPUT  Profile #2-yr
***********************************************************************************************
* E.G. Elev (ft)         *  756.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.            *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  755.59  * Reach Len. (ft)       *  456.70  *  490.33  *  484.77  *
* Crit W.S. (ft)         *  747.64  * Flow Area (sq ft)     *          * 1700.29  *  632.31  *
* E.G. Slope (ft/ft)     *0.001110  * Area (sq ft)          *          * 1700.29  *  632.31  *
* Q Total (cfs)          *13200.00  * Flow (cfs)            *          *12627.81  *  572.19  *
* Top Width (ft)         *  322.90  * Top Width (ft)        *          *  128.68  *  194.22  *
* Vel Total (ft/s)       *    5.66  * Avg. Vel. (ft/s)      *          *    7.43  *    0.90  *
* Max Chl Dpth (ft)      *   24.69  * Hydr. Depth (ft)      *          *   13.21  *    3.26  *
* Conv. Total (cfs)      *396253.7  * Conv. (cfs)           *          *379077.1  * 17176.6  *
* Length Wtd. (ft)       *  490.09  * Wetted Per. (ft)      *          *  141.29  *  194.60  *
* Min Ch El (ft)         *  730.90  * Shear (lb/sq ft)      *          *    0.83  *    0.23  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *          *    6.19  *    0.20  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)  *   91.33  * 3613.88  *   38.56  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)        *   17.56  *  308.07  *   14.10  *
***********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
***********************************************************************************************
* E.G. Elev (ft)         *  759.96  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.            *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  758.91  * Reach Len. (ft)       *  456.70  *  490.33  *  484.77  *
* Crit W.S. (ft)         *  750.84  * Flow Area (sq ft)     *          * 2137.94  * 1301.43  *
* E.G. Slope (ft/ft)     *0.001182  * Area (sq ft)          *          * 2137.94  * 1301.43  *
* Q Total (cfs)          *20300.00  * Flow (cfs)            *          *18431.82  * 1868.18  *
* Top Width (ft)         *  345.01  * Top Width (ft)        *          *  135.57  *  209.44  *
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* Vel Total (ft/s)       *    5.90  * Avg. Vel. (ft/s)       *          *    8.62  *    1.44  *
* Max Chl Dpth (ft)      *   28.01  * Hydr. Depth (ft)       *          *   15.77  *    6.21  *
* Conv. Total (cfs)      *590467.7  * Conv. (cfs)            *          *536127.7  * 54340.0  *
* Length Wtd. (ft)       *  489.46  * Wetted Per. (ft)       *          *  148.93  *  210.18  *
* Min Ch El (ft)         *  730.90  * Shear (lb/sq ft)       *          *    1.06  *    0.46  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *          *    9.13  *    0.66  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *  194.61  * 4985.87  *  112.37  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   36.48  *  343.62  *   32.42  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.              *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  761.00  * Reach Len. (ft)        *  456.70  *  490.33  *  484.77  *
* Crit W.S. (ft)         *  753.41  * Flow Area (sq ft)      *          * 2425.96  * 1752.04  *
* E.G. Slope (ft/ft)     *0.001287  * Area (sq ft)           *          * 2425.96  * 1752.04  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *23239.73  * 3080.27  *
* Top Width (ft)         *  361.54  * Top Width (ft)         *          *  139.95  *  221.59  *
* Vel Total (ft/s)       *    6.30  * Avg. Vel. (ft/s)       *          *    9.58  *    1.76  *
* Max Chl Dpth (ft)      *   30.10  * Hydr. Depth (ft)       *          *   17.33  *    7.91  *
* Conv. Total (cfs)      *733699.6  * Conv. (cfs)            *          *647833.5  * 85866.1  *
* Length Wtd. (ft)       *  489.06  * Wetted Per. (ft)       *          *  153.78  *  222.51  *
* Min Ch El (ft)         *  730.90  * Shear (lb/sq ft)       *          *    1.27  *    0.63  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *          *   12.14  *    1.11  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *  302.51  * 6159.62  *  300.12  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   52.51  *  369.80  *   93.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.48  * Wt. n-Val.              *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  763.45  * Reach Len. (ft)        *  456.70  *  490.33  *  484.77  *
* Crit W.S. (ft)         *  755.97  * Flow Area (sq ft)      *          * 2775.82  * 2313.26  *
* E.G. Slope (ft/ft)     *0.001362  * Area (sq ft)           *          * 2775.82  * 2313.26  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *29169.21  * 4830.79  *
* Top Width (ft)         *  381.20  * Top Width (ft)         *          *  145.49  *  235.71  *
* Vel Total (ft/s)       *    6.68  * Avg. Vel. (ft/s)       *          *   10.51  *    2.09  *
* Max Chl Dpth (ft)      *   32.55  * Hydr. Depth (ft)       *          *   19.08  *    9.81  *
* Conv. Total (cfs)      *921167.6  * Conv. (cfs)            *          *790286.2  *130881.4  *
* Length Wtd. (ft)       *  488.64  * Wetted Per. (ft)       *          *  159.84  *  236.85  *
* Min Ch El (ft)         *  730.90  * Shear (lb/sq ft)       *          *    1.48  *    0.83  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *          *   15.52  *    1.73  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   *  483.58  * 7357.79  *  684.82  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   81.13  *  390.93  *  154.80  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.59  * Wt. n-Val.              *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  767.11  * Reach Len. (ft)        *  456.70  *  490.33  *  484.77  *
* Crit W.S. (ft)         *  758.24  * Flow Area (sq ft)      *          * 3323.45  * 3211.07  *
* E.G. Slope (ft/ft)     *0.001286  * Area (sq ft)           *          * 3323.45  * 3211.07  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *36832.20  * 7667.81  *
* Top Width (ft)         *  410.28  * Top Width (ft)         *          *  154.17  *  256.11  *
* Vel Total (ft/s)       *    6.81  * Avg. Vel. (ft/s)       *          *   11.08  *    2.39  *
* Max Chl Dpth (ft)      *   36.21  * Hydr. Depth (ft)       *          *   21.56  *   12.54  *
* Conv. Total (cfs)      *1240684.0  * Conv. (cfs)            *          *1026901.0  *213782.5  *
* Length Wtd. (ft)       *  488.10  * Wetted Per. (ft)       *          *  169.27  *  257.57  *
* Min Ch El (ft)         *  730.90  * Shear (lb/sq ft)       *          *    1.58  *    1.00  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *          *   17.48  *    2.39  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   * 1154.65  * 9326.98  * 2017.59  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  270.12  *  416.16  *  453.15  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	771.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.73	Wt. n-Val.	0.075	0.035	0.120
W.S. Elev (ft)	769.69	Reach Len. (ft)	456.70	490.33	484.77
Crit W.S. (ft)	759.92	Flow Area (sq ft)	79.25	3729.29	3892.94
E.G. Slope (ft/ft)	0.001284	Area (sq ft)	79.25	3729.29	3892.94
Q Total (cfs)	53690.00	Flow (cfs)	70.95	43450.97	10168.08
Top Width (ft)	486.79	Top Width (ft)	55.66	160.31	270.82
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	0.90	11.65	2.61
Max Chl Dpth (ft)	38.79	Hydr. Depth (ft)	1.42	23.26	14.37
Conv. Total (cfs)	1498487.0	Conv. (cfs)	1980.2	1212715.0	283790.9
Length Wtd. (ft)	487.89	Wetted Per. (ft)	55.96	175.92	272.53
Min Ch El (ft)	730.90	Shear (lb/sq ft)	0.11	1.70	1.14
Alpha	2.29	Stream Power (lb/ft s)	0.10	19.80	2.99
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	2087.00	10443.30	3491.54
C & E Loss (ft)	0.03	Cum SA (acres)	431.13	422.11	721.26

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	773.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.86	Wt. n-Val.	0.075	0.035	0.120
W.S. Elev (ft)	771.56	Reach Len. (ft)	456.70	490.33	484.77
Crit W.S. (ft)	761.33	Flow Area (sq ft)	377.32	4032.26	4404.07
E.G. Slope (ft/ft)	0.001297	Area (sq ft)	461.18	4032.26	4404.07
Q Total (cfs)	62000.00	Flow (cfs)	412.01	49210.31	12377.68
Top Width (ft)	849.16	Top Width (ft)	409.76	163.00	276.39
Vel Total (ft/s)	7.03	Avg. Vel. (ft/s)	1.09	12.20	2.81
Max Chl Dpth (ft)	40.66	Hydr. Depth (ft)	1.31	24.74	15.93
Conv. Total (cfs)	1721332.0	Conv. (cfs)	11438.8	1366246.0	343646.8
Length Wtd. (ft)	487.46	Wetted Per. (ft)	288.85	178.84	278.41
Min Ch El (ft)	730.90	Shear (lb/sq ft)	0.11	1.83	1.28
Alpha	2.42	Stream Power (lb/ft s)	0.12	22.29	3.60
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	2851.89	11111.85	4831.30
C & E Loss (ft)	0.03	Cum SA (acres)	519.89	423.28	1010.68

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	775.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.03	Wt. n-Val.	0.080	0.035	0.120
W.S. Elev (ft)	773.87	Reach Len. (ft)	456.70	490.33	484.77
Crit W.S. (ft)	763.38	Flow Area (sq ft)	1721.38	4409.55	5058.41
E.G. Slope (ft/ft)	0.001303	Area (sq ft)	2919.91	4409.55	5058.41
Q Total (cfs)	74720.00	Flow (cfs)	2157.44	57236.82	15325.74
Top Width (ft)	1861.71	Top Width (ft)	1405.10	163.00	293.60
Vel Total (ft/s)	6.68	Avg. Vel. (ft/s)	1.25	12.98	3.03
Max Chl Dpth (ft)	42.97	Hydr. Depth (ft)	2.38	27.05	17.23
Conv. Total (cfs)	2070297.0	Conv. (cfs)	59777.1	1585883.0	424636.4
Length Wtd. (ft)	486.19	Wetted Per. (ft)	724.95	178.84	296.33
Min Ch El (ft)	730.90	Shear (lb/sq ft)	0.19	2.01	1.39
Alpha	2.94	Stream Power (lb/ft s)	0.24	26.03	4.21
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	4395.95	12205.08	7743.80
C & E Loss (ft)	0.08	Cum SA (acres)	665.26	425.20	1317.17

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	766.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.56	Wt. n-Val.		0.035	0.120

* W.S. Elev (ft)	* 764.74	* Reach Len. (ft)	* 456.70	* 490.33	* 484.77	*
* Crit W.S. (ft)	* 756.89	* Flow Area (sq ft)	*	* 2965.34	* 2621.33	*
* E.G. Slope (ft/ft)	*0.001365	* Area (sq ft)	*	* 2965.34	* 2621.33	*
* Q Total (cfs)	*38000.00	* Flow (cfs)	*	*32155.30	* 5844.70	*
* Top Width (ft)	* 390.97	* Top Width (ft)	*	* 148.55	* 242.42	*
* Vel Total (ft/s)	* 6.80	* Avg. Vel. (ft/s)	*	* 10.84	* 2.23	*
* Max Chl Dpth (ft)	* 33.84	* Hydr. Depth (ft)	*	* 19.96	* 10.81	*
* Conv. Total (cfs)	*1028400.0	* Conv. (cfs)	*	*870223.9	*158176.1	*
* Length Wtd. (ft)	* 488.44	* Wetted Per. (ft)	*	* 163.17	* 243.68	*
* Min Ch El (ft)	* 730.90	* Shear (lb/sq ft)	*	* 1.55	* 0.92	*
* Alpha	* 2.17	* Stream Power (lb/ft s)	*	* 16.80	* 2.04	*
* Frctn Loss (ft)	* 0.53	* Cum Volume (acre-ft)	* 620.08	* 8002.35	* 973.37	*
* C & E Loss (ft)	* 0.08	* Cum SA (acres)	* 114.84	* 400.29	* 204.10	*

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.788

INPUT
Description:
Station Elevation Data num= 224

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	830.58	9.14	832.15	11.62	832.12	12.47	832.13	39.92	830.95
40.28	830.91	40.99	830.82	64.48	827.45	67.22	826.58	85.31	820.19
97.23	816.46	108.67	812.5	116.57	807.34	122.26	804.12	128.56	798.1
131.98	795.24	137.33	793.83	142.83	792.49	143.66	791.82	146.8	789.4
156.21	786.61	166.25	783.36	190.84	779.34	196.03	778.63	197.31	778.39
198.25	777.91	199.86	777.99	204.83	778.02	209.54	778.56	211.98	779.09
223.56	779.97	223.74	779.97	223.91	779.98	225.13	780.1	236.95	780.82
238.51	780.78	251.86	780.59	265.64	777.46	269.47	776.78	281.91	779.13
292.49	778.82	301.3	779.93	308.56	779.94	320.72	778.21	327.07	778.11
329.9	778.01	342.69	775.53	356.42	774.28	375.19	774.55	393.72	774.3
409.86	774.39	417.41	774.63	463.35	774.3	497.61	774.32	523.46	774.11
547.62	774.34	562.07	774.22	563.88	774.29	655.68	773.13	680.24	773.09
683.3	773.47	684.91	773.71	690.87	773.36	707.02	772.64	709.96	772.07
718.25	770.34	722.74	770.94	726.75	771.27	737.25	771.65	760.94	772.92
770.71	773.29	807.19	773.78	822.72	773.78	850.49	773.16	858.88	773.43
882.73	773.41	892.54	773.65	896.68	773.54	937.85	773.67	941.99	773.86
950.92	773.81	955.25	773.68	977.57	773.65	993.99	773.7	1019.53	773.29
1030.64	773.41	1031.34	773.71	1037.34	777	1040.09	777.5	1061.01	780.77
1081.06	781.25	1085.68	781.52	1135.86	781.6	1145.89	779.06	1160.36	774.47
1163.07	773.71	1176.49	773.07	1182.08	773.04	1184.52	773.23	1197.92	773.74
1210.6	769.63	1215.01	768.26	1220.95	767.76	1230.28	766.4	1240.57	767.78
1245.45	768.14	1247.44	768.21	1254.48	768.57	1255.09	768.59	1287.03	771.03
1306.73	771.02	1322.94	770.69	1385.32	771.25	1407.52	771.71	1422.83	771.69
1426.04	771.62	1440.59	771.62	1472.59	771.23	1524.81	771.48	1529.71	771.62
1620.28	771.88	1620.62	771.89	1628.57	771.98	1629.81	771.87	1632.49	771.79
1638.4	771.52	1650.44	771.57	1651.68	771.55	1663.3	771.05	1688.99	770.25
1700.34	769.35	1701.93	769.32	1702.43	769.35	1712.88	769.84	1717.35	769.77
1725.29	770.01	1732.39	769.85	1747.98	770.17	1749.53	770.17	1755.54	770.35
1757.77	770.53	1758.81	770.41	1815.08	769.51	1820.08	769.28	1848.06	768.79
1856.23	768.78	1857.89	768.82	1878.03	768.4	1898.85	768.4	1912.18	768.9
1934.12	769.11	1943.76	768.85	1945.73	768.87	1955.9	769.16	1960.44	769.1
1969.08	769.25	1994.25	768.27	1998.08	768.17	1999.28	768.05	2010.92	762.76
2026.06	756.12	2060.06	754.73	2072.13	754.05	2079.62	753.83	2123.87	753.36
2131.97	753.56	2137.85	753.84	2150.6	754.21	2180.79	753.57	2183.02	753.15
2187.85	751.89	2196.53	749.65	2202.17	748.07	2222.91	745.22	2225.6	743.9
2236.18	739.02	2254	731.6	2272	730.62	2290	731.6	2308.35	739.02
2314.24	744.63	2316.05	745.8	2318.45	746.7	2331.54	753.15	2332.63	753.88
2335.15	756.98	2342.5	766.49	2364.02	766.98	2388.16	767.57	2397.18	768.11
2412.4	768.7	2424.09	768.6	2479.77	770.55	2486.02	769.38	2487.24	769.08
2495.2	770.42	2505.59	770.96	2530.21	770.97	2534.83	771.04	2542.04	770.96
2551	770.1	2555.34	772.19	2561.21	773.92	2573.61	778.04	2584.94	779.83
2591.5	783.43	2599.71	788.25	2606.85	789.78	2636.49	797.44	2638.84	798.36
2653.44	802.99	2661.13	808.3	2661.26	808.34	2661.48	808.37	2673.83	809.85
2683.54	811.23	2698.38	813.05	2699.98	813.2	2729.57	815.52	2760.83	817.05
2762.28	817.1	2781.54	818.51	2785.18	818.69	2818.67	819.57		

Manning's n Values num= 5

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .15  342.69     .06  1955.9      .1 2183.02    .035  2342.5     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2183.02  2342.5           645.68  734.19  740.89             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     410     600     790

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  755.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.100  *   0.035  *          *
* W.S. Elev (ft)         *  755.43  * Reach Len. (ft)        *  645.68  *  734.19  *  740.89  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  205.55  * 2249.30  *          *
* E.G. Slope (ft/ft)     *0.000561  * Area (sq ft)           *  205.55  * 2249.30  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *   93.43  *13106.57  *          *
* Top Width (ft)         *  290.86  * Top Width (ft)         *  139.99  *  150.87  *          *
* Vel Total (ft/s)       *    5.38  * Avg. Vel. (ft/s)       *    0.45  *    5.83  *          *
* Max Chl Dpth (ft)      *   24.81  * Hydr. Depth (ft)       *    1.47  *   14.91  *          *
* Conv. Total (cfs)      *557196.9  * Conv. (cfs)            *  3943.8  *553253.1  *          *
* Length Wtd. (ft)       *  733.96  * Wetted Per. (ft)       *  140.09  *  161.30  *          *
* Min Ch El (ft)         *  730.62  * Shear (lb/sq ft)       *    0.05  *    0.49  *          *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.02  *    2.85  *          *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   *   90.25  * 3591.66  *   35.04  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   16.83  *  306.50  *   13.02  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  759.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.100  *   0.035  *          *
* W.S. Elev (ft)         *  758.69  * Reach Len. (ft)        *  645.68  *  734.19  *  740.89  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  718.77  * 2745.29  *          *
* E.G. Slope (ft/ft)     *0.000666  * Area (sq ft)           *  718.77  * 2745.29  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  739.53  *19560.47  *          *
* Top Width (ft)         *  316.26  * Top Width (ft)         *  162.81  *  153.45  *          *
* Vel Total (ft/s)       *    5.86  * Avg. Vel. (ft/s)       *    1.03  *    7.13  *          *
* Max Chl Dpth (ft)      *   28.07  * Hydr. Depth (ft)       *    4.41  *   17.89  *          *
* Conv. Total (cfs)      *786878.4  * Conv. (cfs)            * 28665.8  *758212.6  *          *
* Length Wtd. (ft)       *  732.92  * Wetted Per. (ft)       *  163.46  *  165.45  *          *
* Min Ch El (ft)         *  730.62  * Shear (lb/sq ft)       *    0.18  *    0.69  *          *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.19  *    4.91  *          *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   *  190.85  * 4958.39  *  105.13  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   35.62  *  342.00  *   31.25  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  761.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *   0.100  *   0.035  *          *
* W.S. Elev (ft)         *  760.73  * Reach Len. (ft)        *  645.68  *  734.19  *  740.89  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1056.20  * 3060.45  *          *
* E.G. Slope (ft/ft)     *0.000763  * Area (sq ft)           * 1056.20  * 3060.45  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1473.62  *24846.38  *          *
* Top Width (ft)         *  322.50  * Top Width (ft)         *  167.47  *  155.03  *          *
* Vel Total (ft/s)       *    6.39  * Avg. Vel. (ft/s)       *    1.40  *    8.12  *          *
* Max Chl Dpth (ft)      *   30.11  * Hydr. Depth (ft)       *    6.31  *   19.74  *          *
* Conv. Total (cfs)      *952776.5  * Conv. (cfs)            * 53344.5  *899432.0  *          *
* Length Wtd. (ft)       *  732.19  * Wetted Per. (ft)       *  168.55  *  168.04  *          *
* Min Ch El (ft)         *  730.62  * Shear (lb/sq ft)       *    0.30  *    0.87  *          *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    0.42  *    7.04  *          *
* Frctn Loss (ft)        *    0.69  * Cum Volume (acre-ft)   *  296.97  * 6128.74  *  290.37  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   51.63  *  368.14  *   91.91  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  764.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.100  *   0.035  *          *
* W.S. Elev (ft)         *  763.13  * Reach Len. (ft)        *  645.68  *  734.19  *  740.89  *
```

```
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 1464.72  * 3434.77  *          *
* E.G. Slope (ft/ft)      *0.000849  * Area (sq ft)           * 1464.72  * 3434.77  *          *
* Q Total (cfs)           *34000.00  * Flow (cfs)             * 2618.71  *31381.29  *          *
* Top Width (ft)          *  329.80  * Top Width (ft)         *  172.91  *  156.88  *          *
* Vel Total (ft/s)        *    6.94  * Avg. Vel. (ft/s)       *    1.79  *    9.14  *          *
* Max Chl Dpth (ft)       *   32.51  * Hydr. Depth (ft)       *    8.47  *   21.89  *          *
* Conv. Total (cfs)       *1167121.0  * Conv. (cfs)            * 89892.5  *1077228.0  *          *
* Length Wtd. (ft)        *  731.35  * Wetted Per. (ft)       *  174.50  *  171.07  *          *
* Min Ch El (ft)          *  730.62  * Shear (lb/sq ft)       *    0.44  *    1.06  *          *
* Alpha                   *    1.60  * Stream Power (lb/ft s) *    0.80  *    9.72  *          *
* Frctn Loss (ft)         *    0.73  * Cum Volume (acre-ft)   *  475.90  * 7322.84  *  671.95  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   80.22  *  389.23  *  153.49  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  768.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.38  * Wt. n-Val.             *   0.100  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  766.75  * Reach Len. (ft)        *  645.68  *  734.19  *  740.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 2105.86  * 4007.64  *    1.47  *
* E.G. Slope (ft/ft)      *0.000846  * Area (sq ft)           * 2105.86  * 4007.64  *    1.47  *
* Q Total (cfs)           *44500.00  * Flow (cfs)             * 4632.64  *39867.22  *    0.14  *
* Top Width (ft)          *  356.72  * Top Width (ft)         *  185.87  *  159.48  *   11.37  *
* Vel Total (ft/s)        *    7.28  * Avg. Vel. (ft/s)       *    2.20  *    9.95  *    0.09  *
* Max Chl Dpth (ft)       *   36.13  * Hydr. Depth (ft)       *   11.33  *   25.13  *    0.13  *
* Conv. Total (cfs)       *1529690.0  * Conv. (cfs)            *159247.3  *1370438.0  *     4.7  *
* Length Wtd. (ft)        *  729.41  * Wetted Per. (ft)       *  188.29  *  175.32  *   11.37  *
* Min Ch El (ft)          *  730.62  * Shear (lb/sq ft)       *    0.59  *    1.21  *    0.01  *
* Alpha                   *    1.68  * Stream Power (lb/ft s) *    1.30  *   12.01  *    0.00  *
* Frctn Loss (ft)         *    0.67  * Cum Volume (acre-ft)   * 1143.61  * 9285.72  * 1999.71  *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)         *  269.15  *  414.40  *  451.66  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  770.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.62  * Wt. n-Val.             *   0.099  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  769.25  * Reach Len. (ft)        *  645.68  *  734.19  *  740.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 2710.98  * 4406.53  *  140.56  *
* E.G. Slope (ft/ft)      *0.000880  * Area (sq ft)           * 2710.98  * 4406.53  *  140.56  *
* Q Total (cfs)           *53690.00  * Flow (cfs)             * 6018.27  *47607.14  *   64.59  *
* Top Width (ft)          *  674.45  * Top Width (ft)         *  413.12  *  159.48  *  101.85  *
* Vel Total (ft/s)        *    7.40  * Avg. Vel. (ft/s)       *    2.22  *   10.80  *    0.46  *
* Max Chl Dpth (ft)       *   38.63  * Hydr. Depth (ft)       *    6.56  *   27.63  *    1.38  *
* Conv. Total (cfs)       *1810339.0  * Conv. (cfs)            *202926.3  *1605235.0  *  2177.8  *
* Length Wtd. (ft)        *  728.06  * Wetted Per. (ft)       *  416.24  *  175.32  *  101.94  *
* Min Ch El (ft)          *  730.62  * Shear (lb/sq ft)       *    0.36  *    1.38  *    0.08  *
* Alpha                   *    1.90  * Stream Power (lb/ft s) *    0.79  *   14.91  *    0.03  *
* Frctn Loss (ft)         *    0.66  * Cum Volume (acre-ft)   * 2072.37  *10397.51  * 3469.09  *
* C & E Loss (ft)         *    0.14  * Cum SA (acres)         *  428.67  *  420.31  *  719.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  772.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.76  * Wt. n-Val.             *   0.097  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  771.10  * Reach Len. (ft)        *  645.68  *  734.19  *  740.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 3694.49  * 4702.07  *  405.91  *
* E.G. Slope (ft/ft)      *0.000900  * Area (sq ft)           * 3694.49  * 4702.07  *  405.91  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             * 8103.01  *53663.88  *  233.11  *
* Top Width (ft)          * 1064.05  * Top Width (ft)         *  693.98  *  159.48  *  210.58  *
* Vel Total (ft/s)        *    7.04  * Avg. Vel. (ft/s)       *    2.19  *   11.41  *    0.57  *
* Max Chl Dpth (ft)       *   40.48  * Hydr. Depth (ft)       *    5.32  *   29.48  *    1.93  *
* Conv. Total (cfs)       *2066501.0  * Conv. (cfs)            *270078.8  *1788652.0  *  7769.6  *
* Length Wtd. (ft)        *  726.62  * Wetted Per. (ft)       *  697.69  *  175.32  *  211.20  *
* Min Ch El (ft)          *  730.62  * Shear (lb/sq ft)       *    0.30  *    1.51  *    0.11  *
* Alpha                   *    2.29  * Stream Power (lb/ft s) *    0.65  *   17.20  *    0.06  *
* Frctn Loss (ft)         *    0.65  * Cum Volume (acre-ft)   * 2830.10  *11062.69  * 4804.53  *
* C & E Loss (ft)         *    0.17  * Cum SA (acres)         *  514.11  *  421.47  * 1007.97  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	775.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.	0.089	0.035	0.120
W.S. Elev (ft)	773.54	Reach Len. (ft)	645.68	734.19	740.89
Crit W.S. (ft)		Flow Area (sq ft)	6099.31	5090.89	926.69
E.G. Slope (ft/ft)	0.000872	Area (sq ft)	6099.31	5090.89	926.69
Q Total (cfs)	74720.00	Flow (cfs)	13548.12	60284.19	887.69
Top Width (ft)	1631.87	Top Width (ft)	1254.97	159.48	217.42
Vel Total (ft/s)	6.17	Avg. Vel. (ft/s)	2.22	11.84	0.96
Max Chl Dpth (ft)	42.92	Hydr. Depth (ft)	4.86	31.92	4.26
Conv. Total (cfs)	2530854.0	Conv. (cfs)	458890.5	2041896.0	30067.2
Length Wtd. (ft)	723.12	Wetted Per. (ft)	1259.42	175.32	218.48
Min Ch El (ft)	730.62	Shear (lb/sq ft)	0.26	1.58	0.23
Alpha	3.00	Stream Power (lb/ft s)	0.59	18.71	0.22
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	4348.67	12151.61	7710.50
C & E Loss (ft)	0.15	Cum SA (acres)	651.32	423.39	1314.33

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	765.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.30	Wt. n-Val.	0.100	0.035	
W.S. Elev (ft)	764.40	Reach Len. (ft)	645.68	734.19	740.89
Crit W.S. (ft)		Flow Area (sq ft)	1685.65	3634.24	
E.G. Slope (ft/ft)	0.000870	Area (sq ft)	1685.65	3634.24	
Q Total (cfs)	38000.00	Flow (cfs)	3311.97	34688.03	
Top Width (ft)	333.56	Top Width (ft)	175.70	157.86	
Vel Total (ft/s)	7.14	Avg. Vel. (ft/s)	1.96	9.54	
Max Chl Dpth (ft)	33.78	Hydr. Depth (ft)	9.59	23.02	
Conv. Total (cfs)	1288466.0	Conv. (cfs)	112299.0	1176167.0	
Length Wtd. (ft)	730.79	Wetted Per. (ft)	177.56	172.67	
Min Ch El (ft)	730.62	Shear (lb/sq ft)	0.52	1.14	
Alpha	1.64	Stream Power (lb/ft s)	1.01	10.91	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	611.25	7965.21	958.79
C & E Loss (ft)	0.01	Cum SA (acres)	113.92	398.56	202.76

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.676

INPUT
Description:
Station Elevation Data num= 228

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	841.44	12.07	838.72	30.98	827.91	52	817.98	53.83	817.33
54.77	817.21	57.56	817.01	74.72	815.58	84.89	814.99	92.31	811.02
96.84	808	111.85	803.95	112.12	803.87	112.92	803.28	141.45	781.89
146.87	780.47	158.35	777.21	163.97	778.35	166.49	778.94	186.06	779.05
193.96	777.95	206.17	776.04	209.39	775.76	224.73	774.87	226.26	774.53
234.4	772.34	236.44	772.27	268.11	771.74	268.49	771.74	268.86	771.73
269.09	771.73	269.5	771.74	302.52	771.75	328.72	771.3	340.84	771.24
421.52	772.26	465.9	772.58	466.28	772.55	472.35	772.45	522.4	772.28
528.16	771.72	552.43	771.82	582.73	770.76	612.72	767.49	641.58	768
646.7	767.93	682.27	762.78	701.4	756.05	705.71	754.32	709.79	753.85
722.13	752.22	729.37	749.36	733.9	747.87	745.15	753.01	774.1	773.62
775.29	774.49	776.3	774.82	777.55	775.33	793.89	781.51	823.63	782.45
823.74	782.46	845.58	783.8	874.03	783.6	903.41	783.89	996.37	783.56
1057.27	782.66	1114.69	781.39	1115.52	781.32	1150.28	780.01	1155.67	779.49
1157.6	779.33	1167.55	778.76	1182.86	777.54	1196.83	774.47	1218.99	767.89
1239.26	764.11	1247.77	766.04	1257.89	766.79	1283.12	766.85	1284.6	766.61
1293.43	764.9	1332.27	762.06	1332.65	762.12	1349.88	763.11	1353.69	763.65
1355.97	763.41	1360.18	763.12	1368	762.28	1371.51	762.17	1377.31	761.66
1384.01	761.33	1406.82	760.71	1409.73	760.89	1422.29	761.49	1437.54	762.45
1443.75	762.65	1462.94	764.42	1475.29	765.29	1498.04	769.37	1530.34	770.3

```
 1563.76   770.8 1577.46  771.92 1604.93   771.2 1612.37  768.04 1613.43  767.64
 1626.74  762.62 1626.96  762.54 1628.52  761.79 1628.75  761.65  1643.8  752.85
 1646.97  751.17 1669.85  746.55 1687.04  738.99 1689.22  737.85    1697   731.2
    1713   730.2    1728   731.2 1736.41  737.85 1739.41  739.38 1747.38  744.34
 1754.67  747.61 1769.62   752.9 1774.52  753.11 1780.35  753.53 1784.56  753.84
 1812.49  750.56 1819.49     751 1841.08  753.32 1842.93  753.31 1854.92  752.83
  1877.5  752.62 1879.38  752.69 1880.27  752.65 1968.49  752.46 1986.42  752.81
 2026.88   752.9 2084.24  753.57  2110.3  754.35 2125.27  758.36 2125.46  758.42
    2126  758.58 2146.65  765.24 2159.73  767.19 2166.53   768.1  2173.6  768.82
  2202.2   772.3  2203.2  772.38 2236.09  772.83 2238.61  772.91 2265.21  773.35
 2269.12  772.91 2276.31  772.24  2289.8  773.41 2342.02  772.97 2360.52  773.39
 2368.29  773.73 2390.62  773.84 2403.23   774.3 2406.59  774.35 2441.39  774.19
  2447.2  774.08 2454.99  773.79 2461.33  772.91 2462.75  772.83 2472.68  771.96
 2474.27  771.87 2475.64  772.03 2503.01  772.13 2505.63  772.29 2508.99  772.34
 2520.03  773.56 2522.68  773.64 2526.48  773.83 2547.27   774.5 2551.01  774.67
  2554.3  775.02 2578.08  775.66 2580.31  775.63 2597.02  776.13 2602.63   776.1
 2610.46  776.33  2620.1  777.13 2635.53  778.71 2642.95  779.68 2664.64   781.7
  2665.6  782.02 2672.84  784.34 2680.82  785.29  2686.6  785.87 2690.53   786.4
 2714.74  794.03 2719.04  795.57 2720.45  796.47 2724.84  798.76 2729.54  801.11
 2732.21  802.86 2732.35  802.86 2732.74  802.88 2752.01  804.15 2753.43  804.27
 2768.42  807.01 2769.61  807.32 2804.98  813.29 2806.88  813.32 2825.16  814.54
 2829.34  814.61 2831.72  814.61 2841.96  814.83 2844.55  814.79 2868.25  815.75
 2871.23  815.64  2875.8  815.87 2878.79  816.09 2880.05   816.1 2888.66  816.43
 2889.18  816.41 2889.94  816.43 2898.11  816.97 2899.47  816.97 2911.31  818.56
  2916.5  819.06 2919.75  819.52 2926.93  820.84 2939.86  821.78 2955.73   822.7
 2964.21   823.4 2967.53  823.92 2980.66  827.36

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .15   234.4     .05   522.4     .12  793.89     .05 1218.99    .075
 1613.43    .035 1769.62     .12  2202.2    .075 2454.99     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1613.43 1769.62           680.41     659  560.26             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     500     800     772       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     270     480     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  755.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.85  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)          *  754.50  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 1711.03  *  580.85  *
* E.G. Slope (ft/ft)      *0.001114  * Area (sq ft)           *  120.52  * 1711.03  *  580.85  *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *          *12858.10  *  341.90  *
* Top Width (ft)          *  511.85  * Top Width (ft)         *   41.98  *  128.64  *  341.24  *
* Vel Total (ft/s)        *    5.76  * Avg. Vel. (ft/s)       *          *    7.51  *    0.59  *
* Max Chl Dpth (ft)       *   24.30  * Hydr. Depth (ft)       *          *   13.30  *    1.70  *
* Conv. Total (cfs)       *395558.5  * Conv. (cfs)            *          *385313.0  * 10245.5  *
* Length Wtd. (ft)        *  652.66  * Wetted Per. (ft)       *          *  140.06  *  341.65  *
* Min Ch El (ft)          *  730.20  * Shear (lb/sq ft)       *          *    0.85  *    0.12  *
* Alpha                   *    1.66  * Stream Power (lb/ft s) *          *    6.38  *    0.07  *
* Frctn Loss (ft)         *    0.51  * Cum Volume (acre-ft)   *   87.84  * 3558.28  *   30.10  *
* C & E Loss (ft)         *    0.13  * Cum SA (acres)         *   15.48  *  304.14  *   10.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  758.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.01  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)          *  757.78  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 2142.59  * 1721.30  *
* E.G. Slope (ft/ft)      *0.001126  * Area (sq ft)           *  279.86  * 2142.59  * 1721.30  *
* Q Total (cfs)           *20300.00  * Flow (cfs)              *          *18248.60  * 2051.41  *
* Top Width (ft)          *  543.12  * Top Width (ft)         *   55.38  *  134.26  *  353.49  *
* Vel Total (ft/s)        *    5.25  * Avg. Vel. (ft/s)       *          *    8.52  *    1.19  *
* Max Chl Dpth (ft)       *   27.58  * Hydr. Depth (ft)       *          *   15.96  *    4.87  *
* Conv. Total (cfs)       *604979.3  * Conv. (cfs)            *          *543843.5  * 61135.8  *
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* Length Wtd. (ft)       *  645.77  * Wetted Per. (ft)       *          *  146.56  *  354.34  *
* Min Ch El (ft)         *  730.20  * Shear (lb/sq ft)       *          *    1.03  *    0.34  *
* Alpha                  *    2.37  * Stream Power (lb/ft s) *          *    8.75  *    0.41  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   *  183.45  * 4917.20  *   90.49  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   34.01  *  339.57  *   28.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.99  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)         *  759.83  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2420.48  * 2450.76  *
* E.G. Slope (ft/ft)     *0.001189  * Area (sq ft)           *  401.88  * 2420.48  * 2450.76  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *22570.20  * 3749.80  *
* Top Width (ft)         *  562.05  * Top Width (ft)         *   64.05  *  137.75  *  360.24  *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *          *    9.32  *    1.53  *
* Max Chl Dpth (ft)      *   29.63  * Hydr. Depth (ft)       *          *   17.57  *    6.80  *
* Conv. Total (cfs)      *763145.4  * Conv. (cfs)            *          *654420.3  *108725.1  *
* Length Wtd. (ft)       *  642.22  * Wetted Per. (ft)       *          *  150.61  *  361.39  *
* Min Ch El (ft)         *  730.20  * Shear (lb/sq ft)       *          *    1.19  *    0.50  *
* Alpha                  *    2.57  * Stream Power (lb/ft s) *          *   11.13  *    0.77  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   *  286.17  * 6082.55  *  269.53  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *   49.91  *  365.68  *   88.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.59  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *   0.075  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  762.31  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   62.40  * 2768.61  * 3356.83  *
* E.G. Slope (ft/ft)     *0.001197  * Area (sq ft)           *  636.83  * 2768.61  * 3356.83  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *   39.69  *27699.89  * 6260.42  *
* Top Width (ft)         *  659.69  * Top Width (ft)         *  149.54  *  142.19  *  367.96  *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *    0.64  *   10.00  *    1.86  *
* Max Chl Dpth (ft)      *   32.11  * Hydr. Depth (ft)       *    0.83  *   19.47  *    9.12  *
* Conv. Total (cfs)      *982870.6  * Conv. (cfs)            *  1147.4  *800747.3  *180976.0  *
* Length Wtd. (ft)       *  639.69  * Wetted Per. (ft)       *   75.03  *  155.70  *  369.50  *
* Min Ch El (ft)         *  730.20  * Shear (lb/sq ft)       *    0.06  *    1.33  *    0.68  *
* Alpha                  *    2.72  * Stream Power (lb/ft s) *    0.04  *   13.29  *    1.27  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *  460.32  * 7270.56  *  643.40  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *   77.83  *  386.71  *  150.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.40  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.075  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  766.22  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  681.01  * 3344.48  * 4821.24  *
* E.G. Slope (ft/ft)     *0.001010  * Area (sq ft)           * 1603.86  * 3344.48  * 4821.24  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  949.61  *33329.17  *10221.22  *
* Top Width (ft)         *  857.55  * Top Width (ft)         *  321.48  *  152.44  *  383.63  *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *    1.39  *    9.97  *    2.12  *
* Max Chl Dpth (ft)      *   36.02  * Hydr. Depth (ft)       *    3.15  *   21.94  *   12.57  *
* Conv. Total (cfs)      *1399897.0  * Conv. (cfs)           * 29873.1  *1048481.0  *321542.9  *
* Length Wtd. (ft)       *  637.22  * Wetted Per. (ft)       *  217.33  *  166.67  *  385.71  *
* Min Ch El (ft)         *  730.20  * Shear (lb/sq ft)       *    0.20  *    1.27  *    0.79  *
* Alpha                  *    2.98  * Stream Power (lb/ft s) *    0.28  *   12.61  *    1.67  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   * 1116.11  * 9223.76  * 1958.70  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *  265.39  *  411.77  *  448.30  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *   0.075  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  768.92  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1383.16  * 3762.22  * 5880.03  *
* E.G. Slope (ft/ft)     *0.000923  * Area (sq ft)           * 2664.00  * 3762.22  * 5880.03  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              * 2416.92  *38150.89  *13122.19  *
* Top Width (ft)         * 1011.91  * Top Width (ft)         *  450.95  *  156.19  *  404.77  *
* Vel Total (ft/s)       *    4.87  * Avg. Vel. (ft/s)       *    1.75  *   10.14  *    2.23  *
* Max Chl Dpth (ft)      *   38.72  * Hydr. Depth (ft)       *    4.89  *   24.09  *   14.53  *
* Conv. Total (cfs)      *1767086.0  * Conv. (cfs)            * 79547.5  *1255651.0  *431887.5  *
* Length Wtd. (ft)       *  636.58  * Wetted Per. (ft)       *  285.05  *  170.69  *  407.02  *
* Min Ch El (ft)         *  730.20  * Shear (lb/sq ft)       *    0.28  *    1.27  *    0.83  *
* Alpha                  *    3.14  * Stream Power (lb/ft s) *    0.49  *   12.88  *    1.86  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 2032.53  *10328.67  * 3417.89  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *  422.27  *  417.65  *  714.88  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  772.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.075  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  770.84  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1983.56  * 4062.15  * 6672.46  *
* E.G. Slope (ft/ft)     *0.000897  * Area (sq ft)           * 3606.27  * 4062.15  * 6672.46  *
* Q Total (cfs)          *62000.00  * Flow (cfs)              * 3704.73  *42730.66  *15564.62  *
* Top Width (ft)         * 1129.17  * Top Width (ft)         *  552.43  *  156.19  *  420.55  *
* Vel Total (ft/s)       *    4.87  * Avg. Vel. (ft/s)       *    1.87  *   10.52  *    2.33  *
* Max Chl Dpth (ft)      *   40.64  * Hydr. Depth (ft)       *    5.47  *   26.01  *   15.87  *
* Conv. Total (cfs)      *2070335.0  * Conv. (cfs)            *123710.0  *1426884.0  *519741.5  *
* Length Wtd. (ft)       *  636.17  * Wetted Per. (ft)       *  365.46  *  170.69  *  422.92  *
* Min Ch El (ft)         *  730.20  * Shear (lb/sq ft)       *    0.30  *    1.33  *    0.88  *
* Alpha                  *    3.28  * Stream Power (lb/ft s) *    0.57  *   14.02  *    2.06  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   * 2775.99  *10988.83  * 4744.34  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *  504.87  *  418.80  * 1002.60  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  774.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.075  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  773.27  * Reach Len. (ft)        *  680.41  *  659.00  *  560.26  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3336.57  * 4442.38  * 7819.77  *
* E.G. Slope (ft/ft)     *0.000870  * Area (sq ft)           * 5223.13  * 4442.38  * 7819.77  *
* Q Total (cfs)          *74720.00  * Flow (cfs)              * 6666.41  *48853.35  *19200.25  *
* Top Width (ft)         * 1522.14  * Top Width (ft)         *  745.23  *  156.19  *  620.72  *
* Vel Total (ft/s)       *    4.79  * Avg. Vel. (ft/s)       *    2.00  *   11.00  *    2.46  *
* Max Chl Dpth (ft)      *   43.07  * Hydr. Depth (ft)       *    4.48  *   28.44  *   12.60  *
* Conv. Total (cfs)      *2533360.0  * Conv. (cfs)            *226022.5  *1656359.0  *650978.9  *
* Length Wtd. (ft)       *  635.70  * Wetted Per. (ft)       *  761.49  *  170.69  *  623.42  *
* Min Ch El (ft)         *  730.20  * Shear (lb/sq ft)       *    0.24  *    1.41  *    0.68  *
* Alpha                  *    3.53  * Stream Power (lb/ft s) *    0.48  *   15.54  *    1.67  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   * 4264.76  *12071.27  * 7636.12  *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)         *  636.49  *  420.73  * 1307.20  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	764.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.075	0.035	0.120
W.S. Elev (ft)	763.68	Reach Len. (ft)	680.41	659.00	560.26
Crit W.S. (ft)		Flow Area (sq ft)	216.86	2965.09	3862.16
E.G. Slope (ft/ft)	0.001160	Area (sq ft)	898.80	2965.09	3862.16
Q Total (cfs)	38000.00	Flow (cfs)	191.23	30085.55	7723.22
Top Width (ft)	746.75	Top Width (ft)	228.87	145.69	372.19
Vel Total (ft/s)	5.39	Avg. Vel. (ft/s)	0.88	10.15	2.00
Max Chl Dpth (ft)	33.48	Hydr. Depth (ft)	1.50	20.35	10.38
Conv. Total (cfs)	1115944.0	Conv. (cfs)	5615.9	883520.8	226807.5
Length Wtd. (ft)	638.55	Wetted Per. (ft)	145.13	159.46	373.95
Min Ch El (ft)	730.20	Shear (lb/sq ft)	0.11	1.35	0.75
Alpha	2.83	Stream Power (lb/ft s)	0.10	13.66	1.50
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	592.09	7909.59	925.94
C & E Loss (ft)	0.24	Cum SA (acres)	110.92	396.00	199.59

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.563

INPUT
Description: Tributary area on left ineffective
Station Elevation Data num= 282

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	831.16	7.93	829.91	31.78	824.08	51.87	818.39	58.2	817.52
59.51	817.28	65.89	816.63	67.72	816.28	69.62	816.1	70.38	815.95
75.72	815.21	80.17	811.36	101.66	810.38	105.7	810.89	111.44	810.22
122.76	810.28	145.7	809.56	157.86	808.19	161.51	806.88	169.78	805.52
178.62	803.6	191.22	800.15	193.51	799.01	202.98	794.11	206.5	792.39
218.86	784.65	219.76	784.38	227.3	779.78	229.64	779	236	774.66
246.35	772.01	255.54	772.28	257.95	772.86	268.69	775.25	282.39	775.81
288.22	775.81	288.92	775.67	298.56	773.59	306.25	769.93	312.86	767.01
320.68	762.63	328.2	759.31	340.04	755.99	340.74	755.78	343.31	754.97
343.56	754.92	351.97	754.7	360.01	753.19	369.39	754.3	376.25	754.43
386.8	754.32	393.33	755.08	397.78	755.5	398.95	755.29	408.89	752.53
431.26	750.7	433.94	750.65	440.79	743.87	444.21	740.36	448.05	740.3
471.46	739.03	492.67	738.87	499.63	740.5	514.58	742.96	514.92	742.9
517.96	743.09	518.39	743.08	519.11	743.14	522.72	743.33	523.91	743.32
526.82	743.59	542.24	744.18	543.48	744.27	543.76	744.27	544.19	744.29
551.03	745.14	562.24	746.82	575.38	749.15	583.4	750.09	611.57	755.06
624.01	757.4	628	758.05	631.75	758.42	645.39	760.17	667.09	764.25
670.19	764.61	671.68	765.2	698.43	767.4	700.73	767.56	703.94	767.68
717.57	767.69	723.51	767.99	770.01	767.93	774.31	767.16	796.9	766.99
802.45	767.08	807.66	767.63	812.58	767.62	828.81	768.02	841.79	770.24
847.51	771.52	848.73	771.53	852.45	771.32	854.84	770.7	865.28	772.65
865.82	772.78	867.11	772.9	907.22	776.07	946.28	776.74	958.51	777.39
969.94	778.22	971.32	778.3	985.43	778.74	1022.82	779.15	1028.76	779.11
1036.03	779.26	1045.4	777.59	1045.51	777.58	1062.45	778.37	1066.72	778.63
1121.58	778.55	1138.5	778.33	1194.26	776.17	1200.12	772.5	1211.12	766.87
1234.41	764.05	1238.33	763.7	1257	760.8	1257.54	760.73	1271.3	762.94
1296.72	762.94	1307.25	761.73	1312.03	759.45	1322.49	754.91	1355.65	755.2
1375.06	755.14	1420.11	756.01	1440.14	756.62	1464.55	757.62	1508.98	758.86
1552.43	758.86	1647.03	760.28	1651.16	760.21	1653.2	760.2	1655.06	759.92
1656.95	759.05	1665.15	757.27	1670.93	756.59	1671.24	756.53	1671.97	756.4
1680.23	752.45	1683.1	751.55	1688.17	750.04	1699.95	746.06	1709.58	744.5
1712.3	744.3	1729.15	741.47	1732.04	739.94	1738.17	737.13	1746	730.8
1765	729.82	1784	730.8	1791.8	738.07	1805.01	744.82	1809	745.41

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 1818.74   746.1 1830.14  750.96 1831.83  750.95 1874.04  750.68 1922.41  749.98
 1966.13  749.78 1994.94  749.88 2026.64  748.81 2042.77   748.5 2105.43  749.05
 2135.37  748.79 2142.47  748.91 2170.67  749.88 2175.41  749.98 2179.06  750.98
 2193.54     754 2198.83  754.98  2200.7  755.26 2205.61  755.37  2209.1  755.54
 2222.48  755.75 2222.67  755.81 2222.83  755.74 2228.45  753.96 2233.23  753.71
 2238.83  753.07 2247.83  753.62 2252.79  751.72 2253.35  751.54 2253.55  751.39
 2258.46   752.4 2264.69  754.21 2268.69  754.25 2277.14  754.65 2283.85   754.4
  2285.8  754.61 2289.78  754.61 2291.67   754.8 2296.86  755.24 2311.13  755.68
 2327.01  759.52  2362.7  762.94 2375.85  763.35 2403.28  763.62 2449.11  764.81
 2451.64  764.94 2481.56  765.82 2493.05  765.94 2500.74  766.58 2515.05   767.1
 2517.44  767.14 2523.49  767.41 2532.82  767.61 2539.49  768.63 2540.02  768.65
 2551.34   768.6  2558.4  768.32 2601.02  768.46 2605.64  768.68 2619.15  768.87
 2625.14  769.17 2652.94  769.54 2709.56  771.02 2713.23  771.29 2755.67  772.13
 2786.26  773.29 2830.48  775.55 2842.64  776.01 2872.49  777.97 2904.38  779.04
  2925.5  779.03 2938.67  781.44 2939.47   781.6 2944.54   781.8 2945.59  781.77
 2956.32  781.82 2963.89  782.44 2964.68  782.61 2979.86  784.94 2981.79  785.42
 2982.65  785.55 2991.21  788.64  3003.7  791.68 3004.49  791.96 3008.98  794.52
 3011.17   797.3 3011.57  797.32 3012.84  796.38  3014.7  799.46 3015.63  801.16
  3016.3  801.41  3017.6   800.7 3026.05  796.29 3028.94  801.79 3029.99  804.34
 3037.14  802.02 3039.22  801.26 3039.89  801.03 3040.91   799.9 3046.55  800.33
 3055.45  802.41 3057.38  802.78 3058.63  803.93 3065.53  811.11 3068.03  811.41
 3081.15  813.31 3084.17   813.7 3086.37  813.93  3102.6  815.97 3104.02  816.18
 3122.32  821.21 3131.58  822.15 3161.81  825.83 3179.73  828.21 3200.42  831.26
 3216.12  833.89 3220.51  834.79

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .12  907.22     .06  1271.3     .05 1552.43      .1  1653.2    .035
 1830.14     .12  2362.7    .075 2709.56     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1653.2 1830.14          461.36  447.64  387.89             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1050     778       T

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  754.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *          *   0.035  *   0.120  *
* W.S. Elev (ft)          *  754.29  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 2122.85  * 1699.47  *
* E.G. Slope (ft/ft)      *0.000570  * Area (sq ft)           * 1827.79  * 2122.85  * 1699.47  *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *          *11846.64  * 1353.36  *
* Top Width (ft)          *  780.47  * Top Width (ft)         *  219.73  *  153.75  *  406.99  *
* Vel Total (ft/s)        *    3.45  * Avg. Vel. (ft/s)       *          *    5.58  *    0.80  *
* Max Chl Dpth (ft)       *   24.47  * Hydr. Depth (ft)        *          *   13.81  *    4.18  *
* Conv. Total (cfs)       *552765.3  * Conv. (cfs)             *          *496091.8  * 56673.4  *
* Length Wtd. (ft)        *  444.55  * Wetted Per. (ft)        *          *  164.38  *  408.42  *
* Min Ch El (ft)          *  729.82  * Shear (lb/sq ft)        *          *    0.46  *    0.15  *
* Alpha                   *    2.35  * Stream Power (lb/ft s) *          *    2.57  *    0.12  *
* Frctn Loss (ft)         *    0.36  * Cum Volume (acre-ft)    *   72.62  * 3529.28  *   15.43  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)          *   13.44  *  302.01  *    5.31  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  758.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.50  * Wt. n-Val.             *   0.050  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  757.63  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  273.51  * 2653.06  * 3256.96  *
* E.G. Slope (ft/ft)      *0.000588  * Area (sq ft)           * 3010.06  * 2653.06  * 3256.96  *
* Q Total (cfs)           *20300.00  * Flow (cfs)              *  294.99  *16552.54  * 3452.47  *
* Top Width (ft)          * 1095.80  * Top Width (ft)         *  440.07  *  166.66  *  489.07  *
* Vel Total (ft/s)        *    3.28  * Avg. Vel. (ft/s)       *    1.08  *    6.24  *    1.06  *
* Max Chl Dpth (ft)       *   27.81  * Hydr. Depth (ft)        *    1.84  *   15.92  *    6.66  *
* Conv. Total (cfs)       *837028.4  * Conv. (cfs)             * 12163.2  *682509.8  *142355.4  *
* Length Wtd. (ft)        *  443.52  * Wetted Per. (ft)        *  149.41  *  177.87  *  491.12  *
* Min Ch El (ft)          *  729.82  * Shear (lb/sq ft)        *    0.07  *    0.55  *    0.24  *
* Alpha                   *    2.96  * Stream Power (lb/ft s) *    0.07  *    3.42  *    0.26  *
* Frctn Loss (ft)         *    0.31  * Cum Volume (acre-ft)    *  157.75  * 4880.92  *   58.48  *
```

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* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   30.14  *  337.29  *   22.83  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.050  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  759.76  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  727.34  * 3017.05  * 4305.86  *
* E.G. Slope (ft/ft)     *0.000587  * Area (sq ft)           * 4108.42  * 3017.05  * 4305.86  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 1029.90  *19873.39  * 5416.71  *
* Top Width (ft)         * 1289.99  * Top Width (ft)         *  615.90  *  174.73  *  499.36  *
* Vel Total (ft/s)       *    3.27  * Avg. Vel. (ft/s)       *    1.42  *    6.59  *    1.26  *
* Max Chl Dpth (ft)      *   29.94  * Hydr. Depth (ft)       *    2.42  *   17.27  *    8.62  *
* Conv. Total (cfs)      *1086086.0  * Conv. (cfs)            * 42498.5  *820068.8  *223518.5  *
* Length Wtd. (ft)       *  443.28  * Wetted Per. (ft)       *  301.98  *  186.24  *  501.65  *
* Min Ch El (ft)         *  729.82  * Shear (lb/sq ft)       *    0.09  *    0.59  *    0.31  *
* Alpha                  *    3.10  * Stream Power (lb/ft s) *    0.13  *    3.91  *    0.40  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *  250.94  * 6041.42  *  226.07  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   44.60  *  363.31  *   83.32  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  762.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.053  *   0.035  *   0.120  *
* W.S. Elev (ft)         *  762.38  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1638.86  * 3481.00  * 5652.83  *
* E.G. Slope (ft/ft)     *0.000512  * Area (sq ft)           * 5875.52  * 3481.00  * 5652.83  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 2943.79  *23371.02  * 7685.19  *
* Top Width (ft)         * 1412.30  * Top Width (ft)         *  708.60  *  176.94  *  526.76  *
* Vel Total (ft/s)       *    3.16  * Avg. Vel. (ft/s)       *    1.80  *    6.71  *    1.36  *
* Max Chl Dpth (ft)      *   32.56  * Hydr. Depth (ft)       *    4.40  *   19.67  *   10.73  *
* Conv. Total (cfs)      *1502043.0  * Conv. (cfs)            *130050.1  *1032479.0  *339514.1  *
* Length Wtd. (ft)       *  443.55  * Wetted Per. (ft)       *  374.50  *  188.51  *  529.17  *
* Min Ch El (ft)         *  729.82  * Shear (lb/sq ft)       *    0.14  *    0.59  *    0.34  *
* Alpha                  *    3.18  * Stream Power (lb/ft s) *    0.25  *    3.97  *    0.46  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *  409.46  * 7223.29  *  585.46  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   71.13  *  384.29  *  144.61  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  766.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.055  *   0.035  *   0.119  *
* W.S. Elev (ft)         *  766.41  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3319.53  * 4193.15  * 8060.39  *
* E.G. Slope (ft/ft)     *0.000360  * Area (sq ft)           * 8971.11  * 4193.15  * 8060.39  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 6725.64  *26700.30  *11074.06  *
* Top Width (ft)         * 1656.19  * Top Width (ft)         *  810.71  *  176.94  *  668.54  *
* Vel Total (ft/s)       *    2.86  * Avg. Vel. (ft/s)       *    2.03  *    6.37  *    1.37  *
* Max Chl Dpth (ft)      *   36.59  * Hydr. Depth (ft)       *    7.57  *   23.70  *   12.06  *
* Conv. Total (cfs)      *2346678.0  * Conv. (cfs)            *354672.2  *1408023.0  *583983.0  *
* Length Wtd. (ft)       *  443.79  * Wetted Per. (ft)       *  440.43  *  188.51  *  671.05  *
* Min Ch El (ft)         *  729.82  * Shear (lb/sq ft)       *    0.17  *    0.50  *    0.27  *
* Alpha                  *    3.11  * Stream Power (lb/ft s) *    0.34  *    3.18  *    0.37  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 1033.52  * 9166.74  * 1875.86  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  256.54  *  409.28  *  441.54  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  769.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.056  *   0.035  *   0.118  *
* W.S. Elev (ft)         *  769.16  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4537.85  * 4679.09  *10025.95  *
* E.G. Slope (ft/ft)     *0.000307  * Area (sq ft)           *11447.46  * 4679.09  *10025.95  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *10108.23  *29604.86  *13976.91  *
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* Top Width (ft)          * 1945.63  * Top Width (ft)          *  973.99  *  176.94  *  794.70  *
* Vel Total (ft/s)        *    2.79  * Avg. Vel. (ft/s)        *    2.23  *    6.33  *    1.39  *
* Max Chl Dpth (ft)       *   39.34  * Hydr. Depth (ft)        *   10.16  *   26.44  *   12.62  *
* Conv. Total (cfs)       *3065547.0  * Conv. (cfs)            *577151.4  *1690354.0  *798041.8  *
* Length Wtd. (ft)        *  443.91  * Wetted Per. (ft)        *  449.28  *  188.51  *  797.33  *
* Min Ch El (ft)          *  729.82  * Shear (lb/sq ft)        *    0.19  *    0.48  *    0.24  *
* Alpha                   *    3.02  * Stream Power (lb/ft s) *    0.43  *    3.01  *    0.34  *
* Frctn Loss (ft)         *    0.13  * Cum Volume (acre-ft)    * 1922.32  *10264.82  * 3315.60  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  411.14  *  415.13  *  707.17  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  771.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.36  * Wt. n-Val.              *   0.056  *   0.035  *   0.117  *
* W.S. Elev (ft)          *  771.13  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 5424.21  * 5028.79  *11694.85  *
* E.G. Slope (ft/ft)      *0.000287  * Area (sq ft)           *13392.27  * 5028.79  *11694.85  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             *12965.40  *32310.12  *16724.48  *
* Top Width (ft)          * 2054.30  * Top Width (ft)         *  996.43  *  176.94  *  880.93  *
* Vel Total (ft/s)        *    2.80  * Avg. Vel. (ft/s)        *    2.39  *    6.43  *    1.43  *
* Max Chl Dpth (ft)       *   41.31  * Hydr. Depth (ft)        *   12.04  *   28.42  *   13.28  *
* Conv. Total (cfs)       *3657641.0  * Conv. (cfs)            *764883.6  *1906110.0  *986647.1  *
* Length Wtd. (ft)        *  443.89  * Wetted Per. (ft)        *  453.62  *  188.51  *  883.59  *
* Min Ch El (ft)          *  729.82  * Shear (lb/sq ft)        *    0.21  *    0.48  *    0.24  *
* Alpha                   *    2.97  * Stream Power (lb/ft s) *    0.51  *    3.07  *    0.34  *
* Frctn Loss (ft)         *    0.13  * Cum Volume (acre-ft)    * 2643.23  *10920.07  * 4626.22  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  492.77  *  416.28  *  994.23  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  773.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.37  * Wt. n-Val.              *   0.057  *   0.035  *   0.115  *
* W.S. Elev (ft)          *  773.60  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 6544.02  * 5466.44  *13987.72  *
* E.G. Slope (ft/ft)      *0.000276  * Area (sq ft)           *15926.07  * 5466.44  *13987.72  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *17115.38  *36391.72  *21212.90  *
* Top Width (ft)          * 2192.78  * Top Width (ft)         * 1053.56  *  176.94  *  962.28  *
* Vel Total (ft/s)        *    2.87  * Avg. Vel. (ft/s)        *    2.62  *    6.66  *    1.52  *
* Max Chl Dpth (ft)       *   43.78  * Hydr. Depth (ft)        *   14.39  *   30.89  *   14.54  *
* Conv. Total (cfs)       *4497636.0  * Conv. (cfs)            *1030230.0  *2190534.0  *1276873.0  *
* Length Wtd. (ft)        *  444.12  * Wetted Per. (ft)        *  458.71  *  188.51  *  964.98  *
* Min Ch El (ft)          *  729.82  * Shear (lb/sq ft)        *    0.25  *    0.50  *    0.25  *
* Alpha                   *    2.88  * Stream Power (lb/ft s) *    0.64  *    3.33  *    0.38  *
* Frctn Loss (ft)         *    0.12  * Cum Volume (acre-ft)    * 4099.58  *11996.32  * 7495.88  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  622.45  *  418.21  * 1297.02  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  764.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.47  * Wt. n-Val.              *   0.054  *   0.035  *   0.120  *
* W.S. Elev (ft)          *  763.80  * Reach Len. (ft)        *  461.36  *  447.64  *  387.89  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 2204.66  * 3731.67  * 6423.62  *
* E.G. Slope (ft/ft)      *0.000464  * Area (sq ft)           * 6924.52  * 3731.67  * 6423.62  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             * 4080.82  *24972.99  * 8946.18  *
* Top Width (ft)          * 1519.14  * Top Width (ft)         *  762.11  *  176.94  *  580.10  *
* Vel Total (ft/s)        *    3.07  * Avg. Vel. (ft/s)        *    1.85  *    6.69  *    1.39  *
* Max Chl Dpth (ft)       *   33.98  * Hydr. Depth (ft)        *    5.30  *   21.09  *   11.07  *
* Conv. Total (cfs)       *1764120.0  * Conv. (cfs)            *189449.0  *1159351.0  *415319.3  *
* Length Wtd. (ft)        *  443.61  * Wetted Per. (ft)        *  418.00  *  188.51  *  582.55  *
* Min Ch El (ft)          *  729.82  * Shear (lb/sq ft)        *    0.15  *    0.57  *    0.32  *
* Alpha                   *    3.20  * Stream Power (lb/ft s) *    0.28  *    3.84  *    0.44  *
* Frctn Loss (ft)         *    0.20  * Cum Volume (acre-ft)    *  530.99  * 7858.94  *  859.80  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  103.18  *  393.56  *  193.47  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.484

INPUT
Description: Tributary inffective on left.
Station Elevation Data num= 190

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	834.88	7.36	834.66	21.34	826.58	23.77	825.34	27.05	823.42
30.48	821.66	46.66	812.77	52.42	809.37	71.53	807.31	95.89	804.05
98.2	803.45	104.61	801.68	106.39	800.52	108.93	798.79	109.38	798.71
109.59	798.1	113.59	796.68	115.37	793.23	117.22	791.41	128.82	786.5
134.72	780.3	137.07	779.18	147.55	773.58	147.91	773.62	155.95	773.82
164.68	770.1	168.64	768.91	175.99	768.88	182.42	766.59	184.55	765.64
195.56	766.3	206.31	766.63	209.6	767.94	223.08	772.28	239.62	773.5
240.28	773.54	245.98	773.54	254.84	771.64	261.04	768.18	273.28	761.75
283.07	756.81	286.16	754.83	312.97	750.26	315	749.84	315.48	749.7
323.91	744.06	328.88	742.54	329.67	742.35	330.36	741.93	334.74	740.8
341.26	739.27	342.23	739.1	350.36	739.21	350.68	739.21	351.59	739.37
358.89	740.2	365.83	739.96	372.05	739.59	374.72	738.94	399.46	739.21
404.36	739.1	419.66	739.25	425.06	739.5	430.59	740	444.48	740.63
447.62	740.82	448.85	740.92	450.06	741.69	462.29	748.88	482.01	750.27
482.88	750.31	522.19	758.87	523.38	759.11	582.32	769.23	675.95	770.99
692.64	771.82	745.44	771.82	816.61	770.89	841.47	770.22	926.34	769.04
955.88	768.04	961.63	767.95	962.96	767.63	982.27	764.03	986.35	763.99
1012.71	762.86	1016.08	763.69	1042.1	763.72	1057.15	762.53	1063.85	760.22
1082.38	753.35	1118.11	753.7	1245.86	754.42	1327.73	754.13	1384.43	754.68
1566.08	753.49	1642.33	753.16	1674.59	752.71	1678.97	752.99	1683.71	753.41
1685.08	753.65	1685.35	753.69	1689.47	753.72	1690.4	753.62	1701	752.25
1702.48	751.99	1703.37	751.91	1720.37	750.68	1722.42	750.53	1731.17	748.85
1731.99	748.6	1735.47	748.32	1746.24	747.11	1756.07	744.74	1764.9	741.99
1769.21	739.44	1770.81	737.07	1778	730.5	1794	729.57	1810	730.5
1817.15	738.49	1825.23	741.95	1827.48	743.12	1836.67	744.66	1838.05	745.21
1842.87	746.37	1853.15	749.13	1854.57	749.38	1863.16	751.48	1870.49	751.71
1874	751.82	1882.05	752.22	1891.43	753.74	1912.57	756.85	1926.64	760.73
1947.88	767	1961	771.29	1977.99	771.64	2030.04	771.64	2132.63	772.39
2343.75	772.52	2347.54	772.46	2362.31	772.48	2367.56	772.72	2383.54	772.7
2385.33	772.73	2390.32	772.62	2395.28	772.37	2400.63	772.36	2402.63	772.39
2404.35	772.36	2425.56	772.34	2443.78	772.97	2586.31	772.93	2592.74	773.04
2611.52	773.04	2619.1	772.92	2664.23	773.33	2668.65	773.43	2798.78	774.26
2823.51	774.85	2843.15	775.59	2869.28	776.17	2874.76	776.11	2875.52	776.12
2887.65	776.61	2894.58	777.19	2897.47	777.68	2903.49	778.98	2913.55	780.35
2945.95	786.39	2955.27	789.37	2974.19	796.78	2990.46	804.76	3004.73	811.26
3012.29	815.02	3027.99	821.18	3050.94	824.09	3053.37	824.48	3056.95	825.88
3090.7	840.21	3091.08	840.27	3101.4	843.53	3121.68	849.46	3123.85	849.78
3130.7	850.68	3143.32	852.65	3147.45	852.94	3158.03	854.09	3194.15	857.2

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	692.64	.07	1082.38	.05	1566.08	.1	1722.42	.035
1863.16	.1	2343.75	.075	2887.65	.15				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1722.42	1863.16	554.52	817.42	512.91	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	700	770	T

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	754.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.	0.100	0.035	0.100
W.S. Elev (ft)	753.44	Reach Len. (ft)	554.52	817.42	512.91
Crit W.S. (ft)		Flow Area (sq ft)	80.64	1741.50	35.45
E.G. Slope (ft/ft)	0.001220	Area (sq ft)	2093.07	1741.50	35.45
Q Total (cfs)	13200.00	Flow (cfs)	43.57	13134.12	22.32
Top Width (ft)	516.68	Top Width (ft)	349.51	140.74	26.42
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)	0.54	7.54	0.63
Max Chl Dpth (ft)	23.87	Hydr. Depth (ft)	0.55	12.37	1.34
Conv. Total (cfs)	377880.4	Conv. (cfs)	1247.3	375994.3	638.8
Length Wtd. (ft)	815.48	Wetted Per. (ft)	146.77	151.86	26.54
Min Ch El (ft)	729.57	Shear (lb/sq ft)	0.04	0.87	0.10

```
* Alpha                  *    1.12  * Stream Power (lb/ft s) *    0.02  *    6.59  *    0.06  *
* Frctn Loss (ft)        *    0.97  * Cum Volume (acre-ft)   *   51.86  * 3509.42  *    7.71  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   10.42  *  300.49  *    3.38  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  757.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.061  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  757.07  * Reach Len. (ft)        *  554.52  *  817.42  *  512.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2098.29  * 2252.41  *  175.42  *
* E.G. Slope (ft/ft)     *0.000850  * Area (sq ft)           * 4905.55  * 2252.41  *  175.42  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             * 3299.07  *16826.90  *  174.03  *
* Top Width (ft)         * 1072.40  * Top Width (ft)         *  881.45  *  140.74  *   50.21  *
* Vel Total (ft/s)       *    4.49  * Avg. Vel. (ft/s)       *    1.57  *    7.47  *    0.99  *
* Max Chl Dpth (ft)      *   27.50  * Hydr. Depth (ft)       *    3.23  *   16.00  *    3.49  *
* Conv. Total (cfs)      *696430.4  * Conv. (cfs)            *113180.9  *577279.1  *  5970.5  *
* Length Wtd. (ft)       *  787.45  * Wetted Per. (ft)       *  650.98  *  151.86  *   50.61  *
* Min Ch El (ft)         *  729.57  * Shear (lb/sq ft)       *    0.17  *    0.79  *    0.18  *
* Alpha                  *    2.32  * Stream Power (lb/ft s) *    0.27  *    5.88  *    0.18  *
* Frctn Loss (ft)        *    0.82  * Cum Volume (acre-ft)   *  115.83  * 4855.72  *   43.20  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   23.14  *  335.72  *   20.43  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  759.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.059  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  759.40  * Reach Len. (ft)        *  554.52  *  817.42  *  512.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3617.94  * 2579.83  *  302.05  *
* E.G. Slope (ft/ft)     *0.000663  * Area (sq ft)           * 6981.35  * 2579.83  *  302.05  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 7338.58  *18639.48  *  341.94  *
* Top Width (ft)         * 1102.85  * Top Width (ft)         *  903.46  *  140.74  *   58.65  *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *    2.03  *    7.23  *    1.13  *
* Max Chl Dpth (ft)      *   29.83  * Hydr. Depth (ft)       *    5.51  *   18.33  *    5.15  *
* Conv. Total (cfs)      *1022062.0  * Conv. (cfs)           *284972.6  *723811.1  * 13278.3  *
* Length Wtd. (ft)       *  767.15  * Wetted Per. (ft)       *  657.67  *  151.86  *   59.36  *
* Min Ch El (ft)         *  729.57  * Shear (lb/sq ft)       *    0.23  *    0.70  *    0.21  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.46  *    5.08  *    0.24  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   *  192.21  * 6012.66  *  205.56  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *   36.56  *  361.69  *   80.84  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  762.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.059  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  762.16  * Reach Len. (ft)        *  554.52  *  817.42  *  512.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5441.10  * 2968.48  *  477.58  *
* E.G. Slope (ft/ft)     *0.000510  * Area (sq ft)           * 9516.66  * 2968.48  *  477.58  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *12758.95  *20661.10  *  579.95  *
* Top Width (ft)         * 1141.89  * Top Width (ft)         *  932.83  *  140.74  *   68.32  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    2.34  *    6.96  *    1.21  *
* Max Chl Dpth (ft)      *   32.59  * Hydr. Depth (ft)       *    8.19  *   21.09  *    6.99  *
* Conv. Total (cfs)      *1504952.0  * Conv. (cfs)           *564753.0  *914528.0  * 25670.6  *
* Length Wtd. (ft)       *  748.79  * Wetted Per. (ft)       *  665.99  *  151.86  *   69.42  *
* Min Ch El (ft)         *  729.57  * Shear (lb/sq ft)       *    0.26  *    0.62  *    0.22  *
* Alpha                  *    2.15  * Stream Power (lb/ft s) *    0.61  *    4.34  *    0.27  *
* Frctn Loss (ft)        *    0.61  * Cum Volume (acre-ft)   *  327.95  * 7190.15  *  558.17  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *   62.44  *  382.66  *  141.96  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
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         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.058  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.27  * Reach Len. (ft)        *  554.52  *  817.42  *  512.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 8396.42  * 3546.83  *  786.94  *
* E.G. Slope (ft/ft)     *0.000343  * Area (sq ft)           *13644.88  * 3546.83  *  786.94  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *20751.03  *22786.08  *  962.89  *
* Top Width (ft)         * 1287.41  * Top Width (ft)         * 1064.43  *  140.74  *   82.24  *
* Vel Total (ft/s)       *    3.50  * Avg. Vel. (ft/s)       *    2.47  *    6.42  *    1.22  *
* Max Chl Dpth (ft)      *   36.70  * Hydr. Depth (ft)       *   11.16  *   25.20  *    9.57  *
* Conv. Total (cfs)      *2402880.0  * Conv. (cfs)            *1120500.0  *1230387.0  * 51993.4  *
* Length Wtd. (ft)       *  727.52  * Wetted Per. (ft)       *  754.39  *  151.86  *   83.93  *
* Min Ch El (ft)         *  729.57  * Shear (lb/sq ft)       *    0.24  *    0.50  *    0.20  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    0.59  *    3.21  *    0.25  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *  913.76  * 9126.97  * 1836.47  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *  246.61  *  407.64  *  438.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  769.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.058  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  769.03  * Reach Len. (ft)        *  554.52  *  817.42  *  512.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *10512.58  * 3935.81  * 1026.49  *
* E.G. Slope (ft/ft)     *0.000295  * Area (sq ft)           *16701.49  * 3935.81  * 1026.49  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *27251.84  *25139.70  * 1298.46  *
* Top Width (ft)         * 1393.93  * Top Width (ft)         * 1162.25  *  140.74  *   90.93  *
* Vel Total (ft/s)       *    3.47  * Avg. Vel. (ft/s)       *    2.59  *    6.39  *    1.26  *
* Max Chl Dpth (ft)      *   39.46  * Hydr. Depth (ft)       *   13.21  *   27.97  *   11.29  *
* Conv. Total (cfs)      *3125339.0  * Conv. (cfs)            *1586352.0  *1463403.0  * 75584.3  *
* Length Wtd. (ft)       *  717.58  * Wetted Per. (ft)       *  798.26  *  151.86  *   93.05  *
* Min Ch El (ft)         *  729.57  * Shear (lb/sq ft)       *    0.24  *    0.48  *    0.20  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.63  *    3.05  *    0.26  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   * 1773.25  *10220.56  * 3266.39  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *  399.82  *  413.49  *  703.22  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  771.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.058  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  771.01  * Reach Len. (ft)        *  554.52  *  817.42  *  512.91  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *12647.69  * 4214.73  * 1212.71  *
* E.G. Slope (ft/ft)     *0.000281  * Area (sq ft)           *19237.29  * 4214.73  * 1212.71  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *32918.36  *27481.96  * 1599.69  *
* Top Width (ft)         * 1630.09  * Top Width (ft)         * 1392.35  *  140.74  *   97.00  *
* Vel Total (ft/s)       *    3.43  * Avg. Vel. (ft/s)       *    2.60  *    6.52  *    1.32  *
* Max Chl Dpth (ft)      *   41.44  * Hydr. Depth (ft)       *    9.08  *   29.95  *   12.50  *
* Conv. Total (cfs)      *3700559.0  * Conv. (cfs)            *1964779.0  *1640300.0  * 95479.7  *
* Length Wtd. (ft)       *  715.62  * Wetted Per. (ft)       * 1407.72  *  151.86  *   99.43  *
* Min Ch El (ft)         *  729.57  * Shear (lb/sq ft)       *    0.16  *    0.49  *    0.21  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.41  *    3.17  *    0.28  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   * 2470.44  *10872.57  * 4568.75  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         *  480.12  *  414.65  *  989.88  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	773.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.059	0.035	0.099
W.S. Elev (ft)	773.49	Reach Len. (ft)	554.52	817.42	512.91
Crit W.S. (ft)		Flow Area (sq ft)	16376.73	4563.40	2162.05
E.G. Slope (ft/ft)	0.000275	Area (sq ft)	22971.41	4563.40	2162.05
Q Total (cfs)	74720.00	Flow (cfs)	42414.57	31032.91	1272.53
Top Width (ft)	2514.81	Top Width (ft)	1558.99	140.74	815.08
Vel Total (ft/s)	3.23	Avg. Vel. (ft/s)	2.59	6.80	0.59
Max Chl Dpth (ft)	43.92	Hydr. Depth (ft)	10.50	32.42	2.65
Conv. Total (cfs)	4508886.0	Conv. (cfs)	2559455.0	1872643.0	76789.0
Length Wtd. (ft)	705.66	Wetted Per. (ft)	1575.49	151.86	817.59
Min Ch El (ft)	729.57	Shear (lb/sq ft)	0.18	0.52	0.05
Alpha	2.20	Stream Power (lb/ft s)	0.46	3.50	0.03
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	3893.59	11944.78	7423.97
C & E Loss (ft)	0.23	Cum SA (acres)	608.61	416.57	1289.10

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	764.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.058	0.035	0.100
W.S. Elev (ft)	763.61	Reach Len. (ft)	554.52	817.42	512.91
Crit W.S. (ft)		Flow Area (sq ft)	6423.96	3173.23	580.56
E.G. Slope (ft/ft)	0.000447	Area (sq ft)	10898.51	3173.23	580.56
Q Total (cfs)	38000.00	Flow (cfs)	15669.61	21613.68	716.71
Top Width (ft)	1193.48	Top Width (ft)	979.49	140.74	73.25
Vel Total (ft/s)	3.73	Avg. Vel. (ft/s)	2.44	6.81	1.23
Max Chl Dpth (ft)	34.04	Hydr. Depth (ft)	9.18	22.55	7.93
Conv. Total (cfs)	1796933.0	Conv. (cfs)	740979.9	1022061.0	33891.6
Length Wtd. (ft)	741.20	Wetted Per. (ft)	701.62	151.86	74.56
Min Ch El (ft)	729.57	Shear (lb/sq ft)	0.26	0.58	0.22
Alpha	2.07	Stream Power (lb/ft s)	0.62	3.97	0.27
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	436.61	7823.46	828.61
C & E Loss (ft)	0.16	Cum SA (acres)	93.96	391.93	190.56

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.387

INPUT
Description: Tributary ineffective on Left
Station Elevation Data num= 248

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	812.38	4.1	810.27	8.92	808.7	23.4	805.99	29.03	805.31
35.88	803.82	38.93	803.33	52.37	802.78	67.26	801.08	74.71	800.38
83.03	799.19	98.01	797.35	134.36	794.46	180.9	790.39	224.02	787.64
253.93	786.81	283.65	786.81	317.18	787.06	319.19	787.16	321.75	787.39
325.57	787.31	382.22	787.87	385.11	787.44	400.84	784.76	536.99	784.76
540.7	785.41	544.6	786.25	557.87	785.4	586.12	775.56	599	776.76
606.7	776.89	612.51	775.44	646.25	774.49	659.66	772.87	668.04	773.43
679.32	774.52	685.05	774.52	702.88	772.04	703.54	771.96	729.77	771.55
740.68	770.3	743.58	770.02	759.07	771.24	766.91	771.99	788.16	771.39
788.84	771.38	791.25	771.23	856.56	769.29	871.38	768.56	873.63	768.54
885.82	767.98	893.37	767.87	906.66	763.1	907.42	762.25	922.44	752.01
931.58	746.27	936.55	743.37	938.31	742.6	946.2	740.73	955.67	738.66

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  962.72  739.07  974.12  741.13  997.94  742.91  1006.2  744.42 1010.33  744.78
 1021.76  744.72 1035.19  744.93 1056.71  749.61 1072.21  752.12 1077.49  752.89
 1088.58  754.11 1107.51  756.89  1124.8  758.84 1159.43  761.26 1163.82  761.73
 1169.66  762.69 1181.12  764.05 1184.15  764.16 1184.81  764.11 1187.56  764.12
 1190.53  764.45 1204.77  765.39 1229.34  765.38 1232.24  765.02 1235.47  764.69
 1240.04  763.77 1248.42  761.94 1263.81  761.77 1288.02  761.07  1288.3  761.08
 1292.93  760.95 1322.17  760.58 1348.49  759.63 1365.34  758.55 1370.11  758.31
 1383.15  757.33 1405.59  754.82 1406.53  754.67 1446.76  752.41  1454.4  752.47
 1458.51  752.44 1470.56  750.07 1483.03  747.56 1491.28  738.17 1492.75  736.91
    1500   730.1    1530   729.1    1541   730.1 1549.25  737.08 1553.61  738.69
 1555.24  739.04 1556.15  739.19 1557.22  739.54 1565.89   742.1 1566.29  742.23
 1572.35  747.55 1574.71  748.51 1576.84  748.61 1583.78  749.34 1586.03  749.52
 1603.33  750.89 1651.91  751.16 1685.07     752 1693.68  752.37 1721.89  753.02
 1730.01  754.86 1731.88  756.03  1750.9  766.48 1751.82  766.93 1752.26  767.01
 1759.58  767.22 1761.59  767.37 1770.08  767.31 1770.42   767.3 1805.49  767.16
 1809.03  767.41 1809.29  767.36 1833.91  767.77 1839.39  767.57  1869.9  767.66
 1872.14  767.77  1913.3  767.72 1919.65  768.23 1933.36  768.16  1938.1  767.88
 1940.93   768.1 1945.59  768.88  1968.3  768.77 1980.75  768.53 1982.51  768.54
 1988.39  768.36 1994.68  768.29 1996.71  768.37  2014.3  768.41 2021.94   768.8
 2070.46  770.08 2072.55  770.16 2090.77  770.46 2091.33  770.45 2128.03  771.21
 2152.17  771.58 2195.24  771.68 2202.13  771.88 2241.54  771.86 2245.37  771.93
 2246.86  771.93 2268.78  771.61 2273.77  771.61 2274.95  771.45 2276.98  771.32
 2339.81  771.28 2345.98  771.57 2360.22  771.45 2362.35   771.4 2376.77  771.67
 2444.11  771.73 2464.22  771.93 2469.94  771.33 2471.83  771.34  2476.6  771.28
 2562.36  771.83 2566.32  771.96 2582.08   771.9 2588.78  771.36 2645.73  771.41
 2651.49  771.17 2656.29  771.17 2661.26  770.96 2672.86  770.16 2677.81  769.95
 2685.36  769.43 2689.79  769.26 2693.99   769.3 2701.52  769.12 2726.06  769.11
  2727.4  769.19 2729.13  769.34 2737.03   769.9 2742.61  770.89 2748.23  771.36
 2770.62  771.97 2771.85  772.16 2809.54  772.23 2823.47  772.43 2879.08  771.87
 2967.78  771.83 3130.94  772.77 3136.73  772.94 3207.38  773.32 3227.35  774.34
 3233.24   774.9 3265.06  776.18 3277.89  776.88 3287.35  776.98 3296.69  778.96
 3313.05  780.32 3329.88  783.45 3333.76  784.24 3352.89  792.46 3364.56  796.03
 3370.54   796.8 3372.59  797.41 3379.56  799.82 3392.28   803.6 3396.61  805.43
  3409.2  809.57 3423.16  813.47 3429.82  815.49 3450.72  820.02 3466.78  823.93
  3466.9  823.91 3468.39  824.01 3468.51  824.03 3469.87   824.2 3470.49  824.26
 3474.27  824.71 3476.62  825.19 3478.31  825.42    3488   825.3 3488.99  825.22
  3496.6  825.18 3507.01  825.37 3509.07  825.52  3532.8  831.47 3534.88  831.72
  3549.7  831.72 3553.63  831.86 3557.73  831.82

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  766.91      .1 1458.51    .035 1574.71      .1 2128.03    .075
 3130.94     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      1458.51 1574.71           704.92  992.81  517.79             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1205     765       T

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  753.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *          *   0.035  *   0.100  *
* W.S. Elev (ft)         *  752.38  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1655.07  *  169.76  *
* E.G. Slope (ft/ft)     *0.001160  * Area (sq ft)           * 1196.62  * 1655.07  *  169.76  *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13091.38  *  108.63  *
* Top Width (ft)         *  387.25  * Top Width (ft)          *  152.07  *  115.88  *  119.29  *
* Vel Total (ft/s)       *    7.23  * Avg. Vel. (ft/s)        *          *    7.91  *    0.64  *
* Max Chl Dpth (ft)      *   23.28  * Hydr. Depth (ft)        *          *   14.28  *    1.42  *
* Conv. Total (cfs)      *387558.4  * Conv. (cfs)             *          *384369.1  *  3189.3  *
* Length Wtd. (ft)       *  990.53  * Wetted Per. (ft)        *          *  129.36  *  119.41  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)        *          *    0.93  *    0.10  *
* Alpha                  *    1.19  * Stream Power (lb/ft s)  *          *    7.33  *    0.07  *
* Frctn Loss (ft)        *    1.46  * Cum Volume (acre-ft)    *   30.92  * 3477.56  *    6.50  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *    7.23  *  298.09  *    2.52  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
```

```
* E.G. Elev (ft)         *  756.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.34  * Wt. n-Val.             *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  755.58  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  122.03  * 2026.73  *  645.25  *
* E.G. Slope (ft/ft)     *0.001289  * Area (sq ft)           * 1853.24  * 2026.73  *  645.25  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *  104.75  *19311.88  *  883.37  *
* Top Width (ft)         *  513.67  * Top Width (ft)         *  241.03  *  116.20  *  156.44  *
* Vel Total (ft/s)       *    7.27  * Avg. Vel. (ft/s)       *    0.86  *    9.53  *    1.37  *
* Max Chl Dpth (ft)      *   26.48  * Hydr. Depth (ft)       *    2.04  *   17.44  *    4.12  *
* Conv. Total (cfs)      *565360.4  * Conv. (cfs)            *  2917.3  *537841.1  * 24602.0  *
* Length Wtd. (ft)       *  972.52  * Wetted Per. (ft)       *   59.80  *  129.69  *  156.98  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.16  *    1.26  *    0.33  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    0.14  *   11.99  *    0.45  *
* Frctn Loss (ft)        *    1.52  * Cum Volume (acre-ft)   *   72.81  * 4815.57  *   38.37  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   16.00  *  333.30  *   19.21  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.67  * Wt. n-Val.             *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  757.49  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  252.65  * 2249.08  *  947.78  *
* E.G. Slope (ft/ft)     *0.001439  * Area (sq ft)           * 2346.42  * 2249.08  *  947.78  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  312.52  *24265.02  * 1742.46  *
* Top Width (ft)         *  551.93  * Top Width (ft)         *  275.90  *  116.20  *  159.83  *
* Vel Total (ft/s)       *    7.63  * Avg. Vel. (ft/s)       *    1.24  *   10.79  *    1.84  *
* Max Chl Dpth (ft)      *   28.39  * Hydr. Depth (ft)       *    3.26  *   19.36  *    5.93  *
* Conv. Total (cfs)      *693921.1  * Conv. (cfs)            *  8239.5  *639742.0  * 45939.7  *
* Length Wtd. (ft)       *  958.97  * Wetted Per. (ft)       *   77.70  *  129.69  *  160.87  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.29  *    1.56  *    0.53  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.36  *   16.80  *    0.97  *
* Frctn Loss (ft)        *    1.60  * Cum Volume (acre-ft)   *  132.84  * 5967.35  *  198.20  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   29.05  *  359.28  *   79.55  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  761.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.96  * Wt. n-Val.             *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  759.93  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  486.09  * 2532.30  * 1342.73  *
* E.G. Slope (ft/ft)     *0.001498  * Area (sq ft)           * 3097.38  * 2532.30  * 1342.73  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  716.17  *30171.41  * 3112.42  *
* Top Width (ft)         *  628.23  * Top Width (ft)         *  347.77  *  116.20  *  164.26  *
* Vel Total (ft/s)       *    7.80  * Avg. Vel. (ft/s)       *    1.47  *   11.91  *    2.32  *
* Max Chl Dpth (ft)      *   30.83  * Hydr. Depth (ft)       *    4.11  *   21.79  *    8.17  *
* Conv. Total (cfs)      *878491.2  * Conv. (cfs)            * 18504.5  *779568.2  * 80418.5  *
* Length Wtd. (ft)       *  942.03  * Wetted Per. (ft)       *  118.54  *  129.69  *  165.93  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.38  *    1.83  *    0.76  *
* Alpha                  *    2.08  * Stream Power (lb/ft s) *    0.56  *   21.76  *    1.75  *
* Frctn Loss (ft)        *    1.50  * Cum Volume (acre-ft)   *  247.66  * 7138.53  *  547.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   54.28  *  380.25  *  140.59  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  766.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.92  * Wt. n-Val.             *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  764.14  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1279.71  * 3021.33  * 2050.15  *
* E.G. Slope (ft/ft)     *0.001238  * Area (sq ft)           * 4969.28  * 3021.33  * 2050.15  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 2158.07  *36807.21  * 5534.72  *
* Top Width (ft)         *  791.32  * Top Width (ft)         *  503.20  *  116.20  *  171.92  *
```

```
* Vel Total (ft/s)       *    7.01  * Avg. Vel. (ft/s)       *    1.69  *   12.18  *    2.70  *
* Max Chl Dpth (ft)      *   35.04  * Hydr. Depth (ft)       *    5.81  *   26.00  *   11.92  *
* Conv. Total (cfs)      *1264985.0  * Conv. (cfs)            * 61346.6  *1046305.0  *157333.4  *
* Length Wtd. (ft)       *  919.10  * Wetted Per. (ft)       *  220.84  *  129.69  *  174.67  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.45  *    1.80  *    0.91  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *    0.75  *   21.93  *    2.45  *
* Frctn Loss (ft)        *    1.12  * Cum Volume (acre-ft)   *  795.28  * 9065.34  * 1819.76  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  236.64  *  405.23  *  436.70  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  768.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.08  * Wt. n-Val.             *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.75  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2432.90  * 3324.90  * 2505.53  *
* E.G. Slope (ft/ft)     *0.001219  * Area (sq ft)           * 6379.55  * 3324.90  * 2505.53  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 3314.75  *42856.83  * 7518.42  *
* Top Width (ft)         *  854.95  * Top Width (ft)         *  562.01  *  116.20  *  176.74  *
* Vel Total (ft/s)       *    6.50  * Avg. Vel. (ft/s)       *    1.36  *   12.89  *    3.00  *
* Max Chl Dpth (ft)      *   37.65  * Hydr. Depth (ft)       *    4.33  *   28.61  *   14.18  *
* Conv. Total (cfs)      *1537568.0  * Conv. (cfs)            * 94927.5  *1227329.0  *215311.6  *
* Length Wtd. (ft)       *  907.21  * Wetted Per. (ft)       *  571.76  *  129.69  *  180.15  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.32  *    1.95  *    1.06  *
* Alpha                  *    3.17  * Stream Power (lb/ft s) *    0.44  *   25.16  *    3.18  *
* Frctn Loss (ft)        *    1.05  * Cum Volume (acre-ft)   * 1626.34  *10152.43  * 3245.60  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  388.85  *  411.08  *  701.65  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  770.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.54  * Wt. n-Val.             *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  768.22  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3261.81  * 3495.73  * 2883.84  *
* E.G. Slope (ft/ft)     *0.001393  * Area (sq ft)           * 7211.43  * 3495.73  * 2883.84  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 5669.41  *49792.71  * 6537.88  *
* Top Width (ft)         * 1058.49  * Top Width (ft)         *  577.87  *  116.20  *  364.42  *
* Vel Total (ft/s)       *    6.43  * Avg. Vel. (ft/s)       *    1.74  *   14.24  *    2.27  *
* Max Chl Dpth (ft)      *   39.12  * Hydr. Depth (ft)       *    5.64  *   30.08  *    7.91  *
* Conv. Total (cfs)      *1661312.0  * Conv. (cfs)            *151913.8  *1334214.0  *175184.9  *
* Length Wtd. (ft)       *  907.98  * Wetted Per. (ft)       *  587.82  *  129.69  *  367.96  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.48  *    2.34  *    0.68  *
* Alpha                  *    3.96  * Stream Power (lb/ft s) *    0.84  *   33.38  *    1.54  *
* Frctn Loss (ft)        *    1.14  * Cum Volume (acre-ft)   * 2302.09  *10800.23  * 4544.63  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *  467.58  *  412.24  *  987.16  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  773.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.64  * Wt. n-Val.             *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  770.61  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4722.64  * 3773.69  * 4071.43  *
* E.G. Slope (ft/ft)     *0.001386  * Area (sq ft)           * 8672.26  * 3773.69  * 4071.43  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 9725.64  *56433.63  * 8560.73  *
* Top Width (ft)         * 1374.73  * Top Width (ft)         *  659.49  *  116.20  *  599.05  *
* Vel Total (ft/s)       *    5.95  * Avg. Vel. (ft/s)       *    2.06  *   14.95  *    2.10  *
* Max Chl Dpth (ft)      *   41.51  * Hydr. Depth (ft)       *    7.16  *   32.48  *    6.80  *
* Conv. Total (cfs)      *2006804.0  * Conv. (cfs)            *261207.9  *1515675.0  *229921.2  *
* Length Wtd. (ft)       *  896.09  * Wetted Per. (ft)       *  669.54  *  129.69  *  602.82  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.61  *    2.52  *    0.58  *
* Alpha                  *    4.81  * Stream Power (lb/ft s) *    1.26  *   37.66  *    1.23  *
```

```
* Frctn Loss (ft)        *    1.15  * Cum Volume (acre-ft)   * 3692.18  *11866.56  * 7387.27  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *  594.49  *  414.16  * 1280.78  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  763.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.06  * Wt. n-Val.              *   0.100  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  761.30  * Reach Len. (ft)        *  704.92  *  992.81  *  517.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  684.44  * 2691.28  * 1569.18  *
* E.G. Slope (ft/ft)     *0.001471  * Area (sq ft)           * 3624.53  * 2691.28  * 1569.18  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  955.22  *33090.89  * 3953.89  *
* Top Width (ft)         *  712.16  * Top Width (ft)         *  429.21  *  116.20  *  166.75  *
* Vel Total (ft/s)       *    7.68  * Avg. Vel. (ft/s)       *    1.40  *   12.30  *    2.52  *
* Max Chl Dpth (ft)      *   32.20  * Hydr. Depth (ft)       *    3.84  *   23.16  *    9.41  *
* Conv. Total (cfs)      *990837.3  * Conv. (cfs)            * 24907.1  *862833.9  *103096.3  *
* Length Wtd. (ft)       *  934.53  * Wetted Per. (ft)       *  178.59  *  129.69  *  168.77  *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)       *    0.35  *    1.91  *    0.85  *
* Alpha                  *    2.24  * Stream Power (lb/ft s) *    0.49  *   23.43  *    2.15  *
* Frctn Loss (ft)        *    1.42  * Cum Volume (acre-ft)   *  344.17  * 7768.43  *  815.95  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   84.99  *  389.52  *  189.14  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.287

INPUT
Description:
Station Elevation Data    num=     190
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  837.52    6.57  837.34   31.56   835.2   34.79   835.1   62.08  832.61
   71.74  831.41   91.12  824.63   97.91  820.61  109.64   811.5  123.41  811.63
  137.96  804.46   143.8  802.64  152.05  797.51  158.14  790.63  160.78  791.62
  167.98  791.11  177.32  778.47  182.63  778.46  187.89  778.17  201.61  777.79
  211.74  777.16  212.15  777.12   221.6  775.95  233.77  776.62  238.57   777.5
   251.9  781.18  320.63  782.69  323.78  785.29  324.73  785.55  329.07  787.26
  332.08  784.54  332.32  784.65  332.47  784.75  338.41  786.36  340.75  786.62
  344.29  784.77  344.48  784.74  347.68   783.4   348.2  783.41   361.8  787.18
  365.19  784.45   366.6  784.26   369.1  783.44  422.26  784.62  457.71  784.71
  459.45  783.44  467.32  776.82   486.9   772.8   502.4  774.37  502.51  774.38
  508.89  775.04  515.63  775.04  526.46  774.07  541.85  769.02  542.54  769.01
  548.22  768.83  560.56  770.42  562.79  770.55  598.13  770.45  650.85  769.86
  660.77  770.05   725.1  770.34  824.05  770.23  871.42  770.46  890.16  769.13
  906.02  769.62  930.57  769.62  934.67  769.06   934.8  769.04  939.21  767.89
  945.36  769.05 1110.02  770.46 1139.27  769.53  1230.7  768.11 1249.13   767.7
    1258  767.25  1262.9  766.86 1319.11     765  1325.6  764.88 1329.82  764.69
 1359.89  763.96 1401.44  763.23 1407.23  762.82 1441.74  759.38 1451.02  758.72
 1456.58  758.45 1461.48  756.97 1486.71  751.85 1488.79  751.79 1505.76  750.89
  1526.7  750.04 1550.22   750.5 1577.33  750.11 1613.06  749.89  1613.2   749.9
 1648.51  750.39 1712.11  751.92 1759.39  750.63  1813.1  750.71 1821.85  750.03
  1847.6  748.81 1849.02   748.8 1854.16  748.73 1870.39  744.11 1873.89  743.49
 1886.24  741.79 1889.19  740.17 1894.02  736.91    1904   729.5    1918  728.53
    1933   729.5 1943.88  736.93 1961.83  748.86 1966.29  751.91 1970.05  753.03
 1980.06  754.97 1980.98  755.12 1982.48  755.24  1990.7  756.12 1995.77  759.99
 2006.24  766.62 2007.93  767.26 2020.18  768.74 2021.85  768.99 2022.61  769.14
 2027.25  769.65  2028.8  769.75 2032.17  769.97 2112.92   770.7 2203.14  770.66
 2213.78  770.84 2230.81  770.57 2265.96  770.85 2266.25  770.84 2267.02  770.86
 2318.59  771.45 2357.47  771.16  2380.5  769.64 2382.91  769.51 2404.48  768.81
 2429.04  768.82 2472.71  770.81 2544.85  771.94 2545.19  771.94 2545.59  771.95
 2580.13  771.68 2621.73  772.06 2643.71  771.94 2696.72  773.22 2777.24  774.47
 2826.08  775.72 2855.85  776.06 2948.08  777.58 2985.61  777.99 2995.33  778.25
 3027.24  780.17 3036.03  781.67 3044.63  784.58  3051.2  787.05 3067.14  790.38
```

```
 3074.25  792.72 3091.11  801.95 3092.46  802.58 3096.03  804.32 3102.63  807.12
 3107.79  809.52 3107.97  809.58  3120.4  811.05 3154.14  810.97 3161.43   808.4
 3162.63  808.12 3164.13  807.52 3165.02  807.09 3168.06  805.39  3173.5   802.2
 3180.73  799.88 3187.23  797.38 3189.02  796.79 3207.05  794.03 3207.33   793.9
 3220.01  789.38 3231.72  780.98 3236.72  782.31 3249.46  786.88  3252.4  789.71
 3254.23  792.65  3259.6  792.95  3291.1  794.32 3352.24  797.81 3366.75     799

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075 1110.02      .1 1401.44     .12 1854.16    .035 1966.29      .1
 2112.92    .075 2948.08     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1854.16 1966.29           603.34  557.57  557.54             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
*************************
     660     760     790

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  751.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.39  * Wt. n-Val.             *   0.120  *   0.035  *          *
* W.S. Elev (ft)         *  750.45  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   75.62  * 1389.01  *          *
* E.G. Slope (ft/ft)     *0.001929  * Area (sq ft)           *   75.62  * 1389.01  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *   30.24  *13169.76  *          *
* Top Width (ft)         *  275.57  * Top Width (ft)         *  165.58  *  109.99  *          *
* Vel Total (ft/s)       *    9.01  * Avg. Vel. (ft/s)       *    0.40  *    9.48  *          *
* Max Chl Dpth (ft)      *   21.92  * Hydr. Depth (ft)       *    0.46  *   12.63  *          *
* Conv. Total (cfs)      *300572.1  * Conv. (cfs)            *   688.6  *299883.6  *          *
* Length Wtd. (ft)       *  557.62  * Wetted Per. (ft)       *  165.64  *  121.12  *          *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.05  *    1.38  *          *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.02  *   13.09  *          *
* Frctn Loss (ft)        *    1.84  * Cum Volume (acre-ft)   *   20.62  * 3442.87  *    5.49  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *    4.66  *  295.51  *    1.81  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  755.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.73  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  753.64  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1138.07  * 1745.02  *    5.33  *
* E.G. Slope (ft/ft)     *0.001931  * Area (sq ft)           * 1138.07  * 1745.02  *    5.33  *
* Q Total (cfs)          *20300.00  * Flow (cfs)              * 1294.28  *19002.84  *    2.88  *
* Top Width (ft)         *  495.27  * Top Width (ft)         *  376.25  *  112.13  *    6.89  *
* Vel Total (ft/s)       *    7.03  * Avg. Vel. (ft/s)       *    1.14  *   10.89  *    0.54  *
* Max Chl Dpth (ft)      *   25.11  * Hydr. Depth (ft)       *    3.02  *   15.56  *    0.77  *
* Conv. Total (cfs)      *462018.3  * Conv. (cfs)            * 29457.2  *432495.7  *    65.4  *
* Length Wtd. (ft)       *  559.64  * Wetted Per. (ft)       *  376.58  *  123.71  *    7.11  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.36  *    1.70  *    0.09  *
* Alpha                  *    2.25  * Stream Power (lb/ft s) *    0.41  *   18.51  *    0.05  *
* Frctn Loss (ft)        *    1.55  * Cum Volume (acre-ft)   *   48.61  * 4772.58  *   34.50  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   11.00  *  330.70  *   18.24  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  757.53  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    1.95  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  755.58  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1877.58  * 1962.64  *   29.09  *
* E.G. Slope (ft/ft)     *0.001968  * Area (sq ft)           * 1877.58  * 1962.64  *   29.09  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             * 2959.02  *23336.14  *   24.84  *
* Top Width (ft)         *  517.29  * Top Width (ft)         *  385.82  *  112.13  *   19.34  *
* Vel Total (ft/s)       *    6.80  * Avg. Vel. (ft/s)       *    1.58  *   11.89  *    0.85  *
* Max Chl Dpth (ft)      *   27.05  * Hydr. Depth (ft)       *    4.87  *   17.50  *    1.50  *
* Conv. Total (cfs)      *593343.3  * Conv. (cfs)            * 66706.4  *526076.9  *   560.0  *
* Length Wtd. (ft)       *  563.73  * Wetted Per. (ft)       *  386.34  *  123.71  *   19.72  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.60  *    1.95  *    0.18  *
* Alpha                  *    2.72  * Stream Power (lb/ft s) *    0.94  *   23.17  *    0.15  *
* Frctn Loss (ft)        *    1.17  * Cum Volume (acre-ft)   *   98.66  * 5919.36  *  192.39  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   23.69  *  356.68  *   78.49  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.92  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  758.46  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3007.24  * 2285.54  *  101.58  *
* E.G. Slope (ft/ft)     *0.001699  * Area (sq ft)           * 3007.24  * 2285.54  *  101.58  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 5904.37  *27951.05  *  144.58  *
* Top Width (ft)         *  537.32  * Top Width (ft)         *  397.72  *  112.13  *   27.47  *
* Vel Total (ft/s)       *    6.30  * Avg. Vel. (ft/s)       *    1.96  *   12.23  *    1.42  *
* Max Chl Dpth (ft)      *   29.93  * Hydr. Depth (ft)       *    7.56  *   20.38  *    3.70  *
* Conv. Total (cfs)      *824849.9  * Conv. (cfs)            *143241.8  *678100.6  *  3507.5  *
* Length Wtd. (ft)       *  567.18  * Wetted Per. (ft)       *  398.60  *  123.71  *   28.67  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.80  *    1.96  *    0.38  *
* Alpha                  *    3.11  * Stream Power (lb/ft s) *    1.57  *   23.97  *    0.53  *
* Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   *  198.27  * 7083.63  *  538.87  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   48.25  *  377.65  *  139.45  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.64  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  763.21  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5037.31  * 2819.03  *  248.51  *
* E.G. Slope (ft/ft)     *0.001198  * Area (sq ft)           * 5037.31  * 2819.03  *  248.51  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *10747.75  *33299.08  *  453.17  *
* Top Width (ft)         *  599.21  * Top Width (ft)         *  452.50  *  112.13  *   34.57  *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *    2.13  *   11.81  *    1.82  *
* Max Chl Dpth (ft)      *   34.68  * Hydr. Depth (ft)       *   11.13  *   25.14  *    7.19  *
* Conv. Total (cfs)      *1285507.0  * Conv. (cfs)           *310478.8  *961936.9  * 13091.2  *
* Length Wtd. (ft)       *  571.04  * Wetted Per. (ft)       *  453.60  *  123.71  *   37.23  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.83  *    1.70  *    0.50  *
* Alpha                  *    3.50  * Stream Power (lb/ft s) *    1.77  *   20.14  *    0.91  *
* Frctn Loss (ft)        *    0.58  * Cum Volume (acre-ft)   *  714.31  * 8998.79  * 1806.10  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  228.90  *  402.63  *  435.47  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  767.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.63  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.01  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 6483.49  * 3132.90  *  351.47  *
* E.G. Slope (ft/ft)     *0.001094  * Area (sq ft)           * 6483.49  * 3132.90  *  351.47  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *15042.70  *37940.41  *  706.90  *
* Top Width (ft)         *  716.81  * Top Width (ft)         *  565.69  *  112.13  *   38.99  *
* Vel Total (ft/s)       *    5.39  * Avg. Vel. (ft/s)       *    2.32  *   12.11  *    2.01  *
* Max Chl Dpth (ft)      *   37.48  * Hydr. Depth (ft)       *   11.46  *   27.94  *    9.01  *
* Conv. Total (cfs)      *1623112.0  * Conv. (cfs)           *454758.5  *1146983.0  * 21370.3  *
* Length Wtd. (ft)       *  572.99  * Wetted Per. (ft)       *  566.82  *  123.71  *   42.46  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.78  *    1.73  *    0.57  *
* Alpha                  *    3.63  * Stream Power (lb/ft s) *    1.81  *   20.95  *    1.14  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   * 1522.26  *10078.84  * 3228.62  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  379.73  *  408.48  *  700.37  *
**********************************************************************************************
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CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  769.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.78  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  767.61  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 7419.95  * 3311.79  *  416.55  *
* E.G. Slope (ft/ft)     *0.001141  * Area (sq ft)           * 7419.95  * 3311.79  *  416.55  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *18629.02  *42492.04  *  878.94  *
* Top Width (ft)         *  759.90  * Top Width (ft)         *  603.24  *  112.13  *   44.53  *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *    2.51  *   12.83  *    2.11  *
* Max Chl Dpth (ft)      *   39.08  * Hydr. Depth (ft)       *   12.30  *   29.54  *    9.35  *
* Conv. Total (cfs)      *1835843.0  * Conv. (cfs)           *551612.2  *1258205.0  * 26025.6  *
* Length Wtd. (ft)       *  573.98  * Wetted Per. (ft)       *  604.41  *  123.71  *   48.31  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.87  *    1.91  *    0.61  *
* Alpha                  *    3.71  * Stream Power (lb/ft s) *    2.19  *   24.46  *    1.30  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   * 2183.70  *10722.65  * 4525.02  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *  458.03  *  409.64  *  984.73  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  771.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.96  * Wt. n-Val.             *   0.119  *   0.035  *   0.099  *
* W.S. Elev (ft)         *  769.94  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 9068.44  * 3572.79  *  601.82  *
* E.G. Slope (ft/ft)     *0.001182  * Area (sq ft)           * 9068.44  * 3572.79  *  601.82  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *24498.55  *49095.24  * 1126.21  *
* Top Width (ft)         * 1181.47  * Top Width (ft)         *  926.43  *  112.13  *  142.91  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    2.70  *   13.74  *    1.87  *
* Max Chl Dpth (ft)      *   41.41  * Hydr. Depth (ft)       *    9.79  *   31.86  *    4.21  *
* Conv. Total (cfs)      *2172983.0  * Conv. (cfs)           *712458.9  *1427772.0  * 32751.9  *
* Length Wtd. (ft)       *  575.27  * Wetted Per. (ft)       *  928.18  *  123.71  *  146.89  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.72  *    2.13  *    0.30  *
* Alpha                  *    3.97  * Stream Power (lb/ft s) *    1.95  *   29.29  *    0.57  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   * 3548.63  *11782.84  * 7359.50  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *  581.66  *  411.56  * 1276.37  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  761.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.88  * Wt. n-Val.             *   0.120  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  760.00  * Reach Len. (ft)        *  603.34  *  557.57  *  557.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3639.09  * 2458.50  *  145.51  *
* E.G. Slope (ft/ft)     *0.001560  * Area (sq ft)           * 3639.09  * 2458.50  *  145.51  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 7513.86  *30247.83  *  238.31  *
* Top Width (ft)         *  560.26  * Top Width (ft)         *  418.63  *  112.13  *   29.49  *
* Vel Total (ft/s)       *    6.09  * Avg. Vel. (ft/s)       *    2.06  *   12.30  *    1.64  *
* Max Chl Dpth (ft)      *   31.47  * Hydr. Depth (ft)       *    8.69  *   21.93  *    4.93  *
* Conv. Total (cfs)      *962022.8  * Conv. (cfs)           *190223.8  *765765.8  *  6033.1  *
* Length Wtd. (ft)       *  568.54  * Wetted Per. (ft)       *  419.57  *  123.71  *   31.22  *
* Min Ch El (ft)         *  728.53  * Shear (lb/sq ft)       *    0.84  *    1.94  *    0.45  *
* Alpha                  *    3.28  * Stream Power (lb/ft s) *    1.74  *   23.82  *    0.74  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *  285.40  * 7709.75  *  805.76  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   78.13  *  386.92  *  187.98  *
*********************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.184

INPUT
Description: End Channel Transition - APPROX. 430 ft US of STA. 90+00
BLUFF ON
             LEFT BANK EXCAVATED
Station Elevation Data    num=     204
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
       0  818.46   10.78  815.75   14.22  814.65   16.88  814.13      26  812.61
   54.66  811.51   83.13  812.03   96.82  811.99  108.55  811.29  124.65  810.86
  126.02  810.88  129.75   810.6  129.87  810.61  145.21  810.89  148.32  810.99
  164.99  810.91  218.25  811.23  251.09  811.14  257.98  810.08  262.39  810.05
  273.09  809.21  287.34  808.41   317.4  804.94  323.75  801.11   331.9  795.71
  333.28  795.11  337.97  793.89  340.76  791.45  346.13  785.18  350.89  782.55
  379.26  772.86  379.84  772.99  390.81  775.69  400.56  775.93  407.31  775.93
  416.94  774.01  424.21  770.34  437.25  763.39  448.72  766.16  451.26  766.74
  522.81  766.74  566.17  766.34  617.19  765.51  658.88  763.38  659.28  763.38
  663.17  763.24  679.02  763.15  682.24  763.39   689.8  763.74  714.36  763.74
  720.81  762.07  726.37  760.76  757.35  773.78  800.13  773.84  811.45  773.68
  840.67  773.81  844.42  773.66  914.23  773.12  943.54  772.41  970.95  772.27
   976.4  773.46   977.9  774.67  979.42  774.86 1004.53  774.24 1008.88  772.98
 1009.23  773.06  1011.6  769.78 1013.38  766.71 1016.12  766.49 1028.74  766.58
 1037.41  766.31 1059.08   766.3 1070.92  773.46 1072.67  774.54 1078.25  772.37
 1131.14  772.16 1136.08  772.02 1191.49  771.47  1191.6  771.47 1235.11  770.68
 1263.65  770.39  1271.4  769.91  1279.1  769.82 1284.56  770.34 1285.14  770.23
 1285.87  770.03 1293.97  770.14 1296.26     770 1302.21  770.45 1331.92  772.33
    1350  763.66 1352.83  763.01 1357.82  759.82 1390.82  761.14 1392.21  761.17
 1393.06  761.15 1394.45  761.18 1403.67  761.22 1406.78  761.08  1414.5  760.94
    1429  761.06    1480     750 1592.79   749.4 1595.06  748.48 1605.19  747.73
 1613.81  745.89 1619.76  744.84  1623.7  744.14 1642.37  741.63 1643.77  741.48
 1655.97  736.91    1665   729.2    1675  728.21    1685   729.2 1696.22  736.93
 1701.85  739.95  1704.5  741.71 1709.86  743.06 1710.19  743.09 1721.13  746.18
 1734.84  747.43 1740.48  747.75 1751.32  755.17 1757.52  759.23 1764.74  761.02
 1765.86  761.36 1766.84  761.42 1803.95  763.63 1818.71  764.25 1845.58  766.75
 1846.92  766.84 1878.55   767.8 1880.05  767.92 1881.73  767.99 1893.44  768.97
 1938.46   770.5 1952.65  770.85 2031.08  770.78 2057.64  770.08 2120.06  769.05
 2122.14  769.05    2132  768.51 2137.38  767.86 2148.56  766.78 2149.15  766.56
 2157.95  765.52 2164.07  765.99  2180.8  765.64 2186.91  765.33 2211.47  765.33
 2249.21  766.66 2302.46  770.16 2329.62  771.34 2379.08  772.48 2441.02   773.3
 2457.63  773.83 2526.18   774.8  2555.1  775.35 2655.57  777.72 2655.84  777.73
 2751.82   779.1 2837.93  778.86 2839.07  778.92 2842.42  778.72 2862.68  773.32
 2876.22  766.18 2877.43  765.82 2879.01  765.13 2904.11  765.25  2917.1  765.77
 2920.22  765.83 2923.13   765.1 2927.38   764.4  2930.8  764.58  2940.8  763.34
 2941.86  763.43  2942.4   763.4 2944.02  763.34 2951.36  763.83 2963.86  767.02
 2979.97  769.03  2981.3  769.23 2983.15  769.41 2996.04  773.52 3011.58  777.58
 3026.07  781.83 3049.19  786.69 3051.12  786.77 3084.14  787.55  3090.8   786.5
 3092.65  786.46 3100.93  788.43 3110.47  788.75 3119.84  787.99 3121.46  788.12
 3123.84   788.8 3146.14  790.18 3148.07  790.37 3153.56  790.78 3154.48  790.81
 3190.53  793.47 3213.14  794.95 3219.03     795 3225.33  795.37

Manning's n Values         num=        7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075 1302.21     .12    1429     .03 1605.19    .035 1721.13      .1
 1938.46    .075 2837.93     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1605.19 1721.13             38.91   53.51   48.21             .1       .3
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     500     600     790    2800    3080     778

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  749.84  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    3.02  * Wt. n-Val.              *          *   0.035  *   0.100  *
* W.S. Elev (ft)          *  746.82  * Reach Len. (ft)         *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *  745.73  * Flow Area (sq ft)       *          *  946.50  *    2.24  *
* E.G. Slope (ft/ft)      *0.006884  * Area (sq ft)            *          *  946.50  *    2.24  *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *          *13198.71  *    1.29  *
* Top Width (ft)          *  118.68  * Top Width (ft)          *          *  111.67  *    7.01  *
* Vel Total (ft/s)        *   13.91  * Avg. Vel. (ft/s)        *          *   13.94  *    0.57  *
* Max Chl Dpth (ft)       *   18.61  * Hydr. Depth (ft)        *          *    8.48  *    0.32  *
* Conv. Total (cfs)       *159097.9  * Conv. (cfs)             *          *159082.4  *    15.5  *
* Length Wtd. (ft)        *   53.51  * Wetted Per. (ft)        *          *  120.16  *    7.04  *
* Min Ch El (ft)          *  728.21  * Shear (lb/sq ft)        *          *    3.39  *    0.14  *
* Alpha                   *    1.00  * Stream Power (lb/ft s)   *          *   47.20  *    0.08  *
* Frctn Loss (ft)         *    0.26  * Cum Volume (acre-ft)     *   20.10  * 3427.92  *    5.48  *
* C & E Loss (ft)         *    0.34  * Cum SA (acres)           *    3.51  *  294.09  *    1.77  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
```

additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	753.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.94	Wt. n-Val.	0.030	0.035	0.100
W.S. Elev (ft)	750.75	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)	748.66	Flow Area (sq ft)	151.03	1400.68	78.56
E.G. Slope (ft/ft)	0.004306	Area (sq ft)	151.03	1400.68	78.56
Q Total (cfs)	20300.00	Flow (cfs)	545.39	19589.10	165.50
Top Width (ft)	268.34	Top Width (ft)	128.66	115.94	23.74
Vel Total (ft/s)	12.45	Avg. Vel. (ft/s)	3.61	13.99	2.11
Max Chl Dpth (ft)	22.54	Hydr. Depth (ft)	1.17	12.08	3.31
Conv. Total (cfs)	309365.0	Conv. (cfs)	8311.6	298531.2	2522.2
Length Wtd. (ft)	53.27	Wetted Per. (ft)	128.95	124.53	24.73
Min Ch El (ft)	728.21	Shear (lb/sq ft)	0.31	3.02	0.85
Alpha	1.22	Stream Power (lb/ft s)	1.14	42.29	1.80
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	39.68	4752.45	33.96
C & E Loss (ft)	0.24	Cum SA (acres)	7.50	329.24	18.04

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	756.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.94	Wt. n-Val.	0.030	0.035	0.100
W.S. Elev (ft)	754.41	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)	652.95	1825.13	175.25
E.G. Slope (ft/ft)	0.002209	Area (sq ft)	652.95	1825.13	175.25
Q Total (cfs)	26320.00	Flow (cfs)	4121.89	21811.49	386.62
Top Width (ft)	290.57	Top Width (ft)	145.54	115.94	29.09
Vel Total (ft/s)	9.92	Avg. Vel. (ft/s)	6.31	11.95	2.21
Max Chl Dpth (ft)	26.20	Hydr. Depth (ft)	4.49	15.74	6.03
Conv. Total (cfs)	559987.9	Conv. (cfs)	87697.9	464064.3	8225.7
Length Wtd. (ft)	51.82	Wetted Per. (ft)	146.23	124.53	31.21
Min Ch El (ft)	728.21	Shear (lb/sq ft)	0.62	2.02	0.77
Alpha	1.27	Stream Power (lb/ft s)	3.89	24.16	1.71
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	81.14	5895.12	191.09
C & E Loss (ft)	0.04	Cum SA (acres)	20.01	355.22	78.18

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	759.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.67	Wt. n-Val.	0.030	0.035	0.100
W.S. Elev (ft)	757.72	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)	1159.07	2208.25	279.55
E.G. Slope (ft/ft)	0.001539	Area (sq ft)	1159.07	2208.25	279.55
Q Total (cfs)	34000.00	Flow (cfs)	8367.63	25007.31	625.07
Top Width (ft)	310.80	Top Width (ft)	160.78	115.94	34.08
Vel Total (ft/s)	9.32	Avg. Vel. (ft/s)	7.22	11.32	2.24
Max Chl Dpth (ft)	29.51	Hydr. Depth (ft)	7.21	19.05	8.20
Conv. Total (cfs)	866789.3	Conv. (cfs)	213322.6	637531.3	15935.3
Length Wtd. (ft)	50.59	Wetted Per. (ft)	161.82	124.53	37.20
Min Ch El (ft)	728.21	Shear (lb/sq ft)	0.69	1.70	0.72
Alpha	1.23	Stream Power (lb/ft s)	4.97	19.29	1.61
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	169.41	7054.87	536.43
C & E Loss (ft)	0.01	Cum SA (acres)	44.38	376.19	139.06

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	764.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.	0.031	0.035	0.100
W.S. Elev (ft)	762.90	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)	2217.31	2808.63	507.96
E.G. Slope (ft/ft)	0.000881	Area (sq ft)	2217.31	2808.63	507.96
Q Total (cfs)	44500.00	Flow (cfs)	15441.24	28252.49	806.27
Top Width (ft)	452.47	Top Width (ft)	266.02	115.94	70.51
Vel Total (ft/s)	8.04	Avg. Vel. (ft/s)	6.96	10.06	1.59
Max Chl Dpth (ft)	34.69	Hydr. Depth (ft)	8.34	24.22	7.20
Conv. Total (cfs)	1499282.0	Conv. (cfs)	520242.2	951875.4	27164.8
Length Wtd. (ft)	49.13	Wetted Per. (ft)	269.04	124.53	74.40
Min Ch El (ft)	728.21	Shear (lb/sq ft)	0.45	1.24	0.38

```
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    3.16  *   12.48  *    0.60  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  664.07  * 8962.77  * 1801.26  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  223.93  *  401.17  *  434.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.032  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  765.83  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3235.48  * 3148.42  *  807.09  *
* E.G. Slope (ft/ft)     *0.000745  * Area (sq ft)           * 3235.48  * 3148.42  *  807.09  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *21124.48  *31431.72  * 1133.79  *
* Top Width (ft)         *  703.64  * Top Width (ft)          *  412.81  *  115.94  *  174.90  *
* Vel Total (ft/s)       *    7.47  * Avg. Vel. (ft/s)        *    6.53  *    9.98  *    1.40  *
* Max Chl Dpth (ft)      *   37.62  * Hydr. Depth (ft)        *    7.84  *   27.16  *    4.61  *
* Conv. Total (cfs)      *1966838.0  * Conv. (cfs)            *773857.9  *1151446.0  * 41534.5  *
* Length Wtd. (ft)       *   48.45  * Wetted Per. (ft)        *  418.13  *  124.53  *  178.94  *
* Min Ch El (ft)         *  728.21  * Shear (lb/sq ft)        *    0.36  *    1.18  *    0.21  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    2.35  *   11.74  *    0.29  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1454.96  *10038.64  * 3221.21  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  372.95  *  407.02  *  699.00  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.033  *   0.035  *   0.098  *
* W.S. Elev (ft)         *  767.50  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4025.81  * 3341.93  * 1180.85  *
* E.G. Slope (ft/ft)     *0.000741  * Area (sq ft)           * 4025.81  * 3341.93  * 1180.85  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *25825.14  *34625.38  * 1549.49  *
* Top Width (ft)         *  908.34  * Top Width (ft)          *  524.18  *  115.94  *  268.22  *
* Vel Total (ft/s)       *    7.25  * Avg. Vel. (ft/s)        *    6.41  *   10.36  *    1.31  *
* Max Chl Dpth (ft)      *   39.29  * Hydr. Depth (ft)        *    7.68  *   28.82  *    4.40  *
* Conv. Total (cfs)      *2277275.0  * Conv. (cfs)            *948563.8  *1271799.0  * 56913.1  *
* Length Wtd. (ft)       *   48.10  * Wetted Per. (ft)        *  533.97  *  124.53  *  272.49  *
* Min Ch El (ft)         *  728.21  * Shear (lb/sq ft)        *    0.35  *    1.24  *    0.20  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    2.24  *   12.87  *    0.26  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 2104.44  *10680.07  * 4514.79  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  450.22  *  408.18  *  982.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  771.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.             *   0.035  *   0.035  *   0.095  *
* W.S. Elev (ft)         *  769.96  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5343.06  * 3627.35  * 2005.18  *
* E.G. Slope (ft/ft)     *0.000709  * Area (sq ft)           * 5343.06  * 3627.35  * 2005.18  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *33292.44  *38819.74  * 2607.82  *
* Top Width (ft)         * 1106.97  * Top Width (ft)          *  555.25  *  115.94  *  435.78  *
* Vel Total (ft/s)       *    6.81  * Avg. Vel. (ft/s)        *    6.23  *   10.70  *    1.30  *
* Max Chl Dpth (ft)      *   41.75  * Hydr. Depth (ft)        *    9.62  *   31.29  *    4.60  *
* Conv. Total (cfs)      *2806227.0  * Conv. (cfs)            *1250350.0  *1457936.0  * 97940.8  *
* Length Wtd. (ft)       *   47.58  * Wetted Per. (ft)        *  573.74  *  124.53  *  440.28  *
* Min Ch El (ft)         *  728.21  * Shear (lb/sq ft)        *    0.41  *    1.29  *    0.20  *
* Alpha                  *    1.66  * Stream Power (lb/ft s) *    2.57  *   13.80  *    0.26  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 3448.83  *11736.76  * 7342.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  571.40  *  410.10  * 1272.67  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  760.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.             *   0.030  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  759.41  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1437.87  * 2404.52  *  339.48  *
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* E.G. Slope (ft/ft)     *0.001306  * Area (sq ft)           * 1437.87  * 2404.52  *  339.48  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *10693.89  *26556.46  *  749.65  *
* Top Width (ft)         *  321.65  * Top Width (ft)         *  168.59  *  115.94  *   37.12  *
* Vel Total (ft/s)       *    9.09  * Avg. Vel. (ft/s)       *    7.44  *   11.04  *    2.21  *
* Max Chl Dpth (ft)      *   31.20  * Hydr. Depth (ft)       *    8.53  *   20.74  *    9.14  *
* Conv. Total (cfs)      *1051359.0  * Conv. (cfs)            *295871.6  *734746.9  * 20740.8  *
* Length Wtd. (ft)       *   50.08  * Wetted Per. (ft)       *  169.81  *  124.53  *   40.72  *
* Min Ch El (ft)         *  728.21  * Shear (lb/sq ft)       *    0.69  *    1.57  *    0.68  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    5.14  *   17.39  *    1.50  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  250.24  * 7678.62  *  802.66  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   74.07  *  385.46  *  187.55  *
*****************************************************************************************
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CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.1756*

INPUT
Description:
Station Elevation Data num= 277

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	818.13	10.66	815.67	14.06	814.68	16.7	814.2	16.8	814.19
25.72	812.81	48.02	811.89	54.06	811.65	82.22	811.97	95.76	811.87
107.36	811.2	115.69	810.97	123.29	810.73	124.64	810.74	128.33	810.47
128.45	810.48	143.62	810.61	146.7	810.68	163.19	810.49	184.59	810.45
213.84	810.21	215.86	810.2	216.79	810.19	237.2	809.92	248.34	809.76
255.16	808.75	259.52	808.67	270.1	807.81	277.01	807.38	284.2	806.93
313.93	803.51	320.21	800.07	328.27	795.24	329.64	794.7	334.28	793.57
337.03	791.39	342.35	785.84	347.05	783.47	375.11	774.62	375.69	774.73
386.54	776.95	396.18	777.04	402.86	776.95	412.38	775.15	413.78	774.51
419.57	771.83	432.47	765.55	443.81	767.81	446.33	768.28	479.86	767.79
517.09	767.53	537.59	767.22	541.68	767.18	551.19	767.07	559.98	766.98
610.44	766.17	650.42	764.29	651.68	764.23	652.07	764.23	655.92	764.1
671.6	763.97	674.78	764.17	682.26	764.45	706.55	764.38	709.31	763.74
712.93	762.91	718.43	761.76	729.19	765.76	749.07	773.16	791.38	773.23
799.69	773.13	802.58	773.1	831.48	773.22	835.19	773.09	865.88	772.89
873.05	772.84	904.24	772.61	929.79	772.05	933.22	771.97	960.34	771.83
965.73	772.87	967.21	773.93	968.71	774.1	993.55	773.54	995.7	772.99
997.85	772.43	998.2	772.5	1000.54	769.63	1002.3	766.94	1005.01	766.74
1017.49	766.8	1026.07	766.55	1027.74	766.55	1047.5	766.54	1051.84	768.86
1059.21	772.8	1059.81	773.13	1060.94	773.75	1065.18	772.31	1066.46	771.86
1118.77	771.63	1123.66	771.5	1178.46	770.97	1178.57	770.97	1221.61	770.23
1249.84	769.95	1257.5	769.52	1265.12	769.44	1270.52	769.89	1271.09	769.79
1271.81	769.61	1279.82	769.7	1282.09	769.58	1287.97	769.96	1317.36	771.58
1335.24	763.97	1338.04	763.4	1342.98	760.6	1375.61	761.73	1376.99	761.75
1377.7	761.74	1377.83	761.73	1379.21	761.75	1388.32	761.74	1391.4	761.6
1399.04	761.44	1415.84	761.48	1424.26	759.63	1463.82	751.74	1473.46	751.7
1515.42	751.29	1564.06	750.74	1575.38	750.69	1577.62	749.88	1587.64	749.22
1597.32	746.9	1604.01	745.49	1608.43	744.55	1613.03	743.73	1629.41	741.65
1629.95	741.59	1630.98	741.43	1644.68	736.42	1646.32	735.22	1654.83	729.55
1658.73	729.25	1666.06	728.15	1669.05	728.15	1674.44	729.06	1681.55	729.55
1683.57	730.53	1695.58	737.52	1695.61	737.53	1702.62	740.38	1705.94	742.02
1708.06	742.46	1712.64	743.72	1713.05	743.79	1726.73	747.86	1740.21	749.13
1745.75	749.48	1749.37	751.73	1756.4	756.04	1762.5	759.61	1769.59	761.2
1770.69	761.5	1771.65	761.55	1808.12	763.58	1822.63	764.16	1842.97	765.91
1846.39	766.44	1849.03	766.66	1850.35	766.74	1869.22	767.25	1881.43	767.47
1882.9	767.57	1884.06	767.6	1884.56	767.61	1896.06	768.16	1940.3	768.36
1954.25	768.3	1955.97	768.25	1975.37	767.87	2029.02	768.82	2031.32	768.91
2057.42	769.34	2072.4	769.73	2118.76	768.97	2120.8	768.96	2130.49	768.48
2135.78	767.9	2146.77	766.93	2147.35	766.74	2156	765.82	2162.01	766.22
2178.45	765.88	2184.45	765.6	2208.59	765.56	2223.06	765.99	2236.76	766.46
2245.68	766.72	2250.46	766.98	2291.55	769.64	2298	770.02	2324.69	771.05
2373.3	772.05	2434.17	772.76	2450.49	773.23	2469.61	773.47	2510.88	774.22
2517.85	774.3	2533.12	774.55	2546.27	774.77	2556.63	774.98	2591.68	775.7
2620.57	776.28	2621	776.28	2621.93	776.3	2645	776.75	2645.27	776.75
2739.59	777.78	2818.11	777.45	2824.21	777.42	2825.33	777.47	2827.45	777.35
2828.62	777.29	2847.47	772.82	2848.53	772.57	2861.83	766.33	2863.02	766.01
2864.58	765.41	2888.62	765.53	2889.24	765.53	2896.49	765.81	2896.75	765.82
2902.01	766.02	2905.07	766.09	2907.34	765.58	2907.93	765.45	2912.11	764.84
2915.47	765	2925.3	763.92	2926.34	764	2926.87	763.98	2928.46	763.93
2935.67	764.36	2947.94	767.16	2947.96	767.16	2963.79	769.03	2965.1	769.21
2966.91	769.38	2968.5	769.85	2979.58	773.09	2994.85	776.77	2998.91	777.87
3009.09	780.89	3031.81	785.96	3033.71	786.1	3066.16	787.95	3072.7	787.27

```
 3074.52   787.3 3082.66  789.31 3092.03  789.93 3101.24  789.59 3102.83  789.77
 3105.17  790.45 3106.73  790.59 3107.22  790.63  3107.9  790.68 3127.08  792.08
 3128.98  792.28 3134.38  792.73 3135.28  792.77 3170.71  795.72 3192.92  797.41
 3198.71  797.55  3204.9  797.99

Manning's n Values        num=      12
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .075  479.86    .074 1287.97    .113 1424.26    .034 1587.64    .035
 1726.73    .094 1884.06    .048  1940.3     .07  2072.4    .039 2824.21    .114
 2896.49    .074  3204.9    .118

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1587.64 1726.73             38.91   53.51   48.21             .1       .3

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.87  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  747.36  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1202.65  *          *
* E.G. Slope (ft/ft)     *0.003696  * Area (sq ft)           *          * 1202.65  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  129.64  * Top Width (ft)         *          *  129.64  *          *
* Vel Total (ft/s)       *   10.98  * Avg. Vel. (ft/s)       *          *   10.98  *          *
* Max Chl Dpth (ft)      *   19.21  * Hydr. Depth (ft)       *          *    9.28  *          *
* Conv. Total (cfs)      *217131.0  * Conv. (cfs)             *          *217131.0  *          *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)        *          *  137.14  *          *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *          *    2.02  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   22.21  *          *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *   20.10  * 3426.60  *    5.48  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *    3.51  *  293.95  *    1.76  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.13  * Wt. n-Val.             *   0.034  *   0.035  *   0.094  *
* W.S. Elev (ft)         *  751.13  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   29.36  * 1720.01  *   47.90  *
* E.G. Slope (ft/ft)     *0.002874  * Area (sq ft)           *   29.36  * 1720.01  *   47.90  *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *   43.42  *20188.84  *   67.74  *
* Top Width (ft)         *  219.17  * Top Width (ft)         *   58.40  *  139.09  *   21.68  *
* Vel Total (ft/s)       *   11.29  * Avg. Vel. (ft/s)       *    1.48  *   11.74  *    1.41  *
* Max Chl Dpth (ft)      *   22.98  * Hydr. Depth (ft)       *    0.50  *   12.37  *    2.21  *
* Conv. Total (cfs)      *378636.9  * Conv. (cfs)             *   809.9  *376563.6  *  1263.4  *
* Length Wtd. (ft)       *   53.48  * Wetted Per. (ft)        *   58.56  *  146.88  *   22.22  *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.09  *    2.10  *    0.39  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.13  *   24.67  *    0.55  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *   39.60  * 4750.54  *   33.89  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *    7.42  *  329.09  *   18.02  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.82  * Wt. n-Val.             *   0.034  *   0.035  *   0.094  *
* W.S. Elev (ft)         *  754.39  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  428.25  * 2172.91  *  127.10  *
* E.G. Slope (ft/ft)     *0.001916  * Area (sq ft)           *  428.25  * 2172.91  *  127.10  *
* Q Total (cfs)          *26320.00  * Flow (cfs)              * 1746.89  *24334.51  *  238.61  *
* Top Width (ft)         *  303.17  * Top Width (ft)         *  137.11  *  139.09  *   26.98  *
* Vel Total (ft/s)       *    9.65  * Avg. Vel. (ft/s)       *    4.08  *   11.20  *    1.88  *
* Max Chl Dpth (ft)      *   26.24  * Hydr. Depth (ft)       *    3.12  *   15.62  *    4.71  *
* Conv. Total (cfs)      *601293.6  * Conv. (cfs)             * 39908.5  *555933.9  *  5451.2  *
* Length Wtd. (ft)       *   52.80  * Wetted Per. (ft)        *  137.54  *  146.88  *   28.44  *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.37  *    1.77  *    0.53  *
* Alpha                  *    1.26  * Stream Power (lb/ft s) *    1.52  *   19.82  *    1.00  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   80.66  * 5892.66  *  190.92  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   19.89  *  355.06  *   78.15  *
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*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.63  * Wt. n-Val.             *   0.034  *   0.035  *   0.094  *
* W.S. Elev (ft)         *  757.67  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  904.87  * 2629.07  *  224.46  *
* E.G. Slope (ft/ft)     *0.001413  * Area (sq ft)           *  904.87  * 2629.07  *  224.46  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 4833.24  *28704.92  *  461.84  *
* Top Width (ft)         *  325.09  * Top Width (ft)         *  153.55  *  139.09  *   32.45  *
* Vel Total (ft/s)       *    9.05  * Avg. Vel. (ft/s)       *    5.34  *   10.92  *    2.06  *
* Max Chl Dpth (ft)      *   29.52  * Hydr. Depth (ft)       *    5.89  *   18.90  *    6.92  *
* Conv. Total (cfs)      *904648.2  * Conv. (cfs)            *128599.4  *763760.4  * 12288.4  *
* Length Wtd. (ft)       *   51.72  * Wetted Per. (ft)       *  154.30  *  146.88  *   34.83  *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.52  *    1.58  *    0.57  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    2.76  *   17.23  *    1.17  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  168.49  * 7051.90  *  536.15  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   44.24  *  376.03  *  139.02  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *   0.034  *   0.035  *   0.094  *
* W.S. Elev (ft)         *  762.86  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1878.74  * 3351.09  *  442.70  *
* E.G. Slope (ft/ft)     *0.000837  * Area (sq ft)           * 1878.74  * 3351.09  *  442.70  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *10709.53  *33108.56  *  681.92  *
* Top Width (ft)         *  464.42  * Top Width (ft)         *  256.87  *  139.09  *   68.46  *
* Vel Total (ft/s)       *    7.84  * Avg. Vel. (ft/s)       *    5.70  *    9.88  *    1.54  *
* Max Chl Dpth (ft)      *   34.71  * Hydr. Depth (ft)       *    7.31  *   24.09  *    6.47  *
* Conv. Total (cfs)      *1538216.0  * Conv. (cfs)           *370192.5  *1144452.0  * 23571.6  *
* Length Wtd. (ft)       *   50.25  * Wetted Per. (ft)       *  258.95  *  146.88  *   71.61  *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.38  *    1.19  *    0.32  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    2.16  *   11.78  *    0.50  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  662.24  * 8958.99  * 1800.74  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  223.69  *  401.01  *  434.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.036  *   0.035  *   0.094  *
* W.S. Elev (ft)         *  765.75  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2765.18  * 3753.01  *  767.48  *
* E.G. Slope (ft/ft)     *0.000730  * Area (sq ft)           * 2765.18  * 3753.01  *  767.48  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *15289.40  *37357.07  * 1043.53  *
* Top Width (ft)         *  721.44  * Top Width (ft)         *  367.79  *  139.09  *  214.56  *
* Vel Total (ft/s)       *    7.37  * Avg. Vel. (ft/s)       *    5.53  *    9.95  *    1.36  *
* Max Chl Dpth (ft)      *   37.60  * Hydr. Depth (ft)       *    7.52  *   26.98  *    3.58  *
* Conv. Total (cfs)      *1986589.0  * Conv. (cfs)           *565724.8  *1382253.0  * 38611.6  *
* Length Wtd. (ft)       *   49.56  * Wetted Per. (ft)       *  371.25  *  146.88  *  218.20  *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.34  *    1.17  *    0.16  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    1.88  *   11.60  *    0.22  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1452.28  *10034.40  * 3220.33  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  372.60  *  406.86  *  698.78  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.037  *   0.035  *   0.087  *
* W.S. Elev (ft)         *  767.39  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3479.52  * 3980.93  * 1248.72  *
* E.G. Slope (ft/ft)     *0.000737  * Area (sq ft)           * 3479.52  * 3980.93  * 1248.72  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *18979.89  *41399.28  * 1620.83  *
* Top Width (ft)         * 1022.47  * Top Width (ft)         *  527.66  *  139.09  *  355.72  *
* Vel Total (ft/s)       *    7.12  * Avg. Vel. (ft/s)       *    5.45  *   10.40  *    1.30  *
* Max Chl Dpth (ft)      *   39.24  * Hydr. Depth (ft)       *    6.59  *   28.62  *    3.51  *
* Conv. Total (cfs)      *2283817.0  * Conv. (cfs)           *699138.8  *1524974.0  * 59704.4  *
* Length Wtd. (ft)       *   49.20  * Wetted Per. (ft)       *  532.76  *  146.88  *  360.12  *
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* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.30  *    1.25  *    0.16  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    1.64  *   12.97  *    0.21  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 2101.09  *10675.57  * 4513.45  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  449.75  *  408.02  *  982.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  771.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.             *   0.040  *   0.035  *   0.077  *
* W.S. Elev (ft)         *  769.93  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5041.89  * 4334.23  * 2590.35  *
* E.G. Slope (ft/ft)     *0.000677  * Area (sq ft)           * 5041.89  * 4334.23  * 2590.35  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *25052.68  *45734.14  * 3933.18  *
* Top Width (ft)         * 1497.55  * Top Width (ft)         *  674.13  *  139.09  *  684.33  *
* Vel Total (ft/s)       *    6.24  * Avg. Vel. (ft/s)       *    4.97  *   10.55  *    1.52  *
* Max Chl Dpth (ft)      *   41.78  * Hydr. Depth (ft)       *    7.48  *   31.16  *    3.79  *
* Conv. Total (cfs)      *2870813.0  * Conv. (cfs)            *962547.6  *1757149.0  *151116.4  *
* Length Wtd. (ft)       *   48.63  * Wetted Per. (ft)       *  682.96  *  146.88  *  689.70  *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.31  *    1.25  *    0.16  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    1.55  *   13.17  *    0.24  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 3444.19  *11731.87  * 7340.27  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  570.85  *  409.94  * 1272.05  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  760.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.54  * Wt. n-Val.             *   0.034  *   0.035  *   0.094  *
* W.S. Elev (ft)         *  759.37  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1173.13  * 2865.50  *  282.09  *
* E.G. Slope (ft/ft)     *0.001216  * Area (sq ft)           * 1173.13  * 2865.50  *  282.09  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 6664.96  *30745.23  *  589.81  *
* Top Width (ft)         *  336.52  * Top Width (ft)         *  162.07  *  139.09  *   35.36  *
* Vel Total (ft/s)       *    8.79  * Avg. Vel. (ft/s)       *    5.68  *   10.73  *    2.09  *
* Max Chl Dpth (ft)      *   31.22  * Hydr. Depth (ft)       *    7.24  *   20.60  *    7.98  *
* Conv. Total (cfs)      *1089671.0  * Conv. (cfs)            *191121.4  *881636.8  * 16913.0  *
* Length Wtd. (ft)       *   51.22  * Wetted Per. (ft)       *  163.00  *  146.88  *   38.19  *
* Min Ch El (ft)         *  728.15  * Shear (lb/sq ft)       *    0.55  *    1.48  *    0.56  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    3.10  *   15.89  *    1.17  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  249.07  * 7675.39  *  802.32  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   73.92  *  385.30  *  187.51  *
*****************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.1673*

INPUT
Description:
Station Elevation Data    num=     276
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   817.8   10.54  815.59   13.91  814.71   16.51  814.28   16.61  814.26
   25.43     813   47.49  812.03   53.46   811.8   81.31  811.92    94.7  811.76
  106.18  811.12  114.41  810.87  121.92   810.6  123.26   810.6  126.91  810.34
  127.03  810.34  142.03  810.33  145.08  810.36  161.38  810.07  182.54  809.86
  211.48   809.2  213.48  809.17  214.39  809.15  234.58  808.67   245.6  808.38
  252.34  807.42  256.65  807.29  267.12   806.4  273.95  805.94  281.06  805.45
  310.46  802.07  316.67  799.03  324.64  794.77  325.99  794.28  330.58  793.24
  333.31  791.34  338.56  786.49  343.22  784.39  370.97  776.39  371.53  776.47
  382.26  778.22   391.8  778.15   398.4  777.98  407.82  776.29  409.21  775.71
  414.93  773.32  427.69  767.72  438.91  769.46  441.39  769.82  474.55  768.83
  511.38  768.31  531.65  767.89  535.69  767.84  545.09  767.72  553.79  767.63
   603.7  766.83  643.23  765.14  644.47  765.08  644.86  765.08  648.67  764.95
  664.17  764.79  667.32  764.95  674.72  765.17  698.74  765.02  701.47  764.46
  705.05  763.74  710.49  762.76  721.13  766.19  740.79  772.55  782.64  772.63
  790.85  772.55  793.71  772.52  822.29  772.63  825.96  772.52  856.31  772.36
   863.4  772.32  894.24   772.1  919.51   771.6  922.91  771.53  949.72   771.4
  955.05  772.29  956.52  773.19     958  773.33  982.57  772.84  984.69  772.37
```

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  986.82  771.89  987.16  771.95  989.48  769.48  991.22  767.17   993.9  766.99
 1006.25  767.03 1014.73   766.8 1016.38  766.79 1035.92  766.78 1040.22  768.77
  1047.5  772.14  1048.1  772.42 1049.22  772.96 1053.41  771.74 1054.67  771.36
 1106.41   771.1 1111.24  770.98 1165.44  770.46 1165.55  770.46  1208.1  769.78
 1236.02  769.51  1243.6  769.13 1251.13  769.05 1256.47  769.43 1257.04  769.35
 1257.75   769.2 1265.68  769.26 1267.92  769.15 1273.74  769.48  1302.8  770.83
 1320.48  764.29 1323.25  763.79 1328.13  761.39 1360.41  762.31 1361.77  762.33
 1362.48  762.32 1363.96  762.32    1373  762.26 1376.02  762.13 1383.57  761.94
    1399  761.87 1408.51  760.25 1447.64  753.49 1457.17  753.45 1498.67  752.86
 1546.77  752.03 1557.96  751.98 1560.18  751.28 1570.09  750.71 1580.84  747.91
 1588.26  746.13 1593.17  744.96 1598.27  743.87 1616.44  741.67 1617.05  741.61
 1618.19  741.39  1633.4  735.94 1635.21  734.77 1644.66  729.91 1648.98  729.65
 1657.12  728.09  1663.1  728.09 1669.57  729.48 1678.11  729.91 1680.53  730.74
 1694.95  738.11 1694.98  738.13  1703.4  740.81 1707.38  742.33 1709.92  742.78
 1715.42  744.39 1715.92  744.49 1732.34  749.55 1745.58  750.83 1751.02  751.21
 1754.58  753.19 1761.48  756.91 1767.47  759.99 1774.44  761.37 1775.52  761.63
 1776.47  761.68 1812.29  763.54 1826.54  764.08 1846.53  765.63 1849.89  766.38
 1852.48  766.56 1853.78  766.63 1872.32  767.07 1884.31  767.15 1885.76  767.21
 1886.89  767.23 1887.38  767.22 1898.69  767.36 1942.15  766.21 1955.85  765.75
 1957.54  765.66  1976.6   764.9  2029.3  766.85 2031.56  767.04  2057.2  768.61
 2071.91  769.62 2117.46  768.88 2119.47  768.88 2128.99  768.44 2134.18  767.93
 2144.98  767.09 2145.54  766.92 2154.04  766.11 2159.95  766.44  2176.1  766.13
    2182  765.87 2205.71  765.79 2219.93  766.14 2233.38  766.58 2242.14  766.77
 2246.84  766.98 2287.21  769.55 2293.55  769.87 2319.77  770.76 2367.52  771.61
 2427.31  772.23 2443.35  772.63 2462.14  772.83 2502.67  773.74 2509.52   773.8
 2524.53  774.01 2537.44  774.19 2547.62  774.36 2582.05  774.96 2610.43  775.42
 2610.86  775.43 2611.77  775.44 2634.44  775.77  2634.7  775.78 2727.35  776.47
 2804.49  776.02 2810.48  775.98 2811.59  776.02 2813.67  775.92 2814.82  775.87
 2833.34  772.04 2834.38  771.82 2847.45  766.48 2848.62  766.21 2850.14  765.69
 2873.77  765.81 2874.37  765.81 2881.49  766.08 2881.75  766.09 2886.91  766.28
 2889.93  766.34 2892.16  765.92 2892.74  765.81 2896.84  765.29 2900.14  765.43
 2909.79  764.51 2910.82  764.58 2911.34  764.56  2912.9  764.51 2919.99  764.89
 2932.04  767.31 2932.06  767.31 2947.61  769.03 2948.89   769.2 2950.68  769.36
 2952.24  769.77 2963.12  772.66 2978.12  775.97 2982.11  776.94 2992.11  779.96
 3014.43  785.24  3016.3  785.44 3048.17  788.35  3054.6  788.03 3056.39  788.13
 3064.38   790.2 3073.59  791.11 3082.64   791.2  3084.2  791.41  3086.5  792.09
 3088.03  792.28 3088.51  792.34 3089.19  792.39 3108.03  793.97 3109.89  794.18
 3115.19  794.68 3116.08  794.73 3150.88  797.98 3172.71  799.87 3178.39  800.11
 3184.48   800.6

Manning's n Values        num=      12
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  474.55    .072 1273.74    .106 1408.51     .03 1570.09    .035
 1732.34    .088 1886.89    .046 1942.15    .065 2071.91    .044 2810.48    .108
 2881.49    .077 3184.48    .115

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1570.09 1732.34             38.91   53.51   48.21             .1       .3

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  748.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  747.58  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1426.10  *          *
* E.G. Slope (ft/ft)     *0.002370  * Area (sq ft)           *          * 1426.10  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  143.74  * Top Width (ft)         *          *  143.74  *          *
* Vel Total (ft/s)       *    9.26  * Avg. Vel. (ft/s)       *          *    9.26  *          *
* Max Chl Dpth (ft)      *   19.49  * Hydr. Depth (ft)       *          *    9.92  *          *
* Conv. Total (cfs)      *271163.1  * Conv. (cfs)             *          *271163.1  *          *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)        *          *  150.46  *          *
* Min Ch El (ft)         *  728.09  * Shear (lb/sq ft)        *          *    1.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   12.98  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   20.10  * 3424.98  *    5.48  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *    3.51  *  293.78  *    1.76  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  752.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.56  * Wt. n-Val.             *   0.030  *   0.035  *   0.088  *
* W.S. Elev (ft)         *  751.40  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    4.03  * 2020.68  *   18.12  *
* E.G. Slope (ft/ft)     *0.002055  * Area (sq ft)           *    4.03  * 2020.68  *   18.12  *
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* Q Total (cfs)          *20300.00  * Flow (cfs)              *    4.84  *20281.79  *   13.37  *
* Top Width (ft)         *  191.56  * Top Width (ft)          *   10.29  *  162.25  *   19.02  *
* Vel Total (ft/s)       *    9.94  * Avg. Vel. (ft/s)        *    1.20  *   10.04  *    0.74  *
* Max Chl Dpth (ft)      *   23.31  * Hydr. Depth (ft)        *    0.39  *   12.45  *    0.95  *
* Conv. Total (cfs)      *447791.7  * Conv. (cfs)             *   106.8  *447390.1  *   294.8  *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)        *   10.32  *  169.67  *   19.15  *
* Min Ch El (ft)         *  728.09  * Shear (lb/sq ft)        *    0.05  *    1.53  *    0.12  *
* Alpha                  *    1.02  * Stream Power (lb/ft s)  *    0.06  *   15.34  *    0.09  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *   39.59  * 4748.24  *   33.85  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)          *    7.39  *  328.90  *   17.99  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.03  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.54  * Wt. n-Val.              *   0.030  *   0.035  *   0.088  *
* W.S. Elev (ft)         *  754.49  * Reach Len. (ft)         *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  235.47  * 2522.44  *   85.59  *
* E.G. Slope (ft/ft)     *0.001552  * Area (sq ft)            *  235.47  * 2522.44  *   85.59  *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *  688.04  *25504.60  *  127.37  *
* Top Width (ft)         *  315.16  * Top Width (ft)          *  128.25  *  162.25  *   24.66  *
* Vel Total (ft/s)       *    9.26  * Avg. Vel. (ft/s)        *    2.92  *   10.11  *    1.49  *
* Max Chl Dpth (ft)      *   26.40  * Hydr. Depth (ft)        *    1.84  *   15.55  *    3.47  *
* Conv. Total (cfs)      *668180.4  * Conv. (cfs)             * 17467.1  *647479.9  *  3233.4  *
* Length Wtd. (ft)       *   53.27  * Wetted Per. (ft)        *  128.47  *  169.67  *   25.57  *
* Min Ch El (ft)         *  728.09  * Shear (lb/sq ft)        *    0.18  *    1.44  *    0.32  *
* Alpha                  *    1.16  * Stream Power (lb/ft s)  *    0.52  *   14.56  *    0.48  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *   80.36  * 5889.78  *  190.80  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *   19.77  *  354.88  *   78.12  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.42  * Wt. n-Val.              *   0.030  *   0.035  *   0.088  *
* W.S. Elev (ft)         *  757.75  * Reach Len. (ft)         *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  683.58  * 3050.54  *  175.69  *
* E.G. Slope (ft/ft)     *0.001175  * Area (sq ft)            *  683.58  * 3050.54  *  175.69  *
* Q Total (cfs)          *34000.00  * Flow (cfs)              * 3224.19  *30462.62  *  313.19  *
* Top Width (ft)         *  340.11  * Top Width (ft)          *  147.09  *  162.25  *   30.77  *
* Vel Total (ft/s)       *    8.70  * Avg. Vel. (ft/s)        *    4.72  *    9.99  *    1.78  *
* Max Chl Dpth (ft)      *   29.66  * Hydr. Depth (ft)        *    4.65  *   18.80  *    5.71  *
* Conv. Total (cfs)      *992047.2  * Conv. (cfs)             * 94075.0  *888833.9  *  9138.3  *
* Length Wtd. (ft)       *   52.42  * Wetted Per. (ft)        *  147.59  *  169.67  *   32.50  *
* Min Ch El (ft)         *  728.09  * Shear (lb/sq ft)        *    0.34  *    1.32  *    0.40  *
* Alpha                  *    1.21  * Stream Power (lb/ft s)  *    1.60  *   13.17  *    0.71  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *  167.78  * 7048.41  *  535.93  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *   44.11  *  375.85  *  138.99  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.03  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.10  * Wt. n-Val.              *   0.030  *   0.035  *   0.088  *
* W.S. Elev (ft)         *  762.93  * Reach Len. (ft)         *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       * 1589.74  * 3890.75  *  386.06  *
* E.G. Slope (ft/ft)     *0.000699  * Area (sq ft)            * 1589.74  * 3890.75  *  386.06  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              * 8707.20  *35257.69  *  535.11  *
* Top Width (ft)         *  476.89  * Top Width (ft)          *  246.52  *  162.25  *   68.12  *
* Vel Total (ft/s)       *    7.59  * Avg. Vel. (ft/s)        *    5.48  *    9.06  *    1.39  *
* Max Chl Dpth (ft)      *   34.84  * Hydr. Depth (ft)        *    6.45  *   23.98  *    5.67  *
* Conv. Total (cfs)      *1682753.0  * Conv. (cfs)             *329259.8  *1333258.0  * 20235.0  *
* Length Wtd. (ft)       *   51.01  * Wetted Per. (ft)        *  247.79  *  169.67  *   70.59  *
* Min Ch El (ft)         *  728.09  * Shear (lb/sq ft)        *    0.28  *    1.00  *    0.24  *
* Alpha                  *    1.23  * Stream Power (lb/ft s)  *    1.53  *    9.07  *    0.33  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *  660.69  * 8954.54  * 1800.28  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  223.47  *  400.83  *  434.64  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.88  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.07  * Wt. n-Val.              *   0.032  *   0.035  *   0.088  *
* W.S. Elev (ft)         *  765.81  * Reach Len. (ft)         *   38.91  *   53.51  *   48.21  *
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* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 2396.97  * 4359.22  *  708.97  *
* E.G. Slope (ft/ft)      *0.000609  * Area (sq ft)           * 2396.97  * 4359.22  *  708.97  *
* Q Total (cfs)           *53690.00  * Flow (cfs)             *13029.03  *39772.74  *  888.22  *
* Top Width (ft)          *  735.04  * Top Width (ft)         *  346.20  *  162.25  *  226.59  *
* Vel Total (ft/s)        *    7.19  * Avg. Vel. (ft/s)       *    5.44  *    9.12  *    1.25  *
* Max Chl Dpth (ft)       *   37.72  * Hydr. Depth (ft)       *    6.92  *   26.87  *    3.13  *
* Conv. Total (cfs)       *2175276.0  * Conv. (cfs)           *527877.5  *1611411.0  * 35986.8  *
* Length Wtd. (ft)        *   50.26  * Wetted Per. (ft)       *  348.67  *  169.67  *  229.41  *
* Min Ch El (ft)          *  728.09  * Shear (lb/sq ft)       *    0.26  *    0.98  *    0.12  *
* Alpha                   *    1.33  * Stream Power (lb/ft s) *    1.42  *    8.92  *    0.15  *
* Frctn Loss (ft)         *    0.03  * Cum Volume (acre-ft)   * 1449.97  *10029.42  * 3219.52  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  372.28  *  406.68  *  698.54  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)          *  768.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.12  * Wt. n-Val.             *   0.033  *   0.035  *   0.082  *
* W.S. Elev (ft)          *  767.46  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 3038.19  * 4625.64  * 1338.64  *
* E.G. Slope (ft/ft)      *0.000613  * Area (sq ft)           * 3038.19  * 4625.64  * 1338.64  *
* Q Total (cfs)           *62000.00  * Flow (cfs)             *16463.00  *44046.18  * 1490.82  *
* Top Width (ft)          * 1135.44  * Top Width (ft)         *  464.87  *  162.25  *  508.32  *
* Vel Total (ft/s)        *    6.89  * Avg. Vel. (ft/s)       *    5.42  *    9.52  *    1.11  *
* Max Chl Dpth (ft)       *   39.36  * Hydr. Depth (ft)       *    6.54  *   28.51  *    2.63  *
* Conv. Total (cfs)       *2503964.0  * Conv. (cfs)           *664883.3  *1778872.0  * 60209.0  *
* Length Wtd. (ft)        *   49.86  * Wetted Per. (ft)       *  468.22  *  169.67  *  511.91  *
* Min Ch El (ft)          *  728.09  * Shear (lb/sq ft)       *    0.25  *    1.04  *    0.10  *
* Alpha                   *    1.52  * Stream Power (lb/ft s) *    1.35  *    9.94  *    0.11  *
* Frctn Loss (ft)         *    0.03  * Cum Volume (acre-ft)   * 2098.18  *10670.28  * 4512.02  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  449.31  *  407.84  *  981.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)          *  771.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.05  * Wt. n-Val.             *   0.035  *   0.035  *   0.073  *
* W.S. Elev (ft)          *  769.99  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      * 4500.00  * 5037.34  * 2837.54  *
* E.G. Slope (ft/ft)      *0.000563  * Area (sq ft)           * 4500.00  * 5037.34  * 2837.54  *
* Q Total (cfs)           *74720.00  * Flow (cfs)             *22020.95  *48661.01  * 4038.04  *
* Top Width (ft)          * 1560.52  * Top Width (ft)         *  719.23  *  162.25  *  679.04  *
* Vel Total (ft/s)        *    6.04  * Avg. Vel. (ft/s)       *    4.89  *    9.66  *    1.42  *
* Max Chl Dpth (ft)       *   41.90  * Hydr. Depth (ft)       *    6.26  *   31.05  *    4.18  *
* Conv. Total (cfs)       *3148597.0  * Conv. (cfs)           *927932.4  *2050507.0  *170157.3  *
* Length Wtd. (ft)        *   49.24  * Wetted Per. (ft)       *  725.96  *  169.67  *  683.53  *
* Min Ch El (ft)          *  728.09  * Shear (lb/sq ft)       *    0.22  *    1.04  *    0.15  *
* Alpha                   *    1.86  * Stream Power (lb/ft s) *    1.07  *   10.08  *    0.21  *
* Frctn Loss (ft)         *    0.03  * Cum Volume (acre-ft)   * 3439.93  *11726.11  * 7337.27  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *  570.22  *  409.76  * 1271.29  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)          *  760.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.34  * Wt. n-Val.             *   0.030  *   0.035  *   0.088  *
* W.S. Elev (ft)          *  759.45  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  941.90  * 3326.27  *  230.79  *
* E.G. Slope (ft/ft)      *0.001013  * Area (sq ft)           *  941.90  * 3326.27  *  230.79  *
* Q Total (cfs)           *38000.00  * Flow (cfs)             * 4891.22  *32682.39  *  426.39  *
* Top Width (ft)          *  353.25  * Top Width (ft)         *  156.93  *  162.25  *   34.07  *
* Vel Total (ft/s)        *    8.45  * Avg. Vel. (ft/s)       *    5.19  *    9.83  *    1.85  *
* Max Chl Dpth (ft)       *   31.36  * Hydr. Depth (ft)       *    6.00  *   20.50  *    6.77  *
* Conv. Total (cfs)       *1193781.0  * Conv. (cfs)           *153659.1  *1026727.0  * 13395.2  *
* Length Wtd. (ft)        *   51.95  * Wetted Per. (ft)       *  157.58  *  169.67  *   36.21  *
* Min Ch El (ft)          *  728.09  * Shear (lb/sq ft)       *    0.38  *    1.24  *    0.40  *
* Alpha                   *    1.21  * Stream Power (lb/ft s) *    1.96  *   12.18  *    0.74  *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)   *  248.12  * 7671.58  *  802.03  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *   73.78  *  385.12  *  187.47  *
**********************************************************************************************
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CROSS SECTION

RIVER: Blue River
REACH: Main RS: 11.1589*

INPUT
Description:
Station Elevation Data num= 276

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	817.46	10.43	815.51	13.75	814.74	16.33	814.35	16.42	814.34
25.15	813.2	46.96	812.18	52.87	811.94	80.4	811.86	93.64	811.64
104.99	811.03	113.13	810.77	120.56	810.48	121.89	810.46	125.49	810.2
125.61	810.21	140.45	810.06	143.46	810.05	159.58	809.65	180.5	809.27
209.11	808.19	211.09	808.14	212	808.11	231.95	807.41	242.85	806.99
249.52	806.08	253.78	805.91	264.13	805	270.89	804.5	277.92	803.97
306.99	800.64	313.13	797.99	321.01	794.29	322.35	793.87	326.89	792.92
329.58	791.28	334.78	787.15	339.38	785.32	366.82	778.15	367.38	778.21
377.99	779.48	387.42	779.26	393.95	779	403.27	777.42	404.63	776.92
410.3	774.81	422.91	769.88	434	771.12	436.46	771.37	469.25	769.88
505.66	769.1	525.7	768.55	529.7	768.5	539	768.37	547.6	768.27
596.95	767.49	636.04	765.99	637.27	765.93	637.66	765.93	641.42	765.81
656.75	765.61	659.86	765.73	667.18	765.88	690.93	765.65	693.63	765.18
697.17	764.58	702.55	763.76	713.07	766.62	732.51	771.93	773.89	772.02
782.01	771.96	784.84	771.94	813.1	772.04	816.73	771.95	846.74	771.83
853.75	771.79	884.25	771.59	909.24	771.15	912.59	771.09	939.11	770.96
944.38	771.7	945.83	772.45	947.3	772.57	971.58	772.15	973.68	771.75
975.79	771.34	976.13	771.39	978.42	769.33	980.14	767.39	982.79	767.25
995	767.25	1003.39	767.04	1005.02	767.03	1024.34	767.01	1028.59	768.67
1035.8	771.49	1036.38	771.72	1037.49	772.17	1041.63	771.17	1042.89	770.85
1094.04	770.57	1098.82	770.47	1152.41	769.96	1152.52	769.96	1194.6	769.34
1222.21	769.07	1229.7	768.75	1237.15	768.67	1242.43	768.98	1242.99	768.91
1243.7	768.78	1251.53	768.82	1253.75	768.73	1259.5	768.99	1288.24	770.09
1305.72	764.6	1308.46	764.18	1313.29	762.17	1345.2	762.9	1346.55	762.92
1347.25	762.9	1348.72	762.9	1357.63	762.78	1360.64	762.65	1368.11	762.45
1383	762.3	1392.77	760.88	1431.46	755.23	1440.89	755.2	1481.92	754.43
1529.48	753.31	1540.55	753.26	1542.75	752.68	1552.54	752.2	1564.35	748.91
1572.5	746.78	1577.9	745.37	1583.51	744.01	1603.48	741.7	1604.15	741.63
1605.4	741.34	1622.11	735.45	1624.1	734.32	1634.48	730.26	1639.24	730.04
1648.18	728.02	1657.14	728.02	1664.7	729.91	1674.66	730.26	1677.49	730.96
1694.31	738.71	1694.35	738.72	1704.17	741.24	1708.82	742.64	1711.79	743.1
1718.2	745.05	1718.78	745.19	1737.94	751.23	1750.94	752.52	1756.29	752.93
1759.78	754.65	1766.57	757.78	1772.45	760.37	1779.29	761.55	1780.35	761.77
1781.28	761.81	1816.46	763.49	1830.46	763.99	1850.08	765.36	1853.39	766.31
1855.93	766.47	1857.2	766.53	1875.41	766.89	1887.19	766.82	1888.61	766.86
1889.73	766.86	1890.21	766.84	1901.31	766.55	1943.99	764.07	1957.44	763.2
1959.1	763.07	1977.83	761.93	2029.58	764.89	2031.8	765.17	2056.98	767.87
2071.43	769.52	2116.16	768.8	2118.13	768.79	2127.48	768.41	2132.58	767.97
2143.18	767.24	2143.74	767.1	2152.09	766.4	2157.89	766.67	2173.75	766.37
2179.54	766.14	2202.83	766.03	2216.79	766.28	2230.01	766.7	2238.61	766.83
2243.22	766.99	2282.87	769.46	2289.09	769.73	2314.84	770.47	2361.73	771.18
2420.46	771.69	2436.21	772.03	2454.66	772.2	2494.47	773.25	2501.2	773.3
2515.93	773.46	2528.62	773.6	2538.6	773.74	2572.42	774.22	2600.3	774.56
2600.71	774.57	2601.61	774.57	2623.87	774.8	2624.13	774.8	2715.12	775.15
2790.88	774.59	2796.76	774.54	2797.84	774.58	2799.89	774.48	2801.02	774.44
2819.21	771.25	2820.23	771.07	2833.06	766.62	2834.21	766.4	2835.71	765.97
2858.91	766.08	2859.51	766.09	2866.5	766.35	2866.75	766.36	2871.82	766.53
2874.78	766.6	2876.97	766.25	2877.54	766.16	2881.57	765.73	2884.81	765.85
2894.29	765.09	2895.3	765.15	2895.81	765.14	2897.34	765.1	2904.3	765.43
2916.14	767.45	2916.15	767.45	2931.43	769.03	2932.69	769.18	2934.44	769.33
2935.97	769.69	2946.66	772.22	2961.4	775.16	2965.31	776.02	2975.13	779.02
2997.05	784.51	2998.88	784.77	3030.19	788.75	3036.5	788.8	3038.26	788.97
3046.11	791.08	3055.15	792.29	3064.04	792.8	3065.57	793.06	3067.83	793.74
3069.33	793.96	3069.81	794.04	3070.47	794.1	3088.97	795.87	3090.8	796.09
3096	796.63	3096.88	796.69	3131.06	800.23	3152.49	802.33	3158.08	802.66
3164.05	803.22								

Manning's n Values num= 13

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	469.25	.071	1259.5	.099	1313.29	.043	1392.77	.03
1552.54	.035	1737.94	.081	1889.73	.044	1943.99	.06	2071.43	.048
2796.76	.101	2866.5	.081	3164.05	.113				

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1552.54 1737.94            38.91   53.51   48.21            .1       .3

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************
* E.G. Elev (ft)         *  748.71  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *          *   0.035  *         *
* W.S. Elev (ft)         *  747.70  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1637.32  *          *
* E.G. Slope (ft/ft)     *0.001677  * Area (sq ft)           *          * 1637.32  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  157.76  * Top Width (ft)         *          *  157.76  *          *
* Vel Total (ft/s)       *    8.06  * Avg. Vel. (ft/s)       *          *    8.06  *          *
* Max Chl Dpth (ft)      *   19.68  * Hydr. Depth (ft)       *          *   10.38  *          *
* Conv. Total (cfs)      *322335.2  * Conv. (cfs)            *          *322335.2  *          *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)       *          *  163.97  *          *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *          *    1.05  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    8.43  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   20.10  * 3423.10  *    5.48  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    3.51  *  293.59  *    1.76  *
*************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************
* E.G. Elev (ft)         *  752.76  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *          *   0.035  *   0.081  *
* W.S. Elev (ft)         *  751.55  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2295.33  *    0.51  *
* E.G. Slope (ft/ft)     *0.001569  * Area (sq ft)           *          * 2295.33  *    0.51  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20299.89  *    0.11  *
* Top Width (ft)         *  186.26  * Top Width (ft)         *          *  183.06  *    3.20  *
* Vel Total (ft/s)       *    8.84  * Avg. Vel. (ft/s)       *          *    8.84  *    0.21  *
* Max Chl Dpth (ft)      *   23.53  * Hydr. Depth (ft)       *          *   12.54  *    0.16  *
* Conv. Total (cfs)      *512465.5  * Conv. (cfs)            *          *512462.8  *     2.7  *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)       *          *  190.33  *    3.22  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *          *    1.18  *    0.02  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.45  *    0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   39.58  * 4745.59  *   33.84  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *    7.38  *  328.69  *   17.98  *
*************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************
* E.G. Elev (ft)         *  755.88  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.             *   0.030  *   0.035  *   0.081  *
* W.S. Elev (ft)         *  754.59  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   74.33  * 2859.38  *   48.16  *
* E.G. Slope (ft/ft)     *0.001272  * Area (sq ft)           *   74.33  * 2859.38  *   48.16  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *  125.60  *26141.58  *   52.83  *
* Top Width (ft)         *  286.51  * Top Width (ft)         *   79.38  *  185.40  *   21.73  *
* Vel Total (ft/s)       *    8.83  * Avg. Vel. (ft/s)       *    1.69  *    9.14  *    1.10  *
* Max Chl Dpth (ft)      *   26.57  * Hydr. Depth (ft)       *    0.94  *   15.42  *    2.22  *
* Conv. Total (cfs)      *737884.2  * Conv. (cfs)            *  3521.1  *732882.1  *  1481.0  *
* Length Wtd. (ft)       *   53.47  * Wetted Per. (ft)       *   79.48  *  192.76  *   22.19  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *    0.07  *    1.18  *    0.17  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.13  *   10.77  *    0.19  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   80.22  * 5886.47  *  190.73  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   19.68  *  354.66  *   78.09  *
*************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************
* E.G. Elev (ft)         *  759.07  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.             *   0.030  *   0.035  *   0.081  *
* W.S. Elev (ft)         *  757.79  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  467.60  * 3451.21  *  128.55  *
* E.G. Slope (ft/ft)     *0.001027  * Area (sq ft)           *  467.60  * 3451.21  *  128.55  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             * 1667.20  *32132.61  *  200.19  *
* Top Width (ft)         *  352.63  * Top Width (ft)         *  138.59  *  185.40  *   28.65  *
* Vel Total (ft/s)       *    8.40  * Avg. Vel. (ft/s)       *    3.57  *    9.31  *    1.56  *
* Max Chl Dpth (ft)      *   29.77  * Hydr. Depth (ft)       *    3.37  *   18.61  *    4.49  *
* Conv. Total (cfs)      *1061045.0  * Conv. (cfs)            * 52028.7  *1002769.0  *  6247.3  *
* Length Wtd. (ft)       *   52.99  * Wetted Per. (ft)       *  138.88  *  192.76  *   29.81  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *    0.22  *    1.15  *    0.28  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.77  *   10.69  *    0.43  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  167.27  * 7044.42  *  535.76  *
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* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   43.98  *  375.63  *  138.95  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  763.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.030  *   0.035  *   0.081  *
* W.S. Elev (ft)         *  762.95  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1299.55  * 4407.81  *  346.09  *
* E.G. Slope (ft/ft)     *0.000630  * Area (sq ft)           * 1299.55  * 4407.81  *  346.09  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 6210.35  *37854.33  *  435.32  *
* Top Width (ft)         *  528.12  * Top Width (ft)         *  241.12  *  185.40  *  101.60  *
* Vel Total (ft/s)       *    7.35  * Avg. Vel. (ft/s)       *    4.78  *    8.59  *    1.26  *
* Max Chl Dpth (ft)      *   34.93  * Hydr. Depth (ft)       *    5.39  *   23.77  *    3.41  *
* Conv. Total (cfs)      *1772277.0  * Conv. (cfs)           *247336.2  *1507604.0  * 17337.3  *
* Length Wtd. (ft)       *   51.75  * Wetted Per. (ft)       *  241.91  *  192.76  *  103.52  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *    0.21  *    0.90  *    0.13  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    1.01  *    7.73  *    0.17  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  659.40  * 8949.44  * 1799.87  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  223.25  *  400.62  *  434.55  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  766.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.             *   0.031  *   0.035  *   0.076  *
* W.S. Elev (ft)         *  765.85  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2038.67  * 4945.51  *  870.79  *
* E.G. Slope (ft/ft)     *0.000541  * Area (sq ft)           * 2038.67  * 4945.51  *  870.79  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *10172.14  *42481.30  * 1036.55  *
* Top Width (ft)         *  765.69  * Top Width (ft)         *  315.64  *  185.40  *  264.65  *
* Vel Total (ft/s)       *    6.84  * Avg. Vel. (ft/s)       *    4.99  *    8.59  *    1.19  *
* Max Chl Dpth (ft)      *   37.83  * Hydr. Depth (ft)       *    6.46  *   26.67  *    3.29  *
* Conv. Total (cfs)      *2308321.0  * Conv. (cfs)           *437336.2  *1826420.0  * 44565.0  *
* Length Wtd. (ft)       *   50.98  * Wetted Per. (ft)       *  317.34  *  192.76  *  267.00  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *    0.22  *    0.87  *    0.11  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    1.08  *    7.44  *    0.13  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1447.99  *10023.70  * 3218.64  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  371.99  *  406.47  *  698.27  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  768.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.031  *   0.035  *   0.071  *
* W.S. Elev (ft)         *  767.50  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2631.33  * 5251.95  * 1559.74  *
* E.G. Slope (ft/ft)     *0.000538  * Area (sq ft)           * 2631.33  * 5251.95  * 1559.74  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *13314.54  *46812.27  * 1873.19  *
* Top Width (ft)         * 1120.61  * Top Width (ft)         *  421.54  *  185.40  *  513.67  *
* Vel Total (ft/s)       *    6.57  * Avg. Vel. (ft/s)       *    5.06  *    8.91  *    1.20  *
* Max Chl Dpth (ft)      *   39.48  * Hydr. Depth (ft)       *    6.24  *   28.33  *    3.04  *
* Conv. Total (cfs)      *2673925.0  * Conv. (cfs)           *574227.1  *2018911.0  * 80786.6  *
* Length Wtd. (ft)       *   50.56  * Wetted Per. (ft)       *  423.89  *  192.76  *  516.73  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *    0.21  *    0.91  *    0.10  *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    1.05  *    8.15  *    0.12  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 2095.64  *10664.21  * 4510.41  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  448.91  *  407.62  *  981.34  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  770.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *   0.033  *   0.035  *   0.068  *
* W.S. Elev (ft)         *  770.04  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4017.79  * 5722.16  * 3062.58  *
* E.G. Slope (ft/ft)     *0.000491  * Area (sq ft)           * 4017.79  * 5722.16  * 3062.58  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *18535.91  *51606.63  * 4577.47  *
* Top Width (ft)         * 1583.86  * Top Width (ft)         *  722.46  *  185.40  *  676.00  *
* Vel Total (ft/s)       *    5.84  * Avg. Vel. (ft/s)       *    4.61  *    9.02  *    1.49  *
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* Max Chl Dpth (ft)      *   42.02  * Hydr. Depth (ft)       *    5.56  *   30.86  *    4.53  *
* Conv. Total (cfs)      *3372207.0  * Conv. (cfs)           *836548.6  *2329072.0  *206586.7  *
* Length Wtd. (ft)       *   49.91  * Wetted Per. (ft)       *  727.25  *  192.76  *  679.90  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *    0.17  *    0.91  *    0.14  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    0.78  *    8.21  *    0.21  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 3436.12  *11719.50  * 7334.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  569.58  *  409.55  * 1270.54  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  760.71  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *   0.030  *   0.035  *   0.081  *
* W.S. Elev (ft)         *  759.48  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  711.74  * 3764.72  *  180.23  *
* E.G. Slope (ft/ft)     *0.000897  * Area (sq ft)           *  711.74  * 3764.72  *  180.23  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 2974.37  *34724.54  *  301.08  *
* Top Width (ft)         *  368.05  * Top Width (ft)         *  150.17  *  185.40  *   32.48  *
* Vel Total (ft/s)       *    8.16  * Avg. Vel. (ft/s)       *    4.18  *    9.22  *    1.67  *
* Max Chl Dpth (ft)      *   31.46  * Hydr. Depth (ft)       *    4.74  *   20.31  *    5.55  *
* Conv. Total (cfs)      *1268478.0  * Conv. (cfs)           * 99287.6  *1159140.0  * 10050.4  *
* Length Wtd. (ft)       *   52.60  * Wetted Per. (ft)       *  150.58  *  192.76  *   34.01  *
* Min Ch El (ft)         *  728.02  * Shear (lb/sq ft)       *    0.26  *    1.09  *    0.30  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *    1.11  *   10.09  *    0.50  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  247.39  * 7667.23  *  801.80  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   73.64  *  384.90  *  187.44  *
*****************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.1506*

INPUT
Description:
Station Elevation Data    num=     277
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  817.13   10.31  815.43    13.6  814.77   16.14  814.42   16.24  814.41
   24.86   813.4   46.43  812.32   52.27  812.09   79.49   811.8   92.59  811.52
   103.8  810.94  111.85  810.67   119.2  810.35  120.51  810.32  124.08  810.07
  124.19  810.07  138.86  809.78  141.83  809.74  157.77  809.23  178.46  808.68
  206.75  807.19  208.71  807.11   209.6  807.07  229.33  806.16  240.11  805.61
   246.7  804.75  250.92  804.53  261.15  803.59  267.83  803.06  274.77  802.49
  303.52   799.2  309.59  796.95  317.39  793.82  318.71  793.45  323.19   792.6
  325.86  791.23  330.99   787.8  335.55  786.24  362.67  779.92  363.23  779.95
  373.72  780.75  383.04  780.37   389.5  780.02  398.71  778.56  400.06  778.13
  405.66   776.3  418.13  772.05   429.1  772.77  431.53  772.91  463.95  770.92
  499.95  769.89  519.76  769.22  523.71  769.17  532.91  769.02  541.41  768.92
   590.2  768.15  628.86  766.83  630.07  766.78  630.45  766.78  634.17  766.66
  649.33  766.42  652.41  766.51  659.63  766.59  683.12  766.29  685.79   765.9
  689.29  765.42  694.61  764.76  705.01  767.04  724.23  771.32  765.14  771.42
  773.17  771.37  775.97  771.35  803.91  771.45  807.49  771.38  837.17   771.3
   844.1  771.27  874.25  771.07  898.96   770.7  902.28  770.65  928.49  770.53
   933.7  771.11  935.14  771.72  936.59  771.81   960.6  771.45  962.68  771.13
  964.76   770.8   965.1  770.84  967.36  769.17  969.06  767.62  971.68   767.5
  983.75  767.47  992.04  767.29  993.66  767.28 1012.77  767.25 1016.96  768.58
 1024.09  770.83 1024.67  771.01 1025.76  771.38 1029.86  770.61  1031.1  770.35
 1081.68  770.04  1086.4  769.95 1139.39  769.45 1139.49  769.45  1181.1  768.89
 1208.39  768.63  1215.8  768.36 1223.16  768.28 1228.39  768.52 1228.94  768.47
 1229.64  768.36 1237.38  768.39 1239.57  768.31 1245.26  768.51 1273.68  769.34
 1290.96  764.91 1293.67  764.58 1298.44  762.95    1330  763.49 1331.33   763.5
 1332.02  763.49 1332.14  763.48 1333.47  763.47 1342.29   763.3 1345.26  763.17
 1352.64  762.95  1369.6  762.67 1377.03  761.51 1415.28  756.98  1424.6  756.95
 1465.17     756 1512.19   754.6 1523.14  754.55 1525.31  754.08 1534.99  753.69
 1547.87  749.92 1556.75  747.43 1562.64  745.78 1568.74  744.15 1590.52  741.72
 1591.25  741.64 1592.61  741.29 1610.83  734.97    1613  733.86 1624.31  730.61
  1629.5  730.44 1639.25  727.96 1651.19  727.96 1659.83  730.33 1671.21  730.61
 1674.45  731.17 1693.68   739.3 1693.72  739.31 1704.95  741.67 1710.25  742.95
 1713.65  743.42 1720.99  745.71 1721.65  745.89 1743.55  752.91 1756.31  754.22
 1761.56  754.66 1764.99  756.11 1771.65  758.64 1777.42  760.75 1784.14  761.72
 1785.18  761.91  1786.1  761.95 1820.64  763.44 1834.37  763.91 1853.64  765.09
 1856.88  766.25 1859.38  766.38 1860.63  766.42 1878.51  766.71 1890.07  766.49
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 1891.47  766.51 1892.56  766.49 1893.03  766.45 1903.93  765.75 1945.83  761.92
 1959.04  760.65 1960.67  760.47 1979.05  758.97 2029.86  762.93 2032.04  763.29
 2056.76  767.14 2070.95  769.42 2114.86  768.72  2116.8  768.71 2125.98  768.37
 2130.98  768.01 2141.39  767.39 2141.94  767.28 2150.13   766.7 2155.83   766.9
  2171.4  766.61 2177.09  766.42 2199.95  766.26 2213.66  766.42 2226.63  766.82
 2235.07  766.88  2239.6  766.99 2278.52  769.37 2284.64  769.58 2309.92  770.18
 2355.95  770.75 2413.61  771.16 2429.07  771.43 2447.18  771.56 2486.26  772.77
 2492.87  772.81 2507.33  772.92 2519.79  773.02 2529.59  773.13  2562.8  773.48
 2590.16  773.71 2590.57  773.71 2591.45  773.71  2613.3  773.82 2613.55  773.82
 2702.89  773.83 2777.26  773.16 2783.04  773.11  2784.1  773.13 2786.11  773.05
 2787.22  773.01 2805.08  770.47 2806.08  770.33 2818.68  766.77  2819.8  766.59
 2821.28  766.25 2844.05  766.36 2844.64  766.37  2851.5  766.61 2851.75  766.62
 2856.73  766.79 2859.63  766.85 2861.78  766.58 2862.34  766.51  2866.3  766.17
 2869.48  766.27 2878.79  765.68 2879.77  765.73 2880.28  765.71 2881.79  765.69
 2888.62  765.96 2900.24   767.6 2900.25   767.6 2915.25  769.03 2916.48  769.17
 2918.21  769.31 2919.71  769.61  2930.2  771.79 2944.67  774.35 2948.51   775.1
 2958.16  778.09 2979.67  783.79 2981.47   784.1 3012.21  789.15  3018.4  789.56
 3020.13   789.8 3027.83  791.96 3036.71  793.47 3045.43  794.41 3046.94   794.7
 3049.16  795.38 3050.63  795.65  3051.1  795.74 3051.75  795.81 3069.91  797.76
 3071.71  797.99 3076.82  798.58 3077.68  798.66 3111.23  802.48 3132.28  804.79
 3137.76  805.22 3143.62  805.84

Manning's n Values        num=      13
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  463.95     .07 1245.26    .092 1298.44    .047 1377.03     .03
 1534.99    .035 1743.55    .075 1892.56    .043 1945.83    .055 2070.95    .052
 2783.04    .095  2851.5    .085 3143.62     .11

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1534.99 1743.55             38.91   53.51   48.21              .1       .3

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  748.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.80  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)          *  747.77  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 1840.21  *          *
* E.G. Slope (ft/ft)      *0.001266  * Area (sq ft)           *          * 1840.21  *          *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)          *  171.97  * Top Width (ft)         *          *  171.97  *          *
* Vel Total (ft/s)        *    7.17  * Avg. Vel. (ft/s)       *          *    7.17  *          *
* Max Chl Dpth (ft)       *   19.81  * Hydr. Depth (ft)       *          *   10.70  *          *
* Conv. Total (cfs)       *370953.9  * Conv. (cfs)            *          *370953.9  *          *
* Length Wtd. (ft)        *   53.51  * Wetted Per. (ft)       *          *  177.86  *          *
* Min Ch El (ft)          *  727.96  * Shear (lb/sq ft)       *          *    0.82  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    5.87  *          *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)   *   20.10  * 3420.97  *    5.48  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *    3.51  *  293.39  *    1.76  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  752.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.98  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)          *  751.64  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 2555.59  *          *
* E.G. Slope (ft/ft)      *0.001208  * Area (sq ft)           *          * 2555.59  *          *
* Q Total (cfs)           *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)          *  197.59  * Top Width (ft)         *          *  197.59  *          *
* Vel Total (ft/s)        *    7.94  * Avg. Vel. (ft/s)       *          *    7.94  *          *
* Max Chl Dpth (ft)       *   23.68  * Hydr. Depth (ft)       *          *   12.93  *          *
* Conv. Total (cfs)       *584036.1  * Conv. (cfs)            *          *584036.1  *          *
* Length Wtd. (ft)        *   53.51  * Wetted Per. (ft)       *          *  204.63  *          *
* Min Ch El (ft)          *  727.96  * Shear (lb/sq ft)       *          *    0.94  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.48  *          *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)   *   39.58  * 4742.61  *   33.84  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)         *    7.38  *  328.46  *   17.98  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)          *  755.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.06  * Wt. n-Val.             *   0.030  *   0.035  *   0.075  *
* W.S. Elev (ft)          *  754.69  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *   10.09  * 3182.97  *   15.73  *
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* E.G. Slope (ft/ft)     *0.001049  * Area (sq ft)           *   10.09  * 3182.97  *   15.73  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *    8.62  *26302.21  *    9.17  *
* Top Width (ft)         *  252.59  * Top Width (ft)         *   25.94  *  208.56  *   18.09  *
* Vel Total (ft/s)       *    8.20  * Avg. Vel. (ft/s)       *    0.85  *    8.26  *    0.58  *
* Max Chl Dpth (ft)      *   26.73  * Hydr. Depth (ft)       *    0.39  *   15.26  *    0.87  *
* Conv. Total (cfs)      *812551.3  * Conv. (cfs)            *   266.1  *812002.1  *   283.1  *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)       *   26.00  *  216.09  *   18.18  *
* Min Ch El (ft)         *  727.96  * Shear (lb/sq ft)       *    0.03  *    0.96  *    0.06  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.02  *    7.97  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   80.18  * 5882.76  *  190.69  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   19.63  *  354.42  *   78.07  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.14  * Wt. n-Val.             *   0.030  *   0.035  *   0.075  *
* W.S. Elev (ft)         *  757.83  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  267.11  * 3838.10  *   84.62  *
* E.G. Slope (ft/ft)     *0.000898  * Area (sq ft)           *  267.11  * 3838.10  *   84.62  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *  650.59  *33240.94  *  108.47  *
* Top Width (ft)         *  361.47  * Top Width (ft)         *  126.93  *  208.56  *   25.98  *
* Vel Total (ft/s)       *    8.11  * Avg. Vel. (ft/s)       *    2.44  *    8.66  *    1.28  *
* Max Chl Dpth (ft)      *   29.87  * Hydr. Depth (ft)       *    2.10  *   18.40  *    3.26  *
* Conv. Total (cfs)      *1134578.0  * Conv. (cfs)           * 21710.2  *1109248.0  *  3619.7  *
* Length Wtd. (ft)       *   53.33  * Wetted Per. (ft)       *  127.07  *  216.09  *   26.68  *
* Min Ch El (ft)         *  727.96  * Shear (lb/sq ft)       *    0.12  *    1.00  *    0.18  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *    0.29  *    8.62  *    0.23  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  166.94  * 7039.94  *  535.64  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   43.86  *  375.39  *  138.92  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *   0.030  *   0.035  *   0.067  *
* W.S. Elev (ft)         *  762.98  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1031.91  * 4910.67  *  468.66  *
* E.G. Slope (ft/ft)     *0.000566  * Area (sq ft)           * 1031.91  * 4910.67  *  468.66  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             * 4180.62  *39781.61  *  537.77  *
* Top Width (ft)         *  555.78  * Top Width (ft)         *  184.96  *  208.56  *  162.26  *
* Vel Total (ft/s)       *    6.94  * Avg. Vel. (ft/s)       *    4.05  *    8.10  *    1.15  *
* Max Chl Dpth (ft)      *   35.02  * Hydr. Depth (ft)       *    5.58  *   23.55  *    2.89  *
* Conv. Total (cfs)      *1871032.0  * Conv. (cfs)           *175777.0  *1672645.0  * 22610.9  *
* Length Wtd. (ft)       *   52.48  * Wetted Per. (ft)       *  185.42  *  216.09  *  163.92  *
* Min Ch El (ft)         *  727.96  * Shear (lb/sq ft)       *    0.20  *    0.80  *    0.10  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.80  *    6.50  *    0.12  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  658.36  * 8943.72  * 1799.42  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  223.06  *  400.37  *  434.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.031  *   0.035  *   0.063  *
* W.S. Elev (ft)         *  765.88  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1728.16  * 5517.02  * 1101.43  *
* E.G. Slope (ft/ft)     *0.000484  * Area (sq ft)           * 1728.16  * 5517.02  * 1101.43  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 7488.70  *44665.72  * 1535.58  *
* Top Width (ft)         *  740.57  * Top Width (ft)         *  261.67  *  208.56  *  270.34  *
* Vel Total (ft/s)       *    6.43  * Avg. Vel. (ft/s)       *    4.33  *    8.10  *    1.39  *
* Max Chl Dpth (ft)      *   37.92  * Hydr. Depth (ft)       *    6.60  *   26.45  *    4.07  *
* Conv. Total (cfs)      *2441153.0  * Conv. (cfs)           *340493.0  *2030841.0  * 69819.1  *
* Length Wtd. (ft)       *   51.89  * Wetted Per. (ft)       *  262.74  *  216.09  *  272.57  *
* Min Ch El (ft)         *  727.96  * Shear (lb/sq ft)       *    0.20  *    0.77  *    0.12  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.86  *    6.24  *    0.17  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1446.31  *10017.28  * 3217.55  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  371.73  *  406.22  *  697.97  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
```

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* E.G. Elev (ft)         *  768.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.93  * Wt. n-Val.             *   0.031  *   0.035  *   0.062  *
* W.S. Elev (ft)         *  767.54  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2246.75  * 5861.68  * 1778.01  *
* E.G. Slope (ft/ft)     *0.000482  * Area (sq ft)           * 2246.75  * 5861.68  * 1778.01  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *10115.39  *49306.52  * 2578.09  *
* Top Width (ft)         * 1113.91  * Top Width (ft)         *  396.19  *  208.56  *  509.15  *
* Vel Total (ft/s)       *    6.27  * Avg. Vel. (ft/s)       *    4.50  *    8.41  *    1.45  *
* Max Chl Dpth (ft)      *   39.58  * Hydr. Depth (ft)       *    5.67  *   28.11  *    3.49  *
* Conv. Total (cfs)      *2825051.0  * Conv. (cfs)            *460911.1  *2246669.0  *117471.3  *
* Length Wtd. (ft)       *   51.52  * Wetted Per. (ft)       *  397.75  *  216.09  *  512.00  *
* Min Ch El (ft)         *  727.96  * Shear (lb/sq ft)       *    0.17  *    0.82  *    0.10  *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    0.76  *    6.86  *    0.15  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2093.46  *10657.39  * 4508.57  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  448.54  *  407.38  *  980.77  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  770.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *   0.033  *   0.035  *   0.062  *
* W.S. Elev (ft)         *  770.06  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3624.38  * 6388.60  * 3270.20  *
* E.G. Slope (ft/ft)     *0.000444  * Area (sq ft)           * 3624.38  * 6388.60  * 3270.20  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *14679.43  *54616.50  * 5424.06  *
* Top Width (ft)         * 1622.35  * Top Width (ft)         *  737.44  *  208.56  *  676.35  *
* Vel Total (ft/s)       *    5.63  * Avg. Vel. (ft/s)       *    4.05  *    8.55  *    1.66  *
* Max Chl Dpth (ft)      *   42.10  * Hydr. Depth (ft)       *    4.91  *   30.63  *    4.84  *
* Conv. Total (cfs)      *3547795.0  * Conv. (cfs)            *696996.9  *2593257.0  *257541.0  *
* Length Wtd. (ft)       *   50.91  * Wetted Per. (ft)       *  740.87  *  216.09  *  679.97  *
* Min Ch El (ft)         *  727.96  * Shear (lb/sq ft)       *    0.14  *    0.82  *    0.13  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.55  *    7.00  *    0.22  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 3432.71  *11712.07  * 7330.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  568.93  *  409.30  * 1269.79  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  760.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *   0.030  *   0.035  *   0.075  *
* W.S. Elev (ft)         *  759.51  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  492.05  * 4188.16  *  135.68  *
* E.G. Slope (ft/ft)     *0.000797  * Area (sq ft)           *  492.05  * 4188.16  *  135.68  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             * 1580.73  *36226.15  *  193.12  *
* Top Width (ft)         *  393.78  * Top Width (ft)         *  141.10  *  208.56  *   44.12  *
* Vel Total (ft/s)       *    7.89  * Avg. Vel. (ft/s)       *    3.21  *    8.65  *    1.42  *
* Max Chl Dpth (ft)      *   31.55  * Hydr. Depth (ft)       *    3.49  *   20.08  *    3.08  *
* Conv. Total (cfs)      *1345763.0  * Conv. (cfs)            * 55981.2  *1282943.0  *  6839.4  *
* Length Wtd. (ft)       *   53.10  * Wetted Per. (ft)       *  141.34  *  216.09  *   45.16  *
* Min Ch El (ft)         *  727.96  * Shear (lb/sq ft)       *    0.17  *    0.96  *    0.15  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *    0.56  *    8.34  *    0.21  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  246.85  * 7662.34  *  801.63  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   73.51  *  384.66  *  187.39  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.1423*

INPUT
Description:
Station Elevation Data    num=     277
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   816.8   10.19  815.35   13.44   814.8   15.96  814.49   16.05  814.48
   24.58   813.6    45.9  812.47   51.67  812.23   78.59  811.75   91.53   811.4
  102.62  810.86  110.57  810.57  117.84  810.22  119.13  810.18  122.66  809.94
  122.77  809.94  137.27   809.5  140.21  809.43  155.97   808.8  176.42  808.08
```

204.39	806.18	206.32	806.08	207.2	806.03	226.71	804.91	237.36	804.23
243.88	803.42	248.05	803.14	258.16	802.19	264.77	801.63	271.63	801.01
300.05	797.77	306.05	795.91	313.76	793.35	315.06	793.04	319.5	792.27
322.13	791.17	327.21	788.46	331.71	787.16	358.53	781.68	359.08	781.69
369.45	782.01	378.66	781.48	385.05	781.04	394.15	779.7	395.49	779.34
401.02	777.79	413.35	774.21	424.19	774.42	426.59	774.45	458.64	771.97
494.23	770.67	513.82	769.89	517.73	769.83	526.82	769.67	535.22	769.56
583.45	768.81	621.67	767.68	622.86	767.64	623.24	767.63	626.92	767.52
641.9	767.24	644.95	767.29	652.09	767.3	675.31	766.93	677.95	766.62
681.41	766.25	686.66	765.75	696.95	767.47	715.95	770.7	756.39	770.81
764.34	770.78	767.09	770.77	794.72	770.86	798.26	770.81	827.6	770.77
834.45	770.75	864.26	770.56	888.68	770.25	891.96	770.21	917.88	770.09
923.03	770.52	924.45	770.98	925.88	771.05	949.62	770.75	951.67	770.51
953.73	770.25	954.06	770.28	956.3	769.02	957.99	767.85	960.58	767.75
972.51	767.69	980.7	767.53	982.3	767.52	1001.19	767.49	1005.34	768.48
1012.38	770.17	1012.95	770.31	1014.04	770.6	1018.08	770.04	1019.31	769.84
1069.31	769.51	1073.98	769.43	1126.36	768.95	1126.46	768.95	1167.6	768.44
1194.58	768.19	1201.9	767.97	1209.18	767.9	1214.34	768.07	1214.89	768.02
1215.58	767.95	1223.24	767.95	1225.4	767.88	1231.03	768.02	1259.11	768.59
1276.21	765.23	1278.88	764.97	1283.6	763.74	1314.79	764.07	1316.11	764.08
1316.79	764.07	1316.91	764.07	1318.23	764.04	1326.94	763.83	1329.88	763.7
1337.18	763.45	1351	763.12	1361.29	762.14	1399.1	758.72	1408.31	758.7
1448.42	757.57	1494.9	755.88	1505.72	755.84	1507.87	755.49	1517.45	755.18
1531.38	750.93	1541	748.08	1547.37	746.18	1553.98	744.29	1577.55	741.74
1578.34	741.66	1579.82	741.25	1599.54	734.48	1601.89	733.41	1614.14	730.97
1619.75	730.84	1630.31	727.9	1645.24	727.9	1654.96	730.75	1667.77	730.97
1671.41	731.39	1693.04	739.89	1693.09	739.91	1705.72	742.1	1711.69	743.26
1715.51	743.74	1723.77	746.38	1724.51	746.59	1749.15	754.6	1761.68	755.92
1766.83	756.39	1770.19	757.57	1776.73	759.51	1782.4	761.13	1788.99	761.9
1790.01	762.04	1790.91	762.08	1824.81	763.4	1838.29	763.82	1857.2	764.82
1860.38	766.19	1862.84	766.28	1864.06	766.32	1881.6	766.54	1892.95	766.17
1894.32	766.15	1895.4	766.12	1895.86	766.07	1906.55	764.94	1947.68	759.78
1960.64	758.1	1962.24	757.88	1980.28	756	2030.15	760.96	2032.28	761.42
2056.55	766.4	2070.46	769.31	2113.56	768.64	2115.46	768.62	2124.47	768.34
2129.39	768.05	2139.6	767.55	2140.14	767.46	2148.18	766.99	2153.77	767.12
2169.05	766.85	2174.63	766.69	2197.06	766.49	2210.52	766.57	2223.25	766.94
2231.54	766.94	2235.99	766.99	2274.18	769.28	2280.18	769.44	2304.99	769.88
2350.17	770.31	2406.75	770.62	2421.92	770.82	2439.7	770.93	2478.06	772.29
2484.54	772.31	2498.74	772.37	2510.96	772.44	2520.58	772.51	2553.17	772.74
2580.02	772.85	2580.43	772.85	2581.29	772.84	2602.74	772.85	2602.98	772.85
2690.66	772.52	2763.64	771.73	2769.32	771.67	2770.36	771.68	2772.33	771.61
2773.42	771.59	2790.94	769.68	2791.92	769.58	2804.29	766.92	2805.4	766.79
2806.84	766.53	2829.19	766.64	2829.77	766.65	2836.5	766.88	2836.75	766.89
2841.64	767.04	2844.49	767.11	2846.6	766.92	2847.14	766.86	2851.03	766.61
2854.15	766.7	2863.28	766.26	2864.25	766.3	2864.75	766.29	2866.23	766.28
2872.93	766.49	2884.34	767.74	2884.35	767.74	2899.07	769.03	2900.28	769.15
2901.97	769.28	2903.45	769.53	2913.74	771.36	2927.94	773.54	2931.71	774.17
2941.18	777.15	2962.3	783.06	2964.06	783.43	2994.22	789.55	3000.31	790.33
3002	790.64	3009.56	792.85	3018.27	794.65	3026.83	796.01	3028.31	796.35
3030.49	797.03	3031.94	797.34	3032.39	797.45	3033.03	797.52	3050.86	799.66
3052.62	799.9	3057.63	800.53	3058.48	800.62	3091.41	804.73	3112.06	807.24
3117.44	807.77	3123.19	808.46						

Manning's n Values num= 12

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	458.64	.068	1231.03	.085	1283.6	.051	1517.45	.035
1749.15	.069	1895.4	.041	1947.68	.05	2070.46	.057	2769.32	.089
2836.5	.089	3123.19	.108						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1517.45	1749.15	38.91	53.51	48.21	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	748.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	747.81	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)		2035.79	
E.G. Slope (ft/ft)	0.001002	Area (sq ft)		2035.79	
Q Total (cfs)	13200.00	Flow (cfs)		13200.00	
Top Width (ft)	186.36	Top Width (ft)		186.36	
Vel Total (ft/s)	6.48	Avg. Vel. (ft/s)		6.48	
Max Chl Dpth (ft)	19.91	Hydr. Depth (ft)		10.92	
Conv. Total (cfs)	417015.5	Conv. (cfs)		417015.5	
Length Wtd. (ft)	53.51	Wetted Per. (ft)		192.08	

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* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)       *           *    0.66  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    4.30  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   20.10  * 3418.59  *    5.48  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    3.51  *  293.17  *    1.76  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  751.70  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2809.21  *          *
* E.G. Slope (ft/ft)     *0.000961  * Area (sq ft)           *          * 2809.21  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)         *  211.37  * Top Width (ft)          *          *  211.37  *          *
* Vel Total (ft/s)       *    7.23  * Avg. Vel. (ft/s)        *          *    7.23  *          *
* Max Chl Dpth (ft)      *   23.80  * Hydr. Depth (ft)        *          *   13.29  *          *
* Conv. Total (cfs)      *654986.7  * Conv. (cfs)             *          *654986.7  *          *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)        *          *  218.27  *          *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)        *          *    0.77  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    5.58  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   39.58  * 4739.31  *   33.84  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    7.38  *  328.20  *   17.98  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *          *   0.035  *   0.069  *
* W.S. Elev (ft)         *  754.76  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3486.84  *    0.13  *
* E.G. Slope (ft/ft)     *0.000883  * Area (sq ft)           *          * 3486.84  *    0.13  *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *26319.98  *    0.02  *
* Top Width (ft)         *  231.90  * Top Width (ft)          *          *  230.34  *    1.56  *
* Vel Total (ft/s)       *    7.55  * Avg. Vel. (ft/s)        *          *    7.55  *    0.12  *
* Max Chl Dpth (ft)      *   26.86  * Hydr. Depth (ft)        *          *   15.14  *    0.08  *
* Conv. Total (cfs)      *885937.4  * Conv. (cfs)             *          *885936.9  *     0.5  *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)        *          *  238.16  *    1.57  *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)        *          *    0.81  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    6.09  *    0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   80.18  * 5878.66  *  190.68  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   19.62  *  354.15  *   78.06  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *   0.051  *   0.035  *   0.062  *
* W.S. Elev (ft)         *  757.89  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  107.26  * 4210.92  *   80.27  *
* E.G. Slope (ft/ft)     *0.000783  * Area (sq ft)           *  107.26  * 4210.92  *   80.27  *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *  105.92  *33822.70  *   71.39  *
* Top Width (ft)         *  371.37  * Top Width (ft)          *   80.42  *  231.70  *   59.25  *
* Vel Total (ft/s)       *    7.73  * Avg. Vel. (ft/s)        *    0.99  *    8.03  *    0.89  *
* Max Chl Dpth (ft)      *   29.99  * Hydr. Depth (ft)        *    1.33  *   18.17  *    1.35  *
* Conv. Total (cfs)      *1214850.0  * Conv. (cfs)             *  3784.5  *1208515.0  *  2550.7  *
* Length Wtd. (ft)       *   53.45  * Wetted Per. (ft)        *   80.49  *  239.58  *   59.78  *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)        *    0.07  *    0.86  *    0.07  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.06  *    6.90  *    0.06  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  166.77  * 7035.00  *  535.55  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   43.77  *  375.12  *  138.88  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *   0.051  *   0.035  *   0.054  *
* W.S. Elev (ft)         *  762.98  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  790.48  * 5390.02  *  662.31  *
* E.G. Slope (ft/ft)     *0.000530  * Area (sq ft)           *  790.48  * 5390.02  *  662.31  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              * 1504.93  *41973.69  * 1021.38  *
* Top Width (ft)         *  579.25  * Top Width (ft)          *  164.98  *  231.70  *  182.57  *
* Vel Total (ft/s)       *    6.50  * Avg. Vel. (ft/s)        *    1.90  *    7.79  *    1.54  *
* Max Chl Dpth (ft)      *   35.08  * Hydr. Depth (ft)        *    4.79  *   23.26  *    3.63  *
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* Conv. Total (cfs)      *1933413.0  * Conv. (cfs)            * 65385.4  *1823651.0  * 44376.4  *
* Length Wtd. (ft)       *   52.97  * Wetted Per. (ft)       *  165.25  *  239.58  *  184.32  *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)       *    0.16  *    0.74  *    0.12  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.30  *    5.79  *    0.18  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  657.54  * 8937.39  * 1798.79  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  222.90  *  400.10  *  434.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  766.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.051  *   0.035  *   0.054  *
* W.S. Elev (ft)         *  765.85  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1420.04  * 6055.17  * 1329.06  *
* E.G. Slope (ft/ft)     *0.000476  * Area (sq ft)           * 1420.04  * 6055.17  * 1329.06  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 2970.64  *48313.09  * 2406.27  *
* Top Width (ft)         *  744.13  * Top Width (ft)         *  246.05  *  231.70  *  266.38  *
* Vel Total (ft/s)       *    6.10  * Avg. Vel. (ft/s)       *    2.09  *    7.98  *    1.81  *
* Max Chl Dpth (ft)      *   37.95  * Hydr. Depth (ft)       *    5.77  *   26.13  *    4.99  *
* Conv. Total (cfs)      *2460349.0  * Conv. (cfs)            *136130.0  *2213951.0  *110267.3  *
* Length Wtd. (ft)       *   52.57  * Wetted Per. (ft)       *  246.60  *  239.58  *  268.84  *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)       *    0.17  *    0.75  *    0.15  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.36  *    6.00  *    0.27  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1444.90  *10010.17  * 3216.21  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  371.50  *  405.95  *  697.67  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  768.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *   0.051  *   0.035  *   0.054  *
* W.S. Elev (ft)         *  767.48  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1859.80  * 6433.19  * 1944.11  *
* E.G. Slope (ft/ft)     *0.000483  * Area (sq ft)           * 1859.80  * 6433.19  * 1944.11  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 4483.55  *53824.71  * 3691.74  *
* Top Width (ft)         * 1049.54  * Top Width (ft)         *  320.77  *  231.70  *  497.07  *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *    2.41  *    8.37  *    1.90  *
* Max Chl Dpth (ft)      *   39.58  * Hydr. Depth (ft)       *    5.80  *   27.77  *    3.91  *
* Conv. Total (cfs)      *2821059.0  * Conv. (cfs)            *204005.7  *2449075.0  *167977.7  *
* Length Wtd. (ft)       *   52.26  * Wetted Per. (ft)       *  321.67  *  239.58  *  500.03  *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)       *    0.17  *    0.81  *    0.12  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.42  *    6.77  *    0.22  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2091.63  *10649.84  * 4506.51  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  448.22  *  407.11  *  980.22  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  770.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *   0.052  *   0.035  *   0.056  *
* W.S. Elev (ft)         *  769.97  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3205.77  * 7009.33  * 3391.16  *
* E.G. Slope (ft/ft)     *0.000458  * Area (sq ft)           * 3205.77  * 7009.33  * 3391.16  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 7461.49  *60450.05  * 6808.45  *
* Top Width (ft)         * 1670.14  * Top Width (ft)         *  755.66  *  231.70  *  682.78  *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *    2.33  *    8.62  *    2.01  *
* Max Chl Dpth (ft)      *   42.07  * Hydr. Depth (ft)       *    4.24  *   30.25  *    4.97  *
* Conv. Total (cfs)      *3492413.0  * Conv. (cfs)            *348750.1  *2825436.0  *318227.0  *
* Length Wtd. (ft)       *   51.72  * Wetted Per. (ft)       *  757.86  *  239.58  *  686.40  *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)       *    0.12  *    0.84  *    0.14  *
* Alpha                  *    2.03  * Stream Power (lb/ft s) *    0.28  *    7.21  *    0.28  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 3429.66  *11703.84  * 7326.81  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  568.26  *  409.03  * 1269.04  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  760.56  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.051  *   0.035  *   0.058  *
* W.S. Elev (ft)         *  759.55  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  287.73  * 4594.37  *  207.13  *
* E.G. Slope (ft/ft)     *0.000715  * Area (sq ft)           *  287.73  * 4594.37  *  207.13  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  385.48  *37367.45  *  247.06  *
* Top Width (ft)         *  453.33  * Top Width (ft)         *  127.48  *  231.70  *   94.15  *
* Vel Total (ft/s)       *    7.47  * Avg. Vel. (ft/s)       *    1.34  *    8.13  *    1.19  *
* Max Chl Dpth (ft)      *   31.65  * Hydr. Depth (ft)       *    2.26  *   19.83  *    2.20  *
* Conv. Total (cfs)      *1421101.0  * Conv. (cfs)            * 14416.0  *1397445.0  *  9239.6  *
* Length Wtd. (ft)       *   53.35  * Wetted Per. (ft)       *  127.60  *  239.58  *   95.11  *
* Min Ch El (ft)         *  727.90  * Shear (lb/sq ft)       *    0.10  *    0.86  *    0.10  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.13  *    6.96  *    0.12  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  246.50  * 7656.95  *  801.44  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   73.39  *  384.39  *  187.32  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.1339*

INPUT
Description:
Station Elevation Data    num=     277
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  816.47   10.07  815.27   13.29  814.83   15.77  814.57   15.87  814.56
   24.29  813.79   45.37  812.61   51.07  812.38   77.68  811.69   90.47  811.29
  101.43  810.77  109.29  810.47  116.47  810.09  117.75  810.04  121.24  809.81
  121.35  809.81  135.68  809.22  138.59  809.11  154.17  808.38  174.38  807.49
  202.02  805.17  203.93  805.05  204.81  804.99  224.09  803.66  234.62  802.85
  241.06  802.09  245.18  801.76  255.18  800.79   261.7  800.19  268.49  799.53
  296.58  796.33  302.51  794.87  310.13  792.88  311.42  792.62   315.8  791.95
  318.41  791.12  323.43  789.12  327.87  788.08  354.38  783.45  354.92  783.43
  365.17  783.27  374.29  782.59  380.59  782.07  389.59  780.84  390.91  780.55
  396.38  779.28  408.57  776.38  419.29  776.07  421.66  775.99  453.34  773.01
  488.52  771.46  507.88  770.56  511.74   770.5  520.72  770.32  529.03  770.21
  576.71  769.47  614.48  768.53  615.66  768.49  616.03  768.48  619.67  768.37
  634.48  768.06  637.49  768.06  644.55  768.02   667.5  767.57  670.11  767.33
  673.53  767.09  678.72  766.75  688.89   767.9  707.67  770.09  747.65  770.21
   755.5   770.2  758.22  770.19  785.53  770.28  789.03  770.24  818.03  770.24
   824.8  770.23  854.26  770.05   878.4   769.8  881.65  769.77  907.26  769.65
  912.35  769.94  913.75  770.24  915.17  770.28  938.64  770.05  940.67  769.88
   942.7  769.71  943.03  769.72  945.24  768.87  946.91  768.08  949.47     768
  961.26  767.92  969.36  767.77  970.94  767.76  989.61  767.73  993.71  768.39
 1000.67  769.51 1001.24   769.6 1002.31  769.81 1006.31  769.47 1007.52  769.34
 1056.94  768.98 1061.56  768.91 1113.33  768.45 1113.44  768.45 1154.09  767.99
 1180.76  767.75    1188  767.58  1195.2  767.52  1200.3  767.62 1200.84  767.58
 1201.52  767.53 1209.09  767.51 1211.23  767.46 1216.79  767.54 1244.55  767.84
 1261.45  765.54 1264.09  765.36 1268.75  764.52 1299.59  764.66 1300.89  764.66
 1301.56  764.65 1301.68  764.65 1302.98  764.61  1311.6  764.35  1314.5  764.22
 1321.72  763.95 1334.54  763.55 1345.54  762.76 1382.92  760.46 1392.03  760.45
 1431.67  759.14 1477.62  757.17 1488.31  757.13 1490.43  756.89  1499.9  756.67
  1514.9  751.94 1525.25  748.72  1532.1  746.59 1539.22  744.43 1564.59  741.76
 1565.44  741.68 1567.03   741.2 1588.26  733.99 1590.78  732.96 1603.97  731.32
 1610.01  731.23 1621.37  727.84 1639.29  727.84 1650.09  731.18 1664.32  731.32
 1668.36   731.6 1692.41  740.48 1692.45   740.5  1706.5  742.53 1713.13  743.57
 1717.38  744.06 1726.55  747.04 1727.37  747.29 1754.76  756.28 1767.05  757.62
  1772.1  758.12  1775.4  759.03 1781.81  760.38 1787.37  761.51 1793.84  762.07
 1794.84  762.18 1795.72  762.21 1828.98  763.35 1842.21  763.74 1860.76  764.55
 1863.88  766.13 1866.29  766.19 1867.49  766.21  1884.7  766.36 1895.83  765.84
 1897.18   765.8 1898.23  765.75 1898.68  765.68 1909.18  764.14 1949.52  757.63
 1962.24  755.55 1963.81  755.28  1981.5  753.04 2030.43     759 2032.52  759.55
 2056.33  765.66 2069.98  769.21 2112.27  768.55 2114.13  768.53 2122.97   768.3
 2127.79  768.08 2137.81   767.7 2138.33  767.64 2146.22  767.29 2151.71  767.35
  2166.7   767.1 2172.17  766.96 2194.18  766.72 2207.38  766.71 2219.88  767.06
    2228  766.99 2232.37  766.99 2269.84  769.18 2275.73  769.29 2300.07  769.59
 2344.39  769.88  2399.9  770.09 2414.78  770.22 2432.22  770.29 2469.85  771.81
 2476.21  771.81 2490.14  771.83 2502.13  771.86 2511.57  771.89 2543.54     772
 2569.89  771.99 2570.28  771.99 2571.13  771.98 2592.17  771.87 2592.41  771.87
 2678.43   771.2 2750.03   770.3 2755.59  770.23 2756.62  770.23 2758.55  770.17
 2759.62  770.16 2776.81   768.9 2777.77  768.83 2789.91  767.07 2790.99  766.98
 2792.41  766.81 2814.34  766.92  2814.9  766.93 2821.51  767.15 2821.75  767.16
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 2826.54   767.3 2829.34  767.36 2831.41  767.25 2831.95  767.22 2835.76  767.06
 2838.82  767.12 2847.78  766.85 2848.73  766.88 2849.22  766.87 2850.67  766.86
 2857.25  767.02 2868.43  767.89 2868.45  767.89 2882.88  769.03 2884.08  769.14
 2885.73  769.26 2887.18  769.45 2897.29  770.93 2911.21  772.74 2914.91  773.25
  2924.2  776.21 2944.92  782.34 2946.65  782.77 2976.24  789.95 2982.21   791.1
 2983.86  791.48 2991.28  793.73 2999.83  795.83 3008.23  797.62 3009.68  797.99
 3011.82  798.67 3013.24  799.03 3013.69  799.15 3014.31  799.23  3031.8  801.56
 3033.53   801.8 3038.45  802.48 3039.27  802.58 3071.58  806.99 3091.84   809.7
 3097.12  810.33 3102.77  811.07

Manning's n Values        num=      12
    Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
      0    .075  453.34    .067 1216.79    .078 1268.75    .055  1499.9    .035
 1754.76    .063 1898.23    .039 1949.52    .045 2069.98    .061 2755.59    .083
 2821.51    .092 3102.77    .105

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1499.9 1754.76             38.91   53.51   48.21             .1       .3

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  748.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.55  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)          *  747.84  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 2225.54  *          *
* E.G. Slope (ft/ft)      *0.000821  * Area (sq ft)           *          * 2225.54  *          *
* Q Total (cfs)           *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)          *  200.95  * Top Width (ft)         *          *  200.95  *          *
* Vel Total (ft/s)        *    5.93  * Avg. Vel. (ft/s)       *          *    5.93  *          *
* Max Chl Dpth (ft)       *   20.00  * Hydr. Depth (ft)       *          *   11.08  *          *
* Conv. Total (cfs)       *460822.3  * Conv. (cfs)            *          *460822.3  *          *
* Length Wtd. (ft)        *   53.51  * Wetted Per. (ft)       *          *  206.62  *          *
* Min Ch El (ft)          *  727.84  * Shear (lb/sq ft)       *          *    0.55  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    3.27  *          *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)   *   20.10  * 3415.97  *    5.48  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *    3.51  *  292.93  *    1.76  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  752.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.68  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)          *  751.74  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 3057.90  *          *
* E.G. Slope (ft/ft)      *0.000787  * Area (sq ft)           *          * 3057.90  *          *
* Q Total (cfs)           *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)          *  225.40  * Top Width (ft)         *          *  225.40  *          *
* Vel Total (ft/s)        *    6.64  * Avg. Vel. (ft/s)       *          *    6.64  *          *
* Max Chl Dpth (ft)       *   23.90  * Hydr. Depth (ft)       *          *   13.57  *          *
* Conv. Total (cfs)       *723791.0  * Conv. (cfs)            *          *723791.0  *          *
* Length Wtd. (ft)        *   53.51  * Wetted Per. (ft)       *          *  232.29  *          *
* Min Ch El (ft)          *  727.84  * Shear (lb/sq ft)       *          *    0.65  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    4.29  *          *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)   *   39.58  * 4735.71  *   33.84  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *    7.38  *  327.94  *   17.98  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)          *  755.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.75  * Wt. n-Val.             *          *   0.035  *   0.045  *
* W.S. Elev (ft)          *  754.82  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          * 3780.06  *   25.39  *
* E.G. Slope (ft/ft)      *0.000727  * Area (sq ft)           *          * 3780.06  *   25.39  *
* Q Total (cfs)           *26320.00  * Flow (cfs)             *          *26299.22  *   20.78  *
* Top Width (ft)          *  273.11  * Top Width (ft)         *          *  244.52  *   28.60  *
* Vel Total (ft/s)        *    6.92  * Avg. Vel. (ft/s)       *          *    6.96  *    0.82  *
* Max Chl Dpth (ft)       *   26.98  * Hydr. Depth (ft)       *          *   15.46  *    0.89  *
* Conv. Total (cfs)       *975902.1  * Conv. (cfs)            *          *975131.8  *   770.3  *
* Length Wtd. (ft)        *   53.48  * Wetted Per. (ft)       *          *  252.37  *   28.82  *
* Min Ch El (ft)          *  727.84  * Shear (lb/sq ft)       *          *    0.68  *    0.04  *
* Alpha                   *    1.01  * Stream Power (lb/ft s) *          *    4.73  *    0.03  *
* Frctn Loss (ft)         *    0.03  * Cum Volume (acre-ft)   *   80.18  * 5874.20  *  190.67  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   19.62  *  353.86  *   78.04  *
**********************************************************************************************
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Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	758.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.055	0.035	0.045
W.S. Elev (ft)	757.97	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)	29.38	4574.37	201.91
E.G. Slope (ft/ft)	0.000668	Area (sq ft)	29.38	4574.37	201.91
Q Total (cfs)	34000.00	Flow (cfs)	16.46	33673.88	309.66
Top Width (ft)	386.01	Top Width (ft)	40.85	254.86	90.30
Vel Total (ft/s)	7.07	Avg. Vel. (ft/s)	0.56	7.36	1.53
Max Chl Dpth (ft)	30.13	Hydr. Depth (ft)	0.72	17.95	2.24
Conv. Total (cfs)	1315534.0	Conv. (cfs)	636.9	1302915.0	11981.4
Length Wtd. (ft)	53.41	Wetted Per. (ft)	40.89	263.24	91.04
Min Ch El (ft)	727.84	Shear (lb/sq ft)	0.03	0.72	0.09
Alpha	1.07	Stream Power (lb/ft s)	0.02	5.33	0.14
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	166.71	7029.60	535.40
C & E Loss (ft)	0.05	Cum SA (acres)	43.72	374.82	138.79

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	763.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.055	0.035	0.046
W.S. Elev (ft)	763.05	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)	567.80	5870.87	888.01
E.G. Slope (ft/ft)	0.000451	Area (sq ft)	567.80	5870.87	888.01
Q Total (cfs)	44500.00	Flow (cfs)	761.99	41919.11	1818.89
Top Width (ft)	609.13	Top Width (ft)	158.45	254.86	195.83
Vel Total (ft/s)	6.07	Avg. Vel. (ft/s)	1.34	7.14	2.05
Max Chl Dpth (ft)	35.21	Hydr. Depth (ft)	3.58	23.04	4.53
Conv. Total (cfs)	2096440.0	Conv. (cfs)	35898.3	1974852.0	85689.8
Length Wtd. (ft)	53.06	Wetted Per. (ft)	158.61	263.24	197.99
Min Ch El (ft)	727.84	Shear (lb/sq ft)	0.10	0.63	0.13
Alpha	1.31	Stream Power (lb/ft s)	0.14	4.48	0.26
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	656.94	8930.47	1797.94
C & E Loss (ft)	0.04	Cum SA (acres)	222.76	399.80	434.00

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	766.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.	0.055	0.035	0.047
W.S. Elev (ft)	765.92	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)	1150.99	6602.50	1582.91
E.G. Slope (ft/ft)	0.000406	Area (sq ft)	1150.99	6602.50	1582.91
Q Total (cfs)	53690.00	Flow (cfs)	1810.34	48379.14	3500.52
Top Width (ft)	768.16	Top Width (ft)	241.27	254.86	272.03
Vel Total (ft/s)	5.75	Avg. Vel. (ft/s)	1.57	7.33	2.21
Max Chl Dpth (ft)	38.08	Hydr. Depth (ft)	4.77	25.91	5.82
Conv. Total (cfs)	2665508.0	Conv. (cfs)	89876.8	2401844.0	173787.5
Length Wtd. (ft)	52.72	Wetted Per. (ft)	241.58	263.24	275.12
Min Ch El (ft)	727.84	Shear (lb/sq ft)	0.12	0.64	0.15
Alpha	1.48	Stream Power (lb/ft s)	0.19	4.66	0.32
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1443.75	10002.39	3214.59
C & E Loss (ft)	0.04	Cum SA (acres)	371.28	405.65	697.37

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	768.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.	0.055	0.035	0.047
W.S. Elev (ft)	767.56	Reach Len. (ft)	38.91	53.51	48.21
Crit W.S. (ft)		Flow Area (sq ft)	1563.44	7018.78	2168.31
E.G. Slope (ft/ft)	0.000413	Area (sq ft)	1563.44	7018.78	2168.31
Q Total (cfs)	62000.00	Flow (cfs)	2953.43	54058.95	4987.62
Top Width (ft)	1038.40	Top Width (ft)	295.17	254.86	488.37
Vel Total (ft/s)	5.77	Avg. Vel. (ft/s)	1.89	7.70	2.30

```
* Max Chl Dpth (ft)      *   39.72  * Hydr. Depth (ft)       *    5.30  *   27.54  *    4.44  *
* Conv. Total (cfs)      *3050171.0  * Conv. (cfs)           *145297.8  *2659501.0  *245372.5  *
* Length Wtd. (ft)       *   52.46  * Wetted Per. (ft)       *  295.67  *  263.24  *  491.85  *
* Min Ch El (ft)         *  727.84  * Shear (lb/sq ft)       *    0.14  *    0.69  *    0.11  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    0.26  *    5.30  *    0.26  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2090.10  *10641.57  * 4504.23  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  447.95  *  406.81  *  979.67  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.056  *   0.035  *   0.049  *
* W.S. Elev (ft)         *  770.04  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2958.32  * 7650.42  * 3636.81  *
* E.G. Slope (ft/ft)     *0.000396  * Area (sq ft)           * 2958.32  * 7650.42  * 3636.81  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 5428.73  *61063.58  * 8227.69  *
* Top Width (ft)         * 1800.78  * Top Width (ft)         *  785.22  *  254.86  *  760.70  *
* Vel Total (ft/s)       *    5.25  * Avg. Vel. (ft/s)       *    1.84  *    7.98  *    2.26  *
* Max Chl Dpth (ft)      *   42.20  * Hydr. Depth (ft)       *    3.77  *   30.02  *    4.78  *
* Conv. Total (cfs)      *3756884.0  * Conv. (cfs)           *272953.6  *3070246.0  *413684.2  *
* Length Wtd. (ft)       *   51.97  * Wetted Per. (ft)       *  786.49  *  263.24  *  764.73  *
* Min Ch El (ft)         *  727.84  * Shear (lb/sq ft)       *    0.09  *    0.72  *    0.12  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    0.17  *    5.73  *    0.27  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 3426.91  *11694.83  * 7322.92  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  567.57  *  408.73  * 1268.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  760.47  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.055  *   0.035  *   0.046  *
* W.S. Elev (ft)         *  759.63  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  130.30  * 4997.88  *  377.77  *
* E.G. Slope (ft/ft)     *0.000607  * Area (sq ft)           *  130.30  * 4997.88  *  377.77  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *  117.07  *37197.65  *  685.28  *
* Top Width (ft)         *  457.02  * Top Width (ft)         *   83.00  *  254.86  *  119.16  *
* Vel Total (ft/s)       *    6.90  * Avg. Vel. (ft/s)       *    0.90  *    7.44  *    1.81  *
* Max Chl Dpth (ft)      *   31.79  * Hydr. Depth (ft)       *    1.57  *   19.61  *    3.17  *
* Conv. Total (cfs)      *1542679.0  * Conv. (cfs)           *  4752.7  *1510106.0  * 27820.3  *
* Length Wtd. (ft)       *   53.33  * Wetted Per. (ft)       *   83.06  *  263.24  *  120.38  *
* Min Ch El (ft)         *  727.84  * Shear (lb/sq ft)       *    0.06  *    0.72  *    0.12  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    0.05  *    5.35  *    0.22  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  246.31  * 7651.06  *  801.12  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   73.30  *  384.09  *  187.20  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.1256*

INPUT
Description:
Station Elevation Data    num=     276
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  816.13    9.96  815.19   13.13  814.86   15.59  814.64   15.68  814.63
   24.01  813.99   44.84  812.76   50.48  812.52   76.77  811.63   89.41  811.17
  100.24  810.68  108.01  810.37  115.11  809.96  116.38   809.9  119.82  809.68
  119.93  809.67   134.1  808.94  136.97   808.8  152.36  807.96  172.34   806.9
  199.66  804.16  201.55  804.02  202.41  803.95  221.47  802.41  231.87  801.46
  238.24  800.75  242.31  800.38  252.19  799.38  258.64  798.75  265.35  798.05
  293.11   794.9  298.97  793.84   306.5  792.41  307.77  792.21  312.11  791.63
  314.68  791.06  319.64  789.77  324.04  789.01  350.24  785.21  350.77  785.18
   360.9  784.54  369.91  783.69  376.14  783.09  385.03  781.98  386.34  781.76
  391.75  780.78  403.79  778.54  414.38  777.72  416.73  777.54  448.03  774.06
   482.8  772.25  501.94  771.23  505.75  771.16  514.63  770.97  522.84  770.85
  569.96  770.13  607.29  769.37  608.46  769.34  608.83  769.33  612.42  769.23
```

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  627.06  768.88  630.03  768.84  637.01  768.73  659.69  768.21  662.27  768.05
  665.65  767.93  670.78  767.75  680.83  768.33  699.39  769.47   738.9   769.6
  746.66  769.61  749.35  769.61  776.34  769.69   779.8  769.68  808.45  769.71
  815.15   769.7  844.27  769.54  868.13  769.35  871.33  769.33  896.65  769.22
  901.68  769.35  903.06   769.5  904.47  769.52  927.66  769.35  929.66  769.26
  931.67  769.16     932  769.17  934.18  768.72  935.83  768.31  938.36  768.25
  950.01  768.14  958.02  768.02  959.58     768  978.03  767.96  982.08   768.3
  988.97  768.85  989.52   768.9  990.58  769.02  994.54  768.91  995.73  768.83
 1044.58  768.44 1049.14  768.39 1100.31  767.94 1100.41  767.94 1140.59  767.54
 1166.95  767.31  1174.1   767.2 1181.21  767.13 1186.26  767.16 1186.79  767.14
 1187.47  767.11 1194.95  767.07 1197.06  767.04 1202.55  767.05 1229.99  767.09
 1246.69  765.85  1249.3  765.75 1253.91   765.3 1284.38  765.25 1285.67  765.24
 1286.33  765.24 1286.45  765.23 1287.74  765.19 1296.25  764.87 1299.12  764.74
 1306.25  764.45  1329.8  763.39 1366.74  762.21 1375.74   762.2 1414.92   760.7
 1460.33  758.45  1470.9  758.41 1472.99  758.29 1482.35  758.17 1498.41  752.94
  1509.5  749.37 1516.84     747 1524.46  744.57 1551.63  741.78 1552.54  741.69
 1554.24  741.15 1576.97  733.51 1579.68  732.51  1593.8  731.67 1600.26  731.63
 1612.43  727.77 1633.34  727.77 1645.22   731.6 1660.87  731.67 1665.32  731.82
 1691.77  741.08 1691.82   741.1 1707.27  742.96 1714.57  743.88 1719.24  744.38
 1729.33   747.7 1730.24     748 1760.36  757.97 1772.41  759.31 1777.37  759.84
 1780.61  760.49  1786.9  761.25 1792.35  761.89 1798.69  762.25 1799.68  762.31
 1800.54  762.34 1833.15   763.3 1846.12  763.65 1864.31  764.28 1867.38  766.06
 1869.74   766.1 1870.92  766.11 1887.79  766.18 1898.71  765.52 1900.03  765.44
 1901.06  765.38 1901.51   765.3  1911.8  763.33 1951.37  755.49 1963.84     753
 1965.38  752.69 1982.73  750.07 2030.71  757.03 2032.77  757.68 2056.11  764.93
  2069.5  769.11 2110.97  768.47 2112.79  768.45 2121.46  768.27 2126.19  768.12
 2136.01  767.85 2136.53  767.82 2144.27  767.58 2149.64  767.58 2164.35  767.34
 2169.72  767.23  2191.3  766.95 2204.25  766.85  2216.5  767.18 2224.47  767.05
 2228.75     767  2265.5  769.09 2271.27  769.15 2295.14   769.3 2338.61  769.45
 2393.04  769.55 2407.64  769.62 2424.75  769.66 2461.65  771.33 2467.89  771.31
 2481.54  771.28  2493.3  771.27 2502.56  771.27 2533.91  771.26 2559.75  771.14
 2560.14  771.13 2560.96  771.12  2581.6   770.9 2581.84  770.89 2666.19  769.89
 2736.41  768.87 2741.87  768.79 2742.87  768.78 2744.77  768.74 2745.82  768.73
 2762.68  768.11 2763.62  768.08 2775.52  767.21 2776.59  767.17 2777.97  767.09
 2799.48   767.2 2800.03  767.21 2806.51  767.41 2806.75  767.42 2811.45  767.55
 2814.19  767.62 2816.22  767.58 2816.75  767.57 2820.48   767.5 2823.49  767.54
 2832.28  767.43 2833.21  767.45 2833.69  767.45 2835.11  767.45 2841.56  767.55
 2852.53  768.03 2852.55  768.03  2866.7  769.03 2867.87  769.12  2869.5  769.23
 2870.92  769.37 2880.83   770.5 2894.48  771.93 2898.11  772.33 2907.22  775.28
 2927.54  781.61 2929.23   782.1 2958.25  790.35 2964.11  791.86 2965.73  792.31
 2973.01  794.61 2981.39  797.01 2989.63  799.22 2991.05  799.64 2993.14  800.32
 2994.54  800.72 2994.98  800.86 2995.59  800.94 3012.74  803.45 3014.44  803.71
 3019.26  804.43 3020.07  804.54 3051.76  809.24 3071.63  812.16  3076.8  812.88
 3082.34  813.69

Manning's n Values         num=      12
     Sta   n Val      Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  448.03    .065 1202.55    .071 1253.91     .06 1482.35    .034
 1760.36    .056 1901.06    .037 1951.37     .04  2069.5    .065 2741.87    .076
 2806.51    .096 3082.34    .103

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1482.35 1760.36             38.91   53.51   48.21              .1       .3

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.034  *          *
* W.S. Elev (ft)         *  747.85  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2409.64  *          *
* E.G. Slope (ft/ft)     *0.000651  * Area (sq ft)           *          * 2409.64  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  215.61  * Top Width (ft)          *          *  215.61  *          *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)        *          *    5.48  *          *
* Max Chl Dpth (ft)      *   20.08  * Hydr. Depth (ft)        *          *   11.18  *          *
* Conv. Total (cfs)      *517293.0  * Conv. (cfs)             *          *517293.0  *          *
* Length Wtd. (ft)       *   53.51  * Wetted Per. (ft)        *          *  221.34  *          *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)        *          *    0.44  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    2.42  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)     *   20.10  * 3413.12  *    5.48  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)           *    3.51  *  292.68  *    1.76  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  752.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *          *   0.034  *   0.040  *
* W.S. Elev (ft)         *  751.77  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3301.66  *   19.61  *
* E.G. Slope (ft/ft)     *0.000622  * Area (sq ft)           *          * 3301.66  *   19.61  *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20283.79  *   16.21  *
* Top Width (ft)         *  262.63  * Top Width (ft)          *          *  239.61  *   23.03  *
* Vel Total (ft/s)       *    6.11  * Avg. Vel. (ft/s)        *          *    6.14  *    0.83  *
* Max Chl Dpth (ft)      *   24.00  * Hydr. Depth (ft)        *          *   13.78  *    0.85  *
* Conv. Total (cfs)      *814277.1  * Conv. (cfs)             *          *813627.1  *   650.1  *
* Length Wtd. (ft)       *   53.47  * Wetted Per. (ft)        *          *  246.59  *   23.28  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)        *          *    0.52  *    0.03  *
* Alpha                  *    1.01  * Stream Power (lb/ft s)   *          *    3.19  *    0.03  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)     *   39.58  * 4731.80  *   33.83  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)           *    7.38  *  327.65  *   17.97  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  755.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *          *   0.034  *   0.040  *
* W.S. Elev (ft)         *  754.86  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4071.56  *  151.53  *
* E.G. Slope (ft/ft)     *0.000566  * Area (sq ft)           *          * 4071.56  *  151.53  *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *26077.05  *  242.95  *
* Top Width (ft)         *  319.76  * Top Width (ft)          *          *  258.48  *   61.28  *
* Vel Total (ft/s)       *    6.23  * Avg. Vel. (ft/s)        *          *    6.40  *    1.60  *
* Max Chl Dpth (ft)      *   27.09  * Hydr. Depth (ft)        *          *   15.75  *    2.47  *
* Conv. Total (cfs)      *1105959.0  * Conv. (cfs)            *          *1095750.0  * 10208.8  *
* Length Wtd. (ft)       *   53.39  * Wetted Per. (ft)        *          *  266.45  *   62.04  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)        *          *    0.54  *    0.09  *
* Alpha                  *    1.05  * Stream Power (lb/ft s)   *          *    3.46  *    0.14  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)     *   80.18  * 5869.38  *  190.57  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)           *   19.62  *  353.55  *   77.99  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  758.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.034  *   0.040  *
* W.S. Elev (ft)         *  758.04  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4922.94  *  404.35  *
* E.G. Slope (ft/ft)     *0.000533  * Area (sq ft)           *          * 4922.94  *  404.35  *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *33057.77  *  942.23  *
* Top Width (ft)         *  373.67  * Top Width (ft)          *          *  277.61  *   96.06  *
* Vel Total (ft/s)       *    6.38  * Avg. Vel. (ft/s)        *          *    6.72  *    2.33  *
* Max Chl Dpth (ft)      *   30.27  * Hydr. Depth (ft)        *          *   17.73  *    4.21  *
* Conv. Total (cfs)      *1473213.0  * Conv. (cfs)            *          *1432386.0  * 40826.6  *
* Length Wtd. (ft)       *   53.27  * Wetted Per. (ft)        *          *  286.58  *   97.44  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)        *          *    0.57  *    0.14  *
* Alpha                  *    1.08  * Stream Power (lb/ft s)   *          *    3.84  *    0.32  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)     *  166.70  * 7023.77  *  535.06  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)           *   43.70  *  374.50  *  138.69  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  763.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.060  *   0.034  *   0.040  *
* W.S. Elev (ft)         *  763.12  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  353.10  * 6335.57  * 1118.29  *
* E.G. Slope (ft/ft)     *0.000360  * Area (sq ft)           *  353.10  * 6335.57  * 1118.29  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *  301.49  *41358.56  * 2839.95  *
* Top Width (ft)         *  626.30  * Top Width (ft)          *  144.14  *  278.01  *  204.15  *
* Vel Total (ft/s)       *    5.70  * Avg. Vel. (ft/s)        *    0.85  *    6.53  *    2.54  *
* Max Chl Dpth (ft)      *   35.35  * Hydr. Depth (ft)        *    2.45  *   22.79  *    5.48  *
* Conv. Total (cfs)      *2344404.0  * Conv. (cfs)            * 15883.7  *2178902.0  *149617.5  *
* Length Wtd. (ft)       *   52.99  * Wetted Per. (ft)        *  144.24  *  287.00  *  207.08  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)        *    0.06  *    0.50  *    0.12  *
* Alpha                  *    1.23  * Stream Power (lb/ft s)   *    0.05  *    3.24  *    0.31  *
```

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* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  656.53  * 8922.98  * 1796.83  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  222.62  *  399.48  *  433.78  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
**************************************************************************************************
* E.G. Elev (ft)         *  766.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.060  *   0.034  *   0.041  *
* W.S. Elev (ft)         *  765.99  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  886.81  * 7132.91  * 1829.38  *
* E.G. Slope (ft/ft)     *0.000326  * Area (sq ft)           *  886.81  * 7132.91  * 1829.38  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *  975.13  *47968.94  * 4745.93  *
* Top Width (ft)         *  791.00  * Top Width (ft)         *  237.54  *  278.01  *  275.46  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    1.10  *    6.73  *    2.59  *
* Max Chl Dpth (ft)      *   38.22  * Hydr. Depth (ft)       *    3.73  *   25.66  *    6.64  *
* Conv. Total (cfs)      *2971483.0  * Conv. (cfs)           * 53968.7  *2654850.0  *262664.3  *
* Length Wtd. (ft)       *   52.72  * Wetted Per. (ft)       *  237.71  *  287.00  *  279.53  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)       *    0.08  *    0.51  *    0.13  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.08  *    3.41  *    0.35  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1442.84  * 9993.96  * 3212.71  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  371.07  *  405.33  *  697.07  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
**************************************************************************************************
* E.G. Elev (ft)         *  768.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.060  *   0.034  *   0.042  *
* W.S. Elev (ft)         *  767.62  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1329.12  * 7587.26  * 2381.10  *
* E.G. Slope (ft/ft)     *0.000334  * Area (sq ft)           * 1329.12  * 7587.26  * 2381.10  *
* Q Total (cfs)          *62000.00  * Flow (cfs)              * 1796.98  *53810.10  * 6392.92  *
* Top Width (ft)         * 1102.78  * Top Width (ft)         *  350.16  *  278.01  *  474.61  *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *    1.35  *    7.09  *    2.68  *
* Max Chl Dpth (ft)      *   39.85  * Hydr. Depth (ft)       *    3.80  *   27.29  *    5.02  *
* Conv. Total (cfs)      *3390506.0  * Conv. (cfs)           * 98268.9  *2942636.0  *349600.3  *
* Length Wtd. (ft)       *   52.49  * Wetted Per. (ft)       *  350.38  *  287.00  *  479.01  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)       *    0.08  *    0.55  *    0.10  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.11  *    3.91  *    0.28  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2088.81  *10632.60  * 4501.71  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  447.66  *  406.49  *  979.14  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**************************************************************************************************
* E.G. Elev (ft)         *  770.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.061  *   0.034  *   0.044  *
* W.S. Elev (ft)         *  770.10  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2845.68  * 8275.16  * 3992.89  *
* E.G. Slope (ft/ft)     *0.000323  * Area (sq ft)           * 2845.68  * 8275.16  * 3992.89  *
* Q Total (cfs)          *74720.00  * Flow (cfs)              * 3810.20  *61096.96  * 9812.84  *
* Top Width (ft)         * 2091.55  * Top Width (ft)         *  910.82  *  278.01  *  902.72  *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *    1.34  *    7.38  *    2.46  *
* Max Chl Dpth (ft)      *   42.33  * Hydr. Depth (ft)       *    3.12  *   29.77  *    4.42  *
* Conv. Total (cfs)      *4158845.0  * Conv. (cfs)           *212072.0  *3400600.0  *546173.6  *
* Length Wtd. (ft)       *   52.00  * Wetted Per. (ft)       *  911.29  *  287.00  *  907.56  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)       *    0.06  *    0.58  *    0.09  *
* Alpha                  *    1.86  * Stream Power (lb/ft s) *    0.08  *    4.29  *    0.22  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 3424.31  *11685.05  * 7318.70  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  566.82  *  408.41  * 1267.32  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**************************************************************************************************
* E.G. Elev (ft)         *  760.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.060  *   0.034  *   0.040  *
* W.S. Elev (ft)         *  759.71  * Reach Len. (ft)        *   38.91  *   53.51  *   48.21  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   46.14  * 5386.58  *  588.59  *
* E.G. Slope (ft/ft)     *0.000482  * Area (sq ft)           *   46.14  * 5386.58  *  588.59  *
```

```
* Q Total (cfs)          *38000.00  * Flow (cfs)              *   24.62  *36487.32  * 1488.07  *
* Top Width (ft)         *  450.40  * Top Width (ft)          *   47.40  *  278.01  *  124.99  *
* Vel Total (ft/s)       *    6.31  * Avg. Vel. (ft/s)        *    0.53  *    6.77  *    2.53  *
* Max Chl Dpth (ft)      *   31.94  * Hydr. Depth (ft)        *    0.97  *   19.38  *    4.71  *
* Conv. Total (cfs)      *1731510.0  * Conv. (cfs)            *  1121.7  *1662583.0  * 67805.3  *
* Length Wtd. (ft)       *   53.19  * Wetted Per. (ft)        *   47.44  *  287.00  *  126.88  *
* Min Ch El (ft)         *  727.77  * Shear (lb/sq ft)        *    0.03  *    0.56  *    0.14  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    0.02  *    3.82  *    0.35  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *  246.23  * 7644.68  *  800.58  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *   73.24  *  383.77  *  187.06  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.1173*

INPUT
Description:
Station Elevation Data    num=     270
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   815.8    9.84  815.11   12.98  814.88    15.4  814.71    15.5  814.71
   23.73  814.19   44.31   812.9   49.88  812.67   75.86  811.58   88.35  811.05
   99.06   810.6  106.74  810.27  113.75  809.84     115  809.76   118.4  809.54
  118.51  809.54  132.51  808.67  135.35  808.49  150.56  807.54   170.3  806.31
  197.29  803.16  199.16  802.99  200.02  802.91  218.84  801.15  229.13  800.08
  235.42  799.42  239.44     799  249.21  797.98  255.58  797.31  262.21  796.56
  289.64  793.47  295.43   792.8  302.87  791.94  304.13  791.79  308.41  791.31
  310.96  791.01  315.86  790.43   320.2  789.93  346.09  786.98  346.62  786.92
  356.63   785.8  365.53   784.8  371.69  784.11  380.47  783.11  381.76  782.97
  387.11  782.27  399.01  780.71  409.47  779.37  411.79  779.08  442.73   775.1
  477.08  773.03  495.99   771.9  499.76  771.83  508.54  771.62  516.65  771.49
  563.21  770.79   600.1  770.22  601.25  770.19  601.62  770.18  605.17  770.08
  619.63   769.7  622.57  769.62  629.47  769.44  651.88  768.85  654.43  768.77
  657.77  768.76  662.84  768.75  672.77  768.75  691.11  768.86  730.15  768.99
  737.82  769.02  740.48  769.03  767.14   769.1  770.57  769.11  798.88  769.18
   805.5  769.18  834.27  769.03  857.85  768.91  861.02  768.89  886.03  768.78
     891  768.76  892.37  768.76  893.76  768.76  916.67  768.65  918.65  768.64
  920.64  768.61  920.96  768.61  923.13  768.57  924.75  768.54  927.25   768.5
  938.77  768.36  946.68  768.26  948.22  768.24  966.45   768.2  970.46   768.2
  977.26   768.2  977.81   768.2  978.85  768.23  982.76  768.34  983.95  768.33
 1032.21  767.91 1036.72  767.87 1087.28  767.44 1087.38  767.44 1127.09  767.09
 1153.13  766.87  1160.2  766.81 1167.23  766.75 1172.21  766.71 1172.74   766.7
 1173.41   766.7  1180.8  766.63 1182.89  766.61 1188.32  766.57 1215.43  766.35
 1231.93  766.17 1234.51  766.14 1239.06  766.09 1271.11  765.81 1311.98  764.02
 1314.06  764.02 1350.56  763.95 1359.45  763.95 1398.17  762.27 1443.04  759.73
 1453.48   759.7 1455.56  759.69  1464.8  759.66 1481.93  753.95 1493.75  750.02
 1501.57  747.41  1509.7  744.71 1538.66  741.81 1539.63  741.71 1541.45  741.11
 1565.68  733.02 1568.57  732.06 1583.62  732.03 1590.52  732.03 1603.49  727.71
 1627.38  727.71 1640.34  732.02 1657.43  732.03 1662.28  732.03 1691.13  741.67
 1691.19  741.69 1708.05  743.39 1716.01  744.19  1721.1   744.7 1732.11  748.37
  1733.1   748.7 1765.97  759.65 1777.78  761.01 1782.64  761.57 1785.81  761.95
 1791.98  762.12 1797.32  762.27 1803.54  762.43 1804.51  762.45 1805.35  762.47
 1837.32  763.26 1850.04  763.57 1867.87  764.01 1870.87     766 1873.19     766
 1874.34     766 1890.89  766.01 1901.59  765.19 1902.89  765.09  1903.9  765.01
 1904.33  764.91 1914.42  762.52 1953.21  753.34 1965.44  750.45 1966.94  750.09
 1983.96  747.11 2030.99  755.07 2033.01  755.81 2055.89  764.19 2069.02     769
 2109.67  768.39 2111.46  768.36 2119.95  768.23 2124.59  768.16 2134.22  768.01
 2134.73     768 2142.31  767.88 2147.58   767.8    2162  767.58 2167.26   767.5
 2188.42  767.18 2201.11  766.99 2213.12   767.3 2220.94   767.1 2225.13     767
 2261.16     769 2266.81  769.01 2290.21  769.01 2332.83  769.02 2386.19  769.02
  2400.5  769.02 2417.27  769.02 2453.44  770.85 2459.56  770.81 2472.95  770.74
 2484.48  770.69 2493.55  770.65 2524.29  770.52 2549.61  770.28 2549.99  770.27
  2550.8  770.25 2571.04  769.92 2571.27  769.92 2653.96  768.57  2722.8  767.44
 2728.15  767.35 2729.13  767.33 2730.99   767.3 2732.02   767.3 2748.55  767.33
 2749.47  767.33 2761.14  767.36 2762.18  767.36 2763.54  767.37 2784.62  767.48
 2785.17   767.5 2791.52  767.68 2791.75  767.69 2796.36   767.8 2799.05  767.87
 2801.03  767.92 2801.55  767.92 2805.21  767.94 2808.16  767.96 2816.78  768.02
 2817.69  768.03 2818.15  768.03 2819.55  768.04 2825.87  768.09 2836.63  768.17
 2836.64  768.18 2850.52  769.04 2851.67  769.11 2853.26  769.21 2854.65  769.29
 2864.37  770.06 2877.76  771.12 2881.31   771.4 2890.24  774.34 2910.16  780.89
 2911.82  781.43 2940.27  790.75 2946.01  792.63  2947.6  793.15 2954.74  795.49
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 2962.96  798.19 2971.03  800.83 2972.42  801.29 2974.47  801.96 2975.84  802.41
 2976.27  802.56 2976.87  802.65 2993.69  805.35 2995.35  805.62 3000.08  806.38
 3000.87   806.5 3031.93  811.49 3051.41  814.62 3056.49  815.43 3061.91  816.31

Manning's n Values        num=      16
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  442.73    .064 1188.32    .064 1239.06    .064  1464.8     .03
 1568.57    .075 1590.52    .035 1640.34    .075 1662.28     .03 1765.97     .05
  1903.9    .035 1953.21    .035 2069.02     .07 2728.15     .07 2791.52      .1
 3061.91      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1464.8 1765.97              1.4    1.92    1.73             .1       .3

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  748.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.041  *   0.035  *
* W.S. Elev (ft)         *  747.86  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2586.38  *    3.26  *
* E.G. Slope (ft/ft)     *0.000820  * Area (sq ft)           *          * 2586.38  *    3.26  *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13197.96  *    2.04  *
* Top Width (ft)         *  239.05  * Top Width (ft)          *          *  230.35  *    8.70  *
* Vel Total (ft/s)       *    5.10  * Avg. Vel. (ft/s)        *          *    5.10  *    0.63  *
* Max Chl Dpth (ft)      *   20.15  * Hydr. Depth (ft)        *          *   11.23  *    0.37  *
* Conv. Total (cfs)      *460855.0  * Conv. (cfs)             *          *460783.9  *    71.1  *
* Length Wtd. (ft)       *    1.92  * Wetted Per. (ft)        *          *  236.21  *    8.83  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *          *    0.56  *    0.02  *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    2.86  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)     *   20.10  * 3410.05  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)           *    3.51  *  292.40  *    1.76  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  752.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.040  *   0.035  *
* W.S. Elev (ft)         *  751.80  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3541.75  *  125.78  *
* E.G. Slope (ft/ft)     *0.000722  * Area (sq ft)           *          * 3541.75  *  125.78  *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20044.10  *  255.90  *
* Top Width (ft)         *  306.01  * Top Width (ft)          *          *  254.03  *   51.98  *
* Vel Total (ft/s)       *    5.54  * Avg. Vel. (ft/s)        *          *    5.66  *    2.03  *
* Max Chl Dpth (ft)      *   24.09  * Hydr. Depth (ft)        *          *   13.94  *    2.42  *
* Conv. Total (cfs)      *755251.0  * Conv. (cfs)             *          *745730.3  *  9520.7  *
* Length Wtd. (ft)       *    1.92  * Wetted Per. (ft)        *          *  261.17  *   52.83  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *          *    0.61  *    0.11  *
* Alpha                  *    1.03  * Stream Power (lb/ft s)   *          *    3.46  *    0.22  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)     *   39.58  * 4727.60  *   33.75  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)           *    7.38  *  327.35  *   17.93  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  755.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.039  *   0.035  *
* W.S. Elev (ft)         *  754.92  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4361.75  *  336.74  *
* E.G. Slope (ft/ft)     *0.000617  * Area (sq ft)           *          * 4361.75  *  336.74  *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *25399.20  *  920.80  *
* Top Width (ft)         *  356.27  * Top Width (ft)          *          *  272.73  *   83.54  *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)        *          *    5.82  *    2.73  *
* Max Chl Dpth (ft)      *   27.21  * Hydr. Depth (ft)        *          *   15.99  *    4.03  *
* Conv. Total (cfs)      *1059247.0  * Conv. (cfs)             *          *1022189.0  * 37057.6  *
* Length Wtd. (ft)       *    1.92  * Wetted Per. (ft)        *          *  280.88  *   85.02  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *          *    0.60  *    0.15  *
* Alpha                  *    1.05  * Stream Power (lb/ft s)   *          *    3.49  *    0.42  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)     *   80.18  * 5864.20  *  190.30  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)           *   19.62  *  353.22  *   77.91  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.039  *   0.035  *
* W.S. Elev (ft)         *  758.11  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5263.11  *  640.43  *
* E.G. Slope (ft/ft)     *0.000551  * Area (sq ft)           *          * 5263.11  *  640.43  *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *31810.42  * 2189.58  *
* Top Width (ft)         *  398.13  * Top Width (ft)          *          *  291.89  *  106.23  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)        *          *    6.04  *    3.42  *
* Max Chl Dpth (ft)      *   30.40  * Hydr. Depth (ft)        *          *   18.03  *    6.03  *
* Conv. Total (cfs)      *1448537.0  * Conv. (cfs)            *          *1355252.0  * 93284.7  *
* Length Wtd. (ft)       *    1.91  * Wetted Per. (ft)        *          *  301.08  *  108.64  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *          *    0.60  *    0.20  *
* Alpha                  *    1.05  * Stream Power (lb/ft s)   *          *    3.63  *    0.69  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *  166.70  * 7017.51  *  534.48  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   43.70  *  374.15  *  138.58  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.064  *   0.039  *   0.035  *
* W.S. Elev (ft)         *  763.19  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  184.22  * 6786.59  * 1347.34  *
* E.G. Slope (ft/ft)     *0.000378  * Area (sq ft)           *  184.22  * 6786.59  * 1347.34  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *  136.06  *39655.50  * 4708.45  *
* Top Width (ft)         *  599.23  * Top Width (ft)          *   87.88  *  301.17  *  210.18  *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)        *    0.74  *    5.84  *    3.49  *
* Max Chl Dpth (ft)      *   35.48  * Hydr. Depth (ft)        *    2.10  *   22.53  *    6.41  *
* Conv. Total (cfs)      *2289739.0  * Conv. (cfs)            *  7000.7  *2040466.0  *242272.2  *
* Length Wtd. (ft)       *    1.91  * Wetted Per. (ft)        *   87.97  *  310.86  *  214.22  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *    0.05  *    0.51  *    0.15  *
* Alpha                  *    1.11  * Stream Power (lb/ft s)   *    0.04  *    3.01  *    0.52  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *  656.29  * 8914.92  * 1795.46  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  222.52  *  399.12  *  433.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.064  *   0.039  *   0.036  *
* W.S. Elev (ft)         *  766.06  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  629.28  * 7650.93  * 2070.32  *
* E.G. Slope (ft/ft)     *0.000343  * Area (sq ft)           *  629.28  * 7650.93  * 2070.32  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *  540.48  *46114.23  * 7035.29  *
* Top Width (ft)         *  818.72  * Top Width (ft)          *  222.52  *  301.17  *  295.03  *
* Vel Total (ft/s)       *    5.19  * Avg. Vel. (ft/s)        *    0.86  *    6.03  *    3.40  *
* Max Chl Dpth (ft)      *   38.35  * Hydr. Depth (ft)        *    2.83  *   25.40  *    7.02  *
* Conv. Total (cfs)      *2901072.0  * Conv. (cfs)            * 29204.1  *2491725.0  *380143.0  *
* Length Wtd. (ft)       *    1.90  * Wetted Per. (ft)        *  222.67  *  310.86  *  300.45  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *    0.06  *    0.53  *    0.15  *
* Alpha                  *    1.22  * Stream Power (lb/ft s)   *    0.05  *    3.17  *    0.50  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    * 1442.16  * 9984.88  * 3210.55  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  370.86  *  404.97  *  696.76  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.064  *   0.039  *   0.036  *
* W.S. Elev (ft)         *  767.71  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1144.25  * 8145.84  * 2617.60  *
```

```
* E.G. Slope (ft/ft)     *0.000349  * Area (sq ft)           * 1144.25  * 8145.84  * 2617.60  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 1228.00  *51643.19  * 9128.81  *
* Top Width (ft)         * 1179.17  * Top Width (ft)         *  408.70  *  301.17  *  469.30  *
* Vel Total (ft/s)       *    5.21  * Avg. Vel. (ft/s)       *    1.07  *    6.34  *    3.49  *
* Max Chl Dpth (ft)      *   40.00  * Hydr. Depth (ft)       *    2.80  *   27.05  *    5.58  *
* Conv. Total (cfs)      *3320845.0  * Conv. (cfs)            * 65774.2  *2766114.0  *488957.4  *
* Length Wtd. (ft)       *    1.88  * Wetted Per. (ft)       *  408.86  *  310.86  *  475.05  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *    0.06  *    0.57  *    0.12  *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *    0.07  *    3.62  *    0.42  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2087.70  *10622.94  * 4498.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  447.32  *  406.13  *  978.62  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  770.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.064  *   0.039  *   0.039  *
* W.S. Elev (ft)         *  770.19  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2809.79  * 8895.57  * 4506.65  *
* E.G. Slope (ft/ft)     *0.000331  * Area (sq ft)           * 2809.79  * 8895.57  * 4506.65  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 3251.63  *58246.56  *13221.82  *
* Top Width (ft)         * 2151.28  * Top Width (ft)         *  863.73  *  301.17  *  986.39  *
* Vel Total (ft/s)       *    4.61  * Avg. Vel. (ft/s)       *    1.16  *    6.55  *    2.93  *
* Max Chl Dpth (ft)      *   42.48  * Hydr. Depth (ft)       *    3.25  *   29.54  *    4.57  *
* Conv. Total (cfs)      *4109284.0  * Conv. (cfs)            *178825.7  *3203315.0  *727144.1  *
* Length Wtd. (ft)       *    1.87  * Wetted Per. (ft)       *  863.91  *  310.86  *  992.54  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *    0.07  *    0.59  *    0.09  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *    0.08  *    3.87  *    0.27  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 3421.79  *11674.50  * 7314.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  566.02  *  408.05  * 1266.28  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  760.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.064  *   0.039  *   0.035  *
* W.S. Elev (ft)         *  759.78  * Reach Len. (ft)        *    1.40  *    1.92  *    1.73  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.90  * 5759.70  *  827.92  *
* E.G. Slope (ft/ft)     *0.000508  * Area (sq ft)           *    1.90  * 5759.70  *  827.92  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *    0.19  *34992.13  * 3007.68  *
* Top Width (ft)         *  442.87  * Top Width (ft)         *   22.68  *  301.17  *  119.02  *
* Vel Total (ft/s)       *    5.77  * Avg. Vel. (ft/s)       *    0.10  *    6.08  *    3.63  *
* Max Chl Dpth (ft)      *   32.07  * Hydr. Depth (ft)       *    0.08  *   19.12  *    6.96  *
* Conv. Total (cfs)      *1685736.0  * Conv. (cfs)            *     8.4  *1552303.0  *133425.2  *
* Length Wtd. (ft)       *    1.91  * Wetted Per. (ft)       *   22.69  *  310.86  *  121.92  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *    0.00  *    0.59  *    0.22  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.00  *    3.57  *    0.78  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  246.21  * 7637.83  *  799.80  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   73.21  *  383.41  *  186.93  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.117

INPUT
Description: Sta 90+00 Begin Transition to Natural Channel - Last XS wtih Full
             Modified Channel XS
Station Elevation Data    num=      78
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  815.79   15.49  814.71   44.29  812.91  106.69  810.27  170.23  806.29
  197.21  803.12  199.93  802.87  218.75  801.11  255.47  797.26   381.6  783.01
  442.54  775.14  495.78  771.92  499.55  771.85  508.32  771.64  599.84  770.25
  654.15   768.8  672.48  768.77   737.5     769  798.54  769.16  805.15  769.16
```

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  857.48  768.89  918.26  768.62  947.81  768.25  970.04   768.2  977.39  768.17
  982.34  768.32 1270.56  765.84 1311.42  764.04 1358.87  764.01 1397.57  762.33
 1442.42  759.78 1464.17  759.71 1509.17  744.71 1539.17  741.71 1568.17  732.04
 1590.17  732.04 1603.17  727.71 1627.17  727.71 1640.17  732.04 1662.17  732.04
 1691.17  741.71 1721.17  744.71 1766.17  759.71    1786     762    1868     764
    1871     766    1891     766    1904     765    1967     750    1984     747
    2031     755    2069     769    2201     767    2213   767.3    2225     767
    2261     769    2417     769 2453.15  770.83 2472.64  770.72 2493.23  770.63
 2523.94  770.49 2549.25  770.25 2549.63  770.24 2550.44  770.22 2722.31  767.39
  2730.5  767.25 2748.04   767.3 2784.09  767.49 2790.98  767.69 2791.21   767.7
 2800.49  767.93 2836.06  768.18 2854.07  769.29 2880.71  771.37 2975.17  802.47
  2975.6  802.62  2976.2  802.71 3061.18   816.4

Manning's n Values        num=      11
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075  442.54    .064 1464.17     .03 1568.17    .075 1590.17     .03
 1640.17    .075 1662.17     .03 1766.17     .05    1904    .035    2069     .07
 2790.98      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1464.17 1766.17             150     150     150             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1891 3061.18     766       F

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  748.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  747.86  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  738.53  * Flow Area (sq ft)      *          * 2592.82  *          *
* E.G. Slope (ft/ft)     *0.000778  * Area (sq ft)           *          * 2592.82  *    4.25  *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  240.80  * Top Width (ft)          *          *  230.89  *    9.91  *
* Vel Total (ft/s)       *    5.09  * Avg. Vel. (ft/s)        *          *    5.09  *          *
* Max Chl Dpth (ft)      *   20.15  * Hydr. Depth (ft)        *          *   11.23  *          *
* Conv. Total (cfs)      *473116.8  * Conv. (cfs)             *          *473116.8  *          *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)        *          *  236.76  *          *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *          *    0.53  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    2.71  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)    *   20.10  * 3409.94  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    3.51  *  292.39  *    1.76  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  752.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.039  *          *
* W.S. Elev (ft)         *  751.78  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  740.96  * Flow Area (sq ft)      *          * 3545.23  *          *
* E.G. Slope (ft/ft)     *0.000708  * Area (sq ft)           *          * 3545.23  *  129.70  *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)         *  307.03  * Top Width (ft)          *          *  254.44  *   52.59  *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)        *          *    5.73  *          *
* Max Chl Dpth (ft)      *   24.07  * Hydr. Depth (ft)        *          *   13.93  *          *
* Conv. Total (cfs)      *762882.1  * Conv. (cfs)             *          *762882.1  *          *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)        *          *  261.58  *          *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *          *    0.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    3.43  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)    *   39.58  * 4727.44  *   33.75  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    7.38  *  327.34  *   17.92  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*******************************************************************************************
```

```
* E.G. Elev (ft)         *  755.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.039  *          *
* W.S. Elev (ft)         *  754.86  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  743.03  * Flow Area (sq ft)      *          * 4355.18  *          *
* E.G. Slope (ft/ft)     *0.000639  * Area (sq ft)           *          * 4355.18  *  338.80  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  356.41  * Top Width (ft)         *          *  272.87  *   83.54  *
* Vel Total (ft/s)       *    6.04  * Avg. Vel. (ft/s)       *          *    6.04  *          *
* Max Chl Dpth (ft)      *   27.15  * Hydr. Depth (ft)       *          *   15.96  *          *
* Conv. Total (cfs)      *1040809.0  * Conv. (cfs)            *          *1040809.0  *          *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)       *          *  281.01  *          *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *          *    0.62  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.74  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   80.18  * 5864.01  *  190.29  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   19.62  *  353.21  *   77.91  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)         *  757.99  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  745.09  * Flow Area (sq ft)      *          * 5238.80  *          *
* E.G. Slope (ft/ft)     *0.000614  * Area (sq ft)           *          * 5238.80  *  635.60  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  397.30  * Top Width (ft)         *          *  291.65  *  105.64  *
* Vel Total (ft/s)       *    6.49  * Avg. Vel. (ft/s)       *          *    6.49  *          *
* Max Chl Dpth (ft)      *   30.28  * Hydr. Depth (ft)       *          *   17.96  *          *
* Conv. Total (cfs)      *1372324.0  * Conv. (cfs)            *          *1372324.0  *          *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)       *          *  300.81  *          *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *          *    0.67  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.33  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  166.70  * 7017.28  *  534.46  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   43.70  *  374.13  *  138.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.064  *   0.038  *   0.050  *
* W.S. Elev (ft)         *  763.00  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  747.05  * Flow Area (sq ft)      *  163.00  * 6743.48  *   62.89  *
* E.G. Slope (ft/ft)     *0.000465  * Area (sq ft)           *  163.00  * 6743.48  * 1314.81  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  128.95  *44329.86  *   41.19  *
* Top Width (ft)         *  585.01  * Top Width (ft)         *   81.98  *  302.00  *  201.03  *
* Vel Total (ft/s)       *    6.39  * Avg. Vel. (ft/s)       *    0.79  *    6.57  *    0.65  *
* Max Chl Dpth (ft)      *   35.29  * Hydr. Depth (ft)       *    1.99  *   22.33  *    1.04  *
* Conv. Total (cfs)      *2063641.0  * Conv. (cfs)            *  5980.0  *2055751.0  *  1910.0  *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)       *   82.07  *  311.71  *   60.88  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *    0.06  *    0.63  *    0.03  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.05  *    4.13  *    0.02  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  656.28  * 8914.62  * 1795.41  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  222.52  *  399.11  *  433.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.064  *   0.038  *   0.050  *
* W.S. Elev (ft)         *  765.81  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  748.58  * Flow Area (sq ft)      *  568.22  * 7593.79  *  331.47  *
```

```
* E.G. Slope (ft/ft)     *0.000442  * Area (sq ft)           *  568.22  * 7593.79  * 2008.74  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *  569.42  *52675.66  *  444.93  *
* Top Width (ft)         *  766.47  * Top Width (ft)         *  193.00  *  302.00  *  271.47  *
* Vel Total (ft/s)       *    6.32  * Avg. Vel. (ft/s)       *    1.00  *    6.94  *    1.34  *
* Max Chl Dpth (ft)      *   38.10  * Hydr. Depth (ft)       *    2.94  *   25.15  *    3.17  *
* Conv. Total (cfs)      *2553948.0  * Conv. (cfs)            * 27086.3  *2505697.0  * 21164.5  *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)       *  193.15  *  311.71  *  105.26  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *    0.08  *    0.67  *    0.09  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.08  *    4.66  *    0.12  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1442.15  * 9984.54  * 3210.47  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  370.86  *  404.96  *  696.74  *
**********************************************************************************************

Warning: Multiple water surfaces were found that could balance the energy equation. The program
         selected the water surface whose main channel velocity head was the closest to the previously
         computed cross section.
Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  768.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.064  *   0.038  *   0.036  *
* W.S. Elev (ft)         *  767.69  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  749.86  * Flow Area (sq ft)      * 1131.42  * 8161.30  * 2620.07  *
* E.G. Slope (ft/ft)     *0.000341  * Area (sq ft)           * 1131.42  * 8161.30  * 2620.07  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *  955.41  *52152.49  * 8892.10  *
* Top Width (ft)         * 1179.42  * Top Width (ft)         *  408.89  *  302.00  *  468.53  *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)       *    0.84  *    6.39  *    3.39  *
* Max Chl Dpth (ft)      *   39.98  * Hydr. Depth (ft)       *    2.77  *   27.02  *    5.59  *
* Conv. Total (cfs)      *3359020.0  * Conv. (cfs)            * 51761.8  *2825504.0  *481754.1  *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)       *  409.04  *  311.71  *  474.33  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *    0.06  *    0.56  *    0.12  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *    0.05  *    3.56  *    0.40  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 2087.67  *10622.58  * 4498.84  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  447.31  *  406.12  *  978.60  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  770.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.064  *   0.038  *   0.039  *
* W.S. Elev (ft)         *  770.17  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  751.73  * Flow Area (sq ft)      * 2784.68  * 8909.72  * 4499.07  *
* E.G. Slope (ft/ft)     *0.000327  * Area (sq ft)           * 2784.68  * 8909.72  * 4499.07  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 2556.13  *59146.55  *13017.32  *
* Top Width (ft)         * 2149.22  * Top Width (ft)         *  861.36  *  302.00  *  985.86  *
* Vel Total (ft/s)       *    4.61  * Avg. Vel. (ft/s)       *    0.92  *    6.64  *    2.89  *
* Max Chl Dpth (ft)      *   42.46  * Hydr. Depth (ft)       *    3.23  *   29.50  *    4.56  *
* Conv. Total (cfs)      *4131532.0  * Conv. (cfs)            *141337.2  *3270422.0  *719773.5  *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)       *  861.54  *  311.71  *  992.07  *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)       *    0.07  *    0.58  *    0.09  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    0.06  *    3.87  *    0.27  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 3421.70  *11674.11  * 7313.82  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  566.00  *  408.04  * 1266.24  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  760.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)         *  759.63  * Reach Len. (ft)        *  150.00  *  150.00  *  150.00  *
* Crit W.S. (ft)         *  745.86  * Flow Area (sq ft)      *          * 5725.65  *          *
* E.G. Slope (ft/ft)     *0.000589  * Area (sq ft)           *          * 5725.65  *  818.34  *
```

```
* Q Total (cfs)          *38000.00  * Flow (cfs)              *          *38000.00  *          *
* Top Width (ft)         *  418.50  * Top Width (ft)          *          *  301.50  *  116.99  *
* Vel Total (ft/s)       *    6.64  * Avg. Vel. (ft/s)        *          *    6.64  *          *
* Max Chl Dpth (ft)      *   31.92  * Hydr. Depth (ft)        *          *   18.99  *          *
* Conv. Total (cfs)      *1566325.0  * Conv. (cfs)             *          *1566325.0  *          *
* Length Wtd. (ft)       *  150.00  * Wetted Per. (ft)        *          *  311.19  *          *
* Min Ch El (ft)         *  727.71  * Shear (lb/sq ft)        *          *    0.68  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.49  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *  246.21  * 7637.58  *  799.76  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   73.21  *  383.40  *  186.92  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 11.089

INPUT
Description: R3Y  91+50  ROB raised for Fill Area, Blocked Obstructions are
             buildings.
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  815.47  106.17  808.83  198.95  800.33  379.73  782.59  440.37  775.24
   497.1  773.94   596.9  770.76  650.95  768.13  669.19   767.9  965.29  766.41
   972.6  766.36  977.53  766.56 1264.34  762.62    1305     760    1457  759.63
    1502  744.63    1532  741.63    1561  731.96    1583  731.96    1596  727.63
    1620  727.63    1633  731.96    1655  731.96    1684  741.63    1714  744.63
    1759  759.63    1773     761    1860     764 1905.36  769.21 1999.59  770.16
 2026.66  770.39 2059.03  770.32 2081.71  770.37 2183.04  768.77  2277.3  768.51
 2316.55  768.49  2367.2  768.95 2412.67  768.95  2450.8  768.23 2480.02   767.7
 2668.78  762.71 2676.57  762.49 2693.26  762.54 2734.12  762.78 2794.15  764.74
 2819.49  766.18 2909.37  805.17 2909.78  805.36 2910.35  805.46 2991.21  820.16

Manning's n Values        num=      10
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .075  440.37     .06    1457     .03    1561    .075    1583     .03
    1633    .075    1655     .03    1759     .05 1905.36    .075 2734.12     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1457    1759             260     440     475              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 2412.88 2844.72  769.98       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************
     510     620     790     700     930     790    1040    1140     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  747.74  * Reach Len. (ft)        *  260.00  *  440.00  *  475.00  *
* Crit W.S. (ft)         *  738.46  * Flow Area (sq ft)      *          * 2583.46  *          *
* E.G. Slope (ft/ft)     *0.000787  * Area (sq ft)           *          * 2583.46  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  230.65  * Top Width (ft)          *          *  230.65  *          *
* Vel Total (ft/s)       *    5.11  * Avg. Vel. (ft/s)        *          *    5.11  *          *
* Max Chl Dpth (ft)      *   20.11  * Hydr. Depth (ft)        *          *   11.20  *          *
* Conv. Total (cfs)      *470493.8  * Conv. (cfs)             *          *470493.8  *          *
* Length Wtd. (ft)       *  440.00  * Wetted Per. (ft)        *          *  236.50  *          *
* Min Ch El (ft)         *  727.63  * Shear (lb/sq ft)        *          *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.74  *          *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)    *   20.10  * 3401.03  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    3.51  *  291.60  *    1.74  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	752.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.039	
W.S. Elev (ft)	751.67	Reach Len. (ft)	260.00	440.00	475.00
Crit W.S. (ft)	740.86	Flow Area (sq ft)		3537.91	
E.G. Slope (ft/ft)	0.000713	Area (sq ft)		3537.91	
Q Total (cfs)	20300.00	Flow (cfs)		20300.00	
Top Width (ft)	254.27	Top Width (ft)		254.27	
Vel Total (ft/s)	5.74	Avg. Vel. (ft/s)		5.74	
Max Chl Dpth (ft)	24.04	Hydr. Depth (ft)		13.91	
Conv. Total (cfs)	760495.1	Conv. (cfs)		760495.1	
Length Wtd. (ft)	440.00	Wetted Per. (ft)		261.40	
Min Ch El (ft)	727.63	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		3.45	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	39.58	4715.25	33.52
C & E Loss (ft)	0.00	Cum SA (acres)	7.38	326.46	17.83

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	755.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.039	
W.S. Elev (ft)	754.76	Reach Len. (ft)	260.00	440.00	475.00
Crit W.S. (ft)	742.95	Flow Area (sq ft)		4350.45	
E.G. Slope (ft/ft)	0.000642	Area (sq ft)		4350.45	
Q Total (cfs)	26320.00	Flow (cfs)		26320.00	
Top Width (ft)	272.77	Top Width (ft)		272.77	
Vel Total (ft/s)	6.05	Avg. Vel. (ft/s)		6.05	
Max Chl Dpth (ft)	27.13	Hydr. Depth (ft)		15.95	
Conv. Total (cfs)	1039109.0	Conv. (cfs)		1039109.0	
Length Wtd. (ft)	440.00	Wetted Per. (ft)		280.90	
Min Ch El (ft)	727.63	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)		3.75	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	80.18	5849.02	189.70
C & E Loss (ft)	0.00	Cum SA (acres)	19.62	352.27	77.76

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	758.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.038	
W.S. Elev (ft)	757.89	Reach Len. (ft)	260.00	440.00	475.00
Crit W.S. (ft)	745.00	Flow Area (sq ft)		5234.97	
E.G. Slope (ft/ft)	0.000615	Area (sq ft)		5234.97	
Q Total (cfs)	34000.00	Flow (cfs)		34000.00	
Top Width (ft)	291.58	Top Width (ft)		291.58	
Vel Total (ft/s)	6.49	Avg. Vel. (ft/s)		6.49	
Max Chl Dpth (ft)	30.26	Hydr. Depth (ft)		17.95	
Conv. Total (cfs)	1370827.0	Conv. (cfs)		1370827.0	
Length Wtd. (ft)	440.00	Wetted Per. (ft)		300.72	
Min Ch El (ft)	727.63	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)		4.34	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	166.70	6999.25	533.36
C & E Loss (ft)	0.00	Cum SA (acres)	43.70	373.13	138.39

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	763.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.060	0.038	0.050

```
* W.S. Elev (ft)         *  762.94  * Reach Len. (ft)        *  260.00  *  440.00  *  475.00  *
* Crit W.S. (ft)         *  746.96  * Flow Area (sq ft)      *  545.61  * 6751.09  *   91.52  *
* E.G. Slope (ft/ft)     *0.000454  * Area (sq ft)           *  545.61  * 6751.09  *  114.32  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  533.74  *43897.23  *   69.02  *
* Top Width (ft)         *  667.63  * Top Width (ft)         *  216.16  *  302.00  *  149.47  *
* Vel Total (ft/s)       *    6.02  * Avg. Vel. (ft/s)       *    0.98  *    6.50  *    0.75  *
* Max Chl Dpth (ft)      *   35.31  * Hydr. Depth (ft)       *    2.52  *   22.35  *    1.30  *
* Conv. Total (cfs)      *2087899.0  * Conv. (cfs)           * 25042.8  *2059618.0  *  3238.4  *
* Length Wtd. (ft)       *  438.95  * Wetted Per. (ft)       *  216.25  *  311.71  *   70.44  *
* Min Ch El (ft)         *  727.63  * Shear (lb/sq ft)       *    0.07  *    0.61  *    0.04  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *    0.07  *    3.99  *    0.03  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *  655.06  * 8891.39  * 1792.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  222.00  *  398.07  *  432.94  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  766.47  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.060  *   0.038  *   0.050  *
* W.S. Elev (ft)         *  765.79  * Reach Len. (ft)        *  260.00  *  440.00  *  475.00  *
* Crit W.S. (ft)         *  748.52  * Flow Area (sq ft)      * 1378.08  * 7610.45  *  376.64  *
* E.G. Slope (ft/ft)     *0.000417  * Area (sq ft)           * 1378.08  * 7610.45  *  894.61  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             * 1849.26  *51341.95  *  498.79  *
* Top Width (ft)         * 1002.14  * Top Width (ft)         *  323.30  *  302.00  *  376.84  *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)       *    1.34  *    6.75  *    1.32  *
* Max Chl Dpth (ft)      *   38.16  * Hydr. Depth (ft)       *    4.26  *   25.20  *    3.23  *
* Conv. Total (cfs)      *2629878.0  * Conv. (cfs)           * 90581.4  *2514865.0  * 24432.2  *
* Length Wtd. (ft)       *  437.11  * Wetted Per. (ft)       *  324.94  *  311.71  *  116.79  *
* Min Ch El (ft)         *  727.63  * Shear (lb/sq ft)       *    0.11  *    0.64  *    0.08  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *    0.15  *    4.29  *    0.11  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 1438.79  * 9958.36  * 3205.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  369.97  *  403.92  *  695.63  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  768.18  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.060  *   0.038  *   0.050  *
* W.S. Elev (ft)         *  767.44  * Reach Len. (ft)        *  260.00  *  440.00  *  475.00  *
* Crit W.S. (ft)         *  749.82  * Flow Area (sq ft)      * 2028.65  * 8109.05  *  580.96  *
* E.G. Slope (ft/ft)     *0.000427  * Area (sq ft)           * 2028.65  * 8109.05  * 1592.04  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 3261.65  *57776.39  *  961.96  *
* Top Width (ft)         * 1192.46  * Top Width (ft)         *  427.00  *  302.00  *  463.46  *
* Vel Total (ft/s)       *    5.78  * Avg. Vel. (ft/s)       *    1.61  *    7.12  *    1.66  *
* Max Chl Dpth (ft)      *   39.81  * Hydr. Depth (ft)       *    4.75  *   26.85  *    4.44  *
* Conv. Total (cfs)      *2999776.0  * Conv. (cfs)           *157810.0  *2795423.0  * 46542.8  *
* Length Wtd. (ft)       *  435.71  * Wetted Per. (ft)       *  432.81  *  311.71  *  131.26  *
* Min Ch El (ft)         *  727.63  * Shear (lb/sq ft)       *    0.13  *    0.69  *    0.12  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    0.20  *    4.94  *    0.20  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 2082.23  *10594.57  * 4491.59  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  445.87  *  405.08  *  976.99  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  770.66  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.060  *   0.038  *   0.052  *
* W.S. Elev (ft)         *  769.87  * Reach Len. (ft)        *  260.00  *  440.00  *  475.00  *
* Crit W.S. (ft)         *  751.67  * Flow Area (sq ft)      * 3193.08  * 8842.56  * 1252.05  *
* E.G. Slope (ft/ft)     *0.000425  * Area (sq ft)           * 3193.08  * 8842.56  * 3204.37  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 6117.11  *66545.76  * 2057.14  *
```

```
* Top Width (ft)          * 1735.15  * Top Width (ft)          *  507.00  *  302.00  *  926.15  *
* Vel Total (ft/s)        *    5.62  * Avg. Vel. (ft/s)        *    1.92  *    7.53  *    1.64  *
* Max Chl Dpth (ft)       *   42.24  * Hydr. Depth (ft)        *    6.30  *   29.28  *    2.45  *
* Conv. Total (cfs)       *3626134.0  * Conv. (cfs)            *296861.0  *3229441.0  * 99832.0  *
* Length Wtd. (ft)        *  433.46  * Wetted Per. (ft)        *  522.49  *  311.71  *  511.47  *
* Min Ch El (ft)          *  727.63  * Shear (lb/sq ft)        *    0.16  *    0.75  *    0.06  *
* Alpha                   *    1.61  * Stream Power (lb/ft s) *    0.31  *    5.66  *    0.11  *
* Frctn Loss (ft)         *    0.20  * Cum Volume (acre-ft)   * 3411.41  *11643.55  * 7300.55  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  563.64  *  407.00  * 1262.94  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  760.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.68  * Wt. n-Val.              *          *   0.038  *          *
* W.S. Elev (ft)          *  759.54  * Reach Len. (ft)        *  260.00  *  440.00  *  475.00  *
* Crit W.S. (ft)          *  745.77  * Flow Area (sq ft)      *          * 5722.94  *          *
* E.G. Slope (ft/ft)      *0.000589  * Area (sq ft)           *          * 5722.94  *          *
* Q Total (cfs)           *38000.00  * Flow (cfs)              *          *38000.00  *          *
* Top Width (ft)          *  301.45  * Top Width (ft)          *          *  301.45  *          *
* Vel Total (ft/s)        *    6.64  * Avg. Vel. (ft/s)        *          *    6.64  *          *
* Max Chl Dpth (ft)       *   31.91  * Hydr. Depth (ft)        *          *   18.98  *          *
* Conv. Total (cfs)       *1565224.0  * Conv. (cfs)            *          *1565224.0  *          *
* Length Wtd. (ft)        *  440.00  * Wetted Per. (ft)        *          *  311.13  *          *
* Min Ch El (ft)          *  727.63  * Shear (lb/sq ft)        *          *    0.68  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    4.49  *          *
* Frctn Loss (ft)         *    0.26  * Cum Volume (acre-ft)   *  246.21  * 7617.87  *  798.36  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   73.21  *  382.36  *  186.72  *
*****************************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.996

INPUT
Description: STA 95+90
Blocked Obstructions are buildings, Ineffective area in
              basin of small trib.
Station Elevation Data    num=      90
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  817.21  159.65  802.71  246.33  794.27  305.45  786.68  365.72  782.57
  424.68  775.21  481.71  771.58   497.6  770.42  550.27  769.66  786.39  767.41
  799.32  767.33   900.8  771.43    1047     776    1092  770.36    1116  762.36
    1146  759.36    1191  744.36    1221  741.36    1250  731.69    1272  731.69
    1285  727.36    1309  727.36    1322  731.69    1344  731.69    1373  741.36
    1403  744.36    1448  759.36    1478  762.36    1495     765    1533     765
 1574.86  764.93 1696.07  763.08 1706.09  762.89 1752.68  765.62 1797.61  768.62
 1798.22  768.62 1828.64  768.65 1846.69  768.64 1847.04  768.65  1847.4  768.64
 1876.03  766.04  1928.9  764.58 1971.22  765.95 2062.41  768.98 2063.87  768.98
 2064.26  768.97 2064.46  768.97  2066.7  768.87 2166.13  759.87 2224.27  762.71
 2287.82  751.09 2306.64   749.3    2310  748.83 2312.89  748.78 2342.28  752.19
 2412.74  756.98 2433.82  757.18 2496.39  748.75 2507.08  748.94 2576.24  749.13
 2587.06  749.16 2647.66  748.79 2649.46  748.88 2675.32  748.96 2708.25  749.18
 2733.78  749.15 2746.85  749.26 2751.24  749.33 2754.56  749.44 2760.45  749.38
 2861.28  754.34 2926.62  753.82 2954.61  752.24 2965.96  752.12 2996.24  752.12
 3004.43  752.43 3032.33  755.08 3051.77  756.62 3087.78  764.89 3115.55  772.33
 3119.71  774.14 3122.55  775.54 3157.22  788.51 3192.57     799 3205.54  803.87
  3224.9  812.12 3255.97   818.5 3280.41   824.6 3293.27  826.75  3293.9  826.87

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075    1092     .03    1250    .075    1272     .03    1322    .075
    1344     .03    1478      .1
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1092    1478              950  1014.3     770              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 2083.12  3101.3     770       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     640     770     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.79  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  747.38  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2563.30  *          *
* E.G. Slope (ft/ft)     *0.000806  * Area (sq ft)           *          * 2563.30  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  230.12  * Top Width (ft)         *          *  230.12  *          *
* Vel Total (ft/s)       *    5.15  * Avg. Vel. (ft/s)       *          *    5.15  *          *
* Max Chl Dpth (ft)      *   20.02  * Hydr. Depth (ft)       *          *   11.14  *          *
* Conv. Total (cfs)      *464857.5  * Conv. (cfs)            *          *464857.5  *          *
* Length Wtd. (ft)       * 1014.30  * Wetted Per. (ft)        *          *  235.95  *          *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.82  *          *
* Frctn Loss (ft)        *    0.73  * Cum Volume (acre-ft)   *   20.10  * 3375.03  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.51  *  289.27  *    1.74  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.87  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.039  *          *
* W.S. Elev (ft)         *  751.36  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3525.41  *          *
* E.G. Slope (ft/ft)     *0.000720  * Area (sq ft)           *          * 3525.41  *  739.80  *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  626.24  * Top Width (ft)         *          *  253.97  *  372.27  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *          *    5.76  *          *
* Max Chl Dpth (ft)      *   24.00  * Hydr. Depth (ft)       *          *   13.88  *          *
* Conv. Total (cfs)      *756422.6  * Conv. (cfs)            *          *756422.6  *          *
* Length Wtd. (ft)       * 1014.30  * Wetted Per. (ft)        *          *  261.08  *          *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.61  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.50  *          *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   *   39.58  * 4679.57  *   29.49  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    7.38  *  323.89  *   15.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.04  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.039  *          *
* W.S. Elev (ft)         *  754.47  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4346.77  *          *
* E.G. Slope (ft/ft)     *0.000643  * Area (sq ft)           *          * 4346.77  * 2323.72  *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  951.31  * Top Width (ft)         *          *  272.69  *  678.62  *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *          *    6.06  *          *
* Max Chl Dpth (ft)      *   27.11  * Hydr. Depth (ft)       *          *   15.94  *          *
* Conv. Total (cfs)      *1037788.0  * Conv. (cfs)            *          *1037788.0  *          *
* Length Wtd. (ft)       * 1014.30  * Wetted Per. (ft)        *          *  280.81  *          *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.62  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.76  *          *
* Frctn Loss (ft)        *    0.59  * Cum Volume (acre-ft)   *   80.18  * 5805.09  *  177.04  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   19.62  *  349.52  *   74.06  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
```

```
CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  758.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)         *  757.62  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5234.78  *          *
* E.G. Slope (ft/ft)     *0.000615  * Area (sq ft)           *          * 5234.78  * 4658.86  *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         * 1095.61  * Top Width (ft)         *          *  291.57  *  804.04  *
* Vel Total (ft/s)       *    6.50  * Avg. Vel. (ft/s)       *          *    6.50  *          *
* Max Chl Dpth (ft)      *   30.26  * Hydr. Depth (ft)       *          *   17.95  *          *
* Conv. Total (cfs)      *1370751.0  * Conv. (cfs)            *          *1370751.0  *          *
* Length Wtd. (ft)       * 1014.30  * Wetted Per. (ft)       *          *  300.72  *          *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.67  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.34  *          *
* Frctn Loss (ft)        *    0.57  * Cum Volume (acre-ft)   *  166.70  * 6946.37  *  507.96  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   43.70  *  370.18  *  134.01  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  763.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.037  *   0.100  *
* W.S. Elev (ft)         *  762.73  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 6879.83  *    0.43  *
* E.G. Slope (ft/ft)     *0.000521  * Area (sq ft)           *          * 6879.83  * 9021.03  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *44499.95  *    0.05  *
* Top Width (ft)         * 1309.27  * Top Width (ft)         *          *  363.10  *  946.17  *
* Vel Total (ft/s)       *    6.47  * Avg. Vel. (ft/s)       *          *    6.47  *    0.11  *
* Max Chl Dpth (ft)      *   35.37  * Hydr. Depth (ft)       *          *   18.95  *    0.18  *
* Conv. Total (cfs)      *1948659.0  * Conv. (cfs)            *          *1948657.0  *     2.1  *
* Length Wtd. (ft)       * 1014.02  * Wetted Per. (ft)       *          *  373.17  *    2.39  *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.60  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.88  *    0.00  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *  653.43  * 8822.54  * 1743.14  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  221.36  *  394.71  *  426.97  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  766.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *          *   0.036  *   0.100  *
* W.S. Elev (ft)         *  765.56  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 7919.79  *  384.94  *
* E.G. Slope (ft/ft)     *0.000484  * Area (sq ft)           *          * 7919.79  *12139.01  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *          *53547.02  *  142.99  *
* Top Width (ft)         * 1697.87  * Top Width (ft)         *          *  371.60  * 1326.27  *
* Vel Total (ft/s)       *    6.46  * Avg. Vel. (ft/s)       *          *    6.76  *    0.37  *
* Max Chl Dpth (ft)      *   38.20  * Hydr. Depth (ft)       *          *   21.31  *    1.13  *
* Conv. Total (cfs)      *2441632.0  * Conv. (cfs)            *          *2435130.0  *  6502.6  *
* Length Wtd. (ft)       * 1013.15  * Wetted Per. (ft)       *          *  382.12  *  339.61  *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.63  *    0.03  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *          *    4.23  *    0.01  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   * 1434.68  * 9879.93  * 3134.41  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  369.00  *  400.52  *  686.34  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  767.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *          *   0.036  *   0.100  *
* W.S. Elev (ft)         *  767.17  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 8523.05  * 1022.43  *
* E.G. Slope (ft/ft)     *0.000504  * Area (sq ft)           *          * 8523.05  *14387.65  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *          *61380.96  *  619.03  *
* Top Width (ft)         * 1829.58  * Top Width (ft)         *          *  376.43  * 1453.15  *
* Vel Total (ft/s)       *    6.50  * Avg. Vel. (ft/s)       *          *    7.20  *    0.61  *
```

```
* Max Chl Dpth (ft)      *   39.81  * Hydr. Depth (ft)       *          *   22.64  *    2.31  *
* Conv. Total (cfs)      *2761502.0  * Conv. (cfs)            *          *2733930.0  * 27572.0  *
* Length Wtd. (ft)       * 1011.72  * Wetted Per. (ft)       *          *  387.23  *  442.78  *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.69  *    0.07  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *          *    4.99  *    0.04  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   * 2076.17  *10510.57  * 4404.46  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  444.60  *  401.65  *  966.54  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  770.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.075  *   0.036  *   0.100  *
* W.S. Elev (ft)         *  769.54  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  150.62  * 9423.43  * 2285.05  *
* E.G. Slope (ft/ft)     *0.000517  * Area (sq ft)           *  150.62  * 9423.43  *18059.26  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *   76.07  *72781.48  * 1862.45  *
* Top Width (ft)         * 2171.95  * Top Width (ft)         *  161.27  *  383.54  * 1627.14  *
* Vel Total (ft/s)       *    6.30  * Avg. Vel. (ft/s)       *    0.51  *    7.72  *    0.82  *
* Max Chl Dpth (ft)      *   42.18  * Hydr. Depth (ft)       *    0.93  *   24.57  *    3.75  *
* Conv. Total (cfs)      *3286463.0  * Conv. (cfs)            *  3345.9  *3201200.0  * 81917.4  *
* Length Wtd. (ft)       * 1007.87  * Wetted Per. (ft)       *  164.03  *  394.72  *  609.77  *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *    0.03  *    0.77  *    0.12  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *    0.01  *    5.95  *    0.10  *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)   * 3401.43  *11551.29  * 7184.62  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  561.65  *  403.54  * 1249.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  759.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)         *  759.28  * Reach Len. (ft)        *  950.00  * 1014.30  *  770.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5726.36  *          *
* E.G. Slope (ft/ft)     *0.000588  * Area (sq ft)           *          * 5726.36  * 6005.22  *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         * 1121.84  * Top Width (ft)         *          *  301.52  *  820.32  *
* Vel Total (ft/s)       *    6.64  * Avg. Vel. (ft/s)       *          *    6.64  *          *
* Max Chl Dpth (ft)      *   31.92  * Hydr. Depth (ft)       *          *   18.99  *          *
* Conv. Total (cfs)      *1566614.0  * Conv. (cfs)            *          *1566614.0  *          *
* Length Wtd. (ft)       * 1014.30  * Wetted Per. (ft)       *          *  311.20  *          *
* Min Ch El (ft)         *  727.36  * Shear (lb/sq ft)       *          *    0.68  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.49  *          *
* Frctn Loss (ft)        *    0.55  * Cum Volume (acre-ft)   *  246.21  * 7560.04  *  765.61  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   73.21  *  379.31  *  182.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 10.817

INPUT
Description: STA. 106+04.3     U/S of Blue Pkwy Bridge,  B-22  Bridge #15
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  801.59   16.67  800.45    27.2  800.23   66.16  800.41   87.45  800.86
  128.49  788.78  209.93  774.41     295  767.37  314.78  764.38  365.72  760.04
     445     759     477  758.84     522  743.84     552  740.84     581  731.17
     603  731.17     616  726.84     640  726.84     653  731.17     675  731.17
     704  740.84     734  743.84     779  758.84     806  760.54     812  762.54
  834.47  765.66     915     766  928.25  776.39  959.45  776.88  997.72  777.65
 1033.97  776.47 1173.81  769.74 1230.38  770.01 1267.16  769.78 1327.76  769.72
 1375.68  767.42 1382.88  767.29 1385.93  767.19 1388.65  767.11 1405.25  767.24
 1528.25   768.3 1561.58  768.28 1637.69  769.39 1701.69  768.41 1771.98  768.47
```

```
 1874.84  764.35 1880.07  764.13 1882.59  764.14 1961.48  764.29 2000.09  766.61
  2092.4  765.29 2097.21  765.33 2099.18  765.25 2235.73   768.1 2260.57  768.04
 2339.12  768.96 2409.18  769.88 2447.44  769.57 2480.51  769.55 2491.51  769.75
 2623.04  772.13 2655.67  772.23  2713.6  772.68 2823.44  787.29 2869.92  798.58
 2871.02  798.72 2911.67  808.33 2942.54  814.68 2956.15  815.59 2981.38  816.43
 3001.76  817.07 3065.35  820.81    3068  821.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .08     477    .035     779      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           477     779              104     104     104             .3       .5

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  746.63  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  737.63  * Flow Area (sq ft)      *          * 2510.12  *          *
* E.G. Slope (ft/ft)     *0.000650  * Area (sq ft)           *          * 2510.12  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  228.73  * Top Width (ft)         *          *  228.73  *          *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *          *    5.26  *          *
* Max Chl Dpth (ft)      *   19.79  * Hydr. Depth (ft)       *          *   10.97  *          *
* Conv. Total (cfs)      *517623.1  * Conv. (cfs)             *          *517623.1  *          *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *          *  234.48  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)        *          *    0.43  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.29  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   20.10  * 3315.96  *    5.47  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    3.51  *  283.93  *    1.74  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  750.68  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  740.01  * Flow Area (sq ft)      *          * 3486.73  *          *
* E.G. Slope (ft/ft)     *0.000591  * Area (sq ft)           *          * 3486.73  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)         *  253.06  * Top Width (ft)         *          *  253.06  *          *
* Vel Total (ft/s)       *    5.82  * Avg. Vel. (ft/s)       *          *    5.82  *          *
* Max Chl Dpth (ft)      *   23.84  * Hydr. Depth (ft)       *          *   13.78  *          *
* Conv. Total (cfs)      *835299.5  * Conv. (cfs)             *          *835299.5  *          *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *          *  260.12  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)        *          *    0.49  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.88  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   39.58  * 4597.94  *   22.95  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    7.38  *  317.99  *   12.51  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  753.87  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  742.14  * Flow Area (sq ft)      *          * 4324.96  *          *
* E.G. Slope (ft/ft)     *0.000535  * Area (sq ft)           *          * 4324.96  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *26320.00  *          *
* Top Width (ft)         *  272.21  * Top Width (ft)         *          *  272.21  *          *
* Vel Total (ft/s)       *    6.09  * Avg. Vel. (ft/s)       *          *    6.09  *          *
* Max Chl Dpth (ft)      *   27.03  * Hydr. Depth (ft)       *          *   15.89  *          *
* Conv. Total (cfs)      *1138001.0  * Conv. (cfs)             *          *1138001.0  *          *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *          *  280.31  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)        *          *    0.52  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.14  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   80.18  * 5704.13  *  156.50  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   19.62  *  343.17  *   68.07  *
```

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*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  757.04  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  744.15  * Flow Area (sq ft)      *          * 5217.40  *          *
* E.G. Slope (ft/ft)     *0.000524  * Area (sq ft)           *          * 5217.40  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *34000.00  *          *
* Top Width (ft)         *  291.21  * Top Width (ft)          *          *  291.21  *          *
* Vel Total (ft/s)       *    6.52  * Avg. Vel. (ft/s)        *          *    6.52  *          *
* Max Chl Dpth (ft)      *   30.20  * Hydr. Depth (ft)        *          *   17.92  *          *
* Conv. Total (cfs)      *1485734.0  * Conv. (cfs)            *          *1485734.0  *          *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *          *  300.34  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)        *          *    0.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.70  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    *  166.70  * 6824.68  *  466.78  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)          *   43.70  *  363.40  *  126.90  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  762.27  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  746.14  * Flow Area (sq ft)      *  354.11  * 6785.84  *   74.08  *
* E.G. Slope (ft/ft)     *0.000388  * Area (sq ft)           *  354.11  * 6785.84  *   74.08  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *  243.25  *44219.23  *   37.52  *
* Top Width (ft)         *  471.61  * Top Width (ft)          *  137.43  *  302.00  *   32.18  *
* Vel Total (ft/s)       *    6.17  * Avg. Vel. (ft/s)        *    0.69  *    6.52  *    0.51  *
* Max Chl Dpth (ft)      *   35.43  * Hydr. Depth (ft)        *    2.58  *   22.47  *    2.30  *
* Conv. Total (cfs)      *2260372.0  * Conv. (cfs)            * 12356.0  *2246110.0  *  1905.9  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *  137.53  *  311.71  *   32.52  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)        *    0.06  *    0.53  *    0.06  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    0.04  *    3.43  *    0.03  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *  649.57  * 8663.44  * 1662.75  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *  219.86  *  386.96  *  418.32  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  765.11  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  747.69  * Flow Area (sq ft)      *  790.95  * 7644.52  *  282.17  *
* E.G. Slope (ft/ft)     *0.000371  * Area (sq ft)           *  790.95  * 7644.52  *  282.17  *
* Q Total (cfs)          *53690.00  * Flow (cfs)              *  796.69  *52741.12  *  152.19  *
* Top Width (ft)         *  639.89  * Top Width (ft)          *  167.06  *  302.00  *  170.83  *
* Vel Total (ft/s)       *    6.16  * Avg. Vel. (ft/s)        *    1.01  *    6.90  *    0.54  *
* Max Chl Dpth (ft)      *   38.27  * Hydr. Depth (ft)        *    4.73  *   25.31  *    1.65  *
* Conv. Total (cfs)      *2788816.0  * Conv. (cfs)            * 41382.2  *2739528.0  *  7905.3  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *  167.30  *  311.71  *  171.43  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)        *    0.11  *    0.57  *    0.04  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *    0.11  *    3.92  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    * 1426.06  * 9698.72  * 3024.62  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *  367.18  *  392.67  *  673.11  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
```

```
* W.S. Elev (ft)         *  766.68  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  748.93  * Flow Area (sq ft)      * 1060.68  * 8117.46  *  799.55  *
* E.G. Slope (ft/ft)     *0.000397  * Area (sq ft)           * 1060.68  * 8117.46  *  799.55  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 1291.93  *60359.27  *  348.80  *
* Top Width (ft)         *  967.11  * Top Width (ft)         *  177.42  *  302.00  *  487.69  *
* Vel Total (ft/s)       *    6.21  * Avg. Vel. (ft/s)       *    1.22  *    7.44  *    0.44  *
* Max Chl Dpth (ft)      *   39.84  * Hydr. Depth (ft)       *    5.98  *   26.88  *    1.64  *
* Conv. Total (cfs)      *3110095.0  * Conv. (cfs)           * 64806.7  *3027791.0  * 17497.0  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *  177.78  *  311.71  *  488.67  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.15  *    0.65  *    0.04  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.18  *    4.80  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2064.61  *10316.83  * 4270.23  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  442.66  *  393.75  *  949.39  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  769.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  769.01  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  750.85  * Flow Area (sq ft)      * 1500.13  * 8822.29  * 2505.99  *
* E.G. Slope (ft/ft)     *0.000417  * Area (sq ft)           * 1500.13  * 8822.29  * 2505.99  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 2164.76  *71073.21  * 1482.03  *
* Top Width (ft)         * 1593.43  * Top Width (ft)         *  201.83  *  302.00  * 1089.60  *
* Vel Total (ft/s)       *    5.82  * Avg. Vel. (ft/s)       *    1.44  *    8.06  *    0.59  *
* Max Chl Dpth (ft)      *   42.17  * Hydr. Depth (ft)       *    7.43  *   29.21  *    2.30  *
* Conv. Total (cfs)      *3657002.0  * Conv. (cfs)           *105949.5  *3478518.0  * 72534.4  *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *  202.32  *  311.71  * 1091.49  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.19  *    0.74  *    0.06  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.28  *    5.94  *    0.04  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 3383.43  *11338.87  * 7002.86  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  557.69  *  395.55  * 1225.01  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  759.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  758.72  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *  744.90  * Flow Area (sq ft)      *          * 5715.75  *          *
* E.G. Slope (ft/ft)     *0.000506  * Area (sq ft)           *          * 5715.75  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  301.31  * Top Width (ft)         *          *  301.31  *          *
* Vel Total (ft/s)       *    6.65  * Avg. Vel. (ft/s)       *          *    6.65  *          *
* Max Chl Dpth (ft)      *   31.88  * Hydr. Depth (ft)       *          *   18.97  *          *
* Conv. Total (cfs)      *1690029.0  * Conv. (cfs)           *          *1690029.0  *          *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)       *          *  310.98  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.58  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.86  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  246.21  * 7426.83  *  712.54  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   73.21  *  372.29  *  175.00  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 10.808

INPUT
Description: Blue Pkwy  B-22 @ BLUE RIVER STA. 106+58.8
Distance from Upstream XS =      20
Deck/Roadway Width        =      69
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
```

```
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
      42     799     796     100     801     796     957     779     774
    1033   776.5     774

Upstream Bridge Cross Section Data
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  801.59   16.67  800.45    27.2  800.23   66.16  800.41   87.45  800.86
  128.49  788.78  209.93  774.41     295  767.37  314.78  764.38  365.72  760.04
     445     759     477  758.84     522  743.84     552  740.84     581  731.17
     603  731.17     616  726.84     640  726.84     653  731.17     675  731.17
     704  740.84     734  743.84     779  758.84     806  760.54     812  762.54
  834.47  765.66     915     766  928.25  776.39  959.45  776.88  997.72  777.65
 1033.97  776.47 1173.81  769.74 1230.38  770.01 1267.16  769.78 1327.76  769.72
 1375.68  767.42 1382.88  767.29 1385.93  767.19 1388.65  767.11 1405.25  767.24
 1528.25   768.3 1561.58  768.28 1637.69  769.39 1701.69  768.41 1771.98  768.47
 1874.84  764.35 1880.07  764.13 1882.59  764.14 1961.48  764.29 2000.09  766.61
  2092.4  765.29 2097.21  765.33 2099.18  765.25 2235.73   768.1 2260.57  768.04
 2339.12  768.96 2409.18  769.88 2447.44  769.57 2480.51  769.55 2491.51  769.75
 2623.04  772.13 2655.67  772.23  2713.6  772.68 2823.44  787.29 2869.92  798.58
 2871.02  798.72 2911.67  808.33 2942.54  814.68 2956.15  815.59 2981.38  816.43
 3001.76  817.07 3065.35  820.81    3068  821.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .08     477    .035     779      .1

Bank Sta: Left   Right    Coeff Contr.   Expan.
           477     779             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
      42     799     796     100     801     796     957     779     774
    1033   776.5     774

Downstream Bridge Cross Section Data
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  801.59   16.67  800.45    27.2  800.23   66.16  800.41   87.45  800.86
  128.49  788.78  209.93  774.41     295  767.37  314.78  764.38  365.72  760.04
     445     759     477  758.84     522  743.84     552  740.84     581  731.17
     603  731.17     616  726.84     640  726.84     653  731.17     675  731.17
     704  740.84     734  743.84     779  758.84     806  760.54     812  762.54
  834.47  765.66     915     766  928.25  776.39  959.45  776.88  997.72  777.65
 1033.97  776.47 1173.81  769.74 1230.38  770.01 1267.16  769.78 1327.76  769.72
 1375.68  767.42 1382.88  767.29 1385.93  767.19 1388.65  767.11 1405.25  767.24
 1528.25   768.3 1561.58  768.28 1637.69  769.39 1701.69  768.41 1771.98  768.47
 1874.84  764.35 1880.07  764.13 1882.59  764.14 1961.48  764.29 2000.09  766.61
  2092.4  765.29 2097.21  765.33 2099.18  765.25 2235.73   768.1 2260.57  768.04
 2339.12  768.96 2409.18  769.88 2447.44  769.57 2480.51  769.55 2491.51  769.75
 2623.04  772.13 2655.67  772.23  2713.6  772.68 2823.44  787.29 2869.92  798.58
 2871.02  798.72 2911.67  808.33 2942.54  814.68 2956.15  815.59 2981.38  816.43
 3001.76  817.07 3065.35  820.81    3068  821.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0   .0801     477    .035     779      .1

Bank Sta: Left   Right    Coeff Contr.   Expan.
           477     779             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested
```

```
Number of Abutments =  1

Abutment Data
Upstream     num=       4
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************
      95      790      95   795.5     130   795.5     130      785
Downstream     num=       4
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************
      95      790      95   795.5     130   795.5     130      785

Number of Piers =  13

Pier Data
Pier Station     Upstream=     186    Downstream=     186
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     765       5     797
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     765       5     797

Pier Data
Pier Station     Upstream=     245    Downstream=     245
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     760       5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     760       5     795

Pier Data
Pier Station     Upstream=     304    Downstream=     304
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     795

Pier Data
Pier Station     Upstream=     363    Downstream=     363
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     795

Pier Data
Pier Station     Upstream=     422    Downstream=     422
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     745       5     794
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     745       5     794

Pier Data
Pier Station     Upstream=     475    Downstream=     475
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     735       5     793
```

```
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     735       5     793

Pier Data
Pier Station     Upstream=     525    Downstream=     525
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     725       5     792
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     725       5     792

Pier Data
Pier Station     Upstream=     584    Downstream=     584
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     725       5     791
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     725       5     791

Pier Data
Pier Station     Upstream=     637    Downstream=     637
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     740       5     791
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     740       5     791

Pier Data
Pier Station     Upstream=     696    Downstream=     696
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     755       5     790

Pier Data
Pier Station     Upstream=     755    Downstream=     755
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     763       5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     763       5     790

Pier Data
Pier Station     Upstream=     814    Downstream=     814
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     770       5     788
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     770       5     788

Pier Data
Pier Station     Upstream=     873    Downstream=     873
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
```

```
       5     773       5     788
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       5     773       5     788

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     747.06  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     746.63  * E.G. Elev (ft)         *     747.01  *     746.91  *
* Q Total (cfs)          *   13200.00  * W.S. Elev (ft)         *     746.47  *     746.36  *
* Q Bridge (cfs)         *   13200.00  * Crit W.S. (ft)         *     738.18  *     738.18  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.63  *      19.52  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.88  *       5.94  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2243.06  *    2220.57  *
* Weir Submerg           *             * Froude # Chl           *       0.32  *       0.32  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   18382.76  *   18165.26  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      10.80  *      10.72  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *     305.49  *     303.94  *
* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *   359746.5  *   354959.5  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *     207.78  *     207.13  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       5.94  * C & E Loss (ft)        *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.62  *       0.63  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.63  *       3.75  *
*********************************************************************************************

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     751.21  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.68  * E.G. Elev (ft)         *     751.15  *     751.06  *
* Q Total (cfs)          *   20300.00  * W.S. Elev (ft)         *     750.50  *     750.40  *
* Q Bridge (cfs)         *   20300.00  * Crit W.S. (ft)         *     740.75  *     740.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.66  *      23.56  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.49  *       6.54  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3128.91  *    3104.69  *
* Weir Submerg           *             * Froude # Chl           *       0.31  *       0.31  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   30854.70  *   30558.84  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      13.58  *      13.49  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *     362.16  *     360.88  *
* Delta EG (ft)          *       0.22  * Conv. Total (cfs)      *   559303.9  *   553410.1  *
* Delta WS (ft)          *       0.24  * Top Width (ft)         *     230.48  *     230.17  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       6.54  * C & E Loss (ft)        *       0.00  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.71  *       0.72  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.61  *       4.73  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     754.45  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.87  * E.G. Elev (ft)         *     754.39  *     754.30  *
* Q Total (cfs)          *   26320.00  * W.S. Elev (ft)         *     753.68  *     753.58  *
* Q Bridge (cfs)         *   26320.00  * Crit W.S. (ft)         *     743.11  *     743.11  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.84  *      26.74  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.78  *       6.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3882.63  *    3858.01  *
```

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* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   43434.28  *   43081.99  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      15.78  *      15.72  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *     409.16  *     407.53  *
* Delta EG (ft)          *       0.23  * Conv. Total (cfs)      *   738821.2  *   732986.1  *
* Delta WS (ft)          *       0.24  * Top Width (ft)         *     246.03  *     245.43  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       6.82  * C & E Loss (ft)        *       0.00  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.75  *       0.76  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.10  *       5.20  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     757.70  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     757.04  * E.G. Elev (ft)         *     757.64  *     757.54  *
* Q Total (cfs)          *   34000.00  * W.S. Elev (ft)         *     756.82  *     756.72  *
* Q Bridge (cfs)         *   34000.00  * Crit W.S. (ft)         *     744.91  *     744.91  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.98  *      29.88  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.26  *       7.30  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4685.33  *    4657.60  *
* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.31  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   59001.26  *   58557.31  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      17.69  *      17.63  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *     460.46  *     458.75  *
* Delta EG (ft)          *       0.24  * Conv. Total (cfs)      *   934044.8  *   927148.4  *
* Delta WS (ft)          *       0.26  * Top Width (ft)         *     264.88  *     264.26  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       7.30  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.84  *       0.85  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       6.11  *       6.22  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     762.92  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     762.27  * E.G. Elev (ft)         *     762.87  *     762.79  *
* Q Total (cfs)          *   44500.00  * W.S. Elev (ft)         *     762.07  *     761.98  *
* Q Bridge (cfs)         *   44500.00  * Crit W.S. (ft)         *     746.99  *     746.99  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.23  *      35.14  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.86  *       6.90  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6482.33  *    6445.71  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   90032.98  *   89525.54  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      15.12  *      15.08  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *     693.45  *     690.80  *
* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *  1342775.0  *  1335179.0  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *     428.67  *     427.41  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.08  *       0.01  *
* BR Open Vel (ft/s)     *       6.90  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.64  *       0.65  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.40  *       4.47  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     765.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     765.11  * E.G. Elev (ft)         *     765.78  *     765.70  *
* Q Total (cfs)          *   53690.00  * W.S. Elev (ft)         *     764.91  *     764.82  *
* Q Bridge (cfs)         *   53665.87  * Crit W.S. (ft)         *     748.63  *     748.63  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.07  *      37.98  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.86  *       6.90  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7829.32  *    7778.33  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  112775.50  *  112149.60  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      13.41  *      13.43  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *     898.77  *     892.31  *
```

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* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *  1607003.0  *  1598361.0  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *     583.86  *     579.00  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.08  *       0.01  *
* BR Open Vel (ft/s)     *       6.95  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.61  *       0.61  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.16  *       4.24  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     767.51  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     766.68  * E.G. Elev (ft)         *     767.46  *     767.37  *
* Q Total (cfs)          *   62000.00  * W.S. Elev (ft)         *     766.47  *     766.37  *
* Q Bridge (cfs)         *   61752.50  * Crit W.S. (ft)         *     750.01  *     750.01  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.63  *      39.53  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.93  *       7.00  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8942.57  *    8855.42  *
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.28  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  128538.60  *  127741.50  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      10.12  *      10.22  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *    1228.89  *    1210.11  *
* Delta EG (ft)          *       0.23  * Conv. Total (cfs)      *  1767405.0  *  1756504.0  *
* Delta WS (ft)          *       0.25  * Top Width (ft)         *     883.34  *     866.78  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       7.26  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.56  *       0.57  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.88  *       3.99  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     769.97  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     769.01  * E.G. Elev (ft)         *     769.92  *     769.82  *
* Q Total (cfs)          *   74720.00  * W.S. Elev (ft)         *     768.83  *     768.72  *
* Q Bridge (cfs)         *   73280.81  * Crit W.S. (ft)         *     751.86  *     751.86  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.99  *      41.88  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.45  *       6.55  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11578.04  *   11409.79  *
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.29  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  156286.10  *  155135.30  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *       7.75  *       7.79  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *    1891.83  *    1860.44  *
* Delta EG (ft)          *       0.22  * Conv. Total (cfs)      *  2049170.0  *  2033693.0  *
* Delta WS (ft)          *       0.24  * Top Width (ft)         *    1493.28  *    1464.45  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       7.45  * C & E Loss (ft)        *       0.00  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.51  *       0.52  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.28  *       3.38  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     759.41  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     758.72  * E.G. Elev (ft)         *     759.35  *     759.25  *
* Q Total (cfs)          *   38000.00  * W.S. Elev (ft)         *     758.50  *     758.39  *
* Q Bridge (cfs)         *   38000.00  * Crit W.S. (ft)         *     745.73  *     745.73  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.66  *      31.55  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.40  *       7.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5137.76  *    5109.28  *
* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   68297.79  *   67815.13  *
* Min El Weir Flow (ft)  *     764.14  * Hydr Depth (ft)        *      18.69  *      18.63  *
* Min El Prs (ft)        *     795.89  * W.P. Total (ft)        *     487.82  *     486.13  *
* Delta EG (ft)          *       0.25  * Conv. Total (cfs)      *  1048037.0  *  1040782.0  *
* Delta WS (ft)          *       0.27  * Top Width (ft)         *     274.94  *     274.32  *
* BR Open Area (sq ft)   *   20584.83  * Frctn Loss (ft)        *       0.09  *       0.01  *
* BR Open Vel (ft/s)     *       7.44  * C & E Loss (ft)        *       0.00  *       0.08  *
```

```
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.86  *       0.87  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       6.39  *       6.51  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.8039

INPUT
Description: STA. 107+13.3   D/S of Blue Pkwy Bridge,  B-22  Bridge #15 Copied
             from XS 10.817

US END OF NEWBURY STRUCTURE
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  801.59   16.67  800.45    27.2  800.23   66.16  800.41   87.45  800.86
  128.49  788.78  209.93  774.41     295  767.37  314.78  764.38  365.72  760.04
     445     759     477  758.84     522  743.84     552  740.84     581  731.17
     603  731.17     616  726.84     640  726.84     653  731.17     675  731.17
     704  740.84     734  743.84     779  758.84     806  760.54     812  762.54
  834.47  765.66     915     766  928.25  776.39  959.45  776.88  997.72  777.65
 1033.97  776.47 1173.81  769.74 1230.38  770.01 1267.16  769.78 1327.76  769.72
 1375.68  767.42 1382.88  767.29 1385.93  767.19 1388.65  767.11 1405.25  767.24
 1528.25   768.3 1561.58  768.28 1637.69  769.39 1701.69  768.41 1771.98  768.47
 1874.84  764.35 1880.07  764.13 1882.59  764.14 1961.48  764.29 2000.09  766.61
  2092.4  765.29 2097.21  765.33 2099.18  765.25 2235.73   768.1 2260.57  768.04
 2339.12  768.96 2409.18  769.88 2447.44  769.57 2480.51  769.55 2491.51  769.75
 2623.04  772.13 2655.67  772.23  2713.6  772.68 2823.44  787.29 2869.92  798.58
 2871.02  798.72 2911.67  808.33 2942.54  814.68 2956.15  815.59 2981.38  816.43
 3001.76  817.07 3065.35  820.81    3068  821.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .08     477    .035     779      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           477     779                 5       5       5              .3       .5

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  746.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  746.40  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2457.38  *          *
* E.G. Slope (ft/ft)     *0.000692  * Area (sq ft)           *          * 2457.38  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  227.34  * Top Width (ft)         *          *  227.34  *          *
* Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *          *    5.37  *          *
* Max Chl Dpth (ft)      *   19.56  * Hydr. Depth (ft)        *          *   10.81  *          *
* Conv. Total (cfs)      *501714.3  * Conv. (cfs)             *          *501714.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *  233.02  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)        *          *    0.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.45  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *   20.10  * 3310.53  *    5.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    3.51  *  283.42  *    1.74  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  750.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  750.44  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3425.79  *          *
* E.G. Slope (ft/ft)     *0.000621  * Area (sq ft)           *          * 3425.79  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  251.61  * Top Width (ft)         *          *  251.61  *          *
* Vel Total (ft/s)       *    5.93  * Avg. Vel. (ft/s)       *          *    5.93  *          *
* Max Chl Dpth (ft)      *   23.60  * Hydr. Depth (ft)        *          *   13.62  *          *
* Conv. Total (cfs)      *814300.1  * Conv. (cfs)             *          *814300.1  *          *
```

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* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *           *  258.59  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *           *    0.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    3.05  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   39.58  * 4590.36  *   22.95  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    7.38  *  317.43  *   12.51  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  753.63  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4258.89  *          *
* E.G. Slope (ft/ft)     *0.000559  * Area (sq ft)           *          * 4258.89  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  270.75  * Top Width (ft)         *          *  270.75  *          *
* Vel Total (ft/s)       *    6.18  * Avg. Vel. (ft/s)       *          *    6.18  *          *
* Max Chl Dpth (ft)      *   26.79  * Hydr. Depth (ft)       *          *   15.73  *          *
* Conv. Total (cfs)      *1113255.0  * Conv. (cfs)            *          *1113255.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  278.77  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.53  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.29  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   80.18  * 5694.72  *  156.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   19.62  *  342.58  *   68.07  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  756.78  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5140.60  *          *
* E.G. Slope (ft/ft)     *0.000546  * Area (sq ft)           *          * 5140.60  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  289.63  * Top Width (ft)         *          *  289.63  *          *
* Vel Total (ft/s)       *    6.61  * Avg. Vel. (ft/s)       *          *    6.61  *          *
* Max Chl Dpth (ft)      *   29.94  * Hydr. Depth (ft)       *          *   17.75  *          *
* Conv. Total (cfs)      *1454867.0  * Conv. (cfs)            *          *1454867.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  298.67  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.59  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.88  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  166.70  * 6813.32  *  466.78  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   43.70  *  362.76  *  126.90  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  762.04  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  323.30  * 6717.47  *   66.87  *
* E.G. Slope (ft/ft)     *0.000401  * Area (sq ft)           *  323.30  * 6717.47  *   66.87  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  215.52  *44251.80  *   32.68  *
* Top Width (ft)         *  468.28  * Top Width (ft)         *  134.77  *  302.00  *   31.50  *
* Vel Total (ft/s)       *    6.26  * Avg. Vel. (ft/s)       *    0.67  *    6.59  *    0.49  *
* Max Chl Dpth (ft)      *   35.20  * Hydr. Depth (ft)       *    2.40  *   22.24  *    2.12  *
* Conv. Total (cfs)      *2220909.0  * Conv. (cfs)            * 10756.2  *2208522.0  *  1630.9  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  134.86  *  311.71  *   31.80  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.06  *    0.54  *    0.05  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.04  *    3.56  *    0.03  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  648.87  * 8648.58  * 1662.59  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  219.57  *  386.29  *  418.25  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  764.88  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  753.04  * 7575.69  *  244.51  *
* E.G. Slope (ft/ft)     *0.000383  * Area (sq ft)           *  753.04  * 7575.69  *  244.51  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *  750.68  *52803.87  *  135.45  *
* Top Width (ft)         *  627.26  * Top Width (ft)         *  165.55  *  302.00  *  159.71  *
* Vel Total (ft/s)       *    6.26  * Avg. Vel. (ft/s)       *    1.00  *    6.97  *    0.55  *
* Max Chl Dpth (ft)      *   38.04  * Hydr. Depth (ft)       *    4.55  *   25.09  *    1.53  *
* Conv. Total (cfs)      *2743829.0  * Conv. (cfs)            * 38363.7  *2698543.0  *  6922.1  *
```

```
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  165.78  *  311.71  *  160.28  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.11  *    0.58  *    0.04  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.11  *    4.05  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1424.41  * 9681.96  * 3024.06  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  366.82  *  392.00  *  672.74  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  767.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.43  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1017.17  * 8043.07  *  683.05  *
* E.G. Slope (ft/ft)     *0.000411  * Area (sq ft)           * 1017.17  * 8043.07  *  683.05  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 1233.27  *60466.71  *  300.03  *
* Top Width (ft)         *  931.71  * Top Width (ft)         *  175.79  *  302.00  *  453.92  *
* Vel Total (ft/s)       *    6.36  * Avg. Vel. (ft/s)       *    1.21  *    7.52  *    0.44  *
* Max Chl Dpth (ft)      *   39.59  * Hydr. Depth (ft)       *    5.79  *   26.63  *    1.50  *
* Conv. Total (cfs)      *3057293.0  * Conv. (cfs)           * 60813.7  *2981685.0  * 14794.6  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  176.13  *  311.71  *  454.80  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.15  *    0.66  *    0.04  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.18  *    4.98  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2062.38  *10299.03  * 4268.63  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  442.28  *  393.08  *  948.32  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  769.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  768.77  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1451.05  * 8748.32  * 2246.25  *
* E.G. Slope (ft/ft)     *0.000432  * Area (sq ft)           * 1451.05  * 8748.32  * 2246.25  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 2104.16  *71297.17  * 1318.67  *
* Top Width (ft)         * 1531.82  * Top Width (ft)         *  198.87  *  302.00  * 1030.95  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *    1.45  *    8.15  *    0.59  *
* Max Chl Dpth (ft)      *   41.93  * Hydr. Depth (ft)       *    7.30  *   28.97  *    2.18  *
* Conv. Total (cfs)      *3594714.0  * Conv. (cfs)           *101229.2  *3430045.0  * 63439.9  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *  199.35  *  311.71  * 1032.75  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.20  *    0.76  *    0.06  *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *    0.28  *    6.17  *    0.03  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 3380.24  *11319.49  * 6997.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  557.25  *  394.88  * 1222.55  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  759.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  758.46  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5635.64  *          *
* E.G. Slope (ft/ft)     *0.000526  * Area (sq ft)           *          * 5635.64  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  299.71  * Top Width (ft)         *          *  299.71  *          *
* Vel Total (ft/s)       *    6.74  * Avg. Vel. (ft/s)       *          *    6.74  *          *
* Max Chl Dpth (ft)      *   31.62  * Hydr. Depth (ft)       *          *   18.80  *          *
* Conv. Total (cfs)      *1656728.0  * Conv. (cfs)           *          *1656728.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  309.29  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.04  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  246.21  * 7414.37  *  712.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   73.21  *  371.63  *  175.00  *
**********************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.803
```

```
INPUT
Description: FLOW LINE RAISED TO MODEL NEWBURY STRUCTURE
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  801.59   16.67  800.45    27.2  800.23   66.16  800.41   87.45  800.86
  128.49  788.78  209.93  774.41     295  767.37  314.78  764.38  365.72  760.04
     445     759     477  758.84     522  743.84     552  740.84     581  731.17
     603  731.17     616  729.34     640  729.34     653  731.17     675  731.17
     704  740.84     734  743.84     779  758.84     806  760.54     812  762.54
  834.47  765.66     915     766  928.25  776.39  959.45  776.88  997.72  777.65
 1033.97  776.47 1173.81  769.74 1230.38  770.01 1267.16  769.78 1327.76  769.72
 1375.68  767.42 1382.88  767.29 1385.93  767.19 1388.65  767.11 1405.25  767.24
 1528.25   768.3 1561.58  768.28 1637.69  769.39 1701.69  768.41 1771.98  768.47
 1874.84  764.35 1880.07  764.13 1882.59  764.14 1961.48  764.29 2000.09  766.61
  2092.4  765.29 2097.21  765.33 2099.18  765.25 2235.73   768.1 2260.57  768.04
 2339.12  768.96 2409.18  769.88 2447.44  769.57 2480.51  769.55 2491.51  769.75
 2623.04  772.13 2655.67  772.23  2713.6  772.68 2823.44  787.29 2869.92  798.58
 2871.02  798.72 2911.67  808.33 2942.54  814.68 2956.15  815.59 2981.38  816.43
 3001.76  817.07 3065.35  820.81    3068  821.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .08     477    .035     779      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           477     779               25      25      25             .3       .5

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  746.34  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2351.90  *          *
* E.G. Slope (ft/ft)     *0.000794  * Area (sq ft)           *          * 2351.90  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  227.00  * Top Width (ft)         *          *  227.00  *          *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)       *          *    5.61  *          *
* Max Chl Dpth (ft)      *   17.00  * Hydr. Depth (ft)       *          *   10.36  *          *
* Conv. Total (cfs)      *468363.1  * Conv. (cfs)             *          *468363.1  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)        *          *  231.51  *          *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *          *    0.50  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.83  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   20.10  * 3310.26  *    5.47  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    3.51  *  283.40  *    1.74  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  750.39  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3321.06  *          *
* E.G. Slope (ft/ft)     *0.000684  * Area (sq ft)           *          * 3321.06  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)         *  251.31  * Top Width (ft)         *          *  251.31  *          *
* Vel Total (ft/s)       *    6.11  * Avg. Vel. (ft/s)       *          *    6.11  *          *
* Max Chl Dpth (ft)      *   21.05  * Hydr. Depth (ft)       *          *   13.21  *          *
* Conv. Total (cfs)      *776148.8  * Conv. (cfs)             *          *776148.8  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)        *          *  257.14  *          *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *          *    0.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.37  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   39.58  * 4589.97  *   22.95  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    7.38  *  317.40  *   12.51  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  753.59  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4155.05  *          *
* E.G. Slope (ft/ft)     *0.000603  * Area (sq ft)           *          * 4155.05  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *26320.00  *          *
* Top Width (ft)         *  270.49  * Top Width (ft)         *          *  270.49  *          *
```

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* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *          *    6.33  *          *
* Max Chl Dpth (ft)      *   24.25  * Hydr. Depth (ft)       *          *   15.36  *          *
* Conv. Total (cfs)      *1072008.0  * Conv. (cfs)            *          *1072008.0  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  277.35  *          *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *          *    0.56  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.57  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   80.18  * 5694.23  *  156.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   19.62  *  342.55  *   68.07  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *          *    0.035  *          *
* W.S. Elev (ft)         *  756.74  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5036.61  *          *
* E.G. Slope (ft/ft)     *0.000581  * Area (sq ft)           *          * 5036.61  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  289.39  * Top Width (ft)         *          *  289.39  *          *
* Vel Total (ft/s)       *    6.75  * Avg. Vel. (ft/s)       *          *    6.75  *          *
* Max Chl Dpth (ft)      *   27.40  * Hydr. Depth (ft)       *          *   17.40  *          *
* Conv. Total (cfs)      *1410558.0  * Conv. (cfs)            *          *1410558.0  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  297.27  *          *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *          *    0.61  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.15  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  166.70  * 6812.73  *  466.78  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   43.70  *  362.72  *  126.90  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.70  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  762.01  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  319.42  * 6616.25  *   65.96  *
* E.G. Slope (ft/ft)     *0.000420  * Area (sq ft)           *  319.42  * 6616.25  *   65.96  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  216.46  *44250.80  *   32.74  *
* Top Width (ft)         *  467.85  * Top Width (ft)         *  134.43  *  302.00  *   31.42  *
* Vel Total (ft/s)       *    6.36  * Avg. Vel. (ft/s)       *    0.68  *    6.69  *    0.50  *
* Max Chl Dpth (ft)      *   32.67  * Hydr. Depth (ft)       *    2.38  *   21.91  *    2.10  *
* Conv. Total (cfs)      *2170797.0  * Conv. (cfs)            * 10559.3  *2158640.0  *  1597.3  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *  134.52  *  310.56  *   31.71  *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *    0.06  *    0.56  *    0.05  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.04  *    3.74  *    0.03  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  648.83  * 8647.82  * 1662.59  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  219.55  *  386.26  *  418.24  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.62  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  764.86  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  748.46  * 7474.82  *  240.10  *
* E.G. Slope (ft/ft)     *0.000398  * Area (sq ft)           *  748.46  * 7474.82  *  240.10  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *  758.45  *52795.61  *  135.94  *
* Top Width (ft)         *  625.72  * Top Width (ft)         *  165.37  *  302.00  *  158.35  *
* Vel Total (ft/s)       *    6.34  * Avg. Vel. (ft/s)       *    1.01  *    7.06  *    0.57  *
* Max Chl Dpth (ft)      *   35.52  * Hydr. Depth (ft)       *    4.53  *   24.75  *    1.52  *
* Conv. Total (cfs)      *2690239.0  * Conv. (cfs)            * 38003.5  *2645423.0  *  6811.7  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *  165.59  *  310.56  *  158.92  *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *    0.11  *    0.60  *    0.04  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.11  *    4.23  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1424.32  * 9681.10  * 3024.03  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  366.80  *  391.97  *  672.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.28  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.40  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1011.88  * 7941.46  *  669.44  *
* E.G. Slope (ft/ft)     *0.000427  * Area (sq ft)           * 1011.88  * 7941.46  *  669.44  *
```

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* Q Total (cfs)          *62000.00  * Flow (cfs)             * 1246.42  *60455.88  *  297.70  *
* Top Width (ft)         *  926.66  * Top Width (ft)         *  175.59  *  302.00  *  449.07  *
* Vel Total (ft/s)       *    6.44  * Avg. Vel. (ft/s)       *    1.23  *    7.61  *    0.44  *
* Max Chl Dpth (ft)      *   37.06  * Hydr. Depth (ft)       *    5.76  *   26.30  *    1.49  *
* Conv. Total (cfs)      *3001104.0  * Conv. (cfs)            * 60332.9  *2926361.0  * 14409.9  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *  175.93  *  310.56  *  449.94  *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *    0.15  *    0.68  *    0.04  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.19  *    5.19  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2062.26  *10298.11  * 4268.55  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  442.26  *  393.05  *  948.27  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  769.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  768.73  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1444.82  * 8646.35  * 2214.02  *
* E.G. Slope (ft/ft)     *0.000447  * Area (sq ft)           * 1444.82  * 8646.35  * 2214.02  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 2127.16  *71275.18  * 1317.66  *
* Top Width (ft)         * 1523.87  * Top Width (ft)         *  198.49  *  302.00  * 1023.38  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *    1.47  *    8.24  *    0.60  *
* Max Chl Dpth (ft)      *   39.39  * Hydr. Depth (ft)       *    7.28  *   28.63  *    2.16  *
* Conv. Total (cfs)      *3534922.0  * Conv. (cfs)            *100633.6  *3371951.0  * 62337.0  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *  198.97  *  310.56  * 1025.17  *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *    0.20  *    0.78  *    0.06  *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *    0.30  *    6.40  *    0.04  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 3380.08  *11318.49  * 6997.24  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  557.23  *  394.85  * 1222.43  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  759.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  758.42  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5531.93  *          *
* E.G. Slope (ft/ft)     *0.000556  * Area (sq ft)           *          * 5531.93  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  299.48  * Top Width (ft)         *          *  299.48  *          *
* Vel Total (ft/s)       *    6.87  * Avg. Vel. (ft/s)       *          *    6.87  *          *
* Max Chl Dpth (ft)      *   29.08  * Hydr. Depth (ft)       *          *   18.47  *          *
* Conv. Total (cfs)      *1611039.0  * Conv. (cfs)            *          *1611039.0  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  307.91  *          *
* Min Ch El (ft)         *  729.34  * Shear (lb/sq ft)       *          *    0.62  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.29  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  246.21  * 7413.73  *  712.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   73.21  *  371.59  *  175.00  *
**********************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.798

INPUT
Description: NEWBURY STRUCTURE DS END
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  801.59   16.67  800.45    27.2  800.23   66.16  800.41   87.45  800.86
  128.49  788.78  209.93  774.41     295  767.37  314.78  764.38  365.72  760.04
     445     759     477  758.84     522  743.84     552  740.84     581  731.17
     603  731.17     616  726.84     640  726.84     653  731.17     675  731.17
     704  740.84     734  743.84     779  758.84     806  760.54     812  762.54
  834.47  765.66     915     766  928.25  776.39  959.45  776.88  997.72  777.65
 1033.97  776.47 1173.81  769.74 1230.38  770.01 1267.16  769.78 1327.76  769.72
 1375.68  767.42 1382.88  767.29 1385.93  767.19 1388.65  767.11 1405.25  767.24
 1528.25   768.3 1561.58  768.28 1637.69  769.39 1701.69  768.41 1771.98  768.47
 1874.84  764.35 1880.07  764.13 1882.59  764.14 1961.48  764.29 2000.09  766.61
  2092.4  765.29 2097.21  765.33 2099.18  765.25 2235.73   768.1 2260.57  768.04
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 2339.12  768.96 2409.18  769.88 2447.44  769.57 2480.51  769.55 2491.51  769.75
 2623.04  772.13 2655.67  772.23  2713.6  772.68 2823.44  787.29 2869.92  798.58
 2871.02  798.72 2911.67  808.33 2942.54  814.68 2956.15  815.59 2981.38  816.43
 3001.76  817.07 3065.35  820.81    3068  821.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .08     477    .035     779      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           477     779            806.03  803.72  306.46             .3       .5

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  746.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  746.34  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2444.33  *          *
* E.G. Slope (ft/ft)     *0.000703  * Area (sq ft)           *          * 2444.33  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  227.00  * Top Width (ft)         *          *  227.00  *          *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *          *    5.40  *          *
* Max Chl Dpth (ft)      *   19.50  * Hydr. Depth (ft)       *          *   10.77  *          *
* Conv. Total (cfs)      *497799.8  * Conv. (cfs)            *          *497799.8  *          *
* Length Wtd. (ft)       *  803.72  * Wetted Per. (ft)       *          *  232.65  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.49  *          *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   *   20.10  * 3308.88  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.51  *  283.27  *    1.74  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  750.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  750.39  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3413.39  *          *
* E.G. Slope (ft/ft)     *0.000628  * Area (sq ft)           *          * 3413.39  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  251.31  * Top Width (ft)         *          *  251.31  *          *
* Vel Total (ft/s)       *    5.95  * Avg. Vel. (ft/s)       *          *    5.95  *          *
* Max Chl Dpth (ft)      *   23.55  * Hydr. Depth (ft)       *          *   13.58  *          *
* Conv. Total (cfs)      *810044.8  * Conv. (cfs)            *          *810044.8  *          *
* Length Wtd. (ft)       *  803.72  * Wetted Per. (ft)       *          *  258.28  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.52  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.08  *          *
* Frctn Loss (ft)        *    0.57  * Cum Volume (acre-ft)   *   39.58  * 4588.04  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    7.38  *  317.26  *   12.51  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  753.59  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4247.28  *          *
* E.G. Slope (ft/ft)     *0.000563  * Area (sq ft)           *          * 4247.28  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  270.49  * Top Width (ft)         *          *  270.49  *          *
* Vel Total (ft/s)       *    6.20  * Avg. Vel. (ft/s)       *          *    6.20  *          *
* Max Chl Dpth (ft)      *   26.75  * Hydr. Depth (ft)       *          *   15.70  *          *
* Conv. Total (cfs)      *1108921.0  * Conv. (cfs)            *          *1108921.0  *          *
* Length Wtd. (ft)       *  803.72  * Wetted Per. (ft)       *          *  278.50  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.32  *          *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *   80.18  * 5691.82  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   19.62  *  342.39  *   68.07  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  756.74  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5128.74  *          *
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* E.G. Slope (ft/ft)     *0.000550  * Area (sq ft)           *          * 5128.74  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  289.38  * Top Width (ft)         *          *  289.38  *          *
* Vel Total (ft/s)       *    6.63  * Avg. Vel. (ft/s)       *          *    6.63  *          *
* Max Chl Dpth (ft)      *   29.90  * Hydr. Depth (ft)       *          *   17.72  *          *
* Conv. Total (cfs)      *1450117.0  * Conv. (cfs)            *          *1450117.0  *          *
* Length Wtd. (ft)       *  803.72  * Wetted Per. (ft)       *          *  298.41  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.59  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.91  *          *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *  166.70  * 6809.82  *  466.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   43.70  *  362.56  *  126.90  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.              *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  762.01  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  319.31  * 6708.51  *   65.94  *
* E.G. Slope (ft/ft)     *0.000403  * Area (sq ft)           *  319.31  * 6708.51  *   65.94  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *  211.96  *44255.98  *   32.06  *
* Top Width (ft)         *  467.84  * Top Width (ft)         *  134.42  *  302.00  *   31.42  *
* Vel Total (ft/s)       *    6.27  * Avg. Vel. (ft/s)       *    0.66  *    6.60  *    0.49  *
* Max Chl Dpth (ft)      *   35.17  * Hydr. Depth (ft)       *    2.38  *   22.21  *    2.10  *
* Conv. Total (cfs)      *2215765.0  * Conv. (cfs)            * 10553.9  *2203615.0  *  1596.3  *
* Length Wtd. (ft)       *  803.55  * Wetted Per. (ft)       *  134.52  *  311.71  *   31.71  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.06  *    0.54  *    0.05  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.04  *    3.58  *    0.03  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *  648.65  * 8644.00  * 1662.55  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  219.48  *  386.09  *  418.22  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.              *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  764.86  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  748.37  * 7567.16  *  240.01  *
* E.G. Slope (ft/ft)     *0.000384  * Area (sq ft)           *  748.37  * 7567.16  *  240.01  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *  745.00  *52811.48  *  133.52  *
* Top Width (ft)         *  625.69  * Top Width (ft)         *  165.36  *  302.00  *  158.33  *
* Vel Total (ft/s)       *    6.28  * Avg. Vel. (ft/s)       *    1.00  *    6.98  *    0.56  *
* Max Chl Dpth (ft)      *   38.02  * Hydr. Depth (ft)       *    4.53  *   25.06  *    1.52  *
* Conv. Total (cfs)      *2738284.0  * Conv. (cfs)            * 37996.4  *2693478.0  *  6809.5  *
* Length Wtd. (ft)       *  803.12  * Wetted Per. (ft)       *  165.59  *  311.71  *  158.90  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.11  *    0.58  *    0.04  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.11  *    4.07  *    0.02  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   * 1423.89  * 9676.78  * 3023.89  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  366.70  *  391.80  *  672.63  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.              *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  766.40  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1011.74  * 8033.73  *  669.08  *
* E.G. Slope (ft/ft)     *0.000413  * Area (sq ft)           * 1011.74  * 8033.73  *  669.08  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             * 1225.93  *60481.41  *  292.66  *
* Top Width (ft)         *  926.53  * Top Width (ft)         *  175.58  *  302.00  *  448.95  *
* Vel Total (ft/s)       *    6.38  * Avg. Vel. (ft/s)       *    1.21  *    7.53  *    0.44  *
* Max Chl Dpth (ft)      *   39.56  * Hydr. Depth (ft)       *    5.76  *   26.60  *    1.49  *
* Conv. Total (cfs)      *3050634.0  * Conv. (cfs)            * 60320.3  *2975913.0  * 14399.9  *
* Length Wtd. (ft)       *  777.41  * Wetted Per. (ft)       *  175.93  *  311.71  *  449.81  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.15  *    0.66  *    0.04  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.18  *    5.00  *    0.02  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   * 2061.68  *10293.53  * 4268.16  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *  442.16  *  392.87  *  948.01  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  769.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.             *   0.080  *   0.035  *   0.100  *
* W.S. Elev (ft)         *  768.73  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1444.63  * 8738.55  * 2213.02  *
* E.G. Slope (ft/ft)     *0.000434  * Area (sq ft)           * 1444.63  * 8738.55  * 2213.02  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             * 2096.14  *71325.90  * 1297.97  *
* Top Width (ft)         * 1523.62  * Top Width (ft)          *  198.48  *  302.00  * 1023.14  *
* Vel Total (ft/s)       *    6.03  * Avg. Vel. (ft/s)       *    1.45  *    8.16  *    0.59  *
* Max Chl Dpth (ft)      *   41.89  * Hydr. Depth (ft)       *    7.28  *   28.94  *    2.16  *
* Conv. Total (cfs)      *3586581.0  * Conv. (cfs)            *100615.1  *3423663.0  * 62302.8  *
* Length Wtd. (ft)       *  760.05  * Wetted Per. (ft)       *  198.95  *  311.71  * 1024.93  *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *    0.20  *    0.76  *    0.06  *
* Alpha                  *    1.75  * Stream Power (lb/ft s) *    0.29  *    6.20  *    0.03  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   * 3379.25  *11313.50  * 6995.97  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *  557.11  *  394.68  * 1221.85  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  759.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  758.42  * Reach Len. (ft)        *  806.03  *  803.72  *  306.46  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5624.01  *          *
* E.G. Slope (ft/ft)     *0.000529  * Area (sq ft)           *          * 5624.01  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  299.47  * Top Width (ft)          *          *  299.47  *          *
* Vel Total (ft/s)       *    6.76  * Avg. Vel. (ft/s)       *          *    6.76  *          *
* Max Chl Dpth (ft)      *   31.58  * Hydr. Depth (ft)       *          *   18.78  *          *
* Conv. Total (cfs)      *1651908.0  * Conv. (cfs)            *          *1651908.0  *          *
* Length Wtd. (ft)       *  803.72  * Wetted Per. (ft)       *          *  309.05  *          *
* Min Ch El (ft)         *  726.84  * Shear (lb/sq ft)       *          *    0.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.06  *          *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  246.21  * 7410.53  *  712.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   73.21  *  371.42  *  175.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.646

INPUT
Description: STA 115+55 (APPROX.) Brush Cr blocked out in LOB.  Other blocked
             obstructions are buildings.  Only 500-yr flow in ROB from over
             Blue Pkwy.
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  805.94    4.07  805.57   24.08  803.45   62.54  800.52   71.44   799.8
   85.91   798.4  183.06  783.82   190.9  783.37  208.78  782.16  375.54  770.34
  406.63   768.6  431.99  761.99  442.97  759.28  464.93  755.77  477.75   753.8
  487.68  753.59   503.2  754.15   646.7  758.91  787.24  764.77  800.64  764.85
  831.72  765.43  891.06  766.37  913.12  766.42  965.59  763.45  1007.8  767.08
 1042.39  767.13 1071.72  767.21 1119.17  765.74 1161.63  765.46  1249.3   766.4
 1310.12  768.83 1388.63  766.36 1433.88  766.24 1439.31  766.32 1569.67  768.61
 1605.77  768.69 1617.62  768.61 1690.36  768.58 1737.85  768.59    1772  768.62
 1783.44  768.76 1894.51  768.77 1954.27  769.14 1985.36  769.09 2007.24  769.09
 2034.16  768.65 2044.72  768.54 2049.63  768.26    2095  768.34    2116  761.34
    2146  758.34    2191  743.34    2221  740.34    2250  730.67    2272  730.67
    2285  726.34    2309  726.34    2322  730.67    2344  730.67    2373  740.34
    2403  743.34    2448  758.34    2478  761.34    2490     765 2547.42  764.37
 2566.71     764 2583.21  763.89 2610.83  763.28 2645.02  762.99  2671.8  762.38
 2699.12  761.62  2748.2  760.46    2770  759.91    3200     760    3280  763.22
 3293.51  763.69 3322.53  763.34 3377.49  762.09    3488   768.7 3489.17  768.75
 3489.78  768.76 3539.13  769.59 3642.32  775.22 3660.19  775.35 3673.35  776.23
 3686.03  776.47 3721.39  776.57 3765.81  783.56 3814.09  789.76 3875.55  798.53
 3907.11  810.09 3911.91  812.05 3958.19  819.23

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05 1439.31      .1    2095     .03    2250    .075    2272     .03
    2322    .075    2344     .03    2490     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2095    2490           547.53     686  686.34             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  997.97   770.4       F
    2545 3958.19     765       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************************************
     400     800     765    1000    1350     790    1650    1725     790
    1800    1925     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  745.66  * Reach Len. (ft)        *  547.53  *  686.00  *  686.34  *
* Crit W.S. (ft)         *  737.15  * Flow Area (sq ft)      *          * 2402.50  *          *
* E.G. Slope (ft/ft)     *0.000984  * Area (sq ft)           *          * 2402.50  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)         *  225.89  * Top Width (ft)         *          *  225.89  *          *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *          *    5.49  *          *
* Max Chl Dpth (ft)      *   19.32  * Hydr. Depth (ft)       *          *   10.64  *          *
* Conv. Total (cfs)      *420705.3  * Conv. (cfs)             *          *420705.3  *          *
* Length Wtd. (ft)       *  686.00  * Wetted Per. (ft)       *          *  231.49  *          *
* Min Ch El (ft)         *  726.34  * Shear (lb/sq ft)       *          *    0.64  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.50  *          *
* Frctn Loss (ft)        *    0.61  * Cum Volume (acre-ft)   *   20.10  * 3264.17  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.51  *  279.09  *    1.74  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.039  *          *
* W.S. Elev (ft)         *  749.81  * Reach Len. (ft)        *  547.53  *  686.00  *  686.34  *
* Crit W.S. (ft)         *  739.58  * Flow Area (sq ft)      *          * 3393.53  *          *
* E.G. Slope (ft/ft)     *0.000809  * Area (sq ft)           *          * 3393.53  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)         *  250.84  * Top Width (ft)         *          *  250.84  *          *
* Vel Total (ft/s)       *    5.98  * Avg. Vel. (ft/s)       *          *    5.98  *          *
* Max Chl Dpth (ft)      *   23.47  * Hydr. Depth (ft)       *          *   13.53  *          *
* Conv. Total (cfs)      *713879.9  * Conv. (cfs)             *          *713879.9  *          *
* Length Wtd. (ft)       *  686.00  * Wetted Per. (ft)       *          *  257.78  *          *
* Min Ch El (ft)         *  726.34  * Shear (lb/sq ft)       *          *    0.66  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.98  *          *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *   39.58  * 4525.24  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    7.38  *  312.63  *   12.51  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *          *   0.039  *          *
* W.S. Elev (ft)         *  753.09  * Reach Len. (ft)        *  547.53  *  686.00  *  686.34  *
* Crit W.S. (ft)         *  741.64  * Flow Area (sq ft)      *          * 4247.35  *          *
* E.G. Slope (ft/ft)     *0.000690  * Area (sq ft)           *          * 4247.35  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *26320.00  *          *
* Top Width (ft)         *  270.49  * Top Width (ft)         *          *  270.49  *          *
* Vel Total (ft/s)       *    6.20  * Avg. Vel. (ft/s)       *          *    6.20  *          *
* Max Chl Dpth (ft)      *   26.75  * Hydr. Depth (ft)       *          *   15.70  *          *
* Conv. Total (cfs)      *1002300.0  * Conv. (cfs)            *          *1002300.0  *          *
* Length Wtd. (ft)       *  686.00  * Wetted Per. (ft)       *          *  278.50  *          *
* Min Ch El (ft)         *  726.34  * Shear (lb/sq ft)       *          *    0.66  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.07  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *   80.18  * 5613.46  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   19.62  *  337.40  *   68.07  *
```

```
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.94  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.038  *          *
* W.S. Elev (ft)         *  756.26  * Reach Len. (ft)        *  547.53  *  686.00  *  686.34  *
* Crit W.S. (ft)         *  743.67  * Flow Area (sq ft)      *          * 5134.71  *          *
* E.G. Slope (ft/ft)     *0.000652  * Area (sq ft)           *          * 5134.71  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  289.50  * Top Width (ft)         *          *  289.50  *          *
* Vel Total (ft/s)       *    6.62  * Avg. Vel. (ft/s)       *          *    6.62  *          *
* Max Chl Dpth (ft)      *   29.92  * Hydr. Depth (ft)       *          *   17.74  *          *
* Conv. Total (cfs)      *1331855.0  * Conv. (cfs)            *          *1331855.0  *          *
* Length Wtd. (ft)       *  686.00  * Wetted Per. (ft)       *          *  298.54  *          *
* Min Ch El (ft)         *  726.34  * Shear (lb/sq ft)       *          *    0.70  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.63  *          *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *  166.70  * 6715.13  *  466.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   43.70  *  357.22  *  126.90  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.31  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.037  *          *
* W.S. Elev (ft)         *  761.65  * Reach Len. (ft)        *  547.53  *  686.00  *  686.34  *
* Crit W.S. (ft)         *  745.66  * Flow Area (sq ft)      *          * 6859.90  *          *
* E.G. Slope (ft/ft)     *0.000528  * Area (sq ft)           *          * 6859.90  *  825.71  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *44500.00  *          *
* Top Width (ft)         *  907.04  * Top Width (ft)         *          *  363.96  *  543.08  *
* Vel Total (ft/s)       *    6.49  * Avg. Vel. (ft/s)       *          *    6.49  *          *
* Max Chl Dpth (ft)      *   35.31  * Hydr. Depth (ft)       *          *   18.85  *          *
* Conv. Total (cfs)      *1936961.0  * Conv. (cfs)            *          *1936961.0  *          *
* Length Wtd. (ft)       *  686.00  * Wetted Per. (ft)       *          *  374.07  *          *
* Min Ch El (ft)         *  726.34  * Shear (lb/sq ft)       *          *    0.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.92  *          *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *  645.69  * 8518.82  * 1659.41  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  218.23  *  379.94  *  416.20  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.23  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *          *   0.036  *   0.060  *
* W.S. Elev (ft)         *  764.52  * Reach Len. (ft)        *  547.53  *  686.00  *  686.34  *
* Crit W.S. (ft)         *  747.21  * Flow Area (sq ft)      *          * 7930.04  *    0.71  *
* E.G. Slope (ft/ft)     *0.000498  * Area (sq ft)           *   16.81  * 7930.04  * 2862.52  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *          *53689.94  *    0.06  *
* Top Width (ft)         * 1297.87  * Top Width (ft)         *   31.39  *  381.97  *  884.51  *
* Vel Total (ft/s)       *    6.77  * Avg. Vel. (ft/s)       *          *    6.77  *    0.09  *
* Max Chl Dpth (ft)      *   38.18  * Hydr. Depth (ft)       *          *   20.76  *    0.06  *
* Conv. Total (cfs)      *2406507.0  * Conv. (cfs)            *          *2406504.0  *     2.8  *
* Length Wtd. (ft)       *  686.00  * Wetted Per. (ft)       *          *  392.98  *   11.38  *
* Min Ch El (ft)         *  726.34  * Shear (lb/sq ft)       *          *    0.63  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.25  *    0.00  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   * 1416.81  * 9533.81  * 3012.98  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  364.88  *  385.49  *  668.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	766.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.036	0.060
W.S. Elev (ft)	766.21	Reach Len. (ft)	547.53	686.00	686.34
Crit W.S. (ft)	748.51	Flow Area (sq ft)		8581.62	4443.23
E.G. Slope (ft/ft)	0.000419	Area (sq ft)	626.99	8581.62	4443.23
Q Total (cfs)	62000.00	Flow (cfs)		55726.18	6273.82
Top Width (ft)	1891.00	Top Width (ft)	546.02	388.61	956.37
Vel Total (ft/s)	4.76	Avg. Vel. (ft/s)		6.49	1.41
Max Chl Dpth (ft)	39.87	Hydr. Depth (ft)		22.08	4.65
Conv. Total (cfs)	3027163.0	Conv. (cfs)		2720842.0	306320.7
Length Wtd. (ft)	686.02	Wetted Per. (ft)		399.96	956.64
Min Ch El (ft)	726.34	Shear (lb/sq ft)		0.56	0.12
Alpha	1.68	Stream Power (lb/ft s)		3.65	0.17
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	2046.52	10140.24	4250.18
C & E Loss (ft)	0.01	Cum SA (acres)	435.48	386.50	943.07

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	769.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.061	0.036	0.060
W.S. Elev (ft)	768.63	Reach Len. (ft)	547.53	686.00	686.34
Crit W.S. (ft)	750.36	Flow Area (sq ft)	359.59	9532.56	6811.27
E.G. Slope (ft/ft)	0.000380	Area (sq ft)	2404.17	9532.56	6811.27
Q Total (cfs)	74720.00	Flow (cfs)	220.96	62661.93	11837.11
Top Width (ft)	2360.33	Top Width (ft)	968.43	395.00	996.91
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)	0.61	6.57	1.74
Max Chl Dpth (ft)	42.29	Hydr. Depth (ft)	0.96	24.13	6.83
Conv. Total (cfs)	3833067.0	Conv. (cfs)	11335.0	3214499.0	607232.8
Length Wtd. (ft)	685.83	Wetted Per. (ft)	379.89	406.69	997.25
Min Ch El (ft)	726.34	Shear (lb/sq ft)	0.02	0.56	0.16
Alpha	1.83	Stream Power (lb/ft s)	0.01	3.66	0.28
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	3343.64	11144.94	6964.23
C & E Loss (ft)	0.02	Cum SA (acres)	546.32	388.25	1214.74

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	758.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.038	
W.S. Elev (ft)	757.96	Reach Len. (ft)	547.53	686.00	686.34
Crit W.S. (ft)	744.49	Flow Area (sq ft)		5636.96	
E.G. Slope (ft/ft)	0.000617	Area (sq ft)		5636.96	
Q Total (cfs)	38000.00	Flow (cfs)		38000.00	
Top Width (ft)	299.73	Top Width (ft)		299.73	
Vel Total (ft/s)	6.74	Avg. Vel. (ft/s)		6.74	
Max Chl Dpth (ft)	31.62	Hydr. Depth (ft)		18.81	
Conv. Total (cfs)	1530413.0	Conv. (cfs)		1530413.0	
Length Wtd. (ft)	686.00	Wetted Per. (ft)		309.32	
Min Ch El (ft)	726.34	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)		4.73	
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	246.21	7306.64	712.54
C & E Loss (ft)	0.00	Cum SA (acres)	73.21	365.89	175.00

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River

REACH: Main RS: 10.5152*

INPUT
Description: Interpolated Cross-section at the DS face of NEWBURY at CO BR
Station Elevation Data num= 197

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.18	4.5	803.8	4.7	803.79	17.2	803.09	27.83	802.24
29.41	802.13	72.29	800.05	82.58	799.54	93.04	798.97	99.3	798.61
112.12	797.69	132.37	795.99	190.97	791.59	205.03	790.57	211.6	789.98
214.67	789.79	220.66	789.24	236.66	787.7	241.32	787.21	289.41	782.14
302.58	780.85	338.75	776.63	350.24	775.84	414.41	772.45	434.08	771.59
460.94	770.52	470.02	770.03	499.33	766.74	508.52	765.74	512.02	765.16
537.4	761.6	552.22	759.55	558.09	758.96	563.7	758.51	573.21	757.91
581.64	757.53	677.5	753.23	747.51	750.55	776.36	749.52	787.74	749.57
799.12	750.14	808.52	750.33	835.29	750.25	863.04	750.94	899.2	751.79
909.96	751.73	922.61	751.53	925.44	751.5	930.27	751.47	961.37	751.7
990.29	751.89	1011.31	751.9	1027.21	752.81	1029.96	753.03	1030.94	753.1
1055.46	755.49	1078.03	757.32	1116.11	760.75	1119.41	761.18	1128.69	761.47
1147.95	762.59	1164.9	766.3	1166.37	766.59	1204.88	766.66	1233.39	766.72
1238.78	766.7	1291.21	766.03	1293.63	766.05	1338.91	766.72	1342.71	766.77
1416.35	768.03	1421.79	768.04	1444.04	768.27	1499.74	769.29	1508.44	769.47
1514.34	769.53	1580.46	768.91	1594.21	768.72	1605.09	768.54	1632.59	768.3
1655.63	768.29	1657.39	768.28	1663.67	768.27	1739.39	768.16	1783.77	768.58
1786.59	768.64	1792.46	768.65	1797.79	768.64	1814.35	768.66	1856.08	768.52
1869.78	768.44	1886.79	768.37	1923.54	768.17	1945.04	768.04	1953.86	768.03
1979.25	768	2008.75	768.23	2048.22	768.53	2058.77	768.64	2061.44	768.67
2071.96	768.74	2085.96	768.63	2109	768.47	2114.79	768.5	2185.29	767.78
2189.83	767.82	2258.9	768.51	2285.42	768.71	2294.84	768.74	2296.87	768.74
2320.13	768.89	2322.81	768.9	2351.25	768.84	2363.45	768.84	2369.13	768.76
2373.24	768.77	2393.5	768.82	2421.57	769.31	2443.02	762.16	2448.3	760.8
2473.65	758.27	2478	757.5	2519.6	743.63	2522.54	742.88	2550.24	740.11
2552.24	739.76	2579.85	730.55	2580.95	730.3	2602.32	730.3	2602.73	730.26
2615.59	725.97	2639.59	725.97	2652.39	730.23	2653.03	730.3	2674.05	730.3
2675.76	730.69	2702.6	739.64	2705.73	740.18	2732.13	742.82	2736.73	744.02
2782.33	759.22	2783.23	759.37	2811.86	762.24	2814.23	762.85	2826.63	766.87
2853.89	766.72	2863.86	766.38	2876.37	765.91	2887.07	765.57	2904.98	764.87
2927.14	764.15	2944.51	763.46	2954.76	763.03	2962.22	762.77	2973.85	762.41
2994.05	762.36	3007.92	762.32	3008.18	762.31	3042	761.99	3061.09	762.36
3089.71	760.18	3179.68	760.4	3205.58	760.66	3231.48	760.41	3280.97	760.75
3286.99	761.2	3338.86	766.17	3347.62	766.98	3357.1	767.64	3364.83	768.33
3366.44	768.6	3401.61	774.37	3402.08	774.45	3412.12	776.6	3415.17	777.19
3418.45	777.78	3473.73	788.98	3474.49	789.13	3474.89	789.2	3506.88	794.99
3573.79	808.38	3585.38	810.42	3593.22	812.04	3593.91	812.12	3602.13	812.92
3625.06	814.95	3647.69	818.73	3653.86	819.96	3654.23	820.02	3665.22	821.81
3671.43	822.51	3685.17	824.11	3725.02	829.02	3745.48	833.86	3748.59	834.67
3765.97	836.92	3778.6	838						

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	508.52	.084	1663.67	.1	2421.57	.03	2448.3	.035
2782.33	.03	2826.63	.053	3418.45	.097	3778.6	.1		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2421.57	2826.63	5	5	5	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	2055.49	770.8024	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	745.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	745.02	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	736.75	Flow Area (sq ft)		2342.70	
E.G. Slope (ft/ft)	0.000796	Area (sq ft)		2342.70	
Q Total (cfs)	13200.00	Flow (cfs)		13200.00	
Top Width (ft)	224.31	Top Width (ft)		224.31	
Vel Total (ft/s)	5.63	Avg. Vel. (ft/s)		5.63	
Max Chl Dpth (ft)	19.05	Hydr. Depth (ft)		10.44	
Conv. Total (cfs)	467736.2	Conv. (cfs)		467736.2	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		229.71	
Min Ch El (ft)	725.97	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)		2.86	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	20.10	3226.80	5.47

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* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.51  *  275.54  *    1.74  *
*****************************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  749.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  749.30  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  739.22  * Flow Area (sq ft)      *          * 3357.07  *          *
* E.G. Slope (ft/ft)     *0.000659  * Area (sq ft)           *          * 3357.07  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  249.98  * Top Width (ft)         *          *  249.98  *          *
* Vel Total (ft/s)       *    6.05  * Avg. Vel. (ft/s)       *          *    6.05  *          *
* Max Chl Dpth (ft)      *   23.33  * Hydr. Depth (ft)       *          *   13.43  *          *
* Conv. Total (cfs)      *790997.4  * Conv. (cfs)            *          *790997.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  256.76  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.25  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   39.58  * 4472.08  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    7.38  *  308.68  *   12.51  *
*****************************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  753.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  752.65  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  741.26  * Flow Area (sq ft)      *          * 4229.21  *          *
* E.G. Slope (ft/ft)     *0.000570  * Area (sq ft)           *  500.83  * 4229.21  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  602.03  * Top Width (ft)         *  331.94  *  270.10  *          *
* Vel Total (ft/s)       *    6.22  * Avg. Vel. (ft/s)       *          *    6.22  *          *
* Max Chl Dpth (ft)      *   26.68  * Hydr. Depth (ft)       *          *   15.66  *          *
* Conv. Total (cfs)      *1102450.0  * Conv. (cfs)            *          *1102450.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  277.97  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.37  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   77.03  * 5546.71  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   17.53  *  333.14  *   68.07  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  756.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  755.84  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  743.34  * Flow Area (sq ft)      *          * 5121.13  *          *
* E.G. Slope (ft/ft)     *0.000552  * Area (sq ft)           * 1737.22  * 5121.13  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  729.81  * Top Width (ft)         *  440.57  *  289.23  *          *
* Vel Total (ft/s)       *    6.64  * Avg. Vel. (ft/s)       *          *    6.64  *          *
* Max Chl Dpth (ft)      *   29.87  * Hydr. Depth (ft)       *          *   17.71  *          *
* Conv. Total (cfs)      *1447406.0  * Conv. (cfs)            *          *1447406.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  298.14  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.59  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.93  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  155.78  * 6634.38  *  466.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   40.93  *  352.66  *  126.90  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	761.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.035	0.053
W.S. Elev (ft)	761.31	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	745.32	Flow Area (sq ft)		6846.22	179.61
E.G. Slope (ft/ft)	0.000463	Area (sq ft)	4593.86	6846.22	179.61
Q Total (cfs)	44500.00	Flow (cfs)		44403.44	96.56
Top Width (ft)	1153.95	Top Width (ft)	584.25	356.33	213.37
Vel Total (ft/s)	6.33	Avg. Vel. (ft/s)		6.49	0.54
Max Chl Dpth (ft)	35.34	Hydr. Depth (ft)		19.21	0.84
Conv. Total (cfs)	2068510.0	Conv. (cfs)		2064022.0	4488.3
Length Wtd. (ft)	5.00	Wetted Per. (ft)		366.42	213.44
Min Ch El (ft)	725.97	Shear (lb/sq ft)		0.54	0.02
Alpha	1.05	Stream Power (lb/ft s)		3.50	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	616.82	8410.90	1651.49
C & E Loss (ft)	0.00	Cum SA (acres)	214.56	374.27	410.24

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	764.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.034	0.053
W.S. Elev (ft)	764.24	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	746.86	Flow Area (sq ft)		7933.31	1103.20
E.G. Slope (ft/ft)	0.000425	Area (sq ft)	6397.00	7933.31	1103.20
Q Total (cfs)	53690.00	Flow (cfs)		52424.33	1265.67
Top Width (ft)	1413.03	Top Width (ft)	636.92	381.74	394.37
Vel Total (ft/s)	5.94	Avg. Vel. (ft/s)		6.61	1.15
Max Chl Dpth (ft)	38.27	Hydr. Depth (ft)		20.78	2.80
Conv. Total (cfs)	2603559.0	Conv. (cfs)		2542183.0	61375.3
Length Wtd. (ft)	5.00	Wetted Per. (ft)		392.62	394.66
Min Ch El (ft)	725.97	Shear (lb/sq ft)		0.54	0.07
Alpha	1.21	Stream Power (lb/ft s)		3.54	0.09
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1376.50	9408.90	2981.73
C & E Loss (ft)	0.00	Cum SA (acres)	360.68	379.47	658.89

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	766.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.034	0.053
W.S. Elev (ft)	765.77	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	748.16	Flow Area (sq ft)		8522.89	1750.98
E.G. Slope (ft/ft)	0.000442	Area (sq ft)	7382.28	8522.89	1750.98
Q Total (cfs)	62000.00	Flow (cfs)		59460.98	2539.03
Top Width (ft)	1498.98	Top Width (ft)	654.19	391.03	453.76
Vel Total (ft/s)	6.03	Avg. Vel. (ft/s)		6.98	1.45
Max Chl Dpth (ft)	39.80	Hydr. Depth (ft)		21.80	3.86
Conv. Total (cfs)	2947425.0	Conv. (cfs)		2826722.0	120703.0
Length Wtd. (ft)	5.00	Wetted Per. (ft)		402.40	454.15
Min Ch El (ft)	725.97	Shear (lb/sq ft)		0.59	0.11
Alpha	1.28	Stream Power (lb/ft s)		4.08	0.15
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1996.18	10005.56	4201.38
C & E Loss (ft)	0.00	Cum SA (acres)	427.94	380.36	931.96

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

```
* E.G. Elev (ft)         *  768.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.              *   0.100  *   0.034  *   0.053  *
* W.S. Elev (ft)         *  768.13  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  749.98  * Flow Area (sq ft)      *   12.04  * 9460.09  * 2940.57  *
* E.G. Slope (ft/ft)     *0.000438  * Area (sq ft)           * 9318.35  * 9460.09  * 2940.57  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *    1.17  *69355.02  * 5363.82  *
* Top Width (ft)         * 2014.33  * Top Width (ft)         * 1076.91  *  401.51  *  535.92  *
* Vel Total (ft/s)       *    6.02  * Avg. Vel. (ft/s)       *    0.10  *    7.33  *    1.82  *
* Max Chl Dpth (ft)      *   42.16  * Hydr. Depth (ft)       *    0.17  *   23.56  *    5.49  *
* Conv. Total (cfs)      *3570506.0  * Conv. (cfs)            *    55.8  *3314140.0  *256310.9  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *   69.09  *  413.44  *  536.42  *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *    0.00  *    0.63  *    0.15  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.00  *    4.59  *    0.27  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 3269.96  *10995.39  * 6887.40  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  533.46  *  381.97  * 1202.67  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  758.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.              *          *   0.035  *          *
* W.S. Elev (ft)         *  757.57  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  744.12  * Flow Area (sq ft)      *          * 5629.42  *          *
* E.G. Slope (ft/ft)     *0.000528  * Area (sq ft)           * 2549.41  * 5629.42  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  799.82  * Top Width (ft)         *  500.04  *  299.77  *          *
* Vel Total (ft/s)       *    6.75  * Avg. Vel. (ft/s)       *          *    6.75  *          *
* Max Chl Dpth (ft)      *   31.60  * Hydr. Depth (ft)       *          *   18.78  *          *
* Conv. Total (cfs)      *1653885.0  * Conv. (cfs)            *          *1653885.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *  309.24  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.05  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  230.19  * 7217.93  *  712.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   70.06  *  381.17  *  175.00  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.515

INPUT
Description: Interpolated Cross-section at the DS face of NEWBURY at CO BR
Station Elevation Data    num=     197
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  804.18     4.5   803.8     4.7  803.79    17.2  803.09   27.83  802.24
   29.41  802.13   72.29  800.05   82.58  799.54   93.04  798.97    99.3  798.61
  112.12  797.69  132.37  795.99  190.97  791.59  205.03  790.57   211.6  789.98
  214.67  789.79  220.66  789.24  236.66   787.7  241.32  787.21  289.41  782.14
  302.58  780.85  338.75  776.63  350.24  775.84  414.41  772.45  434.08  771.59
  460.94  770.52  470.02  770.03  499.33  766.74  508.52  765.74  512.02  765.16
   537.4   761.6  552.22  759.55  558.09  758.96   563.7  758.51  573.21  757.91
  581.64  757.53   677.5  753.23  747.51  750.55  776.36  749.52  787.74  749.57
  799.12  750.14  808.52  750.33  835.29  750.25  863.04  750.94   899.2  751.79
  909.96  751.73  922.61  751.53  925.44   751.5  930.27  751.47  961.37   751.7
  990.29  751.89 1011.31   751.9 1027.21  752.81 1029.96  753.03 1030.94   753.1
 1055.46  755.49 1078.03  757.32 1116.11  760.75 1119.41  761.18 1128.69  761.47
 1147.95  762.59  1164.9   766.3 1166.37  766.59 1204.88  766.66 1233.39  766.72
 1238.78   766.7 1291.21  766.03 1293.63  766.05 1338.91  766.72 1342.71  766.77
 1416.35  768.03 1421.79  768.04 1444.04  768.27 1499.74  769.29 1508.44  769.47
 1514.34  769.53 1580.46  768.91 1594.21  768.72 1605.09  768.54 1632.59   768.3
 1655.63  768.29 1657.39  768.28 1663.67  768.27 1739.39  768.16 1783.77  768.58
 1786.59  768.64 1792.46  768.65 1797.79  768.64 1814.35  768.66 1856.08  768.52
 1869.78  768.44 1886.79  768.37 1923.54  768.17 1945.04  768.04 1953.86  768.03
```

```
 1979.25     768 2008.75  768.23 2048.22  768.53 2058.77  768.64 2061.44  768.67
 2071.96  768.74 2085.96  768.63    2109  768.47 2114.79   768.5 2185.29  767.78
 2189.83  767.82  2258.9  768.51 2285.42  768.71 2294.84  768.74 2296.87  768.74
 2320.13  768.89 2322.81   768.9 2351.25  768.84 2363.45  768.84 2369.13  768.76
 2373.24  768.77  2393.5  768.82 2421.57  769.31 2443.02  762.16  2448.3   760.8
 2473.65  758.27    2478   757.5  2519.6  743.63 2522.54  742.88 2550.24  740.11
 2552.24  739.76 2579.85  730.55 2580.95   730.3 2602.32   730.3 2602.73  730.26
 2615.59   728.5 2639.59   728.5 2652.39  730.23 2653.03   730.3 2674.05   730.3
 2675.76  730.69  2702.6  739.64 2705.73  740.18 2732.13  742.82 2736.73  744.02
 2782.33  759.22 2783.23  759.37 2811.86  762.24 2814.23  762.85 2826.63  766.87
 2853.89  766.72 2863.86  766.38 2876.37  765.91 2887.07  765.57 2904.98  764.87
 2927.14  764.15 2944.51  763.46 2954.76  763.03 2962.22  762.77 2973.85  762.41
 2994.05  762.36 3007.92  762.32 3008.18  762.31    3042  761.99 3061.09  762.36
 3089.71  760.18 3179.68   760.4 3205.58  760.66 3231.48  760.41 3280.97  760.75
 3286.99   761.2 3338.86  766.17 3347.62  766.98  3357.1  767.64 3364.83  768.33
 3366.44   768.6 3401.61  774.37 3402.08  774.45 3412.12   776.6 3415.17  777.19
 3418.45  777.78 3473.73  788.98 3474.49  789.13 3474.89   789.2 3506.88  794.99
 3573.79  808.38 3585.38  810.42 3593.22  812.04 3593.91  812.12 3602.13  812.92
 3625.06  814.95 3647.69  818.73 3653.86  819.96 3654.23  820.02 3665.22  821.81
 3671.43  822.51 3685.17  824.11 3725.02  829.02 3745.48  833.86 3748.59  834.67
 3765.97  836.92  3778.6     838

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  508.52    .084 1663.67      .1 2421.57     .03  2448.3    .035
 2782.33     .03 2826.63    .053 3418.45    .097  3778.6      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2421.57 2826.63               25      25      25             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2055.49770.8024       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  745.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.54  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)          *  744.97  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)          *  737.55  * Flow Area (sq ft)      *          * 2236.79  *          *
* E.G. Slope (ft/ft)      *0.000921  * Area (sq ft)           *          * 2236.79  *          *
* Q Total (cfs)           *13200.00  * Flow (cfs)              *          *13200.00  *          *
* Top Width (ft)          *  223.97  * Top Width (ft)          *          *  223.97  *          *
* Vel Total (ft/s)        *    5.90  * Avg. Vel. (ft/s)        *          *    5.90  *          *
* Max Chl Dpth (ft)       *   16.47  * Hydr. Depth (ft)        *          *    9.99  *          *
* Conv. Total (cfs)       *434932.9  * Conv. (cfs)             *          *434932.9  *          *
* Length Wtd. (ft)        *   25.00  * Wetted Per. (ft)        *          *  228.20  *          *
* Min Ch El (ft)          *  728.50  * Shear (lb/sq ft)        *          *    0.56  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    3.33  *          *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *   20.10  * 3226.54  *    5.47  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    3.51  *  275.52  *    1.74  *
*********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  749.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.60  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)          *  749.26  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)          *  739.95  * Flow Area (sq ft)      *          * 3252.87  *          *
* E.G. Slope (ft/ft)      *0.000726  * Area (sq ft)           *          * 3252.87  *          *
* Q Total (cfs)           *20300.00  * Flow (cfs)              *          *20300.00  *          *
* Top Width (ft)          *  249.71  * Top Width (ft)          *          *  249.71  *          *
* Vel Total (ft/s)        *    6.24  * Avg. Vel. (ft/s)        *          *    6.24  *          *
* Max Chl Dpth (ft)       *   20.76  * Hydr. Depth (ft)        *          *   13.03  *          *
* Conv. Total (cfs)       *753299.2  * Conv. (cfs)             *          *753299.2  *          *
* Length Wtd. (ft)        *   25.00  * Wetted Per. (ft)        *          *  255.33  *          *
* Min Ch El (ft)          *  728.50  * Shear (lb/sq ft)        *          *    0.58  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    3.60  *          *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *   39.58  * 4471.70  *   22.95  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    7.38  *  308.65  *   12.51  *
*********************************************************************************************
```

```
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  753.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  752.62  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *  742.01  * Flow Area (sq ft)      *          * 4126.21  *          *
* E.G. Slope (ft/ft)     *0.000615  * Area (sq ft)           *  488.79  * 4126.21  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  600.23  * Top Width (ft)         *  330.35  *  269.88  *          *
* Vel Total (ft/s)       *    6.38  * Avg. Vel. (ft/s)       *          *    6.38  *          *
* Max Chl Dpth (ft)      *   24.12  * Hydr. Depth (ft)       *          *   15.29  *          *
* Conv. Total (cfs)      *1061582.0  * Conv. (cfs)            *          *1061582.0  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  276.59  *          *
* Min Ch El (ft)         *  728.50  * Shear (lb/sq ft)       *          *    0.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.65  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   76.98  * 5546.23  *  156.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   17.49  *  333.11  *   68.07  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  756.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  755.81  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *  743.83  * Flow Area (sq ft)      *          * 5018.10  *          *
* E.G. Slope (ft/ft)     *0.000587  * Area (sq ft)           * 1722.24  * 5018.10  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)             *          *34000.00  *          *
* Top Width (ft)         *  728.42  * Top Width (ft)         *  439.39  *  289.03  *          *
* Vel Total (ft/s)       *    6.78  * Avg. Vel. (ft/s)       *          *    6.78  *          *
* Max Chl Dpth (ft)      *   27.31  * Hydr. Depth (ft)       *          *   17.36  *          *
* Conv. Total (cfs)      *1403491.0  * Conv. (cfs)            *          *1403491.0  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  296.77  *          *
* Min Ch El (ft)         *  728.50  * Shear (lb/sq ft)       *          *    0.62  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.20  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  155.58  * 6633.79  *  466.78  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   40.88  *  352.63  *  126.90  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*************************************************************************************************
* E.G. Elev (ft)         *  761.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *          *   0.035  *   0.053  *
* W.S. Elev (ft)         *  761.29  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *  745.76  * Flow Area (sq ft)      *          * 6744.39  *  174.43  *
* E.G. Slope (ft/ft)     *0.000484  * Area (sq ft)           * 4579.68  * 6744.39  *  174.43  *
* Q Total (cfs)          *44500.00  * Flow (cfs)             *          *44405.78  *   94.22  *
* Top Width (ft)         * 1152.09  * Top Width (ft)         *  583.30  *  355.99  *  212.80  *
* Vel Total (ft/s)       *    6.43  * Avg. Vel. (ft/s)       *          *    6.58  *    0.54  *
* Max Chl Dpth (ft)      *   32.79  * Hydr. Depth (ft)       *          *   18.95  *    0.82  *
* Conv. Total (cfs)      *2022680.0  * Conv. (cfs)            *          *2018398.0  *  4282.5  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  364.93  *  212.87  *
* Min Ch El (ft)         *  728.50  * Shear (lb/sq ft)       *          *    0.56  *    0.02  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *          *    3.68  *    0.01  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  616.30  * 8410.12  * 1651.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  214.49  *  374.23  *  410.22  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  764.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.034  *   0.053  *
* W.S. Elev (ft)         *  764.22  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *  747.30  * Flow Area (sq ft)      *          * 7832.24  * 1095.05  *
* E.G. Slope (ft/ft)     *0.000442  * Area (sq ft)           * 6383.83  * 7832.24  * 1095.05  *
* Q Total (cfs)          *53690.00  * Flow (cfs)             *          *52414.08  * 1275.92  *
* Top Width (ft)         * 1411.81  * Top Width (ft)         *  636.68  *  381.62  *  393.52  *
* Vel Total (ft/s)       *    6.01  * Avg. Vel. (ft/s)       *          *    6.69  *    1.17  *
* Max Chl Dpth (ft)      *   35.72  * Hydr. Depth (ft)       *          *   20.52  *    2.78  *
* Conv. Total (cfs)      *2554599.0  * Conv. (cfs)            *          *2493890.0  * 60709.0  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  391.34  *  393.81  *
* Min Ch El (ft)         *  728.50  * Shear (lb/sq ft)       *          *    0.55  *    0.08  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *          *    3.69  *    0.09  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1375.77  * 9407.99  * 2981.61  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  360.61  *  379.43  *  658.84  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  766.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *          *   0.034  *   0.053  *
* W.S. Elev (ft)         *  765.75  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *  748.59  * Flow Area (sq ft)      *          * 8421.67  * 1741.65  *
* E.G. Slope (ft/ft)     *0.000458  * Area (sq ft)           * 7368.82  * 8421.67  * 1741.65  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *          *59436.18  * 2563.82  *
* Top Width (ft)         * 1497.71  * Top Width (ft)         *  653.90  *  390.90  *  452.90  *
* Vel Total (ft/s)       *    6.10  * Avg. Vel. (ft/s)       *          *    7.06  *    1.47  *
* Max Chl Dpth (ft)      *   37.25  * Hydr. Depth (ft)       *          *   21.54  *    3.85  *
* Conv. Total (cfs)      *2896734.0  * Conv. (cfs)            *          *2776949.0  *119785.4  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  401.11  *  453.29  *
* Min Ch El (ft)         *  728.50  * Shear (lb/sq ft)       *          *    0.60  *    0.11  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *          *    4.24  *    0.16  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1995.33  *10004.58  * 4201.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  427.86  *  380.32  *  931.91  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  768.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *  0.100  *   0.034  *   0.053  *
* W.S. Elev (ft)         *  768.11  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *  750.43  * Flow Area (sq ft)      *   10.79  * 9359.44  * 2930.60  *
* E.G. Slope (ft/ft)     *0.000451  * Area (sq ft)           * 9298.41  * 9359.44  * 2930.60  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *    1.02  *69303.02  * 5415.95  *
* Top Width (ft)         * 2002.95  * Top Width (ft)         * 1065.79  *  401.45  *  535.71  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *    0.09  *    7.40  *    1.85  *
* Max Chl Dpth (ft)      *   39.61  * Hydr. Depth (ft)       *    0.16  *   23.31  *    5.47  *
* Conv. Total (cfs)      *3517084.0  * Conv. (cfs)            *    48.2  *3262106.0  *254929.8  *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *   65.41  *  412.23  *  536.21  *
* Min Ch El (ft)         *  728.50  * Shear (lb/sq ft)       *    0.00  *    0.64  *    0.15  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.00  *    4.74  *    0.28  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 3268.90  *10994.31  * 6887.07  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  533.34  *  381.93  * 1202.60  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  758.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *          *   0.035  *          *
```

```
* W.S. Elev (ft)         *  757.54  * Reach Len. (ft)        *   25.00  *   25.00  *   25.00  *
* Crit W.S. (ft)         *  744.58  * Flow Area (sq ft)      *          * 5526.67  *          *
* E.G. Slope (ft/ft)     *0.000558  * Area (sq ft)           * 2533.47  * 5526.67  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  798.48  * Top Width (ft)         *  498.98  *  299.50  *          *
* Vel Total (ft/s)       *    6.88  * Avg. Vel. (ft/s)       *          *    6.88  *          *
* Max Chl Dpth (ft)      *   29.04  * Hydr. Depth (ft)       *          *   18.45  *          *
* Conv. Total (cfs)      *1608862.0  * Conv. (cfs)            *          *1608862.0  *          *
* Length Wtd. (ft)       *   25.00  * Wetted Per. (ft)       *          *  307.80  *          *
* Min Ch El (ft)         *  728.50  * Shear (lb/sq ft)       *          *    0.63  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.30  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  229.90  * 7217.29  *  712.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   70.01  *  361.14  *  175.00  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.510

INPUT
Description: Interpolated Cross-section at the DS face of NEWBURY at CO BR
Station Elevation Data    num=     197
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  804.18     4.5   803.8     4.7  803.79    17.2  803.09   27.83  802.24
   29.41  802.13   72.29  800.05   82.58  799.54   93.04  798.97    99.3  798.61
  112.12  797.69  132.37  795.99  190.97  791.59  205.03  790.57   211.6  789.98
  214.67  789.79  220.66  789.24  236.66   787.7  241.32  787.21  289.41  782.14
  302.58  780.85  338.75  776.63  350.24  775.84  414.41  772.45  434.08  771.59
  460.94  770.52  470.02  770.03  499.33  766.74  508.52  765.74  512.02  765.16
   537.4   761.6  552.22  759.55  558.09  758.96   563.7  758.51  573.21  757.91
  581.64  757.53   677.5  753.23  747.51  750.55  776.36  749.52  787.74  749.57
  799.12  750.14  808.52  750.33  835.29  750.25  863.04  750.94   899.2  751.79
  909.96  751.73  922.61  751.53  925.44   751.5  930.27  751.47  961.37   751.7
  990.29  751.89 1011.31   751.9 1027.21  752.81 1029.96  753.03 1030.94   753.1
 1055.46  755.49 1078.03  757.32 1116.11  760.75 1119.41  761.18 1128.69  761.47
 1147.95  762.59  1164.9   766.3 1166.37  766.59 1204.88  766.66 1233.39  766.72
 1238.78   766.7 1291.21  766.03 1293.63  766.05 1338.91  766.72 1342.71  766.77
 1416.35  768.03 1421.79  768.04 1444.04  768.27 1499.74  769.29 1508.44  769.47
 1514.34  769.53 1580.46  768.91 1594.21  768.72 1605.09  768.54 1632.59   768.3
 1655.63  768.29 1657.39  768.28 1663.67  768.27 1739.39  768.16 1783.77  768.58
 1786.59  768.64 1792.46  768.65 1797.79  768.64 1814.35  768.66 1856.08  768.52
 1869.78  768.44 1886.79  768.37 1923.54  768.17 1945.04  768.04 1953.86  768.03
 1979.25     768 2008.75  768.23 2048.22  768.53 2058.77  768.64 2061.44  768.67
 2071.96  768.74 2085.96  768.63    2109  768.47 2114.79   768.5 2185.29  767.78
 2189.83  767.82  2258.9  768.51 2285.42  768.71 2294.84  768.74 2296.87  768.74
 2320.13  768.89 2322.81   768.9 2351.25  768.84 2363.45  768.84 2369.13  768.76
 2373.24  768.77  2393.5  768.82 2421.57  769.31 2443.02  762.16  2448.3   760.8
 2473.65  758.27    2478   757.5  2519.6  743.63 2522.54  742.88 2550.24  740.11
 2552.24  739.76 2579.85  730.55 2580.95   730.3 2602.32   730.3 2602.73  730.26
 2615.59  725.97 2639.59  725.97 2652.39  730.23 2653.03   730.3 2674.05   730.3
 2675.76  730.69  2702.6  739.64 2705.73  740.18 2732.13  742.82 2736.73  744.02
 2782.33  759.22 2783.23  759.37 2811.86  762.24 2814.23  762.85 2826.63  766.87
 2853.89  766.72 2863.86  766.38 2876.37  765.91 2887.07  765.57 2904.98  764.87
 2927.14  764.15 2944.51  763.46 2954.76  763.03 2962.22  762.77 2973.85  762.41
 2994.05  762.36 3007.92  762.32 3008.18  762.31    3042  761.99 3061.09  762.36
 3089.71  760.18 3179.68   760.4 3205.58  760.66 3231.48  760.41 3280.97  760.75
 3286.99   761.2 3338.86  766.17 3347.62  766.98  3357.1  767.64 3364.83  768.33
 3366.44   768.6 3401.61  774.37 3402.08  774.45 3412.12   776.6 3415.17  777.19
 3418.45  777.78 3473.73  788.98 3474.49  789.13 3474.89   789.2 3506.88  794.99
 3573.79  808.38 3585.38  810.42 3593.22  812.04 3593.91  812.12 3602.13  812.92
 3625.06  814.95 3647.69  818.73 3653.86  819.96 3654.23  820.02 3665.22  821.81
 3671.43  822.51 3685.17  824.11 3725.02  829.02 3745.48  833.86 3748.59  834.67
 3765.97  836.92  3778.6     838

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  508.52    .084 1663.67      .1 2421.57     .03  2448.3    .035
```

```
 2782.33     .03 2826.63    .053 3418.45    .097  3778.6      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2421.57 2826.63              243     312     312              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0 2055.49770.8024       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  745.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  744.97  * Reach Len. (ft)        *  243.00  *  312.00  *  312.00  *
* Crit W.S. (ft)         *  736.75  * Flow Area (sq ft)      *          * 2331.79  *          *
* E.G. Slope (ft/ft)     *0.000807  * Area (sq ft)           *          * 2331.79  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  224.02  * Top Width (ft)         *          *  224.02  *          *
* Vel Total (ft/s)       *    5.66  * Avg. Vel. (ft/s)       *          *    5.66  *          *
* Max Chl Dpth (ft)      *   19.00  * Hydr. Depth (ft)       *          *   10.41  *          *
* Conv. Total (cfs)      *464523.5  * Conv. (cfs)            *          *464523.5  *          *
* Length Wtd. (ft)       *  312.00  * Wetted Per. (ft)       *          *  229.40  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.90  *          *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *   20.10  * 3225.23  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.51  *  275.39  *    1.74  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  749.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  749.26  * Reach Len. (ft)        *  243.00  *  312.00  *  312.00  *
* Crit W.S. (ft)         *  739.22  * Flow Area (sq ft)      *          * 3347.54  *          *
* E.G. Slope (ft/ft)     *0.000664  * Area (sq ft)           *          * 3347.54  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  249.75  * Top Width (ft)         *          *  249.75  *          *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *          *    6.06  *          *
* Max Chl Dpth (ft)      *   23.29  * Hydr. Depth (ft)       *          *   13.40  *          *
* Conv. Total (cfs)      *787751.6  * Conv. (cfs)            *          *787751.6  *          *
* Length Wtd. (ft)       *  312.00  * Wetted Per. (ft)       *          *  256.52  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.28  *          *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *   39.58  * 4469.81  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    7.38  *  308.51  *   12.51  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  753.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  752.62  * Reach Len. (ft)        *  243.00  *  312.00  *  312.00  *
* Crit W.S. (ft)         *  741.26  * Flow Area (sq ft)      *          * 4220.62  *          *
* E.G. Slope (ft/ft)     *0.000573  * Area (sq ft)           *  490.30  * 4220.62  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)             *          *26320.00  *          *
* Top Width (ft)         *  600.46  * Top Width (ft)         *  330.55  *  269.91  *          *
* Vel Total (ft/s)       *    6.24  * Avg. Vel. (ft/s)       *          *    6.24  *          *
* Max Chl Dpth (ft)      *   26.65  * Hydr. Depth (ft)       *          *   15.64  *          *
* Conv. Total (cfs)      *1099252.0  * Conv. (cfs)            *          *1099252.0  *          *
* Length Wtd. (ft)       *  312.00  * Wetted Per. (ft)       *          *  277.77  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.39  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *   76.69  * 5543.84  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   17.30  *  332.96  *   68.07  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	756.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.		0.035	
W.S. Elev (ft)	755.81	Reach Len. (ft)	243.00	312.00	312.00
Crit W.S. (ft)	743.34	Flow Area (sq ft)		5112.40	
E.G. Slope (ft/ft)	0.000554	Area (sq ft)	1723.93	5112.40	
Q Total (cfs)	34000.00	Flow (cfs)		34000.00	
Top Width (ft)	728.58	Top Width (ft)	439.53	289.05	
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)		6.65	
Max Chl Dpth (ft)	29.84	Hydr. Depth (ft)		17.69	
Conv. Total (cfs)	1443910.0	Conv. (cfs)		1443910.0	
Length Wtd. (ft)	312.00	Wetted Per. (ft)		297.95	
Min Ch El (ft)	725.97	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		3.95	
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	154.59	6630.89	466.78
C & E Loss (ft)	0.00	Cum SA (acres)	40.63	352.46	126.90

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	761.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.035	0.053
W.S. Elev (ft)	761.29	Reach Len. (ft)	243.00	312.00	312.00
Crit W.S. (ft)	745.32	Flow Area (sq ft)		6837.85	174.60
E.G. Slope (ft/ft)	0.000464	Area (sq ft)	4580.14	6837.85	174.60
Q Total (cfs)	44500.00	Flow (cfs)		44407.57	92.43
Top Width (ft)	1152.15	Top Width (ft)	583.33	356.00	212.82
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.49	0.53
Max Chl Dpth (ft)	35.32	Hydr. Depth (ft)		19.21	0.82
Conv. Total (cfs)	2065102.0	Conv. (cfs)		2060813.0	4289.2
Length Wtd. (ft)	312.00	Wetted Per. (ft)		366.09	212.88
Min Ch El (ft)	725.97	Shear (lb/sq ft)		0.54	0.02
Alpha	1.05	Stream Power (lb/ft s)		3.52	0.01
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	613.67	8406.22	1651.37
C & E Loss (ft)	0.00	Cum SA (acres)	214.16	374.03	410.10

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	764.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.034	0.053
W.S. Elev (ft)	764.22	Reach Len. (ft)	243.00	312.00	312.00
Crit W.S. (ft)	746.86	Flow Area (sq ft)		7925.14	1094.76
E.G. Slope (ft/ft)	0.000427	Area (sq ft)	6383.36	7925.14	1094.76
Q Total (cfs)	53690.00	Flow (cfs)		52436.36	1253.64
Top Width (ft)	1411.77	Top Width (ft)	636.67	381.61	393.49
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)		6.62	1.15
Max Chl Dpth (ft)	38.25	Hydr. Depth (ft)		20.77	2.78
Conv. Total (cfs)	2598984.0	Conv. (cfs)		2538299.0	60685.4
Length Wtd. (ft)	312.00	Wetted Per. (ft)		392.49	393.78
Min Ch El (ft)	725.97	Shear (lb/sq ft)		0.54	0.07
Alpha	1.21	Stream Power (lb/ft s)		3.56	0.08
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1372.11	9403.47	2980.98
C & E Loss (ft)	0.00	Cum SA (acres)	360.24	379.21	658.61

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

```
* E.G. Elev (ft)         *  766.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *          *   0.034  *   0.053  *
* W.S. Elev (ft)         *  765.74  * Reach Len. (ft)        *  243.00  *  312.00  *  312.00  *
* Crit W.S. (ft)         *  748.16  * Flow Area (sq ft)      *          * 8514.23  * 1740.93  *
* E.G. Slope (ft/ft)     *0.000444  * Area (sq ft)           * 7367.79  * 8514.23  * 1740.93  *
* Q Total (cfs)          *62000.00  * Flow (cfs)             *          *59477.29  * 2522.72  *
* Top Width (ft)         * 1497.61  * Top Width (ft)         *  653.88  *  390.89  *  452.84  *
* Vel Total (ft/s)       *    6.05  * Avg. Vel. (ft/s)       *          *    6.99  *    1.45  *
* Max Chl Dpth (ft)      *   39.77  * Hydr. Depth (ft)       *          *   21.78  *    3.84  *
* Conv. Total (cfs)      *2942193.0  * Conv. (cfs)            *          *2822478.0  *119714.8  *
* Length Wtd. (ft)       *  312.00  * Wetted Per. (ft)       *          *  402.26  *  453.22  *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.59  *    0.11  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *          *    4.10  *    0.15  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 1991.10  * 9999.72  * 4200.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  427.49  *  380.09  *  931.65  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  768.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *   0.100  *   0.034  *   0.053  *
* W.S. Elev (ft)         *  768.11  * Reach Len. (ft)        *  243.00  *  312.00  *  312.00  *
* Crit W.S. (ft)         *  749.98  * Flow Area (sq ft)      *   10.66  * 9451.81  * 2929.52  *
* E.G. Slope (ft/ft)     *0.000439  * Area (sq ft)           * 9296.26  * 9451.81  * 2929.52  *
* Q Total (cfs)          *74720.00  * Flow (cfs)             *    0.99  *69378.11  * 5340.90  *
* Top Width (ft)         * 2001.72  * Top Width (ft)         * 1064.58  *  401.45  *  535.69  *
* Vel Total (ft/s)       *    6.03  * Avg. Vel. (ft/s)       *    0.09  *    7.34  *    1.82  *
* Max Chl Dpth (ft)      *   42.14  * Hydr. Depth (ft)       *    0.16  *   23.54  *    5.47  *
* Conv. Total (cfs)      *3564419.0  * Conv. (cfs)            *    47.4  *3309591.0  *254780.6  *
* Length Wtd. (ft)       *  312.00  * Wetted Per. (ft)       *   65.01  *  413.37  *  536.19  *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *    0.00  *    0.63  *    0.15  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.00  *    4.60  *    0.27  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   * 3263.56  *10988.91  * 6885.38  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  532.73  *  381.70  * 1202.30  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  758.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *          *   0.035  *          *
* W.S. Elev (ft)         *  757.54  * Reach Len. (ft)        *  243.00  *  312.00  *  312.00  *
* Crit W.S. (ft)         *  744.12  * Flow Area (sq ft)      *          * 5620.90  *          *
* E.G. Slope (ft/ft)     *0.000530  * Area (sq ft)           * 2535.20  * 5620.90  *          *
* Q Total (cfs)          *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)         *  798.62  * Top Width (ft)         *  499.10  *  299.53  *          *
* Vel Total (ft/s)       *    6.76  * Avg. Vel. (ft/s)       *          *    6.76  *          *
* Max Chl Dpth (ft)      *   31.57  * Hydr. Depth (ft)       *          *   18.77  *          *
* Conv. Total (cfs)      *1650614.0  * Conv. (cfs)            *          *1650614.0  *          *
* Length Wtd. (ft)       *  312.00  * Wetted Per. (ft)       *          *  308.98  *          *
* Min Ch El (ft)         *  725.97  * Shear (lb/sq ft)       *          *    0.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.07  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  228.44  * 7214.09  *  712.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   69.72  *  360.97  *  175.00  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.451
```

```
INPUT
Description: R3U  125+78  Just U/S of Brush Creek  ROB adjusted for Fill Areas,
             Manchester Rd (24+57), and Coal Mine Rd.  Brush Creek blocked on
             LOB.  Other blocked obstructions are buildings.
Station Elevation Data    num=     110
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0   803.32      4.8   802.93    18.34   802.44    31.36   801.53     99.2   798.99
  119.55   798.16   141.14   796.92   203.62   794.09   218.61   793.46   228.89    792.8
  252.34   790.29   308.58   783.58   322.63   782.05   361.19   776.85   373.44   776.02
  441.87   772.89   491.48   771.25   542.21   768.55   595.06   761.55   611.19   759.88
  722.38   751.42   827.79    744.4   839.93   744.27   852.06   744.92   862.08   745.04
  890.63   744.44   920.22   744.97   958.77    745.6   983.73      745    991.9   744.86
  1055.9   745.05  1078.31   744.92  1095.26   746.17  1099.24   746.58  1149.45   753.39
 1193.57   759.94  1203.47   760.04     1224   761.01  1243.64   766.35   1315.1   766.48
 1376.75   766.14  1427.61   767.33  1510.18   768.95  1515.98   768.95   1599.1   769.76
 1608.37   769.88  1685.17   769.83  1699.83   769.74  1740.75   769.28  1765.32    769.3
 1854.62    768.5  1901.94   768.79  1904.95   768.86  1911.21   768.84  1916.89   768.78
 2011.79   768.26  2050.97   767.96   2073.9   767.78  2110.38   767.72  2195.16    768.6
 2209.23   768.73  2224.15   768.57  2248.72   768.33   2254.9   768.37  2330.07    767.3
 2436.83   768.52  2449.04   768.57   2476.7   768.82  2530.47   769.02  2552.07   769.07
    2582   769.79     2609   760.79     2639   757.79     2684   742.79     2714   739.79
    2743   730.12     2765   730.12     2778   725.79     2802   725.79     2815   730.12
    2837   730.12     2866   739.79     2896   742.79     2947   759.79     2977   762.79
    2992   767.79     3012   767.79     3086   763.56     3100      763     3125    763.5
    3150      763     3164   763.56     3185    760.3     3251   760.62     3270      761
    3289   760.62  3325.31   761.12  3381.16   769.66  3386.83   770.76  3413.81   780.39
 3421.52   783.28  3423.76   784.01  3426.17   784.74  3554.38   829.66  3594.34   836.74
 3599.14    837.9   3607.2    839.5  3611.76   839.94  3681.11   847.09  3690.38   847.22

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  542.21      .1    2582     .03    2992     .05  3426.17     .12

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2582    2992           755.54  865.94  943.39             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    2575     771        F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************
     550    1250   766.5    2240    2400     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  744.75  * Reach Len. (ft)       *  755.54  *  865.94  *  943.39  *
* Crit W.S. (ft)         *  736.61  * Flow Area (sq ft)      *          * 2323.61  *          *
* E.G. Slope (ft/ft)     *0.000600  * Area (sq ft)           *          * 2323.61  *          *
* Q Total (cfs)          *13200.00  * Flow (cfs)             *          *13200.00  *          *
* Top Width (ft)         *  223.79  * Top Width (ft)         *          *  223.79  *          *
* Vel Total (ft/s)       *    5.68  * Avg. Vel. (ft/s)       *          *    5.68  *          *
* Max Chl Dpth (ft)      *   18.96  * Hydr. Depth (ft)       *          *   10.38  *          *
* Conv. Total (cfs)      *538997.7  * Conv. (cfs)             *          *538997.7  *          *
* Length Wtd. (ft)       *  865.94  * Wetted Per. (ft)       *          *  229.27  *          *
* Min Ch El (ft)         *  725.79  * Shear (lb/sq ft)       *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.16  *          *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   *   20.10  * 3208.56  *    5.47  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    3.51  *  273.79  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.66  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  749.09  * Reach Len. (ft)       *  755.54  *  865.94  *  943.39  *
* Crit W.S. (ft)         *  739.04  * Flow Area (sq ft)      *          * 3349.23  *          *
* E.G. Slope (ft/ft)     *0.000487  * Area (sq ft)           *          * 3349.23  *          *
* Q Total (cfs)          *20300.00  * Flow (cfs)             *          *20300.00  *          *
* Top Width (ft)         *  249.77  * Top Width (ft)         *          *  249.77  *          *
```

```
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)       *          *    6.06  *          *
* Max Chl Dpth (ft)      *   23.30  * Hydr. Depth (ft)       *          *   13.41  *          *
* Conv. Total (cfs)      *919482.3  * Conv. (cfs)            *          *919482.3  *          *
* Length Wtd. (ft)       *  865.94  * Wetted Per. (ft)       *          *  256.66  *          *
* Min Ch El (ft)         *  725.79  * Shear (lb/sq ft)       *          *    0.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.41  *          *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   *   39.58  * 4445.83  *   22.95  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    7.38  *  306.72  *   12.51  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  752.47  * Reach Len. (ft)        *  755.54  *  865.94  *  943.39  *
* Crit W.S. (ft)         *  741.10  * Flow Area (sq ft)      *          * 4229.31  *          *
* E.G. Slope (ft/ft)     *0.000419  * Area (sq ft)           *          * 4229.31  *          *
* Q Total (cfs)          *26320.00  * Flow (cfs)              *          *26320.00  *          *
* Top Width (ft)         *  270.09  * Top Width (ft)         *          *  270.09  *          *
* Vel Total (ft/s)       *    6.22  * Avg. Vel. (ft/s)       *          *    6.22  *          *
* Max Chl Dpth (ft)      *   26.68  * Hydr. Depth (ft)       *          *   15.66  *          *
* Conv. Total (cfs)      *1285926.0  * Conv. (cfs)            *          *1285926.0  *          *
* Length Wtd. (ft)       *  865.94  * Wetted Per. (ft)       *          *  278.07  *          *
* Min Ch El (ft)         *  725.79  * Shear (lb/sq ft)       *          *    0.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.48  *          *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *   75.33  * 5513.57  *  156.50  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   16.38  *  331.02  *   68.07  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  755.67  * Reach Len. (ft)        *  755.54  *  865.94  *  943.39  *
* Crit W.S. (ft)         *  743.16  * Flow Area (sq ft)      *          * 5123.33  *          *
* E.G. Slope (ft/ft)     *0.000405  * Area (sq ft)           *          * 5123.33  *          *
* Q Total (cfs)          *34000.00  * Flow (cfs)              *          *34000.00  *          *
* Top Width (ft)         *  289.27  * Top Width (ft)         *          *  289.27  *          *
* Vel Total (ft/s)       *    6.64  * Avg. Vel. (ft/s)       *          *    6.64  *          *
* Max Chl Dpth (ft)      *   29.88  * Hydr. Depth (ft)       *          *   17.71  *          *
* Conv. Total (cfs)      *1689277.0  * Conv. (cfs)            *          *1689277.0  *          *
* Length Wtd. (ft)       *  865.94  * Wetted Per. (ft)       *          *  298.29  *          *
* Min Ch El (ft)         *  725.79  * Shear (lb/sq ft)       *          *    0.43  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.88  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  149.78  * 6594.23  *  466.78  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   39.40  *  350.39  *  126.90  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.              *          *   0.030  *   0.050  *
* W.S. Elev (ft)         *  761.17  * Reach Len. (ft)        *  755.54  *  865.94  *  943.39  *
* Crit W.S. (ft)         *  745.13  * Flow Area (sq ft)      *          * 6850.70  *   73.42  *
* E.G. Slope (ft/ft)     *0.000342  * Area (sq ft)           *          * 6850.70  *   73.42  *
* Q Total (cfs)          *44500.00  * Flow (cfs)              *          *44474.51  *   25.49  *
* Top Width (ft)         *  499.10  * Top Width (ft)         *          *  352.90  *  146.20  *
* Vel Total (ft/s)       *    6.43  * Avg. Vel. (ft/s)       *          *    6.49  *    0.35  *
* Max Chl Dpth (ft)      *   35.38  * Hydr. Depth (ft)       *          *   19.41  *    0.50  *
* Conv. Total (cfs)      *2405684.0  * Conv. (cfs)            *          *2404306.0  *  1378.1  *
* Length Wtd. (ft)       *  865.55  * Wetted Per. (ft)       *          *  363.22  *  146.28  *
* Min Ch El (ft)         *  725.79  * Shear (lb/sq ft)       *          *    0.40  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *          *    2.62  *    0.00  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *  600.89  * 8357.20  * 1650.48  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  212.53  *  371.49  *  408.81  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	764.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.		0.030	0.050
W.S. Elev (ft)	764.07	Reach Len. (ft)	755.54	865.94	943.39
Crit W.S. (ft)	746.68	Flow Area (sq ft)		7925.90	618.27
E.G. Slope (ft/ft)	0.000333	Area (sq ft)		7925.90	618.27
Q Total (cfs)	53690.00	Flow (cfs)		53104.75	585.24
Top Width (ft)	649.33	Top Width (ft)		381.71	267.63
Vel Total (ft/s)	6.28	Avg. Vel. (ft/s)		6.70	0.95
Max Chl Dpth (ft)	38.28	Hydr. Depth (ft)		20.76	2.31
Conv. Total (cfs)	2941799.0	Conv. (cfs)		2909732.0	32066.9
Length Wtd. (ft)	865.17	Wetted Per. (ft)		392.78	268.16
Min Ch El (ft)	725.79	Shear (lb/sq ft)		0.42	0.05
Alpha	1.12	Stream Power (lb/ft s)		2.81	0.05
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	1354.30	9346.71	2974.84
C & E Loss (ft)	0.03	Cum SA (acres)	358.47	376.48	656.25

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	766.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.		0.030	0.050
W.S. Elev (ft)	765.57	Reach Len. (ft)	755.54	865.94	943.39
Crit W.S. (ft)	747.94	Flow Area (sq ft)		8503.58	1045.49
E.G. Slope (ft/ft)	0.000355	Area (sq ft)		8503.58	1045.49
Q Total (cfs)	62000.00	Flow (cfs)		60667.13	1332.87
Top Width (ft)	694.26	Top Width (ft)		390.68	303.58
Vel Total (ft/s)	6.49	Avg. Vel. (ft/s)		7.13	1.27
Max Chl Dpth (ft)	39.78	Hydr. Depth (ft)		21.77	3.44
Conv. Total (cfs)	3290965.0	Conv. (cfs)		3220217.0	70748.7
Length Wtd. (ft)	865.09	Wetted Per. (ft)		402.24	304.27
Min Ch El (ft)	725.79	Shear (lb/sq ft)		0.47	0.08
Alpha	1.18	Stream Power (lb/ft s)		3.34	0.10
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	1970.55	9938.78	4190.20
C & E Loss (ft)	0.03	Cum SA (acres)	425.67	377.30	928.94

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	768.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.030	0.050
W.S. Elev (ft)	767.89	Reach Len. (ft)	755.54	865.94	943.39
Crit W.S. (ft)	749.83	Flow Area (sq ft)		9424.12	1814.55
E.G. Slope (ft/ft)	0.000370	Area (sq ft)	1232.04	9424.12	1814.55
Q Total (cfs)	74720.00	Flow (cfs)		71772.70	2947.31
Top Width (ft)	1756.33	Top Width (ft)	974.49	404.29	377.55
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)		7.62	1.62
Max Chl Dpth (ft)	42.10	Hydr. Depth (ft)		23.31	4.81
Conv. Total (cfs)	3887033.0	Conv. (cfs)		3733710.0	153322.8
Length Wtd. (ft)	852.18	Wetted Per. (ft)		416.58	378.48
Min Ch El (ft)	725.79	Shear (lb/sq ft)		0.52	0.11
Alpha	1.26	Stream Power (lb/ft s)		3.97	0.18
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	3234.19	10921.31	6868.40
C & E Loss (ft)	0.16	Cum SA (acres)	527.04	378.81	1199.03

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

```
CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)          *  758.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.71  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)          *  757.40  * Reach Len. (ft)        *  755.54  *  865.94  *  943.39  *
* Crit W.S. (ft)          *  743.93  * Flow Area (sq ft)      *          * 5634.26  *          *
* E.G. Slope (ft/ft)      *0.000387  * Area (sq ft)           *          * 5634.26  *          *
* Q Total (cfs)           *38000.00  * Flow (cfs)             *          *38000.00  *          *
* Top Width (ft)          *  299.68  * Top Width (ft)         *          *  299.68  *          *
* Vel Total (ft/s)        *    6.74  * Avg. Vel. (ft/s)       *          *    6.74  *          *
* Max Chl Dpth (ft)       *   31.61  * Hydr. Depth (ft)       *          *   18.80  *          *
* Conv. Total (cfs)       *1932182.0  * Conv. (cfs)            *          *1932182.0  *          *
* Length Wtd. (ft)        *  865.94  * Wetted Per. (ft)       *          *  309.27  *          *
* Min Ch El (ft)          *  725.79  * Shear (lb/sq ft)       *          *    0.44  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    2.97  *          *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)   *  221.37  * 7173.78  *  712.54  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   68.33  *  358.82  *  175.00  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.287

INPUT
Description: R3T  134+08 Just D/S of Brush Creek  L&R OB raised for Fill Areas
             and Manchester Rd (34+07), Blocked Obstructions are buildings, LOB
             ineffective due to high ground D/S
Station Elevation Data    num=      88
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  802.27   93.48  798.17  145.94  793.19  215.85  791.27  324.15  783.06
  386.92  779.21  494.32  774.99  530.01  774.41  543.04  772.99  598.71  766.95
  653.09  769.74     709  769.96  786.17  767.21  796.45  766.45  812.13  765.42
  839.74  763.61  841.68  763.43  853.93  763.45  914.35  761.72  960.41  759.44
     968  759.03  970.06  758.83 1015.26  756.89 1074.64  749.25 1119.15  747.87
 1143.29  750.73 1165.37  753.07 1226.59  758.04 1241.48  759.43 1259.35  760.94
 1260.24  761.01 1287.33  756.57 1472.09  759.39 1482.68  759.25 1533.86  759.29
 1536.84  759.27 1537.66  759.28 1539.13  759.36 1589.12  760.79 1592.43  760.61
 1642.68  759.61    1720   756.5    2110   756.5 2149.74  758.14  2175.6   758.9
 2200.75  760.03 2264.56  762.17 2270.46  762.53  2274.8  762.26 2306.42  760.53
    2404  757.67    2469  757.34    2514  742.34    2544  739.34    2573  729.67
 2595.01  729.67    2608  725.34    2652  725.34 2664.99  729.67    2687  729.67
    2716  739.34    2746  742.34    2797  759.34    2827  762.34    2836  764.99
    2850  764.43    2875  764.93    2900  764.43    2914  764.99 2982.63  766.77
 2994.84  768.11 3030.51  769.06 3035.43  769.31 3073.72  772.86 3091.03  774.59
 3094.31  774.85 3138.68  777.74  3141.5     778 3148.27  778.87  3225.2  790.91
 3245.23  790.59 3281.12  791.39 3323.01  791.33 3407.29  788.99 3431.88  792.19
 3443.65  795.65 3464.77  799.79 3483.66   803.8

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .08  598.71      .1 1533.86     .05    2469     .03    2797     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2469    2797             466.34  421.37  414.02             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 2267.44  768.01       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3000    3080     785

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  744.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.34  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)          *  744.47  * Reach Len. (ft)        *  466.34  *  421.37  *  414.02  *
* Crit W.S. (ft)          *  734.74  * Flow Area (sq ft)      *          * 2742.84  *          *
```

```
* E.G. Slope (ft/ft)     *0.000365  * Area (sq ft)           *          * 2742.84  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  244.77  * Top Width (ft)         *          *  244.77  *          *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *          *    4.67  *          *
* Max Chl Dpth (ft)      *   19.13  * Hydr. Depth (ft)       *          *   11.21  *          *
* Conv. Total (cfs)      *670243.6  * Conv. (cfs)             *          *670243.6  *          *
* Length Wtd. (ft)       *  421.37  * Wetted Per. (ft)        *          *  250.30  *          *
* Min Ch El (ft)         *  725.34  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.16  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)    *   20.10  * 3158.20  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    3.51  *  269.13  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  748.83  * Reach Len. (ft)        *  466.34  *  421.37  *  414.02  *
* Crit W.S. (ft)         *  737.21  * Flow Area (sq ft)      *          * 3867.37  *          *
* E.G. Slope (ft/ft)     *0.000342  * Area (sq ft)           *   18.72  * 3867.37  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  309.96  * Top Width (ft)         *   39.03  *  270.93  *          *
* Vel Total (ft/s)       *    5.30  * Avg. Vel. (ft/s)       *          *    5.30  *          *
* Max Chl Dpth (ft)      *   23.49  * Hydr. Depth (ft)       *          *   14.27  *          *
* Conv. Total (cfs)      *1108299.0  * Conv. (cfs)            *          *1108299.0  *          *
* Length Wtd. (ft)       *  421.37  * Wetted Per. (ft)        *          *  277.88  *          *
* Min Ch El (ft)         *  725.34  * Shear (lb/sq ft)        *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.58  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)    *   39.42  * 4374.10  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    7.05  *  301.55  *   12.51  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  752.24  * Reach Len. (ft)        *  466.34  *  421.37  *  414.02  *
* Crit W.S. (ft)         *  739.01  * Flow Area (sq ft)      *          * 4825.51  *          *
* E.G. Slope (ft/ft)     *0.000316  * Area (sq ft)           *  279.94  * 4825.51  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  397.47  * Top Width (ft)         *  106.08  *  291.38  *          *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *          *    5.62  *          *
* Max Chl Dpth (ft)      *   26.90  * Hydr. Depth (ft)       *          *   16.56  *          *
* Conv. Total (cfs)      *1524902.0  * Conv. (cfs)            *          *1524902.0  *          *
* Length Wtd. (ft)       *  421.37  * Wetted Per. (ft)        *          *  299.44  *          *
* Min Ch El (ft)         *  725.34  * Shear (lb/sq ft)        *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.78  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)    *   72.90  * 5423.57  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   15.46  *  325.44  *   68.07  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  755.46  * Reach Len. (ft)        *  466.34  *  421.37  *  414.02  *
* Crit W.S. (ft)         *  741.16  * Flow Area (sq ft)      *          * 5795.82  *          *
* E.G. Slope (ft/ft)     *0.000303  * Area (sq ft)           *  719.48  * 5795.82  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  479.16  * Top Width (ft)         *  168.44  *  310.72  *          *
* Vel Total (ft/s)       *    5.95  * Avg. Vel. (ft/s)       *          *    5.95  *          *
* Max Chl Dpth (ft)      *   30.12  * Hydr. Depth (ft)       *          *   18.65  *          *
* Conv. Total (cfs)      *1980586.0  * Conv. (cfs)            *          *1980586.0  *          *
* Length Wtd. (ft)       *  421.37  * Wetted Per. (ft)        *          *  319.82  *          *
* Min Ch El (ft)         *  725.34  * Shear (lb/sq ft)        *          *    0.34  *          *
```

```
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.04  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  143.54  * 6485.70  *  466.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   37.94  *  344.43  *  126.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.050  *   0.030  *   0.060  *
* W.S. Elev (ft)         *  761.00  * Reach Len. (ft)        *  466.34  *  421.37  *  414.02  *
* Crit W.S. (ft)         *  743.39  * Flow Area (sq ft)      *  415.20  * 7586.21  *   13.84  *
* E.G. Slope (ft/ft)     *0.000228  * Area (sq ft)           * 5564.44  * 7586.21  *   13.84  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  336.34  *45159.10  *    4.56  *
* Top Width (ft)         * 1816.70  * Top Width (ft)         * 1472.07  *  328.00  *   16.64  *
* Vel Total (ft/s)       *    5.68  * Avg. Vel. (ft/s)       *    0.81  *    5.95  *    0.33  *
* Max Chl Dpth (ft)      *   35.66  * Hydr. Depth (ft)       *    2.42  *   23.13  *    0.83  *
* Conv. Total (cfs)      *3012120.0  * Conv. (cfs)            * 22265.6  *2989552.0  *   302.1  *
* Length Wtd. (ft)       *  421.56  * Wetted Per. (ft)       *  171.29  *  338.04  *   16.72  *
* Min Ch El (ft)         *  725.34  * Shear (lb/sq ft)       *    0.03  *    0.32  *    0.01  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    0.03  *    1.90  *    0.00  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  552.64  * 8213.70  * 1649.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  199.76  *  364.72  *  407.05  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.050  *   0.030  *   0.060  *
* W.S. Elev (ft)         *  763.92  * Reach Len. (ft)        *  466.34  *  421.37  *  414.02  *
* Crit W.S. (ft)         *  744.83  * Flow Area (sq ft)      *  978.11  * 8542.59  *   96.61  *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           *10131.56  * 8542.59  *   96.61  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1214.17  *53118.15  *   67.69  *
* Top Width (ft)         * 1997.34  * Top Width (ft)         * 1633.98  *  328.00  *   35.36  *
* Vel Total (ft/s)       *    5.66  * Avg. Vel. (ft/s)       *    1.24  *    6.22  *    0.70  *
* Max Chl Dpth (ft)      *   38.58  * Hydr. Depth (ft)       *    4.85  *   26.04  *    2.73  *
* Conv. Total (cfs)      *3731666.0  * Conv. (cfs)            * 83288.0  *3643735.0  *  4643.0  *
* Length Wtd. (ft)       *  421.94  * Wetted Per. (ft)       *  201.66  *  338.04  *   35.74  *
* Min Ch El (ft)         *  725.34  * Shear (lb/sq ft)       *    0.06  *    0.34  *    0.04  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.08  *    2.08  *    0.03  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1266.44  * 9183.02  * 2967.10  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  344.30  *  369.42  *  652.97  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.050  *   0.030  *   0.060  *
* W.S. Elev (ft)         *  765.39  * Reach Len. (ft)        *  466.34  *  421.37  *  414.02  *
* Crit W.S. (ft)         *  746.13  * Flow Area (sq ft)      * 1273.83  * 9023.82  *  209.18  *
* E.G. Slope (ft/ft)     *0.000233  * Area (sq ft)           *12545.29  * 9023.82  *  209.18  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1973.92  *60919.10  *  106.99  *
* Top Width (ft)         * 2116.65  * Top Width (ft)         * 1656.36  *  328.00  *  132.29  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *    1.55  *    6.75  *    0.51  *
* Max Chl Dpth (ft)      *   40.05  * Hydr. Depth (ft)       *    6.32  *   27.51  *    1.58  *
* Conv. Total (cfs)      *4128591.0  * Conv. (cfs)            *129357.0  *3992223.0  *  7011.3  *
* Length Wtd. (ft)       *  422.16  * Wetted Per. (ft)       *  201.66  *  338.04  *  132.86  *
* Min Ch El (ft)         *  725.34  * Shear (lb/sq ft)       *    0.09  *    0.39  *    0.02  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *    0.14  *    2.62  *    0.01  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1861.76  * 9764.56  * 4176.62  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  411.30  *  370.15  *  924.22  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	768.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.065	0.030	0.060
W.S. Elev (ft)	768.08	Reach Len. (ft)	466.34	421.37	414.02
Crit W.S. (ft)	747.93	Flow Area (sq ft)	17074.97	9905.68	679.13
E.G. Slope (ft/ft)	0.000136	Area (sq ft)	17074.97	9905.68	679.13
Q Total (cfs)	75900.00	Flow (cfs)	21157.76	54297.13	445.10
Top Width (ft)	2264.93	Top Width (ft)	1739.40	328.00	197.52
Vel Total (ft/s)	2.74	Avg. Vel. (ft/s)	1.24	5.48	0.66
Max Chl Dpth (ft)	42.74	Hydr. Depth (ft)	9.82	30.20	3.44
Conv. Total (cfs)	6518828.0	Conv. (cfs)	1817178.0	4663421.0	38228.5
Length Wtd. (ft)	427.70	Wetted Per. (ft)	1741.62	338.04	198.18
Min Ch El (ft)	725.34	Shear (lb/sq ft)	0.08	0.25	0.03
Alpha	2.91	Stream Power (lb/ft s)	0.10	1.36	0.02
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	3075.43	10729.18	6841.39
C & E Loss (ft)	0.06	Cum SA (acres)	503.50	371.53	1192.80

Warning: Multiple water surfaces were found that could balance the energy equation. The program selected the water surface whose main channel velocity head was the closest to the previously computed cross section.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	757.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.		0.030	
W.S. Elev (ft)	757.20	Reach Len. (ft)	466.34	421.37	414.02
Crit W.S. (ft)	742.20	Flow Area (sq ft)		6346.36	
E.G. Slope (ft/ft)	0.000295	Area (sq ft)	1344.65	6346.36	
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	999.26	Top Width (ft)	678.08	321.17	
Vel Total (ft/s)	6.10	Avg. Vel. (ft/s)		6.10	
Max Chl Dpth (ft)	31.86	Hydr. Depth (ft)		19.76	
Conv. Total (cfs)	2252512.0	Conv. (cfs)		2252512.0	
Length Wtd. (ft)	421.37	Wetted Per. (ft)		330.84	
Min Ch El (ft)	725.34	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		2.16	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	209.71	7054.70	712.54
C & E Loss (ft)	0.00	Cum SA (acres)	62.45	352.65	175.00

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 10.207

INPUT
Description: R3S 138+30 ROB adjusted for Fill Area & Manchester Rd (38+25),
Blocked Obstructions are buildings
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	800.23	2.9	800.21	174.25	789.19	181.97	788.23	195.59	786.56
204.96	785.47	237.33	781.38	277.33	776.31	330.38	770.66	350.66	767.94
395.7	768.61	438.72	769.45	460.29	769.57	512.27	768.99	634.75	767.68
685.74	767.95	723.57	768.03	771.5	768	810.13	767.96	924.32	766.43
1001.01	765.91	1131.51	767.59	1179.44	768.09	1192.98	768.52	1271.32	768.73
1276.29	768.79	1286.5	768.84	1333.9	769.18	1364.26	769.04	1417.79	769.42
1452.77	769.82	1484.58	770.14	1542.52	770.81	1579.73	770.97	1638.21	770.74
1683.77	770.17	1737.44	769.47	1798.29	767.86	1828.86	767.22	1871.82	766.85
1907.58	766.76	1946	767.12	1967	760.12	1997	757.12	2042	742.12
2072	739.12	2101	729.45	2123.01	729.45	2136	725.12	2180	725.12
2192.99	729.45	2215	729.45	2244	739.12	2274	742.12	2322	758.12

```
    2347  758.25    2386   765.3    2400  764.74    2425  765.24    2450  764.74
    2464   765.3 2527.87   770.3 2531.74  770.48 2532.44   770.5 2570.75  772.04
 2601.29   771.8 2629.86   774.1 2685.06  780.35 2771.73  787.61 2786.16  788.41
  2798.9  789.16 2801.67  789.16 2805.58  789.16 2851.21   791.4  2859.8  791.78
 2860.53   791.8 2861.72  791.78 2862.46  791.75 2895.46  789.16 2902.18  789.16
 2915.28  790.12 2929.18  790.28 2981.86   788.9 2997.62  788.62 3019.98  791.26
 3083.53   796.6  3188.8  797.04 3193.65  797.37 3196.18  797.29 3199.45  797.54
 3204.17  796.92 3215.92  796.19

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .08  350.66     .05    1997     .03    2322     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1997    2322           732.35   432.6  425.75             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     750     930     790

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  744.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  744.32  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2760.17  *          *
* E.G. Slope (ft/ft)     *0.000358  * Area (sq ft)           *          * 2760.17  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  245.19  * Top Width (ft)          *          *  245.19  *          *
* Vel Total (ft/s)       *    4.64  * Avg. Vel. (ft/s)        *          *    4.64  *          *
* Max Chl Dpth (ft)      *   19.20  * Hydr. Depth (ft)        *          *   11.26  *          *
* Conv. Total (cfs)      *676508.4  * Conv. (cfs)             *          *676508.4  *          *
* Length Wtd. (ft)       *  432.60  * Wetted Per. (ft)        *          *  250.75  *          *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.14  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)    *   20.10  * 3131.58  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    3.51  *  266.76  *    1.74  *
*************************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  749.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  748.69  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3889.18  *          *
* E.G. Slope (ft/ft)     *0.000337  * Area (sq ft)           *          * 3889.18  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  271.42  * Top Width (ft)          *          *  271.42  *          *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)        *          *    5.27  *          *
* Max Chl Dpth (ft)      *   23.57  * Hydr. Depth (ft)        *          *   14.33  *          *
* Conv. Total (cfs)      *1117373.0  * Conv. (cfs)            *          *1117373.0  *          *
* Length Wtd. (ft)       *  432.60  * Wetted Per. (ft)        *          *  278.39  *          *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)        *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.55  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)    *   39.32  * 4336.58  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    6.84  *  298.92  *   12.51  *
*************************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  752.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  752.11  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4852.28  *          *
* E.G. Slope (ft/ft)     *0.000311  * Area (sq ft)           *          * 4852.28  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  291.93  * Top Width (ft)          *          *  291.93  *          *
* Vel Total (ft/s)       *    5.59  * Avg. Vel. (ft/s)        *          *    5.59  *          *
* Max Chl Dpth (ft)      *   26.99  * Hydr. Depth (ft)        *          *   16.62  *          *
* Conv. Total (cfs)      *1537040.0  * Conv. (cfs)            *          *1537040.0  *          *
* Length Wtd. (ft)       *  432.60  * Wetted Per. (ft)        *          *  300.02  *          *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)        *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.75  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)    *   71.40  * 5376.77  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   14.90  *  322.62  *   68.07  *
```

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*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  755.34  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5826.02  *          *
* E.G. Slope (ft/ft)     *0.000299  * Area (sq ft)           *          * 5826.02  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  311.30  * Top Width (ft)         *          *  311.30  *          *
* Vel Total (ft/s)       *    5.92  * Avg. Vel. (ft/s)       *          *    5.92  *          *
* Max Chl Dpth (ft)      *   30.22  * Hydr. Depth (ft)       *          *   18.71  *          *
* Conv. Total (cfs)      *1995259.0  * Conv. (cfs)            *          *1995259.0  *          *
* Length Wtd. (ft)       *  432.60  * Wetted Per. (ft)       *          *  320.44  *          *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.01  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  139.69  * 6429.49  *  466.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   37.04  *  341.42  *  126.90  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.050  *   0.030  *   0.060  *
* W.S. Elev (ft)         *  760.90  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   69.44  * 7618.87  *   87.46  *
* E.G. Slope (ft/ft)     *0.000224  * Area (sq ft)           *   69.44  * 7618.87  *   87.46  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   51.16  *45394.11  *   54.74  *
* Top Width (ft)         *  397.03  * Top Width (ft)         *   32.35  *  325.00  *   39.68  *
* Vel Total (ft/s)       *    5.85  * Avg. Vel. (ft/s)       *    0.74  *    5.96  *    0.63  *
* Max Chl Dpth (ft)      *   35.78  * Hydr. Depth (ft)       *    2.15  *   23.44  *    2.20  *
* Conv. Total (cfs)      *3037029.0  * Conv. (cfs)            *  3414.5  *3029961.0  *  3653.5  *
* Length Wtd. (ft)       *  433.42  * Wetted Per. (ft)       *   32.63  *  334.87  *   39.92  *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)       *    0.03  *    0.32  *    0.03  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.02  *    1.90  *    0.02  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  522.48  * 8140.16  * 1649.06  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  191.71  *  361.56  *  406.78  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.050  *   0.030  *   0.060  *
* W.S. Elev (ft)         *  763.80  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  175.71  * 8560.03  *  225.57  *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           *  175.71  * 8560.03  *  225.57  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  199.64  *53993.31  *  207.05  *
* Top Width (ft)         *  421.74  * Top Width (ft)         *   41.04  *  325.00  *   55.70  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *    1.14  *    6.31  *    0.92  *
* Max Chl Dpth (ft)      *   38.68  * Hydr. Depth (ft)       *    4.28  *   26.34  *    4.05  *
* Conv. Total (cfs)      *3706839.0  * Conv. (cfs)            * 13603.7  *3679127.0  * 14108.5  *
* Length Wtd. (ft)       *  435.57  * Wetted Per. (ft)       *   41.79  *  334.87  *   56.20  *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)       *    0.06  *    0.34  *    0.05  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.06  *    2.17  *    0.05  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1211.26  * 9100.30  * 2965.57  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  335.33  *  366.26  *  652.53  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.050  *   0.030  *   0.060  *
* W.S. Elev (ft)         *  765.23  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  237.68  * 9026.31  *  329.52  *
* E.G. Slope (ft/ft)     *0.000240  * Area (sq ft)           *  237.68  * 9026.31  *  329.52  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  325.85  *62329.32  *  344.83  *
* Top Width (ft)         *  508.17  * Top Width (ft)         *   45.34  *  325.00  *  137.82  *
* Vel Total (ft/s)       *    6.57  * Avg. Vel. (ft/s)       *    1.37  *    6.91  *    1.05  *
* Max Chl Dpth (ft)      *   40.11  * Hydr. Depth (ft)       *    5.24  *   27.77  *    2.39  *
* Conv. Total (cfs)      *4062414.0  * Conv. (cfs)            * 21011.9  *4019167.0  * 22235.3  *
* Length Wtd. (ft)       *  436.66  * Wetted Per. (ft)       *   46.32  *  334.87  *  138.48  *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)       *    0.08  *    0.40  *    0.04  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    0.11  *    2.79  *    0.04  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1793.33  * 9677.26  * 4174.06  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  402.19  *  366.99  *  922.93  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *   0.050  *   0.030  *   0.060  *
* W.S. Elev (ft)         *  767.37  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  563.02  * 9721.00  *  660.35  *
* E.G. Slope (ft/ft)     *0.000271  * Area (sq ft)          *  563.02  * 9721.00  *  660.35  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  406.02  *74827.02  *  666.95  *
* Top Width (ft)         *  853.45  * Top Width (ft)         *  359.99  *  325.00  *  168.47  *
* Vel Total (ft/s)       *    6.94  * Avg. Vel. (ft/s)       *    0.72  *    7.70  *    1.01  *
* Max Chl Dpth (ft)      *   42.25  * Hydr. Depth (ft)       *    1.56  *   29.91  *    3.92  *
* Conv. Total (cfs)      *4613041.0  * Conv. (cfs)            * 24677.0  *4547828.0  * 40535.9  *
* Length Wtd. (ft)       *  438.26  * Wetted Per. (ft)       *  362.27  *  334.87  *  169.21  *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)       *    0.03  *    0.49  *    0.07  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.02  *    3.78  *    0.07  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 2981.01  *10634.25  * 6835.03  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  492.27  *  368.38  * 1191.06  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  757.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *         *   0.030  *          *
* W.S. Elev (ft)         *  757.08  * Reach Len. (ft)        *  732.35  *  432.60  *  425.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *         * 6378.71  *          *
* E.G. Slope (ft/ft)     *0.000291  * Area (sq ft)          *         * 6378.71  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *         *38700.00  *          *
* Top Width (ft)         *  321.78  * Top Width (ft)         *         *  321.78  *          *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *         *    6.07  *          *
* Max Chl Dpth (ft)      *   31.96  * Hydr. Depth (ft)       *         *   19.82  *          *
* Conv. Total (cfs)      *2268773.0  * Conv. (cfs)            *         *2268773.0  *          *
* Length Wtd. (ft)       *  432.60  * Wetted Per. (ft)       *         *  331.48  *          *
* Min Ch El (ft)         *  725.12  * Shear (lb/sq ft)       *         *    0.35  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    2.12  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *  202.51  * 6993.15  *  712.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   58.82  *  349.54  *  175.00  *
*****************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 10.125

INPUT
Description: R3R  142+61 ROB adjusted for Fill Area & Manchester Rd (42+53),
             Blocked Obstructions are buildings
Station Elevation Data    num=      92
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   801.9   70.16  796.27  129.59   795.4  218.31  791.46  336.64  784.87
  510.54  779.81  541.77  779.31  580.06  778.43  594.08  778.19  684.93  776.57
  731.23  776.44   816.2  776.81  841.95  776.96  853.99  776.88  894.87  774.95
  938.89  772.98  955.55  773.07  963.09  773.04 1018.57  772.58 1029.56  772.51
 1041.17  772.45 1125.17  771.96 1159.77   771.2 1213.21  770.92 1261.84  770.62
 1300.46  769.43 1364.62   768.7 1374.75  767.65  1386.7  767.04  1440.3  766.07
 1468.34765.8523 1509.85  765.53 1618.72  766.39 1648.96  766.18 1696.43  766.25
 1698.41  766.42 1698.82  766.45 1699.21   766.5 1702.19  766.47 1702.89  766.39
 1703.49  766.33    1850     764 1984.42  759.28 2020.61  758.68 2022.73  758.69
 2049.17  758.52 2051.77  758.48 2094.76  758.34 2097.88  758.52    2140  758.52
    2168   759.9    2198   756.9    2243   741.9    2273   738.9    2302  729.23
 2324.01  729.23    2337   724.9    2381   724.9 2393.99  729.23    2416  729.23
    2445   738.9    2475   741.9    2520   756.9    2645  757.53    2695  763.62
    2709  763.06    2734  763.56    2759  763.06    2773  763.62 2811.19   775.2
 2817.99  775.95 2822.31  776.28 2829.55  776.92 2854.63  779.18 2864.65  779.94
 2868.73  780.27 2878.31  780.77 2883.22  780.47 2890.52  780.77 2906.23  780.77
 2924.24  780.77 2932.66  780.77 2936.45  780.77 2963.23  780.77 2972.08  780.77
 3037.69  786.95  3067.9   791.8  3148.9  790.45 3177.94  790.18 3239.26   789.8
 3267.69   789.5 3271.74  789.47
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```
Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .08  684.93     .05 1468.34     .08    2198     .03    2520     .05
    2773     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2198    2520           948.34  782.02  514.75             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1020    1170     790

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  744.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  744.17  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2777.19  *          *
* E.G. Slope (ft/ft)     *0.000352  * Area (sq ft)           *          * 2777.19  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  245.61  * Top Width (ft)          *          *  245.61  *          *
* Vel Total (ft/s)       *    4.61  * Avg. Vel. (ft/s)        *          *    4.61  *          *
* Max Chl Dpth (ft)      *   19.27  * Hydr. Depth (ft)        *          *   11.31  *          *
* Conv. Total (cfs)      *682679.8  * Conv. (cfs)             *          *682679.8  *          *
* Length Wtd. (ft)       *  782.02  * Wetted Per. (ft)        *          *  251.19  *          *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)        *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.12  *          *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)    *   20.10  * 3104.08  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    3.51  *  264.32  *    1.74  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  748.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  748.55  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3910.59  *          *
* E.G. Slope (ft/ft)     *0.000331  * Area (sq ft)           *          * 3910.59  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  271.89  * Top Width (ft)          *          *  271.89  *          *
* Vel Total (ft/s)       *    5.24  * Avg. Vel. (ft/s)        *          *    5.24  *          *
* Max Chl Dpth (ft)      *   23.65  * Hydr. Depth (ft)        *          *   14.38  *          *
* Conv. Total (cfs)      *1126301.0  * Conv. (cfs)             *          *1126301.0  *          *
* Length Wtd. (ft)       *  782.02  * Wetted Per. (ft)        *          *  278.89  *          *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)        *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.52  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)    *   39.32  * 4297.85  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    6.84  *  296.22  *   12.51  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  752.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  751.98  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 4878.64  *          *
* E.G. Slope (ft/ft)     *0.000306  * Area (sq ft)           *          * 4878.64  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  292.47  * Top Width (ft)          *          *  292.47  *          *
* Vel Total (ft/s)       *    5.55  * Avg. Vel. (ft/s)        *          *    5.55  *          *
* Max Chl Dpth (ft)      *   27.08  * Hydr. Depth (ft)        *          *   16.68  *          *
* Conv. Total (cfs)      *1549021.0  * Conv. (cfs)             *          *1549021.0  *          *
* Length Wtd. (ft)       *  782.03  * Wetted Per. (ft)        *          *  300.59  *          *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)        *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.72  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)    *   71.40  * 5328.45  *  156.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   14.90  *  319.72  *   68.07  *
*********************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  755.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  755.21  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5855.75  *          *
```

```
* E.G. Slope (ft/ft)     *0.000295  * Area (sq ft)           *          * 5855.75  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  311.88  * Top Width (ft)         *          *  311.88  *          *
* Vel Total (ft/s)       *    5.89  * Avg. Vel. (ft/s)       *          *    5.89  *          *
* Max Chl Dpth (ft)      *   30.31  * Hydr. Depth (ft)       *          *   18.78  *          *
* Conv. Total (cfs)      *2009735.0  * Conv. (cfs)            *          *2009735.0  *          *
* Length Wtd. (ft)       *  782.19  * Wetted Per. (ft)       *          *  321.04  *          *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.98  *          *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   *  139.69  * 6371.48  *  466.78  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   37.04  *  338.32  *  126.90  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.              *   0.080  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  760.83  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  496.94  * 7655.11  *  496.14  *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           *  496.94  * 7655.11  *  496.14  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  208.45  *44818.98  *  472.57  *
* Top Width (ft)         *  731.71  * Top Width (ft)         *  257.64  *  322.00  *  152.07  *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *    0.42  *    5.85  *    0.95  *
* Max Chl Dpth (ft)      *   35.93  * Hydr. Depth (ft)       *    1.93  *   23.77  *    3.26  *
* Conv. Total (cfs)      *3120099.0  * Conv. (cfs)            * 14293.9  *3073399.0  * 32405.8  *
* Length Wtd. (ft)       *  781.41  * Wetted Per. (ft)       *  257.86  *  331.71  *  152.27  *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)       *    0.03  *    0.31  *    0.04  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.01  *    1.79  *    0.04  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *  517.72  * 8064.31  * 1646.21  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  189.27  *  358.35  *  405.84  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.              *   0.080  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  763.75  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1371.34  * 8596.00  * 1008.91  *
* E.G. Slope (ft/ft)     *0.000198  * Area (sq ft)           * 1371.34  * 8596.00  * 1008.91  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  905.66  *52435.13  * 1059.21  *
* Top Width (ft)         *  916.28  * Top Width (ft)         *  340.86  *  322.00  *  253.43  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    0.66  *    6.10  *    1.05  *
* Max Chl Dpth (ft)      *   38.85  * Hydr. Depth (ft)       *    4.02  *   26.70  *    3.98  *
* Conv. Total (cfs)      *3868149.0  * Conv. (cfs)            * 64397.3  *3728436.0  * 75315.9  *
* Length Wtd. (ft)       *  779.60  * Wetted Per. (ft)       *  341.13  *  331.71  *  253.85  *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)       *    0.05  *    0.32  *    0.05  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *    0.03  *    1.95  *    0.05  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   * 1198.26  * 9015.11  * 2959.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  332.12  *  363.05  *  651.02  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.              *   0.080  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  765.20  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1920.75  * 9063.28  * 1380.15  *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           * 1920.75  * 9063.28  * 1380.15  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1432.76  *59713.49  * 1853.76  *
* Top Width (ft)         * 1003.69  * Top Width (ft)         *  423.48  *  322.00  *  258.21  *
* Vel Total (ft/s)       *    5.10  * Avg. Vel. (ft/s)       *    0.75  *    6.59  *    1.34  *
* Max Chl Dpth (ft)      *   40.30  * Hydr. Depth (ft)       *    4.54  *   28.15  *    5.35  *
* Conv. Total (cfs)      *4296448.0  * Conv. (cfs)            * 97710.5  *4072316.0  *126421.7  *
* Length Wtd. (ft)       *  777.86  * Wetted Per. (ft)       *  423.76  *  331.71  *  258.85  *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)       *    0.06  *    0.37  *    0.07  *
* Alpha                  *    1.59  * Stream Power (lb/ft s) *    0.05  *    2.42  *    0.10  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   * 1775.19  * 9587.44  * 4165.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  398.25  *  363.78  *  921.00  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  768.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.              *   0.080  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  767.38  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3365.01  * 9765.72  * 1951.29  *
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* E.G. Slope (ft/ft)     *0.000230  * Area (sq ft)           * 3365.01  * 9765.72  * 1951.29  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2554.06  *69970.29  * 3375.65  *
* Top Width (ft)         * 1405.40  * Top Width (ft)         *  818.00  *  322.00  *  265.41  *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *    0.76  *    7.16  *    1.73  *
* Max Chl Dpth (ft)      *   42.48  * Hydr. Depth (ft)       *    4.11  *   30.33  *    7.35  *
* Conv. Total (cfs)      *5002667.0  * Conv. (cfs)            *168341.5  *4611832.0  *222493.6  *
* Length Wtd. (ft)       *  775.77  * Wetted Per. (ft)       *  818.34  *  331.71  *  266.37  *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)       *    0.06  *    0.42  *    0.11  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.04  *    3.03  *    0.18  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 2947.99  *10537.49  * 6822.26  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  482.36  *  365.16  * 1188.94  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  757.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *   0.080  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  756.96  * Reach Len. (ft)        *  948.34  *  782.02  *  514.75  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    0.02  * 6410.61  *    0.38  *
* E.G. Slope (ft/ft)     *0.000286  * Area (sq ft)           *    0.02  * 6410.61  *    0.38  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *    0.00  *38699.98  *    0.02  *
* Top Width (ft)         *  334.96  * Top Width (ft)         *    0.62  *  322.00  *   12.34  *
* Vel Total (ft/s)       *    6.04  * Avg. Vel. (ft/s)       *    0.03  *    6.04  *    0.05  *
* Max Chl Dpth (ft)      *   32.06  * Hydr. Depth (ft)       *    0.03  *   19.91  *    0.03  *
* Conv. Total (cfs)      *2286643.0  * Conv. (cfs)            *     0.0  *2286641.0  *     1.1  *
* Length Wtd. (ft)       *  782.38  * Wetted Per. (ft)       *    0.63  *  331.71  *   12.34  *
* Min Ch El (ft)         *  724.90  * Shear (lb/sq ft)       *    0.00  *    0.35  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    2.09  *    0.00  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *  202.51  * 6929.64  *  712.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   58.81  *  346.34  *  174.94  *
**********************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.977

INPUT
Description: R3Q  150+44  ROB altered for Fill Area & Manchester Rd (46+58),
             Blocked Obstructions are buildings
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  816.75   35.99  816.36   41.79  816.28   81.14  812.78    92.1  812.56
  240.43  795.96  274.92  792.21  334.43  788.12  354.08  782.42  356.11  781.67
   356.8  781.67  370.08  780.14  378.34  779.06  383.97  778.19  389.66  777.65
  446.13  775.45  835.04  772.02  893.73  770.74  909.01  770.66  934.55  769.56
  944.13  769.52 1050.35  768.23 1191.35  766.77 1207.52  766.37  1221.7  766.16
 1237.45  766.78 1275.89  767.54 1285.47  767.57 1319.44  765.36 1455.51  758.52
    1523  750.49    1558  741.49    1588  738.49    1617  728.82 1639.01  728.82
    1652  724.49    1696  724.49 1708.99  728.82    1731  728.82    1760  738.49
    1790  741.49    1841  758.49    2080     760    2176  766.43    2190  765.87
    2215  766.37    2240  765.87    2254  766.43  2300.5     782 2360.93  782.75
 2380.25  781.49 2393.08  780.74 2419.01  786.14 2428.69   788.2 2431.89  788.72
 2434.26  788.98 2435.62  789.08 2456.74  790.83 2505.41  791.11 2580.59  789.65
 2603.96  789.13 2640.47  789.19 2642.74   789.2

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  446.13     .05    1523     .03    1841     .05    2254     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1523    1841          1046.51  906.95   647.4             .1       .3
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     450     750     790     920    1220     790

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  744.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  743.90  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2815.57  *          *
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* E.G. Slope (ft/ft)     *0.000341  * Area (sq ft)           *          * 2815.57  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  248.63  * Top Width (ft)         *          *  248.63  *          *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *          *    4.55  *          *
* Max Chl Dpth (ft)      *   19.41  * Hydr. Depth (ft)       *          *   11.32  *          *
* Conv. Total (cfs)      *693009.1  * Conv. (cfs)            *          *693009.1  *          *
* Length Wtd. (ft)       *  906.95  * Wetted Per. (ft)       *          *  254.17  *          *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.07  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *   20.10  * 3053.88  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.51  *  259.89  *    1.74  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  748.30  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3975.78  *          *
* E.G. Slope (ft/ft)     *0.000324  * Area (sq ft)           *          * 3975.78  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  278.93  * Top Width (ft)         *          *  278.93  *          *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)       *          *    5.16  *          *
* Max Chl Dpth (ft)      *   23.81  * Hydr. Depth (ft)       *          *   14.25  *          *
* Conv. Total (cfs)      *1139197.0  * Conv. (cfs)            *          *1139197.0  *          *
* Length Wtd. (ft)       *  906.95  * Wetted Per. (ft)       *          *  285.74  *          *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.45  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *   39.32  * 4227.06  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    6.84  *  291.28  *   12.51  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.              *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  751.76  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    6.76  * 4977.89  *          *
* E.G. Slope (ft/ft)     *0.000292  * Area (sq ft)           *    6.76  * 4977.89  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *    2.52  *27097.48  *          *
* Top Width (ft)         *  308.47  * Top Width (ft)         *   10.66  *  297.81  *          *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *    0.37  *    5.44  *          *
* Max Chl Dpth (ft)      *   27.27  * Hydr. Depth (ft)       *    0.63  *   16.72  *          *
* Conv. Total (cfs)      *1584988.0  * Conv. (cfs)            *   147.6  *1584840.0  *          *
* Length Wtd. (ft)       *  906.96  * Wetted Per. (ft)       *   10.74  *  305.45  *          *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *    0.01  *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.62  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *   71.33  * 5239.97  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   14.78  *  314.42  *   68.07  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.              *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  755.01  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   85.75  * 5961.28  *          *
* E.G. Slope (ft/ft)     *0.000270  * Area (sq ft)           *   85.75  * 5961.28  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *   71.81  *34428.19  *          *
* Top Width (ft)         *  345.52  * Top Width (ft)         *   37.97  *  307.55  *          *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)       *    0.84  *    5.78  *          *
* Max Chl Dpth (ft)      *   30.52  * Hydr. Depth (ft)       *    2.26  *   19.38  *          *
* Conv. Total (cfs)      *2097986.0  * Conv. (cfs)            *  4366.6  *2093619.0  *          *
* Length Wtd. (ft)       *  907.10  * Wetted Per. (ft)       *   38.23  *  315.73  *          *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *    0.04  *    0.32  *          *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.03  *    1.84  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *  138.76  * 6265.41  *  466.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   36.63  *  332.76  *  126.90  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.              *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  760.67  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  462.54  * 7745.21  *  345.02  *
```

```
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           *  462.54  * 7745.21  *  345.02  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  504.28  *44815.36  *  180.36  *
* Top Width (ft)         *  677.42  * Top Width (ft)         *  110.35  *  318.00  *  249.07  *
* Vel Total (ft/s)       *    5.32  * Avg. Vel. (ft/s)       *    1.09  *    5.79  *    0.52  *
* Max Chl Dpth (ft)      *   36.18  * Hydr. Depth (ft)       *    4.19  *   24.36  *    1.39  *
* Conv. Total (cfs)      *3213990.0  * Conv. (cfs)            * 35620.9  *3165628.0  * 12740.4  *
* Length Wtd. (ft)       *  907.06  * Wetted Per. (ft)       *  110.88  *  326.74  *  249.10  *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *    0.05  *    0.30  *    0.02  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.06  *    1.72  *    0.01  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  507.27  * 7926.07  * 1641.24  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  185.27  *  352.60  *  403.47  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  763.61  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  872.53  * 8679.37  * 1141.11  *
* E.G. Slope (ft/ft)     *0.000186  * Area (sq ft)           *  872.53  * 8679.37  * 1141.11  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1054.85  *52200.36  * 1144.79  *
* Top Width (ft)         *  779.71  * Top Width (ft)         *  168.79  *  318.00  *  292.93  *
* Vel Total (ft/s)       *    5.09  * Avg. Vel. (ft/s)       *    1.21  *    6.01  *    1.00  *
* Max Chl Dpth (ft)      *   39.12  * Hydr. Depth (ft)       *    5.17  *   27.29  *    3.90  *
* Conv. Total (cfs)      *3988509.0  * Conv. (cfs)            * 77339.4  *3827235.0  * 83934.1  *
* Length Wtd. (ft)       *  905.04  * Wetted Per. (ft)       *  169.39  *  326.74  *  293.05  *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *    0.06  *    0.31  *    0.05  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *    0.07  *    1.86  *    0.05  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   * 1173.83  * 8860.04  * 2946.84  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  326.57  *  357.31  *  647.79  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  765.05  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1135.66  * 9136.40  * 1577.52  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           * 1135.66  * 9136.40  * 1577.52  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1543.23  *59496.53  * 1960.25  *
* Top Width (ft)         *  829.76  * Top Width (ft)         *  197.38  *  318.00  *  314.38  *
* Vel Total (ft/s)       *    5.32  * Avg. Vel. (ft/s)       *    1.36  *    6.51  *    1.24  *
* Max Chl Dpth (ft)      *   40.56  * Hydr. Depth (ft)       *    5.75  *   28.73  *    5.02  *
* Conv. Total (cfs)      *4414472.0  * Conv. (cfs)            *108135.3  *4168980.0  *137356.4  *
* Length Wtd. (ft)       *  904.15  * Wetted Per. (ft)       *  198.02  *  326.74  *  314.56  *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *    0.07  *    0.36  *    0.06  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    0.10  *    2.32  *    0.08  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   * 1741.92  * 9424.07  * 4148.23  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  391.49  *  358.04  *  917.62  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  767.21  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1619.72  * 9824.44  * 2373.42  *
* E.G. Slope (ft/ft)     *0.000221  * Area (sq ft)           * 1619.72  * 9824.44  * 2373.42  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2565.25  *69972.77  * 3361.98  *
* Top Width (ft)         * 1004.72  * Top Width (ft)         *  271.38  *  318.00  *  415.34  *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *    1.58  *    7.12  *    1.42  *
* Max Chl Dpth (ft)      *   42.72  * Hydr. Depth (ft)       *    5.97  *   30.89  *    5.71  *
* Conv. Total (cfs)      *5103837.0  * Conv. (cfs)            *172498.5  *4705265.0  *226073.4  *
* Length Wtd. (ft)       *  902.08  * Wetted Per. (ft)       *  273.13  *  326.74  *  415.72  *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *    0.08  *    0.42  *    0.08  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.13  *    2.96  *    0.11  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   * 2893.73  *10361.64  * 6796.71  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  470.51  *  359.42  * 1184.92  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  757.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.050  *   0.030  *          *
```

```
* W.S. Elev (ft)         *  756.77  * Reach Len. (ft)        * 1046.51  *  906.95  *  647.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  165.52  * 6506.76  *          *
* E.G. Slope (ft/ft)     *0.000259  * Area (sq ft)           *  165.52  * 6506.76  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *  168.86  *38531.14  *          *
* Top Width (ft)         *  365.57  * Top Width (ft)         *   52.75  *  312.83  *          *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)       *    1.02  *    5.92  *          *
* Max Chl Dpth (ft)      *   32.28  * Hydr. Depth (ft)       *    3.14  *   20.80  *          *
* Conv. Total (cfs)      *2405013.0  * Conv. (cfs)            * 10493.7  *2394519.0  *          *
* Length Wtd. (ft)       *  907.25  * Wetted Per. (ft)       *   53.12  *  321.29  *          *
* Min Ch El (ft)         *  724.49  * Shear (lb/sq ft)       *    0.05  *    0.33  *          *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    0.05  *    1.94  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *  200.71  * 6813.69  *  712.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   58.23  *  340.64  *  174.87  *
*****************************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.805

INPUT
Description: R3P  159+90  ROB adjusted for fill area & Manchester Rd (Sta
             51+57)  Blocked Obstructions are buildings
Station Elevation Data    num=      87
     Sta    Elev    Sta    Elev    Sta    Elev    Sta    Elev    Sta    Elev
*****************************************************************************
       0  800.46  147.64  793.47   272.4  776.16  330.94  773.49  396.05  769.78
  399.41  769.31  574.22  769.46  631.38  769.47  705.64  769.17  710.64  769.48
  711.04  769.48  712.12  769.48  739.19  769.48  739.96  769.48  747.16  769.48
  756.89  769.48  790.77  769.48  816.26  769.48  817.75  769.48  831.18  769.48
  857.51  769.48   867.8  769.93  878.62  769.48  894.79  769.27  920.96  768.94
  972.09  768.13  991.92  767.91 1005.84  767.75 1015.91  767.59 1049.84  766.63
 1089.07  766.83 1139.99  766.67 1189.97  766.82 1228.62  769.75 1263.38  767.37
 1329.82  766.15 1425.52  758.53 1427.25  758.53 1443.29  758.53 1463.42  758.53
 1494.78  765.72 1498.77  766.82  1499.4  766.98 1500.41  767.17 1772.71  764.65
 1912.95  760.27 1944.56  759.16 1976.14  758.64 1983.83  758.52 1984.46  758.52
 1985.67  758.52 1993.98  758.52 2003.84  758.52 2008.24  758.52    2019  759.02
    2049  756.02    2094  741.02    2124  738.02    2153  728.35 2175.01  728.35
    2188  724.02    2232  724.02 2244.99  728.35    2267  728.35    2296  738.02
    2326  741.02    2377  758.02 2460.29  758.62    2567  764.63    2581  764.07
    2606  764.57    2631  764.07    2645  764.63 2674.52   770.9 2755.54  772.79
 2762.81  772.96 2764.98  773.12 2809.01  775.15 2872.54   780.2 2883.71  782.01
 2899.51  782.13 2922.19  783.32 2958.84  786.34  3009.6   789.1 3015.92   789.1
 3022.86  789.14 3025.87  789.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .05    2049     .03    2377     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2049    2377          1037.67 1037.41 1084.32              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1298.77 1504.65  768.81       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************
     240     500     790    1000    1300     790

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  743.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  743.61  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  733.42  * Flow Area (sq ft)      *          * 2856.23  *          *
* E.G. Slope (ft/ft)     *0.000324  * Area (sq ft)           *          * 2856.23  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  247.53  * Top Width (ft)         *          *  247.53  *          *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)       *          *    4.48  *          *
* Max Chl Dpth (ft)      *   19.59  * Hydr. Depth (ft)       *          *   11.54  *          *
* Conv. Total (cfs)      *711544.4  * Conv. (cfs)            *          *711544.4  *          *
* Length Wtd. (ft)       * 1037.41  * Wetted Per. (ft)       *          *  253.22  *          *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.02  *          *
```

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* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *   20.10  * 2994.84  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.51  *  254.72  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  748.02  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  735.90  * Flow Area (sq ft)      *          * 4006.46  *          *
* E.G. Slope (ft/ft)     *0.000309  * Area (sq ft)           *          * 4006.46  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  274.00  * Top Width (ft)         *          *  274.00  *          *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *          *    5.12  *          *
* Max Chl Dpth (ft)      *   24.00  * Hydr. Depth (ft)       *          *   14.62  *          *
* Conv. Total (cfs)      *1166510.0  * Conv. (cfs)            *          *1166510.0  *          *
* Length Wtd. (ft)       * 1037.41  * Wetted Per. (ft)       *          *  281.11  *          *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.41  *          *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *   39.32  * 4143.96  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    6.84  *  285.52  *   12.51  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  751.50  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  737.69  * Flow Area (sq ft)      *          * 4995.96  *          *
* E.G. Slope (ft/ft)     *0.000286  * Area (sq ft)           *          * 4995.96  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  294.87  * Top Width (ft)         *          *  294.87  *          *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)       *          *    5.42  *          *
* Max Chl Dpth (ft)      *   27.48  * Hydr. Depth (ft)       *          *   16.94  *          *
* Conv. Total (cfs)      *1602631.0  * Conv. (cfs)            *          *1602631.0  *          *
* Length Wtd. (ft)       * 1037.41  * Wetted Per. (ft)       *          *  303.12  *          *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.60  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *   71.25  * 5136.14  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   14.65  *  308.25  *   68.07  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  754.76  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  739.85  * Flow Area (sq ft)      *          * 5989.79  *          *
* E.G. Slope (ft/ft)     *0.000276  * Area (sq ft)           *          * 5989.79  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  314.44  * Top Width (ft)         *          *  314.44  *          *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *          *    5.76  *          *
* Max Chl Dpth (ft)      *   30.74  * Hydr. Depth (ft)       *          *   19.05  *          *
* Conv. Total (cfs)      *2075343.0  * Conv. (cfs)            *          *2075343.0  *          *
* Length Wtd. (ft)       * 1037.41  * Wetted Per. (ft)       *          *  323.75  *          *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.84  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *  137.73  * 6140.99  *  466.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   36.17  *  326.29  *  126.90  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.00  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  760.49  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  742.07  * Flow Area (sq ft)      *  246.05  * 7851.15  *  211.93  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           *  352.92  * 7851.15  *  211.93  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  149.75  *45216.24  *  134.01  *
* Top Width (ft)         *  658.73  * Top Width (ft)         *  214.22  *  328.00  *  116.52  *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *    0.61  *    5.76  *    0.63  *
* Max Chl Dpth (ft)      *   36.47  * Hydr. Depth (ft)       *    1.72  *   23.94  *    1.82  *
* Conv. Total (cfs)      *3185446.0  * Conv. (cfs)           * 10483.7  *3165580.0  *  9381.9  *
* Length Wtd. (ft)       * 1037.53  * Wetted Per. (ft)       *  143.32  *  338.04  *  116.57  *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *    0.02  *    0.30  *    0.02  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.01  *    1.70  *    0.01  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *  497.48  * 7763.71  * 1637.10  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  181.37  *  345.88  *  400.76  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  763.98  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  763.43  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  743.50  * Flow Area (sq ft)      *  805.50  * 8815.83  *  631.41  *
* E.G. Slope (ft/ft)     *0.000191  * Area (sq ft)           * 1194.63  * 8815.83  *  631.41  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  746.15  *53029.61  *  624.24  *
* Top Width (ft)         *  854.89  * Top Width (ft)         *  358.15  *  328.00  *  168.74  *
* Vel Total (ft/s)       *    5.31  * Avg. Vel. (ft/s)       *    0.93  *    6.02  *    0.99  *
* Max Chl Dpth (ft)      *   39.41  * Hydr. Depth (ft)       *    3.39  *   26.88  *    3.74  *
* Conv. Total (cfs)      *3939283.0  * Conv. (cfs)           * 54031.3  *3840049.0  * 45203.0  *
* Length Wtd. (ft)       * 1037.81  * Wetted Per. (ft)       *  237.54  *  338.04  *  168.87  *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *    0.04  *    0.31  *    0.04  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.04  *    1.87  *    0.04  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   * 1149.00  * 8677.91  * 2933.66  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  320.24  *  350.58  *  644.36  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  765.48  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  764.84  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  744.79  * Flow Area (sq ft)      * 1171.91  * 9276.74  *  925.30  *
* E.G. Slope (ft/ft)     *0.000212  * Area (sq ft)           * 1747.57  * 9276.74  *  925.30  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1265.82  *60822.97  *  911.21  *
* Top Width (ft)         * 1038.16  * Top Width (ft)         *  441.19  *  328.00  *  268.98  *
* Vel Total (ft/s)       *    5.54  * Avg. Vel. (ft/s)       *    1.08  *    6.56  *    0.98  *
* Max Chl Dpth (ft)      *   40.82  * Hydr. Depth (ft)       *    3.95  *   28.28  *    3.44  *
* Conv. Total (cfs)      *4330086.0  * Conv. (cfs)           * 87001.8  *4180456.0  * 62628.8  *
* Length Wtd. (ft)       * 1038.47  * Wetted Per. (ft)       *  296.81  *  338.04  *  269.20  *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *    0.05  *    0.36  *    0.05  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    0.06  *    2.38  *    0.04  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   * 1707.28  * 9232.38  * 4129.63  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  383.82  *  351.31  *  913.28  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  767.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  766.98  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  746.59  * Flow Area (sq ft)      * 2057.27  * 9980.71  * 1513.43  *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           * 2994.05  * 9980.71  * 1513.43  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2290.24  *71509.82  * 2099.94  *
* Top Width (ft)         * 1334.98  * Top Width (ft)         *  727.89  *  328.00  *  279.08  *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)       *    1.11  *    7.16  *    1.39  *
```

```
* Max Chl Dpth (ft)      *   42.96  * Hydr. Depth (ft)       *    3.89  *   30.43  *    5.42  *
* Conv. Total (cfs)      *5012367.0  * Conv. (cfs)            *151245.5  *4722444.0  *138677.9  *
* Length Wtd. (ft)       * 1039.46  * Wetted Per. (ft)       *  528.74  *  338.04  *  279.53  *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *    0.06  *    0.42  *    0.08  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    0.06  *    3.03  *    0.11  *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)   * 2838.31  *10155.46  * 6767.83  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  458.50  *  352.69  * 1179.76  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  757.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.              *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  756.53  * Reach Len. (ft)        * 1037.67  * 1037.41  * 1084.32  *
* Crit W.S. (ft)         *  740.88  * Flow Area (sq ft)      *    1.29  * 6554.42  *          *
* E.G. Slope (ft/ft)     *0.000268  * Area (sq ft)           *    1.29  * 6554.42  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)              *    0.25  *38699.75  *          *
* Top Width (ft)         *  328.60  * Top Width (ft)         *    5.08  *  323.52  *          *
* Vel Total (ft/s)       *    5.90  * Avg. Vel. (ft/s)       *    0.19  *    5.90  *          *
* Max Chl Dpth (ft)      *   32.51  * Hydr. Depth (ft)       *    0.25  *   20.26  *          *
* Conv. Total (cfs)      *2365168.0  * Conv. (cfs)            *    15.3  *2365153.0  *          *
* Length Wtd. (ft)       * 1037.41  * Wetted Per. (ft)       *    5.10  *  333.32  *          *
* Min Ch El (ft)         *  724.02  * Shear (lb/sq ft)       *    0.00  *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.94  *          *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *  198.71  * 6677.72  *  712.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   57.54  *  334.02  *  174.87  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.608

INPUT
Description: R3O  170+27  Checked against 2003 contours.  Manchester Rd raise
             on ROB (62+40), Blocked Obstructions are buildings.  Only 500-yr
             tops Manchester Rd on Right.
Station Elevation Data    num=     106
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   822.89    28.92   821.03    70.8   816.78    84.81   815.17    93.42   814.53
   108.04   808.41   121.47   803.32  130.94   794.11   132.07   793.05   134.85   792.66
   188.88   783.56   245.41   774.88  254.78   774.38   299.73   769.85   363.63   764.65
   377.26   764.41   445.35   764.31  471.33   764.24   518.32   764.17    574.2    764.6
    591.2   764.74   645.49   765.88  649.91   765.94   651.82   765.93    655.4   765.97
   724.21   766.04   760.82    765.8  808.99   765.14   889.29   765.17   889.75   765.17
   890.59   765.16   955.84   764.75  968.99    764.6  1031.12   764.51  1080.26   764.53
   1101.6   764.59  1127.12    765.2 1148.53   765.57  1179.78   764.61  1204.98   764.05
  1219.28   764.23  1266.08   763.84 1324.19   763.57  1517.28   765.68  1657.86   765.32
  1726.48   764.28  1779.09    764.2 1808.09   764.24  1871.83   761.01  1921.93   758.95
  1938.26   758.84  1938.39   758.84 2007.13    758.7  2036.59   758.63  2078.97   758.63
  2099.71   758.06     2181   757.48    2232   740.48     2262   737.48     2291   727.81
  2313.01   727.81     2326   723.48    2370   723.48  2382.99   727.81     2405   727.81
     2434   737.48     2464   740.48    2509   755.48     2539   758.48     2590   764.16
     2604    763.6     2629    764.1    2654    763.6     2668   764.16  2757.93   759.44
  2766.16   759.45  2793.41   759.59 2826.88   759.55   2877.7   760.56  2882.59   760.59
  2886.63   760.59  2957.25   761.11 2970.72   761.14  3026.32   761.55  3052.97   761.57
  3069.01   761.64  3081.83    762.8 3089.24   763.41   3113.3   764.01  3151.56   765.31
  3194.23   765.44  3321.43   767.81 3390.19   768.43  3486.47   769.19   3588.5   769.25
  3600.71   769.34  3608.02   769.34 3612.09   769.38  3623.74   769.71  3671.76   769.88
  3734.07   774.35  3752.01   775.09 3842.39   776.87  3843.11   776.89  3938.47   791.06
  4041.25   801.86

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************************
       0     .15  254.78     .05 1657.86      .1 2078.97     .05    2181     .03
    2509     .05  3113.3     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2181    2509           654.17     713  827.72              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      0    1150     770       F
    2630 4041.25   764.5       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************************************
     370    1000     780    3270    3350     780    3540    3590     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  743.29  * Reach Len. (ft)        *  654.17  *  713.00  *  827.72  *
* Crit W.S. (ft)         *  732.89  * Flow Area (sq ft)      *          * 2911.29  *          *
* E.G. Slope (ft/ft)     *0.000306  * Area (sq ft)           *          * 2911.29  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  248.86  * Top Width (ft)          *          *  248.86  *          *
* Vel Total (ft/s)       *    4.40  * Avg. Vel. (ft/s)        *          *    4.40  *          *
* Max Chl Dpth (ft)      *   19.81  * Hydr. Depth (ft)        *          *   11.70  *          *
* Conv. Total (cfs)      *731851.5  * Conv. (cfs)             *          *731851.5  *          *
* Length Wtd. (ft)       *  713.00  * Wetted Per. (ft)        *          *  254.62  *          *
* Min Ch El (ft)         *  723.48  * Shear (lb/sq ft)        *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.96  *          *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)    *   20.10  * 2926.16  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    3.51  *  248.81  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  747.72  * Reach Len. (ft)        *  654.17  *  713.00  *  827.72  *
* Crit W.S. (ft)         *  735.36  * Flow Area (sq ft)      *          * 4071.30  *          *
* E.G. Slope (ft/ft)     *0.000295  * Area (sq ft)           *          * 4071.30  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  275.41  * Top Width (ft)          *          *  275.41  *          *
* Vel Total (ft/s)       *    5.04  * Avg. Vel. (ft/s)        *          *    5.04  *          *
* Max Chl Dpth (ft)      *   24.24  * Hydr. Depth (ft)        *          *   14.78  *          *
* Conv. Total (cfs)      *1193917.0  * Conv. (cfs)            *          *1193917.0  *          *
* Length Wtd. (ft)       *  713.00  * Wetted Per. (ft)        *          *  282.61  *          *
* Min Ch El (ft)         *  723.48  * Shear (lb/sq ft)        *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.34  *          *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)    *   39.32  * 4047.77  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    6.84  *  278.98  *   12.51  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  751.22  * Reach Len. (ft)        *  654.17  *  713.00  *  827.72  *
* Crit W.S. (ft)         *  737.15  * Flow Area (sq ft)      *          * 5072.64  *          *
* E.G. Slope (ft/ft)     *0.000274  * Area (sq ft)           *          * 5072.64  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  296.43  * Top Width (ft)          *          *  296.43  *          *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)        *          *    5.34  *          *
* Max Chl Dpth (ft)      *   27.74  * Hydr. Depth (ft)        *          *   17.11  *          *
* Conv. Total (cfs)      *1637934.0  * Conv. (cfs)            *          *1637934.0  *          *
* Length Wtd. (ft)       *  713.00  * Wetted Per. (ft)        *          *  304.76  *          *
* Min Ch El (ft)         *  723.48  * Shear (lb/sq ft)        *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.52  *          *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)    *   71.25  * 5016.24  *  156.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   14.65  *  301.21  *   68.07  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	754.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.030	
W.S. Elev (ft)	754.49	Reach Len. (ft)	654.17	713.00	827.72
Crit W.S. (ft)	739.30	Flow Area (sq ft)		6074.60	
E.G. Slope (ft/ft)	0.000266	Area (sq ft)		6074.60	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	316.06	Top Width (ft)		316.06	
Vel Total (ft/s)	5.68	Avg. Vel. (ft/s)		5.68	
Max Chl Dpth (ft)	31.01	Hydr. Depth (ft)		19.22	
Conv. Total (cfs)	2117137.0	Conv. (cfs)		2117137.0	
Length Wtd. (ft)	713.00	Wetted Per. (ft)		325.45	
Min Ch El (ft)	723.48	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.76	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	137.73	5997.33	466.78
C & E Loss (ft)	0.00	Cum SA (acres)	36.17	318.78	126.90

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	760.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.064	0.030	0.050
W.S. Elev (ft)	760.30	Reach Len. (ft)	654.17	713.00	827.72
Crit W.S. (ft)	741.53	Flow Area (sq ft)	514.53	7964.32	114.30
E.G. Slope (ft/ft)	0.000194	Area (sq ft)	514.53	7964.32	187.76
Q Total (cfs)	45500.00	Flow (cfs)	253.01	45160.88	86.11
Top Width (ft)	788.93	Top Width (ft)	291.81	328.00	169.12
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)	0.49	5.67	0.75
Max Chl Dpth (ft)	36.82	Hydr. Depth (ft)	1.76	24.28	2.47
Conv. Total (cfs)	3266337.0	Conv. (cfs)	18162.9	3241993.0	6181.5
Length Wtd. (ft)	712.50	Wetted Per. (ft)	291.85	338.04	46.56
Min Ch El (ft)	723.48	Shear (lb/sq ft)	0.02	0.29	0.03
Alpha	1.14	Stream Power (lb/ft s)	0.01	1.62	0.02
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	487.15	7575.38	1632.12
C & E Loss (ft)	0.01	Cum SA (acres)	175.34	338.07	397.20

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	763.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.070	0.030	0.050
W.S. Elev (ft)	763.25	Reach Len. (ft)	654.17	713.00	827.72
Crit W.S. (ft)	742.98	Flow Area (sq ft)	1470.96	8933.06	290.23
E.G. Slope (ft/ft)	0.000182	Area (sq ft)	1470.96	8933.06	1260.63
Q Total (cfs)	54400.00	Flow (cfs)	1113.77	52994.65	291.58
Top Width (ft)	1156.15	Top Width (ft)	353.37	328.00	474.78
Vel Total (ft/s)	5.09	Avg. Vel. (ft/s)	0.76	5.93	1.00
Max Chl Dpth (ft)	39.77	Hydr. Depth (ft)	4.16	27.23	3.99
Conv. Total (cfs)	4029631.0	Conv. (cfs)	82501.6	3925530.0	21598.7
Length Wtd. (ft)	710.67	Wetted Per. (ft)	353.48	338.04	73.24
Min Ch El (ft)	723.48	Shear (lb/sq ft)	0.05	0.30	0.05
Alpha	1.33	Stream Power (lb/ft s)	0.04	1.78	0.05
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1117.25	8466.56	2910.12
C & E Loss (ft)	0.03	Cum SA (acres)	311.77	342.77	636.35

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	765.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.069	0.030	0.050
W.S. Elev (ft)	764.67	Reach Len. (ft)	654.17	713.00	827.72
Crit W.S. (ft)	744.26	Flow Area (sq ft)	2188.90	9398.88	2054.75

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* E.G. Slope (ft/ft)     *0.000193  * Area (sq ft)           * 2203.51  * 9398.88  * 2054.75  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1714.78  *59376.78  * 1908.45  *
* Top Width (ft)         * 1790.54  * Top Width (ft)         *  838.82  *  328.00  *  623.72  *
* Vel Total (ft/s)       *    4.62  * Avg. Vel. (ft/s)       *    0.78  *    6.32  *    0.93  *
* Max Chl Dpth (ft)      *   41.19  * Hydr. Depth (ft)       *    3.01  *   28.66  *    3.29  *
* Conv. Total (cfs)      *4533304.0  * Conv. (cfs)           *123390.4  *4272587.0  *137326.8  *
* Length Wtd. (ft)       *  724.35  * Wetted Per. (ft)       *  727.42  *  338.04  *  624.45  *
* Min Ch El (ft)         *  723.48  * Shear (lb/sq ft)       *    0.04  *    0.34  *    0.04  *
* Alpha                  *    1.77  * Stream Power (lb/ft s) *    0.03  *    2.12  *    0.04  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1660.22  * 9009.99  * 4092.54  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  368.58  *  343.50  *  902.17  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  767.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.069  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  766.86  * Reach Len. (ft)        *  654.17  *  713.00  *  827.72  *
* Crit W.S. (ft)         *  746.07  * Flow Area (sq ft)      * 4254.69  *10116.28  * 3571.26  *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           * 4618.76  *10116.28  * 3571.26  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3826.58  *67587.14  * 4486.28  *
* Top Width (ft)         * 2303.49  * Top Width (ft)         * 1214.49  *  328.00  *  761.00  *
* Vel Total (ft/s)       *    4.23  * Avg. Vel. (ft/s)       *    0.90  *    6.68  *    1.26  *
* Max Chl Dpth (ft)      *   43.38  * Hydr. Depth (ft)       *    4.13  *   30.84  *    4.69  *
* Conv. Total (cfs)      *5423878.0  * Conv. (cfs)           *273450.5  *4829834.0  *320593.6  *
* Length Wtd. (ft)       *  724.93  * Wetted Per. (ft)       * 1031.18  *  338.04  *  761.76  *
* Min Ch El (ft)         *  723.48  * Shear (lb/sq ft)       *    0.05  *    0.37  *    0.06  *
* Alpha                  *    2.23  * Stream Power (lb/ft s) *    0.05  *    2.44  *    0.07  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 2747.64  * 9916.15  * 6704.54  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  435.37  *  344.88  * 1166.81  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  756.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.030  *   0.050  *
* W.S. Elev (ft)         *  756.27  * Reach Len. (ft)        *  654.17  *  713.00  *  827.72  *
* Crit W.S. (ft)         *  740.32  * Flow Area (sq ft)      *          * 6644.58  *    3.09  *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *          * 6644.58  *    3.09  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38699.21  *    0.79  *
* Top Width (ft)         *  332.22  * Top Width (ft)         *          *  324.36  *    7.86  *
* Vel Total (ft/s)       *    5.82  * Avg. Vel. (ft/s)       *          *    5.82  *    0.25  *
* Max Chl Dpth (ft)      *   32.79  * Hydr. Depth (ft)       *          *   20.49  *    0.39  *
* Conv. Total (cfs)      *2415420.0  * Conv. (cfs)           *          *2415371.0  *    49.1  *
* Length Wtd. (ft)       *  713.00  * Wetted Per. (ft)       *          *  334.20  *    7.90  *
* Min Ch El (ft)         *  723.48  * Shear (lb/sq ft)       *          *    0.32  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.86  *    0.00  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *  198.69  * 6520.55  *  712.49  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   57.48  *  326.31  *  174.77  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main              RS: 9.473

INPUT
Description: R3N  177+48  Checked against 2003 contours.  Lake blocked out on
             right.  L&R OB raised for Fill Areas and Manchester Road (Sta
             70+17).  Only 500-yr tops Manchester Rd on Right.  Far right
```

ineffective due to high ground D/S

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	805.98	12.64	803.32	22.93	795.69	27.24	793.04	65.14	785.88
70.92	784.87	72.98	784.57	77.49	783.9	105.76	783.03	143.64	782.1
161.5	781.65	188.53	781.27	252.15	776.79	324.48	771.05	343.2	770.49
413.43	767.69	424.83	767.43	464.72	766.29	490.3	765.57	496.03	765.49
528.06	765.41	576.13	765.34	582.44	765.23	602.72	764.93	637.33	764.26
650.83	764.1	710.25	763.78	738.68	763.66	800.02	762.5	827.61	762.48
918.22	760.6	926.34	760.04	932.71	760.69	952.08	763.79	992.75	763.87
1040.57	764.05	1247.85	761.49	1309.95	761.05	1341.36	758.99	1396.65	758.32
1417.91	757.82	1425.68	757.81	1455.11	757.8	1516.5	757.77	1571.79	757.74
1720	760	2220	757.5	2296	757.09	2347	740.09	2377	737.09
2406	727.42	2428.01	727.42	2441	723.09	2485	723.09	2497.99	727.42
2520	727.42	2549	737.09	2579	740.09	2624	755.09	2654	758.09
2725	763.34	2750	763.84	2775	763.34	2809	752	2859	752
2900	750	2933	748.3	3673	748.3	3713	762	3715	762.9
3737.18	763.33	3858.11	763.75	3863.55	763.74	3866.42	763.77	3869.43	763.75
3951.35	761.97	4026.38	763.56	4043.85	763.69	4054.39	763.78	4112.33	767.51
4140.26	768.01	4195.6	765.39	4317.03	766.04	4326.64	766.2	4334.29	766.5
4356.69	767.07	4395.98	768.46	4424.73	769.34	4455.03	770.02	4488.38	771.03
4499.5	771.31	4503.58	771.58	4682.07	796.52	4694.39	798.65	4695.18	798.92
4756	816.62	4868.05	848.56	4878.01	848.77	4919.11	847.47	4964.57	849.59
4973.04	849.47								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.15	252.15	.05	918.22	.06	1571.79	.05	2296	.03
2624	.05	4503.58	.1						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2296	2624	668.8	835	989.06	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
2750	3330	764.35	F
3330	4973	772	F
400	1000	772	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	743.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	743.08	Reach Len. (ft)	668.80	835.00	989.06
Crit W.S. (ft)	732.49	Flow Area (sq ft)		2957.01	
E.G. Slope (ft/ft)	0.000292	Area (sq ft)		2957.01	
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	249.96	Top Width (ft)		249.96	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	19.99	Hydr. Depth (ft)		11.83	
Conv. Total (cfs)	748835.2	Conv. (cfs)		748835.2	
Length Wtd. (ft)	818.25	Wetted Per. (ft)		255.78	
Min Ch El (ft)	723.09	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.91	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	20.10	2878.13	5.47
C & E Loss (ft)	0.04	Cum SA (acres)	3.51	244.73	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	747.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.030	
W.S. Elev (ft)	747.52	Reach Len. (ft)	668.80	835.00	989.06
Crit W.S. (ft)	734.95	Flow Area (sq ft)		4123.91	
E.G. Slope (ft/ft)	0.000284	Area (sq ft)		4123.91	
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	276.56	Top Width (ft)		276.56	
Vel Total (ft/s)	4.97	Avg. Vel. (ft/s)		4.97	
Max Chl Dpth (ft)	24.43	Hydr. Depth (ft)		14.91	
Conv. Total (cfs)	1216285.0	Conv. (cfs)		1216285.0	
Length Wtd. (ft)	815.28	Wetted Per. (ft)		283.81	
Min Ch El (ft)	723.09	Shear (lb/sq ft)		0.26	

```
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.28  *          *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   *   39.32  * 3980.70  *   22.95  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    6.84  *  274.46  *   12.51  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  751.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  751.03  * Reach Len. (ft)        *  668.80  *  835.00  *  989.06  *
* Crit W.S. (ft)         *  736.76  * Flow Area (sq ft)      *          * 5133.68  *          *
* E.G. Slope (ft/ft)     *0.000265  * Area (sq ft)           *          * 5133.68  * 2106.62  *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         * 1099.82  * Top Width (ft)         *          *  297.66  *  802.16  *
* Vel Total (ft/s)       *    5.28  * Avg. Vel. (ft/s)       *          *    5.28  *          *
* Max Chl Dpth (ft)      *   27.94  * Hydr. Depth (ft)       *          *   17.25  *          *
* Conv. Total (cfs)      *1666179.0  * Conv. (cfs)            *          *1666179.0  *          *
* Length Wtd. (ft)       *  813.17  * Wetted Per. (ft)       *          *  306.05  *          *
* Min Ch El (ft)         *  723.09  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.46  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *   71.25  * 4932.71  *  136.48  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   14.65  *  296.35  *   60.45  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  754.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  754.31  * Reach Len. (ft)        *  668.80  *  835.00  *  989.06  *
* Crit W.S. (ft)         *  738.92  * Flow Area (sq ft)      *          * 6141.47  *          *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *          * 6141.47  * 4930.28  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         * 1205.80  * Top Width (ft)         *          *  317.32  *  888.48  *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *          *    5.62  *          *
* Max Chl Dpth (ft)      *   31.22  * Hydr. Depth (ft)       *          *   19.35  *          *
* Conv. Total (cfs)      *2150243.0  * Conv. (cfs)            *          *2150243.0  *          *
* Length Wtd. (ft)       *  811.73  * Wetted Per. (ft)       *          *  326.78  *          *
* Min Ch El (ft)         *  723.09  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.70  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  137.73  * 5897.35  *  419.94  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   36.17  *  313.60  *  118.46  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  760.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.053  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  760.18  * Reach Len. (ft)        *  668.80  *  835.00  *  989.06  *
* Crit W.S. (ft)         *  741.16  * Flow Area (sq ft)      * 1642.27  * 8055.61  *  137.51  *
* E.G. Slope (ft/ft)     *0.000182  * Area (sq ft)           * 1642.53  * 8055.61  *10388.71  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  885.37  *44517.36  *   97.27  *
* Top Width (ft)         * 2285.94  * Top Width (ft)         *  976.37  *  328.00  *  981.57  *
* Vel Total (ft/s)       *    4.63  * Avg. Vel. (ft/s)       *    0.54  *    5.53  *    0.71  *
* Max Chl Dpth (ft)      *   37.09  * Hydr. Depth (ft)       *    1.69  *   24.56  *    2.36  *
* Conv. Total (cfs)      *3377100.0  * Conv. (cfs)            * 65713.8  *3304167.0  *  7219.7  *
* Length Wtd. (ft)       *  808.96  * Wetted Per. (ft)       *  972.93  *  338.04  *   58.55  *
* Min Ch El (ft)         *  723.09  * Shear (lb/sq ft)       *    0.02  *    0.27  *    0.03  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.01  *    1.49  *    0.02  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  470.95  * 7444.27  * 1531.64  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  165.82  *  332.70  *  386.27  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
```

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  763.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.052  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  763.20  * Reach Len. (ft)        *  668.80  *  835.00  *  989.06  *
* Crit W.S. (ft)         *  742.56  * Flow Area (sq ft)      * 4853.33  * 9046.10  *  375.30  *
* E.G. Slope (ft/ft)     *0.000153  * Area (sq ft)           * 5098.24  * 9046.10  *13514.26  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 4416.64  *49648.65  *  334.71  *
* Top Width (ft)         * 2870.14  * Top Width (ft)         * 1372.62  *  328.00  * 1169.52  *
* Vel Total (ft/s)       *    3.81  * Avg. Vel. (ft/s)       *    0.91  *    5.49  *    0.89  *
* Max Chl Dpth (ft)      *   40.11  * Hydr. Depth (ft)       *    4.09  *   27.58  *    3.78  *
* Conv. Total (cfs)      *4392294.0  * Conv. (cfs)           *356602.3  *4008667.0  * 27025.0  *
* Length Wtd. (ft)       *  804.11  * Wetted Per. (ft)       * 1187.08  *  338.04  *   99.50  *
* Min Ch El (ft)         *  723.09  * Shear (lb/sq ft)       *    0.04  *    0.26  *    0.04  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    0.04  *    1.41  *    0.03  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1067.93  * 8319.41  * 2769.74  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  298.81  *  337.40  *  620.73  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  765.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.053  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  764.83  * Reach Len. (ft)        *  668.80  *  835.00  *  989.06  *
* Crit W.S. (ft)         *  743.88  * Flow Area (sq ft)      * 6902.26  * 9579.88  * 9134.45  *
* E.G. Slope (ft/ft)     *0.000094  * Area (sq ft)           * 7637.35  * 9579.88  *15761.25  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 5871.21  *42682.04  *14446.75  *
* Top Width (ft)         * 3462.94  * Top Width (ft)         * 1688.21  *  328.00  * 1446.73  *
* Vel Total (ft/s)       *    2.46  * Avg. Vel. (ft/s)       *    0.85  *    4.46  *    1.58  *
* Max Chl Dpth (ft)      *   41.74  * Hydr. Depth (ft)       *    5.33  *   29.21  *   12.94  *
* Conv. Total (cfs)      *6510181.0  * Conv. (cfs)           *606708.7  *4410600.0  *1492872.0  *
* Length Wtd. (ft)       *  820.27  * Wetted Per. (ft)       * 1296.12  *  338.04  *  708.29  *
* Min Ch El (ft)         *  723.09  * Shear (lb/sq ft)       *    0.03  *    0.17  *    0.08  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.03  *    0.74  *    0.12  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1586.33  * 8854.67  * 3923.27  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  349.60  *  338.13  *  882.50  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*************************************************************************************************
* E.G. Elev (ft)         *  767.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.053  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  767.05  * Reach Len. (ft)        *  668.80  *  835.00  *  989.06  *
* Crit W.S. (ft)         *  745.66  * Flow Area (sq ft)      * 9771.04  *10305.93  *10697.22  *
* E.G. Slope (ft/ft)     *0.000090  * Area (sq ft)           *11614.84  *10305.93  *19212.26  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *10113.81  *47331.37  *18454.83  *
* Top Width (ft)         * 3861.91  * Top Width (ft)         * 1857.71  *  328.00  * 1676.20  *
* Vel Total (ft/s)       *    2.47  * Avg. Vel. (ft/s)       *    1.04  *    4.59  *    1.73  *
* Max Chl Dpth (ft)      *   43.96  * Hydr. Depth (ft)       *    7.54  *   31.42  *   15.15  *
* Conv. Total (cfs)      *7988569.0  * Conv. (cfs)           *1064491.0  *4981685.0  *1942393.0  *
* Length Wtd. (ft)       *  818.77  * Wetted Per. (ft)       * 1296.12  *  338.04  *  708.29  *
* Min Ch El (ft)         *  723.09  * Shear (lb/sq ft)       *    0.04  *    0.17  *    0.09  *
* Alpha                  *    2.30  * Stream Power (lb/ft s) *    0.04  *    0.79  *    0.15  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 2625.74  * 9749.02  * 6488.08  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  412.30  *  339.51  * 1143.66  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*************************************************************************************************
* E.G. Elev (ft)         *  756.61  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.030  *   0.050  *
* W.S. Elev (ft)         *  756.09  * Reach Len. (ft)        *  668.80  *  835.00  *  989.06  *
* Crit W.S. (ft)         *  739.94  * Flow Area (sq ft)      *          * 6715.25  *    5.04  *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           *          * 6715.25  * 6528.78  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38698.52  *    1.48  *
* Top Width (ft)         * 1234.08  * Top Width (ft)         *          *  325.01  *  909.06  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *          *    5.76  *    0.29  *
* Max Chl Dpth (ft)      *   33.00  * Hydr. Depth (ft)       *          *   20.66  *    0.50  *
* Conv. Total (cfs)      *2455065.0  * Conv. (cfs)            *          *2454971.0  *    94.2  *
* Length Wtd. (ft)       *  811.10  * Wetted Per. (ft)       *          *  334.89  *   10.09  *
* Min Ch El (ft)         *  723.09  * Shear (lb/sq ft)       *          *    0.31  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.79  *    0.00  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  198.69  * 6411.21  *  650.44  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   57.48  *  320.99  *  166.06  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.315

INPUT
Description: R3M  185+76 Checked against 2003 contours.   Fish Hatchery Area in
             Old Channel on LOB.  No flow in ROB due to high ground U/S (Elev
             768-770).
Station Elevation Data    num=     118
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  817.62    3.04  818.04   14.14  818.32   15.52  818.43   18.36  819.66
   21.57  819.67   24.04  819.66   69.56  812.79   82.87  812.79      86  812.79
  109.89  812.78   117.8  811.91  120.75  811.77  125.83   811.4  134.57  810.61
  161.37  807.97   179.2  806.06  196.91  804.77  198.87  804.58  224.22  796.42
  247.18  791.29  261.26  787.22  266.91  785.05  284.13  776.24  295.11  771.79
  305.55  768.21  316.44  763.41  317.15  763.09  317.77  762.86  330.88  757.74
  372.61  752.54  392.14  750.32  397.61  749.75  408.75  748.44  422.78  745.99
  438.91  744.09  445.52  743.33  465.31  740.95  505.79  735.72  512.35  735.92
  521.14  734.11  538.01  735.22     580  728.53     600  728.53     625  736.86
     655  739.86     667  744.86     687  744.86     702  739.86     732  736.86
     761  727.19  783.01  727.19     796  722.86     840  722.86  852.99  727.19
     875  727.19     904  736.86     934  739.86     985  756.86 1000.25  756.14
    1002  756.23 1014.48  756.94 1133.96   763.7 1158.87  764.05 1208.04  764.15
 1243.57  763.26 1287.78  763.11 1375.79  768.03 1377.34  768.02 1458.56  768.21
  1512.3   768.6 1517.98  768.65 1523.32  768.67 1590.73  768.85 1618.62  768.94
 1655.98  769.18  1668.4  769.09 1722.05  768.93 1734.05  768.87 1779.76  768.36
 1812.68  767.96 1847.13  767.82 1885.98  767.87 1908.48  767.73 1969.84  766.29
 1993.86  766.11 2063.92  764.68 2069.03  764.67  2088.4  764.56 2139.21  763.57
 2157.95  763.46 2207.78   762.5 2268.46  763.35 2303.74  764.91 2329.87  766.81
 2404.52  767.65 2406.62  767.62 2485.28  767.72 2485.87  767.72 2490.66  767.73
 2583.29  767.86  2603.2  768.12 2680.55  769.85 2699.65  770.28 2779.56  768.19
 2840.55  767.07 2885.75  778.27 2922.56  790.08 2959.26  806.06 3017.98  831.49
 3109.07  862.98 3115.77  864.07 3130.04   866.2 3143.53  868.35 3155.43  869.85
 3218.95  874.01 3268.24  877.34 3272.53  877.05

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1  465.31     .05     687     .03     985     .05 2779.56      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           687     985           226.13  370.25  736.27             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 1375.66 3272.53     770       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  743.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  743.00  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
```

```
* Crit W.S. (ft)         *  732.21  * Flow Area (sq ft)      * 1628.52  * 2992.60  *          *
* E.G. Slope (ft/ft)     *0.000180  * Area (sq ft)           * 1628.52  * 2992.60  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             * 2579.91  *10220.09  *          *
* Top Width (ft)         *  465.04  * Top Width (ft)         *  214.23  *  250.82  *          *
* Vel Total (ft/s)       *    2.77  * Avg. Vel. (ft/s)       *    1.58  *    3.42  *          *
* Max Chl Dpth (ft)      *   20.14  * Hydr. Depth (ft)       *    7.60  *   11.93  *          *
* Conv. Total (cfs)      *954519.6  * Conv. (cfs)            *192388.6  *762130.9  *          *
* Length Wtd. (ft)       *  353.31  * Wetted Per. (ft)        *  217.57  *  256.68  *          *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)        *    0.08  *    0.13  *          *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    0.13  *    0.45  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *    7.60  * 2821.11  *    5.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    1.87  *  239.93  *    1.74  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.              *   0.051  *   0.030  *          *
* W.S. Elev (ft)         *  747.49  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  734.47  * Flow Area (sq ft)      * 2743.81  * 4171.02  *          *
* E.G. Slope (ft/ft)     *0.000154  * Area (sq ft)           * 2743.81  * 4171.02  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             * 4865.43  *15634.57  *          *
* Top Width (ft)         *  542.73  * Top Width (ft)         *  272.83  *  269.90  *          *
* Vel Total (ft/s)       *    2.96  * Avg. Vel. (ft/s)       *    1.77  *    3.75  *          *
* Max Chl Dpth (ft)      *   24.63  * Hydr. Depth (ft)       *   10.06  *   15.45  *          *
* Conv. Total (cfs)      *1652617.0  * Conv. (cfs)            *392228.6  *1260389.0  *          *
* Length Wtd. (ft)       *  345.91  * Wetted Per. (ft)        *  276.85  *  276.80  *          *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)        *    0.10  *    0.14  *          *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *    0.17  *    0.54  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   18.26  * 3901.20  *   22.95  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    4.74  *  269.23  *   12.51  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.              *   0.051  *   0.030  *          *
* W.S. Elev (ft)         *  751.06  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  736.31  * Flow Area (sq ft)      * 3763.05  * 5152.25  *          *
* E.G. Slope (ft/ft)     *0.000131  * Area (sq ft)           * 3763.05  * 5152.25  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             * 7119.74  *19980.26  *          *
* Top Width (ft)         *  581.95  * Top Width (ft)         *  301.36  *  280.60  *          *
* Vel Total (ft/s)       *    3.04  * Avg. Vel. (ft/s)       *    1.89  *    3.88  *          *
* Max Chl Dpth (ft)      *   28.20  * Hydr. Depth (ft)       *   12.49  *   18.36  *          *
* Conv. Total (cfs)      *2367222.0  * Conv. (cfs)            *621919.0  *1745303.0  *          *
* Length Wtd. (ft)       *  341.45  * Wetted Per. (ft)        *  305.61  *  288.07  *          *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)        *    0.10  *    0.15  *          *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *    0.19  *    0.57  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   42.36  * 4834.13  *  112.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   12.34  *  290.81  *   51.34  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.              *   0.052  *   0.030  *          *
* W.S. Elev (ft)         *  754.37  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  738.00  * Flow Area (sq ft)      * 4808.99  * 6098.82  *          *
* E.G. Slope (ft/ft)     *0.000121  * Area (sq ft)           * 4808.99  * 6098.82  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             * 9659.87  *24840.13  *          *
* Top Width (ft)         *  619.64  * Top Width (ft)         *  329.10  *  290.54  *          *
* Vel Total (ft/s)       *    3.16  * Avg. Vel. (ft/s)       *    2.01  *    4.07  *          *
* Max Chl Dpth (ft)      *   31.51  * Hydr. Depth (ft)       *   14.61  *   20.99  *          *
* Conv. Total (cfs)      *3135233.0  * Conv. (cfs)            *877853.6  *2257379.0  *          *
* Length Wtd. (ft)       *  338.54  * Wetted Per. (ft)        *  333.55  *  298.55  *          *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)        *    0.11  *    0.15  *          *
```

```
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.22  *    0.63  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  100.81  * 5780.04  *  363.97  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   33.64  *  307.77  *  108.37  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.054  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  760.27  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  739.87  * Flow Area (sq ft)      * 6872.40  * 7847.38  *  208.81  *
* E.G. Slope (ft/ft)     *0.000089  * Area (sq ft)           * 6872.40  * 7847.38  *  208.81  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *13556.27  *31840.04  *  103.69  *
* Top Width (ft)         *  748.98  * Top Width (ft)         *  362.60  *  298.00  *   88.37  *
* Vel Total (ft/s)       *    3.05  * Avg. Vel. (ft/s)       *    1.97  *    4.06  *    0.50  *
* Max Chl Dpth (ft)      *   37.41  * Hydr. Depth (ft)       *   18.95  *   26.33  *    2.36  *
* Conv. Total (cfs)      *4825926.0  * Conv. (cfs)            *1437837.0  *3377092.0  * 10997.5  *
* Length Wtd. (ft)       *  335.74  * Wetted Per. (ft)       *  367.74  *  306.41  *   88.51  *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)       *    0.10  *    0.14  *    0.01  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.20  *    0.58  *    0.01  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  405.58  * 7291.85  * 1411.32  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  155.54  *  326.70  *  374.12  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.054  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  763.26  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  741.10  * Flow Area (sq ft)      * 7967.49  * 8737.96  *  555.39  *
* E.G. Slope (ft/ft)     *0.000086  * Area (sq ft)           * 7967.49  * 8737.96  *  591.06  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *16467.94  *37553.99  *  378.07  *
* Top Width (ft)         *  950.13  * Top Width (ft)         *  370.23  *  298.00  *  281.90  *
* Vel Total (ft/s)       *    3.15  * Avg. Vel. (ft/s)       *    2.07  *    4.30  *    0.68  *
* Max Chl Dpth (ft)      *   40.40  * Hydr. Depth (ft)       *   21.52  *   29.32  *    2.95  *
* Conv. Total (cfs)      *5851869.0  * Conv. (cfs)            *1771475.0  *4039725.0  * 40668.9  *
* Length Wtd. (ft)       *  341.38  * Wetted Per. (ft)       *  375.93  *  306.41  *  188.35  *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)       *    0.11  *    0.15  *    0.02  *
* Alpha                  *    1.41  * Stream Power (lb/ft s) *    0.24  *    0.66  *    0.01  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  967.62  * 8148.96  * 2609.60  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  285.43  *  331.40  *  604.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.055  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  764.71  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  742.05  * Flow Area (sq ft)      * 8505.21  * 9168.89  *  941.75  *
* E.G. Slope (ft/ft)     *0.000098  * Area (sq ft)           * 8505.21  * 9168.89  * 1213.60  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *19204.25  *43241.32  *  554.44  *
* Top Width (ft)         * 1239.37  * Top Width (ft)         *  373.50  *  298.00  *  567.87  *
* Vel Total (ft/s)       *    3.38  * Avg. Vel. (ft/s)       *    2.26  *    4.72  *    0.59  *
* Max Chl Dpth (ft)      *   41.85  * Hydr. Depth (ft)       *   22.77  *   30.77  *    2.84  *
* Conv. Total (cfs)      *6377306.0  * Conv. (cfs)            *1943990.0  *4377193.0  * 56124.0  *
* Length Wtd. (ft)       *  345.80  * Wetted Per. (ft)       *  379.51  *  306.41  *  331.63  *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)       *    0.14  *    0.18  *    0.02  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.31  *    0.86  *    0.01  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1462.41  * 8674.97  * 3730.56  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  333.77  *  332.13  *  859.63  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  767.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.055  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  766.86  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  743.35  * Flow Area (sq ft)      * 9313.13  * 9809.30  * 1695.13  *
* E.G. Slope (ft/ft)     *0.000110  * Area (sq ft)           * 9313.13  * 9809.30  * 2632.90  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *23167.15  *51278.52  * 1454.32  *
* Top Width (ft)         * 1434.36  * Top Width (ft)         *  378.38  *  298.00  *  757.98  *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)       *    2.49  *    5.23  *    0.86  *
* Max Chl Dpth (ft)      *   44.00  * Hydr. Depth (ft)       *   24.61  *   32.92  *    4.58  *
* Conv. Total (cfs)      *7250553.0  * Conv. (cfs)           *2213105.0  *4898520.0  *138928.1  *
* Length Wtd. (ft)       *  354.23  * Wetted Per. (ft)       *  384.83  *  306.41  *  370.13  *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)       *    0.17  *    0.22  *    0.03  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.41  *    1.14  *    0.03  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 2465.08  * 9556.22  * 6240.07  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  395.13  *  333.51  * 1116.02  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  756.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.053  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  756.17  * Reach Len. (ft)        *  226.13  *  370.25  *  736.27  *
* Crit W.S. (ft)         *  738.81  * Flow Area (sq ft)      * 5414.83  * 6627.04  *    0.02  *
* E.G. Slope (ft/ft)     *0.000116  * Area (sq ft)           * 5414.83  * 6627.04  *    0.02  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *11133.91  *27566.09  *    0.00  *
* Top Width (ft)         *  640.91  * Top Width (ft)         *  343.56  *  295.94  *    1.41  *
* Vel Total (ft/s)       *    3.21  * Avg. Vel. (ft/s)       *    2.06  *    4.16  *    0.02  *
* Max Chl Dpth (ft)      *   33.31  * Hydr. Depth (ft)       *   15.76  *   22.39  *    0.02  *
* Conv. Total (cfs)      *3594113.0  * Conv. (cfs)           *1034018.0  *2560094.0  *     0.0  *
* Length Wtd. (ft)       *  336.98  * Wetted Per. (ft)       *  348.12  *  304.25  *    1.41  *
* Min Ch El (ft)         *  722.86  * Shear (lb/sq ft)       *    0.11  *    0.16  *    0.00  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.23  *    0.66  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  157.12  * 6283.33  *  576.32  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   54.84  *  315.04  *  155.72  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.232

INPUT
Description: COE Riverstation=19106.54.  LOMR cross section from 2003 contours.
              FEMA Sec. N
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0     816   33.56  817.12      39  816.84   42.48     816   47.87     814
   56.25     812   127.1  802.96   155.4  799.75   162.9     798  166.57     796
  170.82     792  189.46     786  194.49     784  219.88     772  270.78     760
  285.31     758  368.84  754.66  410.86     752  415.34  750.87   424.4     750
  450.45     746  458.93     742  465.37     740  484.63     738   491.9     732
   496.8  731.03  512.74  730.34  532.18     728  553.33     728  568.38     736
  580.04     740  604.59     741  633.12  739.79  646.74     738  657.78     736
  672.93     732  684.28  730.16 710.295  726.72 722.295  722.72 766.295  722.72
 778.295  726.72  799.89     728  807.03  730.33  830.17     738  853.86     740
   902.1     754  936.61     756  956.24     756 1110.03  759.61 1214.17  760.92
 1246.11     762 1327.75     760 1348.65     758 1357.56     756  1368.2     750
 1381.72     744 1385.97     744 1408.33  750.97 1449.78     760 1506.64  762.57
 1558.28  763.09 1602.26     762 1611.34     758 1618.16  757.12 1644.52  755.19
 1679.92  755.62 1701.61  755.17  1711.3  755.44 1734.61     758 1745.46     758
 1754.15  757.12 1776.73  757.47 1826.26     760 1849.44     762 1862.27  762.48
 1936.77  762.75 1956.87     762 1980.24     758 2004.92     756 2063.29  754.88
 2142.54     754 2153.16  753.01 2185.76     752 2190.95     750 2196.51     750
 2200.81     752 2210.99  753.77 2228.26     756 2254.58     756 2276.86  754.85
```

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 2305.85   754.9 2396.89     758 2430.48     760 2439.51     762 2455.87     764
 2466.55     766  2483.8     772 2497.61     784 2510.19     794

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .065  368.84     .05  633.12     .03   902.1     .05 1214.17      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        633.12   902.1            424.3     496  571.65              .1       .3
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0     581     740    1250 2510.19     760

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  743.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  742.76  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  451.56  * 2799.70  *          *
* E.G. Slope (ft/ft)     *0.000292  * Area (sq ft)           *  451.56  * 2799.70  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *  429.42  *12370.58  *          *
* Top Width (ft)         *  406.06  * Top Width (ft)         *  175.80  *  230.25  *          *
* Vel Total (ft/s)       *    3.94  * Avg. Vel. (ft/s)       *    0.95  *    4.42  *          *
* Max Chl Dpth (ft)      *   20.04  * Hydr. Depth (ft)       *    2.57  *   12.16  *          *
* Conv. Total (cfs)      *748745.3  * Conv. (cfs)            * 25119.1  *723626.2  *          *
* Length Wtd. (ft)       *  494.80  * Wetted Per. (ft)       *  176.32  *  234.87  *          *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.05  *    0.22  *          *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.04  *    0.96  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *    2.20  * 2796.49  *    5.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.86  *  237.88  *    1.74  *
*************************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  747.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  747.27  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1269.54  * 3873.19  *          *
* E.G. Slope (ft/ft)     *0.000241  * Area (sq ft)           * 1269.54  * 3873.19  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              * 2059.46  *18440.54  *          *
* Top Width (ft)         *  436.74  * Top Width (ft)         *  190.95  *  245.79  *          *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *    1.62  *    4.76  *          *
* Max Chl Dpth (ft)      *   24.55  * Hydr. Depth (ft)       *    6.65  *   15.76  *          *
* Conv. Total (cfs)      *1321698.0  * Conv. (cfs)            *132779.4  *1188919.0  *          *
* Length Wtd. (ft)       *  492.41  * Wetted Per. (ft)       *  192.29  *  251.05  *          *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.10  *    0.23  *          *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *    0.16  *    1.10  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    7.84  * 3867.01  *   22.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.54  *  267.04  *   12.51  *
*************************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  751.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  750.85  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1995.36  * 4774.13  *          *
* E.G. Slope (ft/ft)     *0.000206  * Area (sq ft)           * 1995.36  * 4774.13  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              * 3711.13  *23388.87  *          *
* Top Width (ft)         *  475.65  * Top Width (ft)         *  217.54  *  258.11  *          *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *    1.86  *    4.90  *          *
* Max Chl Dpth (ft)      *   28.13  * Hydr. Depth (ft)       *    9.17  *   18.50  *          *
* Conv. Total (cfs)      *1888240.0  * Conv. (cfs)            *258579.5  *1629661.0  *          *
* Length Wtd. (ft)       *  491.59  * Wetted Per. (ft)       *  219.13  *  263.88  *          *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.12  *    0.23  *          *
* Alpha                  *    1.32  * Stream Power (lb/ft s) *    0.22  *    1.14  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   27.41  * 4791.94  *  112.57  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   10.99  *  288.52  *   51.34  *
*************************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  754.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
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* W.S. Elev (ft)         *  754.16  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2765.22  * 5647.40  *    0.21  *
* E.G. Slope (ft/ft)     *0.000191  * Area (sq ft)           * 2765.22  * 5647.40  *    0.21  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             * 5519.66  *28980.33  *    0.02  *
* Top Width (ft)         *  528.02  * Top Width (ft)         *  256.34  *  268.98  *    2.71  *
* Vel Total (ft/s)       *    4.10  * Avg. Vel. (ft/s)       *    2.00  *    5.13  *    0.08  *
* Max Chl Dpth (ft)      *   31.44  * Hydr. Depth (ft)       *   10.79  *   21.00  *    0.08  *
* Conv. Total (cfs)      *2496028.0  * Conv. (cfs)           *399339.7  *2096687.0  *     1.2  *
* Length Wtd. (ft)       *  491.86  * Wetted Per. (ft)       *  258.14  *  275.19  *    2.71  *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.13  *    0.24  *    0.00  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    0.26  *    1.26  *    0.00  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   81.15  * 5730.12  *  363.97  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   32.12  *  305.39  *  108.35  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  760.12  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 4670.45  * 7250.17  *  716.43  *
* E.G. Slope (ft/ft)     *0.000126  * Area (sq ft)           * 4670.45  * 7250.17  *  716.43  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 9480.23  *35633.03  *  386.74  *
* Top Width (ft)         * 1693.45  * Top Width (ft)         *  362.83  *  268.98  * 1061.64  *
* Vel Total (ft/s)       *    3.60  * Avg. Vel. (ft/s)       *    2.03  *    4.91  *    0.54  *
* Max Chl Dpth (ft)      *   37.40  * Hydr. Depth (ft)       *   12.87  *   26.95  *    0.67  *
* Conv. Total (cfs)      *4059985.0  * Conv. (cfs)           *845925.1  *3179551.0  * 34509.0  *
* Length Wtd. (ft)       *  492.22  * Wetted Per. (ft)       *  364.86  *  275.19  * 1061.80  *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.10  *    0.21  *    0.01  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.20  *    1.02  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  375.62  * 7227.69  * 1403.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  153.66  *  324.29  *  364.40  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  763.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.051  *   0.030  *   0.069  *
* W.S. Elev (ft)         *  763.14  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5787.45  * 8063.86  * 4615.94  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           * 5787.45  * 8063.86  * 4615.94  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *12090.73  *40024.70  * 2284.58  *
* Top Width (ft)         * 2191.38  * Top Width (ft)         *  375.66  *  268.98  * 1546.74  *
* Vel Total (ft/s)       *    2.95  * Avg. Vel. (ft/s)       *    2.09  *    4.96  *    0.49  *
* Max Chl Dpth (ft)      *   40.42  * Hydr. Depth (ft)       *   15.41  *   29.98  *    2.98  *
* Conv. Total (cfs)      *5159739.0  * Conv. (cfs)           *1146783.0  *3796268.0  *216687.7  *
* Length Wtd. (ft)       *  494.02  * Wetted Per. (ft)       *  378.05  *  275.19  * 1547.96  *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.11  *    0.20  *    0.02  *
* Alpha                  *    2.20  * Stream Power (lb/ft s) *    0.22  *    1.01  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  931.92  * 8077.56  * 2565.60  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  283.49  *  328.99  *  588.80  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  764.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.051  *   0.030  *   0.073  *
* W.S. Elev (ft)         *  764.60  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 6340.28  * 8456.46  * 6881.76  *
* E.G. Slope (ft/ft)     *0.000118  * Area (sq ft)           * 6340.28  * 8456.46  * 6881.76  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *14197.43  *44622.62  * 4179.95  *
* Top Width (ft)         * 2207.81  * Top Width (ft)         *  381.85  *  268.98  * 1556.98  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    2.24  *    5.28  *    0.61  *
* Max Chl Dpth (ft)      *   41.88  * Hydr. Depth (ft)       *   16.60  *   31.44  *    4.42  *
* Conv. Total (cfs)      *5801654.0  * Conv. (cfs)           *1307438.0  *4109286.0  *384930.4  *
* Length Wtd. (ft)       *  495.49  * Wetted Per. (ft)       *  384.41  *  275.19  * 1558.30  *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.12  *    0.23  *    0.03  *
* Alpha                  *    2.47  * Stream Power (lb/ft s) *    0.27  *    1.19  *    0.02  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1423.87  * 8600.07  * 3662.14  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  331.81  *  329.72  *  841.67  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
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```
* E.G. Elev (ft)         *  767.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.051  *   0.030  *   0.076  *
* W.S. Elev (ft)         *  766.78  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 7182.20  * 9042.42  *10285.50  *
* E.G. Slope (ft/ft)     *0.000122  * Area (sq ft)           * 7182.20  * 9042.42  *10285.50  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *17297.14  *50769.66  * 7833.21  *
* Top Width (ft)         * 2226.76  * Top Width (ft)         *  391.09  *  268.98  * 1566.69  *
* Vel Total (ft/s)       *    2.86  * Avg. Vel. (ft/s)       *    2.41  *    5.61  *    0.76  *
* Max Chl Dpth (ft)      *   44.06  * Hydr. Depth (ft)       *   18.36  *   33.62  *    6.57  *
* Conv. Total (cfs)      *6869066.0  * Conv. (cfs)           *1565417.0  *4594732.0  *708917.1  *
* Length Wtd. (ft)       *  497.72  * Wetted Per. (ft)       *  393.90  *  275.19  * 1568.27  *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.14  *    0.25  *    0.05  *
* Alpha                  *    2.74  * Stream Power (lb/ft s) *    0.33  *    1.41  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 2422.27  * 9476.10  * 6130.90  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  393.13  *  331.10  * 1096.37  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  756.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  755.96  * Reach Len. (ft)        *  424.30  *  496.00  *  571.65  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3262.01  * 6133.42  *   33.28  *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           * 3262.01  * 6133.42  *   33.28  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             * 6768.23  *31918.82  *   12.95  *
* Top Width (ft)         *  599.76  * Top Width (ft)         *  296.89  *  268.98  *   33.89  *
* Vel Total (ft/s)       *    4.10  * Avg. Vel. (ft/s)       *    2.07  *    5.20  *    0.39  *
* Max Chl Dpth (ft)      *   33.24  * Hydr. Depth (ft)       *   10.99  *   22.80  *    0.98  *
* Conv. Total (cfs)      *2917119.0  * Conv. (cfs)           *510173.8  *2405969.0  *   975.9  *
* Length Wtd. (ft)       *  491.93  * Wetted Per. (ft)       *  298.73  *  275.19  *   33.94  *
* Min Ch El (ft)         *  722.72  * Shear (lb/sq ft)       *    0.12  *    0.24  *    0.01  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.25  *    1.27  *    0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  134.60  * 6229.10  *  576.03  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   53.18  *  312.64  *  155.42  *
*****************************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 9.138

INPUT
Description: COE Riverstation=19602.58  LOMR cross section from 2003 contours.
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     820   29.58     812   39.59     810   78.22  803.42   126.9     796
  135.53     794  153.98     786  179.23  778.76  201.43     772  236.06     764
  249.09     762  261.09  761.42  308.52     762  345.87     764  369.61  764.54
  443.23     762  454.05     762  482.26     760  507.38     756  508.71     756
  519.51     754  528.66     752  540.33     750  557.14     748  561.84     748
   615.5     746     617     746  624.33     744  637.37     740  651.35     738
  669.37     736  680.88     732  686.84  730.29  686.94  730.27  698.28     728
 722.265  726.58 734.265  722.58 778.265  722.58 790.265  726.58  825.51  730.31
  825.58  730.33  837.27     734  846.61     736  872.35     738  882.53     740
  889.86     742  895.98     744  900.84  744.85   911.1     746 1002.71  747.71
 1089.23     748  1188.1     750 1214.81     752  1224.1     754 1263.51  757.44
 1277.36     758  1286.3  758.92 1295.18  759.47 1306.66  759.72 1333.32  759.59
 1343.86     760 1466.79     760 1472.05  759.73 1493.02     760 1570.12     760
 1599.71  759.77 1637.19  758.91 1682.24  758.83 1715.51     760 1731.41     760
 1751.64  758.91 1760.02     758 1771.31     756 1782.75  753.19 1800.71  750.92
 1801.34  750.66 1804.91  750.55 1806.08  750.28 1811.97  750.19 1812.68     750
 1825.96     750 1840.26  749.13 1853.46  748.64 1869.88  748.51 1874.44  748.78
 1884.33     750 1889.05     750 1898.81  751.27 1906.64     752 1915.82     752
 1926.55  753.12 1957.95  754.66 2015.22     758 2026.39  759.55 2028.25     760
 2043.58     762 2049.64     764 2066.12     772 2081.02     782 2083.66     784
 2091.14     788

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0    .065  261.09     .05     617     .03   911.1     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           617   911.1           254.15     232  252.82             .1       .3
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```
Blocked Obstructions      num=       8
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
     230     370   764.5     980    1140     748    1140    1200     750
    1200    1220     752    1220    1235     754    1235    1253     756
    1253    1401     775    1401    2050     762

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.64  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 3059.02  *          *
* E.G. Slope (ft/ft)     *0.000277  * Area (sq ft)           *          * 3059.02  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  263.02  * Top Width (ft)          *          *  263.02  *          *
* Vel Total (ft/s)       *    4.18  * Avg. Vel. (ft/s)        *          *    4.18  *          *
* Max Chl Dpth (ft)      *   20.06  * Hydr. Depth (ft)        *          *   11.63  *          *
* Conv. Total (cfs)      *768547.9  * Conv. (cfs)             *          *768547.9  *          *
* Length Wtd. (ft)       *  232.00  * Wetted Per. (ft)        *          *  267.77  *          *
* Min Ch El (ft)         *  722.58  * Shear (lb/sq ft)        *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.83  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *          * 2763.14  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  235.08  *    1.74  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  747.12  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   18.38  * 4316.35  *   33.37  *
* E.G. Slope (ft/ft)     *0.000262  * Area (sq ft)           *   18.38  * 4316.35  *   33.37  *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *    6.18  *20482.94  *   10.88  *
* Top Width (ft)         *  385.34  * Top Width (ft)          *   31.44  *  294.10  *   59.79  *
* Vel Total (ft/s)       *    4.69  * Avg. Vel. (ft/s)        *    0.34  *    4.75  *    0.33  *
* Max Chl Dpth (ft)      *   24.54  * Hydr. Depth (ft)        *    0.58  *   14.68  *    0.56  *
* Conv. Total (cfs)      *1266668.0  * Conv. (cfs)            *   381.8  *1265615.0  *   672.0  *
* Length Wtd. (ft)       *  232.01  * Wetted Per. (ft)        *   31.47  *  299.67  *   59.80  *
* Min Ch El (ft)         *  722.58  * Shear (lb/sq ft)        *    0.01  *    0.24  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s)  *    0.00  *    1.12  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *    1.57  * 3820.39  *   22.73  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    2.46  *  263.96  *   12.12  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  750.71  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  249.04  * 5373.11  *  725.06  *
* E.G. Slope (ft/ft)     *0.000208  * Area (sq ft)           *  249.04  * 5373.11  *  725.06  *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *  225.69  *26299.35  *  574.96  *
* Top Width (ft)         *  661.38  * Top Width (ft)          *   80.81  *  294.10  *  286.47  *
* Vel Total (ft/s)       *    4.27  * Avg. Vel. (ft/s)        *    0.91  *    4.89  *    0.79  *
* Max Chl Dpth (ft)      *   28.13  * Hydr. Depth (ft)        *    3.08  *   18.27  *    2.53  *
* Conv. Total (cfs)      *1878629.0  * Conv. (cfs)            * 15645.6  *1823126.0  * 39857.2  *
* Length Wtd. (ft)       *  232.31  * Wetted Per. (ft)        *   81.02  *  299.67  *  288.21  *
* Min Ch El (ft)         *  722.58  * Shear (lb/sq ft)        *    0.04  *    0.23  *    0.03  *
* Alpha                  *    1.28  * Stream Power (lb/ft s)  *    0.04  *    1.14  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)    *   16.48  * 4734.17  *  107.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    9.54  *  285.37  *   49.46  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  754.06  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  550.24  * 6359.59  * 1732.53  *
* E.G. Slope (ft/ft)     *0.000173  * Area (sq ft)           *  550.24  * 6359.59  * 1732.53  *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *  677.01  *31726.37  * 2096.62  *
* Top Width (ft)         *  705.66  * Top Width (ft)          *   97.83  *  294.10  *  313.73  *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)        *    1.23  *    4.99  *    1.21  *
* Max Chl Dpth (ft)      *   31.48  * Hydr. Depth (ft)        *    5.62  *   21.62  *    5.52  *
* Conv. Total (cfs)      *2625558.0  * Conv. (cfs)            * 51522.7  *2414476.0  *159559.2  *
```

```
* Length Wtd. (ft)       *  232.85  * Wetted Per. (ft)       *   98.38  *  299.67  *  317.58  *
* Min Ch El (ft)         *  722.58  * Shear (lb/sq ft)       *    0.06  *    0.23  *    0.06  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.07  *    1.14  *    0.07  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   65.00  * 5661.76  *  352.60  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   30.40  *  302.19  *  106.27  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  760.07  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1247.77  * 8125.61  * 3744.65  *
* E.G. Slope (ft/ft)     *0.000110  * Area (sq ft)           * 1247.77  * 8125.61  * 3744.65  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1699.79  *38132.38  * 5667.83  *
* Top Width (ft)         *  771.70  * Top Width (ft)         *  135.70  *  294.10  *  341.90  *
* Vel Total (ft/s)       *    3.47  * Avg. Vel. (ft/s)       *    1.36  *    4.69  *    1.51  *
* Max Chl Dpth (ft)      *   37.49  * Hydr. Depth (ft)       *    9.19  *   27.63  *   10.95  *
* Conv. Total (cfs)      *4334295.0  * Conv. (cfs)           *161920.8  *3632461.0  *539912.9  *
* Length Wtd. (ft)       *  233.71  * Wetted Per. (ft)       *  136.75  *  299.67  *  350.41  *
* Min Ch El (ft)         *  722.58  * Shear (lb/sq ft)       *    0.06  *    0.19  *    0.07  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.09  *    0.88  *    0.11  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  346.80  * 7140.15  * 1374.23  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  151.23  *  321.08  *  355.19  *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  763.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  763.08  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1741.11  * 9011.79  * 5471.60  *
* E.G. Slope (ft/ft)     *0.000103  * Area (sq ft)           * 1741.11  * 9011.79  * 5471.60  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2178.21  *43827.87  * 8393.92  *
* Top Width (ft)         * 1486.98  * Top Width (ft)         *  205.12  *  294.10  *  987.76  *
* Vel Total (ft/s)       *    3.35  * Avg. Vel. (ft/s)       *    1.25  *    4.86  *    1.53  *
* Max Chl Dpth (ft)      *   40.50  * Hydr. Depth (ft)       *    8.49  *   30.64  *    5.54  *
* Conv. Total (cfs)      *5357651.0  * Conv. (cfs)           *214523.2  *4316442.0  *826685.9  *
* Length Wtd. (ft)       *  234.13  * Wetted Per. (ft)       *  206.25  *  299.67  * 1000.54  *
* Min Ch El (ft)         *  722.58  * Shear (lb/sq ft)       *    0.05  *    0.19  *    0.04  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *    0.07  *    0.94  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  895.25  * 7980.34  * 2499.41  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  280.66  *  325.78  *  572.17  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  764.53  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2070.78  * 9436.33  * 6900.50  *
* E.G. Slope (ft/ft)     *0.000112  * Area (sq ft)           * 2070.78  * 9436.33  * 6900.50  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2674.62  *49362.23  *10963.15  *
* Top Width (ft)         * 1667.85  * Top Width (ft)         *  382.13  *  294.10  *  991.62  *
* Vel Total (ft/s)       *    3.42  * Avg. Vel. (ft/s)       *    1.29  *    5.23  *    1.59  *
* Max Chl Dpth (ft)      *   41.95  * Hydr. Depth (ft)       *    5.42  *   32.09  *    6.96  *
* Conv. Total (cfs)      *5948291.0  * Conv. (cfs)           *252530.7  *4660649.0  *1035111.0  *
* Length Wtd. (ft)       *  234.56  * Wetted Per. (ft)       *  383.29  *  299.67  * 1007.56  *
* Min Ch El (ft)         *  722.58  * Shear (lb/sq ft)       *    0.04  *    0.22  *    0.05  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.05  *    1.15  *    0.08  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1382.91  * 8498.20  * 3571.71  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  328.09  *  326.52  *  824.95  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  767.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  766.69  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2909.37  *10072.15  * 9049.12  *
* E.G. Slope (ft/ft)     *0.000119  * Area (sq ft)           * 2909.37  *10072.15  * 9049.12  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3694.57  *56684.05  *15521.37  *
```

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* Top Width (ft)          * 1682.75  * Top Width (ft)          *  392.57  *  294.10  *  996.08  *
* Vel Total (ft/s)        *    3.45  * Avg. Vel. (ft/s)        *    1.27  *    5.63  *    1.72  *
* Max Chl Dpth (ft)       *   44.11  * Hydr. Depth (ft)        *    7.41  *   34.25  *    9.08  *
* Conv. Total (cfs)       *6957063.0  * Conv. (cfs)            *338647.9  *5195712.0  *1422703.0  *
* Length Wtd. (ft)        *  235.39  * Wetted Per. (ft)        *  393.98  *  299.67  * 1016.83  *
* Min Ch El (ft)          *  722.58  * Shear (lb/sq ft)        *    0.05  *    0.25  *    0.07  *
* Alpha                   *    2.05  * Stream Power (lb/ft s) *    0.07  *    1.41  *    0.11  *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)    * 2373.12  * 9367.28  * 6004.03  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *  389.32  *  327.90  * 1079.56  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  756.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.              *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)          *  755.89  * Reach Len. (ft)        *  254.15  *  232.00  *  252.82  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  737.68  * 6896.07  * 2318.86  *
* E.G. Slope (ft/ft)      *0.000156  * Area (sq ft)           *  737.68  * 6896.07  * 2318.86  *
* Q Total (cfs)           *38700.00  * Flow (cfs)              *  984.22  *34547.02  * 3168.76  *
* Top Width (ft)          *  725.68  * Top Width (ft)          *  107.68  *  294.10  *  323.90  *
* Vel Total (ft/s)        *    3.89  * Avg. Vel. (ft/s)        *    1.33  *    5.01  *    1.37  *
* Max Chl Dpth (ft)       *   33.31  * Hydr. Depth (ft)        *    6.85  *   23.45  *    7.16  *
* Conv. Total (cfs)       *3095599.0  * Conv. (cfs)            * 78727.2  *2763404.0  *253467.7  *
* Length Wtd. (ft)        *  233.13  * Wetted Per. (ft)        *  108.40  *  299.67  *  328.73  *
* Min Ch El (ft)          *  722.58  * Shear (lb/sq ft)        *    0.07  *    0.22  *    0.07  *
* Alpha                   *    1.49  * Stream Power (lb/ft s) *    0.09  *    1.12  *    0.09  *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)    *  115.12  * 6154.92  *  560.60  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   51.20  *  309.43  *  153.07  *
*****************************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.094

INPUT
Description: u/s Face B-21C.  COE Riverstation=19834.69
LOMR cross section
             from 2003 contours.
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     764   27.84     764   32.54  763.19   99.83  762.49  103.31     762
  195.65     762  200.82   761.6  220.15  759.42  224.61  759.06  254.37     758
  259.88     758  260.77  757.76  293.09  756.55  303.47     756  327.14  753.78
  339.39  753.15  393.87  751.78  416.88   751.7  426.12     752  479.85   755.1
   499.6  756.54     506  756.59  557.25  739.51  587.25  736.51  616.25  726.84
  639.25  726.51  651.25  722.51  673.25  722.51  695.25  722.51  707.25  726.51
  730.25  726.84  759.25  736.51  789.25  739.51     820  749.76  874.86     754
  884.52     760  887.54  761.23  889.07  761.54  889.96  761.57  896.27  761.01
  913.55  761.15  922.98     760  935.02     760  947.36  761.17 1013.01  760.82
 1050.04  761.02 1062.91  760.62 1078.97  760.02 1082.19  760.56 1093.85     764
    1102     764 1112.34     762 1237.78     762 1316.64  760.89 1357.23     762
 1376.76     762 1379.06  764.24 1380.81  766.15 1381.66     768 1394.06  768.47
 1442.62  768.22 1448.71     768 1454.26     762 1526.44     760 1562.84     758
 1580.12     756 1593.87     752 1629.52     750 1677.08  749.74 1717.13     750
 1764.22     750 1799.15  750.42 1813.34  750.27 1868.84  750.18 1878.17  750.39
 1887.24  750.33 1891.57   750.6 1897.64  750.63 1908.45  751.42 1914.21     752
 1951.58     760 1956.34     762 1991.01  779.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .05     506     .03  889.96     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           506  889.96            19.98      24   23.47             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1192    1210     775       F
    1867 1991.01     775       F
Blocked Obstructions      num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
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************************************************************************
       0     125     770     125     506     763    1210    1380     775
    1450    1980     762

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.84  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.55  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  731.84  * Flow Area (sq ft)      *          * 2976.53  *          *
* E.G. Slope (ft/ft)     *0.000286  * Area (sq ft)           *          * 2976.53  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  250.26  * Top Width (ft)         *          *  250.26  *          *
* Vel Total (ft/s)       *    4.30  * Avg. Vel. (ft/s)       *          *    4.30  *          *
* Max Chl Dpth (ft)      *   20.04  * Hydr. Depth (ft)       *          *   11.89  *          *
* Conv. Total (cfs)      *756679.3  * Conv. (cfs)            *          *756679.3  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  255.99  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.89  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          * 2747.06  *    5.47  *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *  233.71  *    1.74  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.40  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  747.02  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  734.33  * Flow Area (sq ft)      *          * 4154.90  *          *
* E.G. Slope (ft/ft)     *0.000278  * Area (sq ft)           *          * 4154.90  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  277.08  * Top Width (ft)         *          *  277.08  *          *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *          *    4.93  *          *
* Max Chl Dpth (ft)      *   24.51  * Hydr. Depth (ft)       *          *   15.00  *          *
* Conv. Total (cfs)      *1230277.0  * Conv. (cfs)            *          *1230277.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  284.26  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.25  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.51  * 3797.83  *   22.64  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.36  *  262.44  *   11.95  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.01  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  750.59  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.12  * Flow Area (sq ft)      *          * 5183.93  *          *
* E.G. Slope (ft/ft)     *0.000266  * Area (sq ft)           *          * 5183.93  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  306.67  * Top Width (ft)         *          *  306.67  *          *
* Vel Total (ft/s)       *    5.23  * Avg. Vel. (ft/s)       *          *    5.23  *          *
* Max Chl Dpth (ft)      *   28.08  * Hydr. Depth (ft)       *          *   16.90  *          *
* Conv. Total (cfs)      *1661569.0  * Conv. (cfs)            *          *1661569.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  314.91  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.43  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   15.75  * 4706.06  *  105.70  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    9.30  *  283.77  *   48.63  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

```
CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  754.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  753.89  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  738.29  * Flow Area (sq ft)      *          * 6284.66  *          *
* E.G. Slope (ft/ft)     *0.000280  * Area (sq ft)           *          * 6284.66  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  359.36  * Top Width (ft)         *          *  359.36  *          *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *          *    5.49  *          *
* Max Chl Dpth (ft)      *   31.38  * Hydr. Depth (ft)       *          *   17.49  *          *
* Conv. Total (cfs)      *2063374.0  * Conv. (cfs)            *          *2063374.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  368.25  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.64  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   63.40  * 5628.09  *  347.57  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   30.11  *  300.45  *  105.36  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  760.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  759.87  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  740.55  * Flow Area (sq ft)      *          * 8505.73  *          *
* E.G. Slope (ft/ft)     *0.000193  * Area (sq ft)           *          * 8505.73  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  378.31  * Top Width (ft)         *          *  378.31  *          *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *          *    5.35  *          *
* Max Chl Dpth (ft)      *   37.36  * Hydr. Depth (ft)       *          *   22.48  *          *
* Conv. Total (cfs)      *3274118.0  * Conv. (cfs)            *          *3274118.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  392.60  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.40  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  343.16  * 7095.86  * 1363.37  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  150.83  *  319.29  *  354.20  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  763.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.030  *   0.050  *
* W.S. Elev (ft)         *  762.85  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  741.97  * Flow Area (sq ft)      *          * 9645.37  *  823.07  *
* E.G. Slope (ft/ft)     *0.000184  * Area (sq ft)           *          * 9645.37  *  915.17  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *53990.47  *  409.53  *
* Top Width (ft)         * 1190.54  * Top Width (ft)         *          *  383.96  *  806.58  *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)       *          *    5.60  *    0.50  *
* Max Chl Dpth (ft)      *   40.34  * Hydr. Depth (ft)       *          *   25.12  *    1.18  *
* Conv. Total (cfs)      *4007413.0  * Conv. (cfs)            *          *3977245.0  * 30168.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  401.55  *  698.59  *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *          *    0.28  *    0.01  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *          *    1.55  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  890.18  * 7930.65  * 2480.87  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  280.07  *  323.98  *  566.96  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  764.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  764.26  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  743.27  * Flow Area (sq ft)      *  481.04  *10187.17  * 1818.71  *
* E.G. Slope (ft/ft)     *0.000198  * Area (sq ft)           *  481.04  *10187.17  * 2066.52  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  234.67  *61338.87  * 1426.47  *
* Top Width (ft)         * 1593.55  * Top Width (ft)         *  381.00  *  383.96  *  828.59  *
* Vel Total (ft/s)       *    5.05  * Avg. Vel. (ft/s)       *    0.49  *    6.02  *    0.78  *
* Max Chl Dpth (ft)      *   41.75  * Hydr. Depth (ft)       *    1.26  *   26.53  *    2.54  *
* Conv. Total (cfs)      *4473398.0  * Conv. (cfs)           * 16663.0  *4355447.0  *101288.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  382.26  *  401.69  *  718.77  *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *    0.02  *    0.31  *    0.03  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.01  *    1.89  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1375.46  * 8445.94  * 3545.68  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  325.87  *  324.71  *  819.67  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  767.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  766.41  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  745.07  * Flow Area (sq ft)      * 1299.15  *11011.64  * 3360.75  *
* E.G. Slope (ft/ft)     *0.000203  * Area (sq ft)           * 1299.15  *11011.64  * 3852.92  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1239.36  *70680.13  * 3980.51  *
* Top Width (ft)         * 1600.63  * Top Width (ft)         *  381.00  *  383.96  *  835.67  *
* Vel Total (ft/s)       *    4.84  * Avg. Vel. (ft/s)       *    0.95  *    6.42  *    1.18  *
* Max Chl Dpth (ft)      *   43.90  * Hydr. Depth (ft)       *    3.41  *   28.68  *    4.67  *
* Conv. Total (cfs)      *5324857.0  * Conv. (cfs)           * 86948.6  *4958650.0  *279257.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  384.41  *  401.69  *  724.32  *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *    0.04  *    0.35  *    0.06  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    0.04  *    2.23  *    0.07  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2360.84  * 9311.13  * 5966.59  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  387.06  *  326.09  * 1074.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  756.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *         *   0.030  *         *
* W.S. Elev (ft)         *  755.70  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  739.33  * Flow Area (sq ft)      *         * 6943.10  *         *
* E.G. Slope (ft/ft)     *0.000262  * Area (sq ft)           *         * 6943.10  *         *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *         *38700.00  *         *
* Top Width (ft)         *  368.91  * Top Width (ft)         *         *  368.91  *         *
* Vel Total (ft/s)       *    5.57  * Avg. Vel. (ft/s)       *         *    5.57  *         *
* Max Chl Dpth (ft)      *   33.19  * Hydr. Depth (ft)       *         *   18.82  *         *
* Conv. Total (cfs)      *2391568.0  * Conv. (cfs)           *         *2391568.0  *         *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *         *  378.59  *         *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *         *    0.30  *         *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    1.67  *         *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  112.97  * 6118.07  *  553.87  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   50.89  *  307.67  *  152.13  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE
```

```
RIVER: Blue River
REACH: Main               RS: 9.092

INPUT
Description: B-21C  Bridge expanded on Left bank.
COE Riverstation=19846.64
Distance from Upstream XS =       1
Deck/Roadway Width        =      18
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
       0   763.4             193   763.4           514.7     763     745
  514.75     763  755.85     753     763  755.85  753.01     763  758.83
     888  762.33  758.83  888.01  762.33           961.8  761.88
    1060     762

Upstream Bridge Cross Section Data
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************************
       0     764   27.84     764   32.54  763.19   99.83  762.49  103.31     762
  195.65     762  200.82   761.6  220.15  759.42  224.61  759.06  254.37     758
  259.88     758  260.77  757.76  293.09  756.55  303.47     756  327.14  753.78
  339.39  753.15  393.87  751.78  416.88   751.7  426.12     752  479.85   755.1
   499.6  756.54     506  756.59  557.25  739.51  587.25  736.51  616.25  726.84
  639.25  726.51  651.25  722.51  673.25  722.51  695.25  722.51  707.25  726.51
  730.25  726.84  759.25  736.51  789.25  739.51     820  749.76  874.86     754
  884.52     760  887.54  761.23  889.07  761.54  889.96  761.57  896.27  761.01
  913.55  761.15  922.98     760  935.02     760  947.36  761.17 1013.01  760.82
 1050.04  761.02 1062.91  760.62 1078.97  760.02 1082.19  760.56 1093.85     764
    1102     764 1112.34     762 1237.78     762 1316.64  760.89 1357.23     762
 1376.76     762 1379.06  764.24 1380.81  766.15 1381.66     768 1394.06  768.47
 1442.62  768.22 1448.71     768 1454.26     762 1526.44     760 1562.84     758
 1580.12     756 1593.87     752 1629.52     750 1677.08  749.74 1717.13     750
 1764.22     750 1799.15  750.42 1813.34  750.27 1868.84  750.18 1878.17  750.39
 1887.24  750.33 1891.57   750.6 1897.64  750.63 1908.45  751.42 1914.21     752
 1951.58     760 1956.34     762 1991.01  779.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .05     506     .03  889.96     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
           506  889.96            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1192    1210     775        F
    1867 1991.01     775        F
Blocked Obstructions      num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
       0     125     770     125     506     763    1210    1380     775
    1450    1980     762

Downstream  Deck/Roadway Coordinates
    num=       10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
       0   763.4             193   763.4           514.7     763     745
  514.75     763  755.85     753     763  755.85  753.01     763  758.83
     888  762.33  758.83  888.01  762.33           961.8  761.88
    1060     762

Downstream Bridge Cross Section Data
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************************
       0     764   27.52     764   31.23  763.35   95.52  763.03  102.74     762
  169.16     762  181.21  762.77  197.41  762.73  206.61  762.49  212.99     762
  233.97     762  242.38  761.76  277.79   761.6  300.35  761.08  312.58  761.06
  355.41     762     490  761.92     506  756.59  557.25  739.51  587.25  736.51
```

```
  616.25  726.84  639.25  726.51  651.25  722.51  673.25  722.51  695.25  722.51
  707.25  726.51  730.25  726.84  759.25  736.51  789.25  739.51     820  749.76
  845.19  751.27  853.31     752  863.37  753.15   872.1  754.62  877.69     756
  881.73     758  885.29     760  886.94     760  888.67  760.29  895.61  760.07
  908.15  760.11  911.92  760.29  914.27     760  928.38     760  933.23  760.46
   961.8  761.88 1067.07     762 1097.53     762 1117.03     764 1126.75     764
 1142.18     762 1207.76     762 1307.62  760.58  1352.5  761.73 1352.89  765.23
 1353.16  767.01 1380.35  769.87 1382.44  769.96 1398.67  769.64 1423.96  769.44
 1463.17     768 1468.61     762 1535.59     760 1571.89     758 1587.06     756
 1599.54     752 1620.08  751.06  1637.9     750 1667.57  749.91 1696.28     750
 1713.54  750.39 1777.88   751.1 1810.65  750.74 1870.19  750.68 1908.77  751.46
 1917.51     752 1933.33  755.58 1949.43     760  1955.8     762 1961.58     764
  1964.9  765.42 1970.03     768 1992.67   779.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .05     490     .03  888.67     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
           490  888.67            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     490     762       F
    1196    1216     775       F
    1749 1992.67     775       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************************************
       0     121     770    1216    1386     775    1450    1980     762

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  8

Pier Data
Pier Station     Upstream=  581.75    Downstream=  581.75
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       6     720       6     760
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       6     720       6     760

Pier Data
Pier Station     Upstream=  649.91    Downstream=  649.91
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       6     720       6     760
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       6     720       6     760

Pier Data
Pier Station     Upstream=  718.08    Downstream=  718.08
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       6     720       6     760
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       6     720       6     760

Pier Data
Pier Station     Upstream=  751.25    Downstream=  751.25
```

```
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  704.33       2  750.33     3.5  750.33     3.5  759.83
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  704.33       2  750.33     3.5  750.33     3.5  759.83

Pier Data
Pier Station     Upstream=  754.75    Downstream=  754.75
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  704.33       2  750.33     3.5  750.33     3.5  759.83
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  704.33       2  750.33     3.5  750.33     3.5  759.83

Pier Data
Pier Station     Upstream=     789    Downstream=     789
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  709.33       2  755.83     3.5  755.83     3.5  759.83
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  709.33       2  755.83     3.5  755.83     3.5  759.83

Pier Data
Pier Station     Upstream=     825    Downstream=     825
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  709.33       2  755.83     3.5  755.83     3.5  759.83
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  709.33       2  755.83     3.5  755.83     3.5  759.83

Pier Data
Pier Station     Upstream=     861    Downstream=     861
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  709.33       2  755.83     3.5  755.83     3.5  759.83
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  709.33       2  755.83     3.5  755.83     3.5  759.83

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. US. (ft)          *     742.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.55  * E.G. Elev (ft)         *     742.84  *     742.84  *
* Q Total (cfs)          *   12800.00  * W.S. Elev (ft)         *     742.49  *     742.49  *
```

```
* Q Bridge (cfs)         *   12800.00  * Crit W.S. (ft)         *     732.34  *     732.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.98  *      19.98  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.78  *       4.78  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2678.37  *    2678.37  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   22483.45  *   22483.45  *
* Min El Weir Flow (ft)  *     761.89  * Hydr Depth (ft)        *      11.86  *      11.86  *
* Min El Prs (ft)        *     758.83  * W.P. Total (ft)        *     350.18  *     350.18  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *   514993.0  *   514993.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     225.88  *     225.88  *
* BR Open Area (sq ft)   *    6693.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.78  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.29  *       0.29  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.41  *       1.41  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     747.40  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     747.02  * E.G. Elev (ft)         *     747.41  *     747.41  *
* Q Total (cfs)          *   20500.00  * W.S. Elev (ft)         *     746.94  *     746.94  *
* Q Bridge (cfs)         *   20500.00  * Crit W.S. (ft)         *     734.90  *     734.90  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.43  *      24.43  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.48  *       5.48  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3742.79  *    3742.79  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   38311.67  *   38311.67  *
* Min El Weir Flow (ft)  *     761.89  * Hydr Depth (ft)        *      14.82  *      14.82  *
* Min El Prs (ft)        *     758.83  * W.P. Total (ft)        *     431.71  *     431.71  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *   782357.1  *   782357.1  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *     252.58  *     252.58  *
* BR Open Area (sq ft)   *    6693.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.48  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.37  *       0.37  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.04  *       2.04  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     751.01  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.59  * E.G. Elev (ft)         *     751.02  *     751.02  *
* Q Total (cfs)          *   27100.00  * W.S. Elev (ft)         *     750.50  *     750.50  *
* Q Bridge (cfs)         *   27100.00  * Crit W.S. (ft)         *     736.89  *     736.89  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.99  *      27.99  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.79  *       5.79  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4680.39  *    4681.23  *
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.28  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   54649.33  *   54648.64  *
* Min El Weir Flow (ft)  *     761.89  * Hydr Depth (ft)        *      16.94  *      16.78  *
* Min El Prs (ft)        *     758.83  * W.P. Total (ft)        *     505.45  *     508.37  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1022253.0  *  1018635.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *     276.23  *     278.98  *
* BR Open Area (sq ft)   *    6693.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.79  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.41  *       0.41  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.35  *       2.36  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	754.36	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	753.89	E.G. Elev (ft)	754.36	754.36
Q Total (cfs)	34500.00	W.S. Elev (ft)	753.79	753.79
Q Bridge (cfs)	34500.00	Crit W.S. (ft)	739.17	739.17
Q Weir (cfs)		Max Chl Dpth (ft)	31.28	31.28
Weir Sta Lft (ft)		Vel Total (ft/s)	6.08	6.07
Weir Sta Rgt (ft)		Flow Area (sq ft)	5675.57	5683.66
Weir Submerg		Froude # Chl	0.26	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	73308.88	73322.51
Min El Weir Flow (ft)	761.89	Hydr Depth (ft)	17.39	17.68
Min El Prs (ft)	758.83	W.P. Total (ft)	597.67	593.00
Delta EG (ft)	0.10	Conv. Total (cfs)	1260613.0	1270234.0
Delta WS (ft)	0.10	Top Width (ft)	326.42	321.44
BR Open Area (sq ft)	6693.04	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.08	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.44	0.44
Br Sel Method	Yarnell	Power Total (lb/ft s)	2.70	2.68

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	760.31	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	759.87	E.G. Elev (ft)	760.28	760.26
Q Total (cfs)	45500.00	W.S. Elev (ft)	759.57	759.54
Q Bridge (cfs)	45500.00	Crit W.S. (ft)	741.32	741.32
Q Weir (cfs)		Max Chl Dpth (ft)	37.06	37.03
Weir Sta Lft (ft)		Vel Total (ft/s)	6.80	6.80
Weir Sta Rgt (ft)		Flow Area (sq ft)	6693.04	6694.37
Weir Submerg		Froude # Chl	0.25	0.25
Weir Max Depth (ft)		Specif Force (cu ft)	113154.80	113008.50
Min El Weir Flow (ft)	761.89	Hydr Depth (ft)		
Min El Prs (ft)	758.83	W.P. Total (ft)	998.16	999.15
Delta EG (ft)	0.14	Conv. Total (cfs)	1178814.0	1178427.0
Delta WS (ft)	0.14	Top Width (ft)		
BR Open Area (sq ft)	6693.04	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	6.80	C & E Loss (ft)	0.00	0.08
Coef of Q		Shear Total (lb/sq ft)	0.62	0.62
Br Sel Method	Energy only	Power Total (lb/ft s)	4.24	4.24

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	763.33	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	762.85	E.G. Elev (ft)	763.28	763.24
Q Total (cfs)	54400.00	W.S. Elev (ft)	762.26	762.22
Q Bridge (cfs)	54251.37	Crit W.S. (ft)	742.85	742.85
Q Weir (cfs)		Max Chl Dpth (ft)	39.75	39.71
Weir Sta Lft (ft)		Vel Total (ft/s)	7.87	7.98
Weir Sta Rgt (ft)		Flow Area (sq ft)	6913.66	6813.52
Weir Submerg		Froude # Chl	0.28	0.28
Weir Max Depth (ft)		Specif Force (cu ft)	135324.10	135058.50
Min El Weir Flow (ft)	761.89	Hydr Depth (ft)	10.12	12.86
Min El Prs (ft)	758.83	W.P. Total (ft)	1682.88	1528.99

```
* Delta EG (ft)          *       0.25  * Conv. Total (cfs)      *  1182044.0  *  1179737.0  *
* Delta WS (ft)          *       0.26  * Top Width (ft)         *     790.83  *     757.14  *
* BR Open Area (sq ft)   *    6693.04  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       8.11  * C & E Loss (ft)        *       0.00  *       0.16  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.54  *       0.59  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.27  *       4.72  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     764.81  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     764.26  * E.G. Elev (ft)         *     764.76  *     764.69  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     763.67  *     763.53  *
* Q Bridge (cfs)         *   59611.75  * Crit W.S. (ft)         *     744.21  *     744.21  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.16  *      41.02  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.53  *       7.97  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8370.10  *    7903.85  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  148407.00  *  147594.40  *
* Min El Weir Flow (ft)  *     761.89  * Hydr Depth (ft)        *       5.69  *       5.90  *
* Min El Prs (ft)        *     758.83  * W.P. Total (ft)        *    2471.48  *    2338.99  *
* Delta EG (ft)          *       0.31  * Conv. Total (cfs)      *  1076152.0  *  1037218.0  *
* Delta WS (ft)          *       0.32  * Top Width (ft)         *    1580.93  *    1570.06  *
* BR Open Area (sq ft)   *    6693.04  * Frctn Loss (ft)        *       0.06  *       0.00  *
* BR Open Vel (ft/s)     *       8.91  * C & E Loss (ft)        *       0.01  *       0.18  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.72  *       0.78  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.45  *       6.20  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     767.01  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     766.41  * E.G. Elev (ft)         *     766.99  *     766.93  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     766.21  *     766.06  *
* Q Bridge (cfs)         *   55156.98  * Crit W.S. (ft)         *     746.14  *     746.14  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.70  *      43.55  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.26  *       6.70  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12124.13  *   11328.70  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  174496.00  *  172455.40  *
* Min El Weir Flow (ft)  *     761.89  * Hydr Depth (ft)        *       8.17  *       8.34  *
* Min El Prs (ft)        *     758.83  * W.P. Total (ft)        *    2490.69  *    2362.92  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *  1571935.0  *  1490709.0  *
* Delta WS (ft)          *       0.16  * Top Width (ft)         *    1599.96  *    1596.23  *
* BR Open Area (sq ft)   *    6693.04  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       8.24  * C & E Loss (ft)        *       0.01  *       0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.71  *       0.78  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.44  *       5.20  *
*****************************************************************************************
```

```
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     756.18  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.70  * E.G. Elev (ft)         *     756.19  *     756.19  *
* Q Total (cfs)          *   38700.00  * W.S. Elev (ft)         *     755.59  *     755.59  *
* Q Bridge (cfs)         *   38700.00  * Crit W.S. (ft)         *     740.05  *     740.05  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.08  *      33.08  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.17  *       6.17  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6270.91  *    6272.14  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   84985.04  *   85013.50  *
* Min El Weir Flow (ft)  *     761.89  * Hydr Depth (ft)        *      18.91  *      18.99  *
* Min El Prs (ft)        *     758.83  * W.P. Total (ft)        *     630.46  *     629.11  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)       *  1436551.0  *  1439068.0  *
* Delta WS (ft)          *       0.10  * Top Width (ft)          *     331.68  *     330.30  *
* BR Open Area (sq ft)   *    6693.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.17  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.45  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.78  *       2.78  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.089

INPUT
Description: d/s Face B-21C
LOMR cross section from 2003 contours.
COE
             Riverstation=19858.58
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0     764   27.52     764   31.23  763.35   95.52  763.03  102.74     762
  169.16     762  181.21  762.77  197.41  762.73  206.61  762.49  212.99     762
  233.97     762  242.38  761.76  277.79   761.6  300.35  761.08  312.58  761.06
  355.41     762     490  761.92     506  756.59  557.25  739.51  587.25  736.51
  616.25  726.84  639.25  726.51  651.25  722.51  673.25  722.51  695.25  722.51
  707.25  726.51  730.25  726.84  759.25  736.51  789.25  739.51     820  749.76
  845.19  751.27  853.31     752  863.37  753.15   872.1  754.62  877.69     756
  881.73     758  885.29     760  886.94     760  888.67  760.29  895.61  760.07
  908.15  760.11  911.92  760.29  914.27     760  928.38     760  933.23  760.46
   961.8  761.88 1067.07     762 1097.53     762 1117.03     764 1126.75     764
 1142.18     762 1207.76     762 1307.62  760.58  1352.5  761.73 1352.89  765.23
 1353.16  767.01 1380.35  769.87 1382.44  769.96 1398.67  769.64 1423.96  769.44
 1463.17     768 1468.61     762 1535.59     760 1571.89     758 1587.06     756
 1599.54     752 1620.08  751.06  1637.9     750 1667.57  749.91 1696.28     750
 1713.54  750.39 1777.88   751.1 1810.65  750.74 1870.19  750.68 1908.77  751.46
 1917.51     752 1933.33  755.58 1949.43     760  1955.8     762 1961.58     764
  1964.9  765.42 1970.03     768 1992.67   779.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .05     490     .03  888.67     .05
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           490  888.67            84.38     114  127.95            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     490     762       F
    1196    1216     775       F
    1749 1992.67     775       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
       0     121     770    1216    1386     775    1450    1980     762

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.49  * Reach Len. (ft)        *   84.38  *  114.00  *  127.95  *
* Crit W.S. (ft)         *  731.87  * Flow Area (sq ft)      *          * 2960.84  *          *
* E.G. Slope (ft/ft)     *0.000291  * Area (sq ft)           *          * 2960.84  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  249.88  * Top Width (ft)          *          *  249.88  *          *
* Vel Total (ft/s)       *    4.32  * Avg. Vel. (ft/s)        *          *    4.32  *          *
* Max Chl Dpth (ft)      *   19.98  * Hydr. Depth (ft)        *          *   11.85  *          *
* Conv. Total (cfs)      *750819.3  * Conv. (cfs)             *          *750819.3  *          *
* Length Wtd. (ft)       *  114.00  * Wetted Per. (ft)        *          *  255.59  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)        *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.91  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *          * 2745.57  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  233.58  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  746.94  * Reach Len. (ft)        *   84.38  *  114.00  *  127.95  *
* Crit W.S. (ft)         *  734.33  * Flow Area (sq ft)      *          * 4132.04  *          *
* E.G. Slope (ft/ft)     *0.000282  * Area (sq ft)           *          * 4132.04  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  276.58  * Top Width (ft)          *          *  276.58  *          *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)        *          *    4.96  *          *
* Max Chl Dpth (ft)      *   24.43  * Hydr. Depth (ft)        *          *   14.94  *          *
* Conv. Total (cfs)      *1220512.0  * Conv. (cfs)             *          *1220512.0  *          *
* Length Wtd. (ft)       *  114.00  * Wetted Per. (ft)        *          *  283.73  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)        *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.27  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *    1.51  * 3795.74  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    2.36  *  262.30  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  750.50  * Reach Len. (ft)        *   84.38  *  114.00  *  127.95  *
* Crit W.S. (ft)         *  736.13  * Flow Area (sq ft)      *          * 5157.19  *          *
* E.G. Slope (ft/ft)     *0.000272  * Area (sq ft)           *          * 5157.19  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  307.98  * Top Width (ft)          *          *  307.98  *          *
* Vel Total (ft/s)       *    5.25  * Avg. Vel. (ft/s)        *          *    5.25  *          *
* Max Chl Dpth (ft)      *   27.99  * Hydr. Depth (ft)        *          *   16.75  *          *
* Conv. Total (cfs)      *1642854.0  * Conv. (cfs)             *          *1642854.0  *          *
* Length Wtd. (ft)       *  114.00  * Wetted Per. (ft)        *          *  316.19  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)        *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.46  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *   15.75  * 4703.45  *  105.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    9.30  *  283.62  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	754.26	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.47	Wt. n-Val.		0.030		
W.S. Elev (ft)	753.79	Reach Len. (ft)	84.38	114.00	127.95	
Crit W.S. (ft)	738.29	Flow Area (sq ft)		6257.04		
E.G. Slope (ft/ft)	0.000277	Area (sq ft)		6257.04		
Q Total (cfs)	34500.00	Flow (cfs)		34500.00		
Top Width (ft)	352.78	Top Width (ft)		352.78		
Vel Total (ft/s)	5.51	Avg. Vel. (ft/s)		5.51		
Max Chl Dpth (ft)	31.28	Hydr. Depth (ft)		17.74		
Conv. Total (cfs)	2072966.0	Conv. (cfs)		2072966.0		
Length Wtd. (ft)	114.00	Wetted Per. (ft)		361.70		
Min Ch El (ft)	722.51	Shear (lb/sq ft)		0.30		
Alpha	1.00	Stream Power (lb/ft s)		1.65		
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	63.40	5624.92	347.57	
C & E Loss (ft)	0.00	Cum SA (acres)	30.11	300.27	105.36	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	760.17	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.45	Wt. n-Val.		0.030		
W.S. Elev (ft)	759.73	Reach Len. (ft)	84.38	114.00	127.95	
Crit W.S. (ft)	740.53	Flow Area (sq ft)		8469.21		
E.G. Slope (ft/ft)	0.000200	Area (sq ft)		8469.21		
Q Total (cfs)	45500.00	Flow (cfs)		45500.00		
Top Width (ft)	388.22	Top Width (ft)		388.22		
Vel Total (ft/s)	5.37	Avg. Vel. (ft/s)		5.37		
Max Chl Dpth (ft)	37.22	Hydr. Depth (ft)		21.82		
Conv. Total (cfs)	3214486.0	Conv. (cfs)		3214486.0		
Length Wtd. (ft)	114.00	Wetted Per. (ft)		399.26		
Min Ch El (ft)	722.51	Shear (lb/sq ft)		0.27		
Alpha	1.00	Stream Power (lb/ft s)		1.43		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	343.16	7092.05	1363.37	
C & E Loss (ft)	0.00	Cum SA (acres)	150.83	319.27	354.20	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	763.08	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.49	Wt. n-Val.	0.050	0.030	0.050	
W.S. Elev (ft)	762.59	Reach Len. (ft)	84.38	114.00	127.95	
Crit W.S. (ft)	741.99	Flow Area (sq ft)	260.74	9602.07	437.61	
E.G. Slope (ft/ft)	0.000194	Area (sq ft)	260.74	9602.07	572.18	
Q Total (cfs)	54400.00	Flow (cfs)	90.27	54146.09	163.63	
Top Width (ft)	1525.63	Top Width (ft)	344.56	398.67	782.39	
Vel Total (ft/s)	5.28	Avg. Vel. (ft/s)	0.35	5.64	0.37	
Max Chl Dpth (ft)	40.08	Hydr. Depth (ft)	0.76	24.09	0.79	
Conv. Total (cfs)	3910314.0	Conv. (cfs)	6489.0	3892063.0	11761.9	
Length Wtd. (ft)	114.09	Wetted Per. (ft)	345.21	410.16	554.30	
Min Ch El (ft)	722.51	Shear (lb/sq ft)	0.01	0.28	0.01	
Alpha	1.13	Stream Power (lb/ft s)	0.00	1.60	0.00	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	890.16	7926.77	2480.73	
C & E Loss (ft)	0.00	Cum SA (acres)	280.05	323.95	566.54	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	764.50	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.56	Wt. n-Val.	0.050	0.030	0.050	
W.S. Elev (ft)	763.94	Reach Len. (ft)	84.38	114.00	127.95	
Crit W.S. (ft)	743.28	Flow Area (sq ft)	757.23	10142.00	1204.60	
E.G. Slope (ft/ft)	0.000209	Area (sq ft)	757.23	10142.00	1651.28	

```
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  523.38  *61628.06  *  848.56  *
* Top Width (ft)         * 1578.86  * Top Width (ft)         *  369.00  *  398.67  *  811.19  *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)       *    0.69  *    6.08  *    0.70  *
* Max Chl Dpth (ft)      *   41.43  * Hydr. Depth (ft)       *    2.05  *   25.44  *    2.08  *
* Conv. Total (cfs)      *4358524.0  * Conv. (cfs)            * 36209.0  *4263609.0  * 58705.6  *
* Length Wtd. (ft)       *  114.14  * Wetted Per. (ft)       *  371.01  *  410.16  *  579.94  *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *    0.03  *    0.32  *    0.03  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *    0.02  *    1.96  *    0.02  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1375.35  * 8441.88  * 3544.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  325.66  *  324.49  *  819.22  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  766.25  * Reach Len. (ft)        *   84.38  *  114.00  *  127.95  *
* Crit W.S. (ft)         *  745.07  * Flow Area (sq ft)      * 1606.76  *11059.83  * 2563.55  *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           * 1606.76  *11059.83  * 3551.46  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1825.10  *71155.63  * 2919.27  *
* Top Width (ft)         * 1596.78  * Top Width (ft)         *  369.00  *  398.67  *  829.11  *
* Vel Total (ft/s)       *    4.98  * Avg. Vel. (ft/s)       *    1.14  *    6.43  *    1.14  *
* Max Chl Dpth (ft)      *   43.74  * Hydr. Depth (ft)       *    4.35  *   27.74  *    4.33  *
* Conv. Total (cfs)      *5254342.0  * Conv. (cfs)            *126346.2  *4925903.0  *202093.0  *
* Length Wtd. (ft)       *  114.19  * Wetted Per. (ft)       *  373.31  *  410.16  *  593.76  *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *    0.06  *    0.35  *    0.06  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    0.06  *    2.26  *    0.06  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2360.21  * 9306.53  * 5964.71  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  386.85  *  325.88  * 1073.78  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  756.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  755.59  * Reach Len. (ft)        *   84.38  *  114.00  *  127.95  *
* Crit W.S. (ft)         *  739.31  * Flow Area (sq ft)      *          * 6906.93  *          *
* E.G. Slope (ft/ft)     *0.000264  * Area (sq ft)           *          * 6906.93  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  367.06  * Top Width (ft)         *          *  367.06  *          *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)       *          *    5.60  *          *
* Max Chl Dpth (ft)      *   33.08  * Hydr. Depth (ft)       *          *   18.82  *          *
* Conv. Total (cfs)      *2379777.0  * Conv. (cfs)            *          *2379777.0  *          *
* Length Wtd. (ft)       *  114.00  * Wetted Per. (ft)       *          *  376.46  *          *
* Min Ch El (ft)         *  722.51  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.70  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  112.97  * 6114.57  *  553.87  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   50.89  *  307.48  *  152.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.068

INPUT
Description: COE Riverstation=19972.59
LOMR cross section from 2003 contours.
Station Elevation Data    num=      74
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     764   27.51     764   31.09  763.38   95.09   763.1  102.81     762
  169.35     762  184.17  762.94     196  762.93  202.47  762.76  212.42     762
  288.52     762  299.66  761.78  315.16     762  347.34     762     350     762
```

```
     464  756.48     515  739.48     545  736.48     574  726.81     597  726.48
     609  722.48     631  722.48     653  722.48     665  726.48     688  726.81
     717  736.48     747  739.48     792  754.48     822  757.48     840     762
  859.62  761.95  885.75   761.1  955.17     762 1062.71     760 1211.84     760
 1234.67     762 1308.52     762 1311.55  761.86 1312.72  761.91 1322.61  761.69
 1333.47     762 1434.38     762 1486.48     764 1491.39  764.93 1503.52     764
    1525     764 1526.55  763.56 1530.51     762 1551.11   760.8 1592.78     758
 1603.36  757.06 1628.95  755.17 1642.47     754 1660.75     754 1668.35  753.79
 1676.35  753.78 1682.83  753.93 1737.42     754 1752.67  754.45 1781.06  754.22
 1799.94  754.27 1805.87  754.38 1820.05  754.96 1824.97  755.29 1828.98  755.43
 1833.73  755.73 1839.82   755.9 1846.87  755.83 1883.69  754.86 1911.41  755.39
 1920.16     756 1932.72     758  1938.9  760.98 1974.98     780

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     464     .03     822     .05  955.17    .025 1211.84     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          464     822            91.48      91  113.48             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  859.62    1218     762       F
    1218    1377     775       F
    1749 1974.98     775       F
     350     464     762       T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0     121     770 1491.39 1974.98     762

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  742.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  742.46  * Reach Len. (ft)       *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)         *  731.84  * Flow Area (sq ft)      *          * 2960.01  *          *
* E.G. Slope (ft/ft)     *0.000291  * Area (sq ft)           *          * 2960.01  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  249.86  * Top Width (ft)         *          *  249.86  *          *
* Vel Total (ft/s)       *    4.32  * Avg. Vel. (ft/s)       *          *    4.32  *          *
* Max Chl Dpth (ft)      *   19.98  * Hydr. Depth (ft)       *          *   11.85  *          *
* Conv. Total (cfs)      *750514.1  * Conv. (cfs)            *          *750514.1  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)       *          *  255.57  *          *
* Min Ch El (ft)         *  722.48  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.91  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *          * 2737.82  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  232.93  *    1.74  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  747.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  746.91  * Reach Len. (ft)       *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)         *  734.30  * Flow Area (sq ft)      *          * 4131.40  *          *
* E.G. Slope (ft/ft)     *0.000282  * Area (sq ft)           *          * 4131.40  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  276.56  * Top Width (ft)         *          *  276.56  *          *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *          *    4.96  *          *
* Max Chl Dpth (ft)      *   24.43  * Hydr. Depth (ft)       *          *   14.94  *          *
* Conv. Total (cfs)      *1220249.0  * Conv. (cfs)            *          *1220249.0  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)       *          *  283.71  *          *
* Min Ch El (ft)         *  722.48  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.27  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    1.51  * 3784.93  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  261.58  *   11.95  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  750.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.43  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)          *  750.46  * Reach Len. (ft)        *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)          *  736.09  * Flow Area (sq ft)      *          * 5153.15  *          *
* E.G. Slope (ft/ft)      *0.000261  * Area (sq ft)           *          * 5153.15  *          *
* Q Total (cfs)           *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)          *  297.91  * Top Width (ft)         *          *  297.91  *          *
* Vel Total (ft/s)        *    5.26  * Avg. Vel. (ft/s)        *          *    5.26  *          *
* Max Chl Dpth (ft)       *   27.98  * Hydr. Depth (ft)        *          *   17.30  *          *
* Conv. Total (cfs)       *1676152.0  * Conv. (cfs)            *          *1676152.0  *          *
* Length Wtd. (ft)        *   91.00  * Wetted Per. (ft)        *          *  306.21  *          *
* Min Ch El (ft)          *  722.48  * Shear (lb/sq ft)        *          *    0.27  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.44  *          *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *   15.75  * 4689.96  *  105.70  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    9.30  *  282.82  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)          *  754.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.49  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)          *  753.75  * Reach Len. (ft)        *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)          *  738.27  * Flow Area (sq ft)      *          * 6162.81  *          *
* E.G. Slope (ft/ft)      *0.000255  * Area (sq ft)           *          * 6162.81  *          *
* Q Total (cfs)           *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)          *  317.59  * Top Width (ft)         *          *  317.59  *          *
* Vel Total (ft/s)        *    5.60  * Avg. Vel. (ft/s)        *          *    5.60  *          *
* Max Chl Dpth (ft)       *   31.27  * Hydr. Depth (ft)        *          *   19.40  *          *
* Conv. Total (cfs)       *2161926.0  * Conv. (cfs)            *          *2161926.0  *          *
* Length Wtd. (ft)        *   91.00  * Wetted Per. (ft)        *          *  326.96  *          *
* Min Ch El (ft)          *  722.48  * Shear (lb/sq ft)        *          *    0.30  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.68  *          *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *   63.40  * 5608.67  *  347.57  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   30.11  *  299.39  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  760.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.48  * Wt. n-Val.             *          *   0.030  *   0.050  *
* W.S. Elev (ft)          *  759.67  * Reach Len. (ft)        *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)          *  740.52  * Flow Area (sq ft)      *          * 8205.45  *    9.56  *
* E.G. Slope (ft/ft)      *0.000200  * Area (sq ft)           *  105.19  * 8205.45  *    9.56  *
* Q Total (cfs)           *45500.00  * Flow (cfs)              *          *45495.82  *    4.18  *
* Top Width (ft)          *  432.64  * Top Width (ft)         *   65.91  *  358.00  *    8.73  *
* Vel Total (ft/s)        *    5.54  * Avg. Vel. (ft/s)        *          *    5.54  *    0.44  *
* Max Chl Dpth (ft)       *   37.19  * Hydr. Depth (ft)        *          *   22.92  *    1.10  *
* Conv. Total (cfs)       *3219485.0  * Conv. (cfs)            *          *3219189.0  *   296.0  *
* Length Wtd. (ft)        *   91.00  * Wetted Per. (ft)        *          *  368.08  *    9.00  *
* Min Ch El (ft)          *  722.48  * Shear (lb/sq ft)        *          *    0.28  *    0.01  *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.54  *    0.01  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *  343.06  * 7070.23  * 1363.35  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  150.77  *  318.29  *  354.19  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  763.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.51  * Wt. n-Val.             *   0.050  *   0.030  *   0.028  *
* W.S. Elev (ft)          *  762.54  * Reach Len. (ft)        *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)          *  741.96  * Flow Area (sq ft)      *  170.33  * 9233.72  *  870.93  *
* E.G. Slope (ft/ft)      *0.000186  * Area (sq ft)           *  484.97  * 9233.72  * 1078.20  *
* Q Total (cfs)           *54400.00  * Flow (cfs)              *   45.77  *53504.95  *  849.28  *
* Top Width (ft)          * 1712.91  * Top Width (ft)         *  315.63  *  358.00  * 1039.29  *
* Vel Total (ft/s)        *    5.29  * Avg. Vel. (ft/s)        *    0.27  *    5.79  *    0.98  *
* Max Chl Dpth (ft)       *   40.06  * Hydr. Depth (ft)        *    0.54  *   25.79  *    1.27  *
```

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* Conv. Total (cfs)      *3984816.0  * Conv. (cfs)            *  3352.4  *3919254.0  * 62210.2  *
* Length Wtd. (ft)       *   91.51  * Wetted Per. (ft)        *  316.34  *  368.08  *  688.15  *
* Min Ch El (ft)         *  722.48  * Shear (lb/sq ft)        *    0.01  *    0.29  *    0.01  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.00  *    1.69  *    0.01  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    *  889.44  * 7902.12  * 2478.31  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  279.41  *  322.96  *  563.86  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  764.48  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *   0.050  *   0.030  *   0.032  *
* W.S. Elev (ft)         *  763.91  * Reach Len. (ft)         *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)         *  743.24  * Flow Area (sq ft)       *  630.57  * 9722.56  * 1836.30  *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)            *  945.21  * 9722.56  * 2525.81  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *  395.02  *60240.87  * 2364.11  *
* Top Width (ft)         * 1782.26  * Top Width (ft)          *  343.00  *  358.00  * 1081.26  *
* Vel Total (ft/s)       *    5.17  * Avg. Vel. (ft/s)        *    0.63  *    6.20  *    1.29  *
* Max Chl Dpth (ft)      *   41.43  * Hydr. Depth (ft)        *    1.84  *   27.16  *    2.53  *
* Conv. Total (cfs)      *4466761.0  * Conv. (cfs)            * 28007.5  *4271136.0  *167617.8  *
* Length Wtd. (ft)       *   92.16  * Wetted Per. (ft)        *  345.11  *  368.08  *  727.80  *
* Min Ch El (ft)         *  722.48  * Shear (lb/sq ft)        *    0.02  *    0.33  *    0.03  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.01  *    2.03  *    0.04  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    * 1373.70  * 8415.89  * 3538.81  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  324.97  *  323.50  *  816.44  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  766.82  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.              *   0.050  *   0.030  *   0.034  *
* W.S. Elev (ft)         *  766.24  * Reach Len. (ft)         *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)         *  745.03  * Flow Area (sq ft)       * 1428.47  *10555.35  * 3611.31  *
* E.G. Slope (ft/ft)     *0.000193  * Area (sq ft)            * 1743.11  *10555.35  * 5130.50  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              * 1515.31  *68124.77  * 6259.93  *
* Top Width (ft)         * 1827.87  * Top Width (ft)          *  343.00  *  358.00  * 1126.87  *
* Vel Total (ft/s)       *    4.87  * Avg. Vel. (ft/s)        *    1.06  *    6.45  *    1.73  *
* Max Chl Dpth (ft)      *   43.76  * Hydr. Depth (ft)        *    4.16  *   29.48  *    4.70  *
* Conv. Total (cfs)      *5457163.0  * Conv. (cfs)            *108949.8  *4898129.0  *450085.0  *
* Length Wtd. (ft)       *   93.38  * Wetted Per. (ft)        *  347.43  *  368.08  *  769.14  *
* Min Ch El (ft)         *  722.48  * Shear (lb/sq ft)        *    0.05  *    0.35  *    0.06  *
* Alpha                  *    1.59  * Stream Power (lb/ft s) *    0.05  *    2.24  *    0.10  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    * 2356.97  * 9278.25  * 5951.96  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *  386.17  *  324.88  * 1070.91  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  756.05  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  755.54  * Reach Len. (ft)         *   91.48  *   91.00  *  113.48  *
* Crit W.S. (ft)         *  739.30  * Flow Area (sq ft)       *          * 6746.32  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)            *          * 6746.32  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)              *          *38700.00  *          *
* Top Width (ft)         *  335.77  * Top Width (ft)          *          *  335.77  *          *
* Vel Total (ft/s)       *    5.74  * Avg. Vel. (ft/s)        *          *    5.74  *          *
* Max Chl Dpth (ft)      *   33.06  * Hydr. Depth (ft)        *          *   20.09  *          *
* Conv. Total (cfs)      *2422488.0  * Conv. (cfs)            *          *2422488.0  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)        *          *  345.61  *          *
* Min Ch El (ft)         *  722.48  * Shear (lb/sq ft)        *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.78  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    *  112.97  * 6096.70  *  553.87  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   50.89  *  306.56  *  152.13  *
*****************************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 9.051

INPUT
Description: u/s Face B-21B. LOMR cross section from 2003 contours. Channel altered to reflect expanded RR bridge.
COE Riverstation=20067.87
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	764	27.6	764	30.68	763.47	66.31	763.47	93.67	763.4
103.56	762	170.9	762	185.34	762.91	192.41	763	198.52	762.96
210.93	762	328.21	762	406.35	762	420	757.45	450	754.45
495	739.45	525	736.45	554	726.78	577	726.45	589	722.45
611	722.45	633	722.45	645	726.45	668	726.78	697	736.45
727	739.45	778.5	756.61	808	760.5	818.35	762	825.43	762
841.33	762	848.9	762.27	857.58	762.35	897.11	762	912.4	762
951.36	761.34	1002.84	760.77	1097.24	760.03	1199.63	760	1331.91	759.89
1400.73	760	1431.7	761.67	1435.25	762	1661.15	762	1695.53	761.31
1714.68	761	1719.21	760.97	1727.32	760.83	1742.4	760.7	1765.28	760.62
1771.95	760.65	1822.71	760.46	1839.65	760.34	1872.89	760	1896.84	759.38
1902.4	759.16	1918.79	758.32	1923.87	758	1937.43	756.64	1944.63	756
1950.36	756	1953.92	758	1961.2	762	1976	770	1992.23	778.53
1995.15	780								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	406.35	.03	818.35	.05	857.58	.025	1400.73	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
406.35	818.35	19.57	20	19.11	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
857.58	1669	762.5	F
1669	1992	775	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	120	770

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	742.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	742.43	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	731.81	Flow Area (sq ft)		2960.84	
E.G. Slope (ft/ft)	0.000291	Area (sq ft)		2960.84	
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	249.88	Top Width (ft)		249.88	
Vel Total (ft/s)	4.32	Avg. Vel. (ft/s)		4.32	
Max Chl Dpth (ft)	19.98	Hydr. Depth (ft)		11.85	
Conv. Total (cfs)	750817.1	Conv. (cfs)		750817.1	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		255.59	
Min Ch El (ft)	722.45	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.91	
Frctn Loss (ft)		Cum Volume (acre-ft)		2731.63	5.47
C & E Loss (ft)		Cum SA (acres)		232.41	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	747.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.030	
W.S. Elev (ft)	746.88	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	734.27	Flow Area (sq ft)		4132.63	
E.G. Slope (ft/ft)	0.000282	Area (sq ft)		4132.63	

```
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  276.60  * Top Width (ft)          *          *  276.60  *          *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)        *          *    4.96  *          *
* Max Chl Dpth (ft)      *   24.43  * Hydr. Depth (ft)        *          *   14.94  *          *
* Conv. Total (cfs)      *1220753.0  * Conv. (cfs)            *          *1220753.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  283.75  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)        *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.27  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *    1.51  * 3776.29  *   22.64  *
* C & E Loss (ft)        *          * Cum SA (acres)          *    2.36  *  261.00  *   11.95  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.87  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  750.44  * Reach Len. (ft)         *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.06  * Flow Area (sq ft)       *          * 5155.09  *          *
* E.G. Slope (ft/ft)     *0.000261  * Area (sq ft)            *          * 5155.09  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  297.96  * Top Width (ft)          *          *  297.96  *          *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)        *          *    5.26  *          *
* Max Chl Dpth (ft)      *   27.99  * Hydr. Depth (ft)        *          *   17.30  *          *
* Conv. Total (cfs)      *1677015.0  * Conv. (cfs)            *          *1677015.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  306.26  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)        *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.44  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *   15.75  * 4679.19  *  105.70  *
* C & E Loss (ft)        *          * Cum SA (acres)          *    9.30  *  282.20  *   48.63  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.21  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  753.72  * Reach Len. (ft)         *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  738.24  * Flow Area (sq ft)       *          * 6165.14  *          *
* E.G. Slope (ft/ft)     *0.000254  * Area (sq ft)            *          * 6165.14  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  317.65  * Top Width (ft)          *          *  317.65  *          *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)        *          *    5.60  *          *
* Max Chl Dpth (ft)      *   31.27  * Hydr. Depth (ft)        *          *   19.41  *          *
* Conv. Total (cfs)      *2163024.0  * Conv. (cfs)            *          *2163024.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  327.02  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)        *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.68  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *   63.40  * 5595.79  *  347.57  *
* C & E Loss (ft)        *          * Cum SA (acres)          *   30.11  *  298.72  *  105.36  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.13  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  759.66  * Reach Len. (ft)         *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  740.49  * Flow Area (sq ft)       *          * 8254.92  *          *
* E.G. Slope (ft/ft)     *0.000218  * Area (sq ft)            *          * 8254.92  *  114.85  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  458.99  * Top Width (ft)          *          *  388.22  *   70.77  *
* Vel Total (ft/s)       *    5.51  * Avg. Vel. (ft/s)        *          *    5.51  *          *
* Max Chl Dpth (ft)      *   37.21  * Hydr. Depth (ft)        *          *   21.26  *          *
```

```
* Conv. Total (cfs)      *3081966.0  * Conv. (cfs)            *          *3081966.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  398.89  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.55  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  342.95  * 7053.04  * 1363.19  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  150.70  *  317.51  *  354.09  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.050  *   0.030  *   0.026  *
* W.S. Elev (ft)         *  762.55  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  741.91  * Flow Area (sq ft)      *  140.98  * 9421.49  * 1327.28  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           *  140.98  * 9421.49  * 2064.71  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   39.52  *52746.29  * 1614.19  *
* Top Width (ft)         * 1818.16  * Top Width (ft)         *  262.28  *  412.00  * 1143.88  *
* Vel Total (ft/s)       *    5.00  * Avg. Vel. (ft/s)       *    0.28  *    5.60  *    1.22  *
* Max Chl Dpth (ft)      *   40.10  * Hydr. Depth (ft)       *    0.54  *   22.87  *    1.56  *
* Conv. Total (cfs)      *3808690.0  * Conv. (cfs)            *  2766.8  *3692909.0  *113013.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  262.88  *  423.21  *  850.73  *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *    0.01  *    0.28  *    0.02  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.00  *    1.59  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  888.78  * 7882.63  * 2474.21  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  278.80  *  322.16  *  561.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.050  *   0.030  *   0.028  *
* W.S. Elev (ft)         *  763.94  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  743.20  * Flow Area (sq ft)      *  530.69  * 9992.99  * 2507.26  *
* E.G. Slope (ft/ft)     *0.000207  * Area (sq ft)           *  530.69  * 9992.99  * 3653.21  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  340.47  *58559.89  * 4099.65  *
* Top Width (ft)         * 1844.79  * Top Width (ft)         *  286.35  *  412.00  * 1146.44  *
* Vel Total (ft/s)       *    4.83  * Avg. Vel. (ft/s)       *    0.64  *    5.86  *    1.64  *
* Max Chl Dpth (ft)      *   41.49  * Hydr. Depth (ft)       *    1.85  *   24.25  *    2.95  *
* Conv. Total (cfs)      *4382638.0  * Conv. (cfs)            * 23684.9  *4073759.0  *285194.6  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  288.36  *  423.21  *  850.73  *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *    0.02  *    0.30  *    0.04  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.02  *    1.79  *    0.06  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1372.15  * 8395.29  * 3530.76  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  324.31  *  322.70  *  813.54  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.050  *   0.030  *   0.029  *
* W.S. Elev (ft)         *  766.29  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  745.00  * Flow Area (sq ft)      * 1204.57  *10962.57  * 4509.12  *
* E.G. Slope (ft/ft)     *0.000186  * Area (sq ft)           * 1204.57  *10962.57  * 6356.29  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1260.67  *64891.88  * 9747.46  *
* Top Width (ft)         * 1849.15  * Top Width (ft)         *  286.35  *  412.00  * 1150.80  *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *    1.05  *    5.92  *    2.16  *
* Max Chl Dpth (ft)      *   43.84  * Hydr. Depth (ft)       *    4.21  *   26.61  *    5.30  *
```

```
* Conv. Total (cfs)      *5559997.0  * Conv. (cfs)            * 92349.7  *4753605.0  *714042.6  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  290.71  *  423.21  *  850.73  *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *    0.05  *    0.30  *    0.06  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.05  *    1.78  *    0.13  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2353.87  * 9255.77  * 5937.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  385.50  *  324.08  * 1067.94  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  756.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  755.52  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  739.27  * Flow Area (sq ft)      *          * 6748.79  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 6748.79  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)              *          *38700.00  *          *
* Top Width (ft)         *  335.88  * Top Width (ft)         *          *  335.88  *          *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)       *          *    5.73  *          *
* Max Chl Dpth (ft)      *   33.07  * Hydr. Depth (ft)       *          *   20.09  *          *
* Conv. Total (cfs)      *2423456.0  * Conv. (cfs)            *          *2423456.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  345.72  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.78  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  112.97  * 6082.61  *  553.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   50.89  *  305.86  *  152.13  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 9.049

INPUT
Description: B-21B
COE Riverstation=20074.16
Distance from Upstream XS =       1
Deck/Roadway Width        =      18
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
     400     762     750   464.9   762.8     750     465   762.8  755.65
     815   762.8  755.65     910     762     750

Upstream Bridge Cross Section Data
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     764    27.6     764   30.68  763.47   66.31  763.47   93.67   763.4
  103.56     762   170.9     762  185.34  762.91  192.41     763  198.52  762.96
  210.93     762  328.21     762  406.35     762     420  757.45     450  754.45
     495  739.45     525  736.45     554  726.78     577  726.45     589  722.45
     611  722.45     633  722.45     645  726.45     668  726.78     697  736.45
     727  739.45   778.5  756.61     808   760.5  818.35     762  825.43     762
  841.33     762   848.9  762.27  857.58  762.35  897.11     762   912.4     762
  951.36  761.34 1002.84  760.77 1097.24  760.03 1199.63     760 1331.91  759.89
 1400.73     760  1431.7  761.67 1435.25     762 1661.15     762 1695.53  761.31
 1714.68     761 1719.21  760.97 1727.32  760.83  1742.4   760.7 1765.28  760.62
 1771.95  760.65 1822.71  760.46 1839.65  760.34 1872.89     760 1896.84  759.38
  1902.4  759.16 1918.79  758.32 1923.87     758 1937.43  756.64 1944.63     756
 1950.36     756 1953.92     758  1961.2     762    1976     770 1992.23  778.53
 1995.15     780

Manning's n Values        num=       5
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  406.35     .03  818.35     .05  857.58    .025 1400.73     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
         406.35  818.35           .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  857.58    1669   762.5       F
    1669    1992     775       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0     120     770

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
     400     762     750   464.9   762.8     750     465   762.8  755.65
     815   762.8  755.65     910     762     750

Downstream Bridge Cross Section Data
Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     764   27.72     764   30.55  763.51   66.66  763.57   93.19  763.55
  104.22     762  172.14     762  176.61  762.28  192.27  762.43  199.91  762.32
  207.12  762.28  210.71     762  326.96     762  350.15     762  406.35     762
     420  757.45     450  754.45     495  739.45     525  736.45     554  726.78
     577  726.45     589  722.45     611  722.45     633  722.45     645  726.45
     668  726.78     697  736.45     727  739.45   778.5  756.61     808   760.5
  817.89  761.56  818.66  761.63  821.35     762   840.3     762  857.86  762.62
  861.22  762.65  879.58  762.49  905.13     762  908.89     762  935.77   761.6
  990.27  761.03  1108.4  760.08 1120.56  760.09 1144.15     760 1199.98     760
 1333.69  759.86 1413.27     760 1435.16     762 1678.33     762 1705.06  761.46
 1719.56  761.23 1737.27  761.06 1810.88  760.82 1840.93  760.61 1874.94  760.26
 1891.39     760 1895.49     760 1900.05  759.75 1926.27     758 1936.83   757.1
 1950.87  757.28 1953.84  758.52 1956.87     760 1958.48  760.69 1963.33  763.04
    1971  766.88 1982.69  772.34 1991.96  776.57 1999.07  780.01

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  406.35     .03  821.35     .05  857.86    .025 1413.27     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
         406.35  821.35           .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  861.22    1659     763       F
    1659    1992     775       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0     121     770

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream=     514    Downstream=     514
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6   708.1       6   755.1       6   755.1       6   758.6
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
```

```
       6   708.1       6   755.1       6   755.1       6   758.6

Pier Data
Pier Station     Upstream=     582    Downstream=     582
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6   708.1       6   755.1       6   755.1       6   758.6
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6   708.1       6   755.1       6   755.1       6   758.6

Pier Data
Pier Station     Upstream=     650    Downstream=     650
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6   704.1       6   750.6       6   750.6       6   758.6
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6   704.1       6   750.6       6   750.6       6   758.6

Pier Data
Pier Station     Upstream=  726.25    Downstream=  726.25
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  700.27       2  750.08     3.5  750.08     3.5  755.08
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  700.27       2  750.08     3.5  750.08     3.5  755.08

Pier Data
Pier Station     Upstream=  729.75    Downstream=  729.75
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  700.27       2  750.08     3.5  750.08     3.5   758.6
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  700.27       2  750.08     3.5  750.08     3.5   758.6

Pier Data
Pier Station     Upstream=  764.75    Downstream=  764.75
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  705.27       2   754.6     3.5   754.6     3.5   758.6
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  705.27       2   754.6     3.5   754.6     3.5   758.6

Pier Data
Pier Station     Upstream=  800.75    Downstream=  800.75
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  705.27       2   754.6     3.5   754.6     3.5   758.6
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       2  705.27       2   754.6     3.5   754.6     3.5   758.6

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Yarnell
```

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	742.72	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	742.43	E.G. Elev (ft)	742.72	742.72
Q Total (cfs)	12800.00	W.S. Elev (ft)	742.38	742.38
Q Bridge (cfs)	12800.00	Crit W.S. (ft)	732.19	732.20
Q Weir (cfs)		Max Chl Dpth (ft)	19.93	19.93
Weir Sta Lft (ft)		Vel Total (ft/s)	4.73	4.73
Weir Sta Rgt (ft)		Flow Area (sq ft)	2707.73	2707.73
Weir Submerg		Froude # Chl	0.24	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	22652.87	22652.87
Min El Weir Flow (ft)	762.01	Hydr Depth (ft)	11.90	11.90
Min El Prs (ft)	755.65	W.P. Total (ft)	319.28	319.28
Delta EG (ft)	0.05	Conv. Total (cfs)	557748.9	557748.9
Delta WS (ft)	0.05	Top Width (ft)	227.56	227.56
BR Open Area (sq ft)	6174.58	Frctn Loss (ft)		
BR Open Vel (ft/s)	4.73	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.28	0.28
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.32	1.32

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	747.26	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	746.88	E.G. Elev (ft)	747.27	747.27
Q Total (cfs)	20500.00	W.S. Elev (ft)	746.81	746.81
Q Bridge (cfs)	20500.00	Crit W.S. (ft)	734.76	734.81
Q Weir (cfs)		Max Chl Dpth (ft)	24.36	24.36
Weir Sta Lft (ft)		Vel Total (ft/s)	5.43	5.43
Weir Sta Rgt (ft)		Flow Area (sq ft)	3775.42	3775.42
Weir Submerg		Froude # Chl	0.25	0.25
Weir Max Depth (ft)		Specif Force (cu ft)	38556.32	38556.32
Min El Weir Flow (ft)	762.01	Hydr Depth (ft)	14.85	14.85
Min El Prs (ft)	755.65	W.P. Total (ft)	391.64	391.64
Delta EG (ft)	0.07	Conv. Total (cfs)	847008.7	847008.7
Delta WS (ft)	0.07	Top Width (ft)	254.16	254.16
BR Open Area (sq ft)	6174.58	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.43	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.35	0.35
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.91	1.91

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	750.87	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	750.44	E.G. Elev (ft)	750.87	750.87
Q Total (cfs)	27100.00	W.S. Elev (ft)	750.36	750.36
Q Bridge (cfs)	27100.00	Crit W.S. (ft)	736.78	736.76
Q Weir (cfs)		Max Chl Dpth (ft)	27.91	27.91
Weir Sta Lft (ft)		Vel Total (ft/s)	5.75	5.75
Weir Sta Rgt (ft)		Flow Area (sq ft)	4714.43	4714.43
Weir Submerg		Froude # Chl	0.25	0.25
Weir Max Depth (ft)		Specif Force (cu ft)	54994.92	54994.92
Min El Weir Flow (ft)	762.01	Hydr Depth (ft)	17.47	17.47

```
* Min El Prs (ft)        *     755.65  * W.P. Total (ft)        *     452.84  *     452.84  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  1113336.0  *  1113336.0  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *     269.84  *     269.84  *
* BR Open Area (sq ft)   *    6174.58  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.75  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.39  *       0.39  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.21  *       2.21  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     754.21  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.72  * E.G. Elev (ft)         *     754.22  *     754.22  *
* Q Total (cfs)          *   34500.00  * W.S. Elev (ft)         *     753.63  *     753.63  *
* Q Bridge (cfs)         *   34500.00  * Crit W.S. (ft)         *     738.94  *     738.96  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.18  *      31.18  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.15  *       6.15  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5609.43  *    5609.43  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   73618.05  *   73618.05  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *      20.21  *      20.21  *
* Min El Prs (ft)        *     755.65  * W.P. Total (ft)        *     493.71  *     493.71  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1404192.0  *  1404192.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *     277.59  *     277.59  *
* BR Open Area (sq ft)   *    6174.58  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.15  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.43  *       0.43  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.63  *       2.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     760.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     759.66  * E.G. Elev (ft)         *     760.09  *     760.06  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     759.25  *     759.22  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     741.10  *     741.10  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.80  *      36.77  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.37  *       7.37  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6174.58  *    6174.58  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  111550.90  *  111388.10  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     755.65  * W.P. Total (ft)        *     805.93  *     805.93  *
* Delta EG (ft)          *       0.17  * Conv. Total (cfs)      *  1188563.0  *  1188563.0  *
* Delta WS (ft)          *       0.18  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    6174.58  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       7.37  * C & E Loss (ft)        *       0.00  *       0.11  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.70  *       0.70  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.17  *       5.17  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	763.03	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	762.55	E.G. Elev (ft)	762.95	762.92
Q Total (cfs)	54400.00	W.S. Elev (ft)	761.75	761.71
Q Bridge (cfs)	54400.00	Crit W.S. (ft)	742.63	742.63
Q Weir (cfs)		Max Chl Dpth (ft)	39.30	39.26
Weir Sta Lft (ft)		Vel Total (ft/s)	8.81	8.81
Weir Sta Rgt (ft)		Flow Area (sq ft)	6174.58	6174.58
Weir Submerg		Froude # Chl	0.30	0.30
Weir Max Depth (ft)		Specif Force (cu ft)	131464.50	131231.70
Min El Weir Flow (ft)	762.01	Hydr Depth (ft)		
Min El Prs (ft)	755.65	W.P. Total (ft)	805.93	805.93
Delta EG (ft)	0.31	Conv. Total (cfs)	1188563.0	1188563.0
Delta WS (ft)	0.38	Top Width (ft)		
BR Open Area (sq ft)	6174.58	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	8.81	C & E Loss (ft)	0.00	0.20
Coef of Q		Shear Total (lb/sq ft)	1.00	1.00
Br Sel Method	Energy only	Power Total (lb/ft s)	8.83	8.83

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	764.44	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	763.94	E.G. Elev (ft)	764.41	764.36
Q Total (cfs)	63000.00	W.S. Elev (ft)	763.58	763.51
Q Bridge (cfs)	51579.39	Crit W.S. (ft)	744.00	744.00
Q Weir (cfs)		Max Chl Dpth (ft)	41.13	41.06
Weir Sta Lft (ft)		Vel Total (ft/s)	6.91	7.01
Weir Sta Rgt (ft)		Flow Area (sq ft)	9117.64	8983.52
Weir Submerg		Froude # Chl	0.22	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	145665.80	145171.80
Min El Weir Flow (ft)	762.01	Hydr Depth (ft)	5.89	5.84
Min El Prs (ft)	755.65	W.P. Total (ft)	2356.66	2345.59
Delta EG (ft)	0.18	Conv. Total (cfs)	1235634.0	1214683.0
Delta WS (ft)	0.20	Top Width (ft)	1844.12	1843.26
BR Open Area (sq ft)	6174.58	Frctn Loss (ft)	0.05	0.00
BR Open Vel (ft/s)	8.35	C & E Loss (ft)	0.00	0.10
Coef of Q		Shear Total (lb/sq ft)	0.63	0.64
Br Sel Method	Energy only	Power Total (lb/ft s)	4.34	4.51

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	766.77	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	766.29	E.G. Elev (ft)	766.76	766.74
Q Total (cfs)	75900.00	W.S. Elev (ft)	766.21	766.18
Q Bridge (cfs)	42308.16	Crit W.S. (ft)	745.89	745.89
Q Weir (cfs)		Max Chl Dpth (ft)	43.76	43.73
Weir Sta Lft (ft)		Vel Total (ft/s)	5.75	5.79
Weir Sta Rgt (ft)		Flow Area (sq ft)	13196.81	13098.03
Weir Submerg		Froude # Chl	0.18	0.18

```
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *  174847.60  *  174405.60  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *       8.52  *       8.52  *
* Min El Prs (ft)        *     755.65  * W.P. Total (ft)        *    2359.29  *    2348.26  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  2058243.0  *  2045989.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *    1848.99  *    1848.60  *
* BR Open Area (sq ft)   *    6174.58  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       6.85  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *            * Shear Total (lb/sq ft) *       0.47  *       0.48  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.73  *       2.78  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. US. (ft)          *     756.03  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.52  * E.G. Elev (ft)         *     756.02  *     756.00  *
* Q Total (cfs)          *   38700.00  * W.S. Elev (ft)         *     755.39  *     755.38  *
* Q Bridge (cfs)         *   38700.00  * Crit W.S. (ft)         *     739.86  *     739.87  *
* Q Weir (cfs)           *            * Max Chl Dpth (ft)      *      32.94  *      32.93  *
* Weir Sta Lft (ft)      *            * Vel Total (ft/s)       *       6.34  *       6.35  *
* Weir Sta Rgt (ft)      *            * Flow Area (sq ft)      *    6101.50  *    6098.26  *
* Weir Submerg           *            * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   84957.77  *   84891.47  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *      21.69  *      21.68  *
* Min El Prs (ft)        *     755.65  * W.P. Total (ft)        *     520.14  *     519.97  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  1560235.0  *  1559180.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     281.35  *     281.31  *
* BR Open Area (sq ft)   *    6174.58  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *       6.35  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *            * Shear Total (lb/sq ft) *       0.45  *       0.45  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.86  *       2.86  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 9.047

INPUT
Description: d/s Face B-21B
LOMR cross section from 2003 contours.
COE
             Riverstation=20083.45
Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     764   27.72     764   30.55  763.51   66.66  763.57   93.19  763.55
  104.22     762  172.14     762  176.61  762.28  192.27  762.43  199.91  762.32
  207.12  762.28  210.71     762  326.96     762  350.15     762  406.35     762
     420  757.45     450  754.45     495  739.45     525  736.45     554  726.78
     577  726.45     589  722.45     611  722.45     633  722.45     645  726.45
     668  726.78     697  736.45     727  739.45   778.5  756.61     808   760.5
  817.89  761.56  818.66  761.63  821.35     762   840.3     762  857.86  762.62
  861.22  762.65  879.58  762.49  905.13     762  908.89     762  935.77   761.6
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  990.27  761.03  1108.4  760.08 1120.56  760.09 1144.15     760 1199.98     760
 1333.69  759.86 1413.27     760 1435.16     762 1678.33     762 1705.06  761.46
 1719.56  761.23 1737.27  761.06 1810.88  760.82 1840.93  760.61 1874.94  760.26
 1891.39     760 1895.49     760 1900.05  759.75 1926.27     758 1936.83   757.1
 1950.87  757.28 1953.84  758.52 1956.87     760 1958.48  760.69 1963.33  763.04
    1971  766.88 1982.69  772.34 1991.96  776.57 1999.07  780.01

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  406.35     .03  821.35     .05  857.86    .025 1413.27     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        406.35  821.35           408.02     335  330.56             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  861.22    1659     763       F
    1659    1992     775       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0     121     770

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  742.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.38  * Reach Len. (ft)        *  408.02  *  335.00  *  330.56  *
* Crit W.S. (ft)         *  731.80  * Flow Area (sq ft)      *          * 2947.38  *          *
* E.G. Slope (ft/ft)     *0.000295  * Area (sq ft)           *          * 2947.38  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  249.56  * Top Width (ft)         *          *  249.56  *          *
* Vel Total (ft/s)       *    4.34  * Avg. Vel. (ft/s)       *          *    4.34  *          *
* Max Chl Dpth (ft)      *   19.93  * Hydr. Depth (ft)       *          *   11.81  *          *
* Conv. Total (cfs)      *745800.9  * Conv. (cfs)            *          *745800.9  *          *
* Length Wtd. (ft)       *  335.00  * Wetted Per. (ft)       *          *  255.25  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.92  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *          * 2730.39  *    5.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *  232.30  *    1.74  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  747.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  746.81  * Reach Len. (ft)        *  408.02  *  335.00  *  330.56  *
* Crit W.S. (ft)         *  734.27  * Flow Area (sq ft)      *          * 4112.59  *          *
* E.G. Slope (ft/ft)     *0.000286  * Area (sq ft)           *          * 4112.59  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  276.16  * Top Width (ft)         *          *  276.16  *          *
* Vel Total (ft/s)       *    4.98  * Avg. Vel. (ft/s)       *          *    4.98  *          *
* Max Chl Dpth (ft)      *   24.36  * Hydr. Depth (ft)       *          *   14.89  *          *
* Conv. Total (cfs)      *1212209.0  * Conv. (cfs)            *          *1212209.0  *          *
* Length Wtd. (ft)       *  335.00  * Wetted Per. (ft)       *          *  283.29  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.29  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.51  * 3774.55  *   22.64  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  260.88  *   11.95  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  750.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  750.36  * Reach Len. (ft)        *  408.02  *  335.00  *  330.56  *
* Crit W.S. (ft)         *  736.06  * Flow Area (sq ft)      *          * 5131.34  *          *
* E.G. Slope (ft/ft)     *0.000265  * Area (sq ft)           *          * 5131.34  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  297.48  * Top Width (ft)         *          *  297.48  *          *
```

```
* Vel Total (ft/s)       *    5.28  * Avg. Vel. (ft/s)       *          *    5.28  *          *
* Max Chl Dpth (ft)      *   27.91  * Hydr. Depth (ft)       *          *   17.25  *          *
* Conv. Total (cfs)      *1665989.0  * Conv. (cfs)            *          *1665989.0  *          *
* Length Wtd. (ft)       *  335.00  * Wetted Per. (ft)       *          *  305.76  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.46  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   15.75  * 4677.01  *  105.70  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.30  *  282.08  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  753.63  * Reach Len. (ft)        *  408.02  *  335.00  *  330.56  *
* Crit W.S. (ft)         *  738.24  * Flow Area (sq ft)      *          * 6136.05  *          *
* E.G. Slope (ft/ft)     *0.000258  * Area (sq ft)           *          * 6136.05  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  317.10  * Top Width (ft)         *          *  317.10  *          *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *          *    5.62  *          *
* Max Chl Dpth (ft)      *   31.18  * Hydr. Depth (ft)       *          *   19.35  *          *
* Conv. Total (cfs)      *2148578.0  * Conv. (cfs)            *          *2148578.0  *          *
* Length Wtd. (ft)       *  335.00  * Wetted Per. (ft)       *          *  326.44  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.70  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   63.40  * 5593.20  *  347.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   30.11  *  298.60  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  759.47  * Reach Len. (ft)        *  408.02  *  335.00  *  330.56  *
* Crit W.S. (ft)         *  740.49  * Flow Area (sq ft)      *          * 8184.60  *          *
* E.G. Slope (ft/ft)     *0.000223  * Area (sq ft)           *          * 8184.60  *   74.31  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  437.92  * Top Width (ft)         *          *  386.30  *   51.62  *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *          *    5.56  *          *
* Max Chl Dpth (ft)      *   37.02  * Hydr. Depth (ft)       *          *   21.19  *          *
* Conv. Total (cfs)      *3048345.0  * Conv. (cfs)            *          *3048345.0  *          *
* Length Wtd. (ft)       *  335.03  * Wetted Per. (ft)       *          *  396.92  *          *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.59  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  342.95  * 7050.16  * 1363.19  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  150.70  *  317.50  *  354.08  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.              *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  762.18  * Reach Len. (ft)        *  408.02  *  335.00  *  330.56  *
* Crit W.S. (ft)         *  741.91  * Flow Area (sq ft)      *   44.73  * 9270.17  *    3.85  *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           *   44.73  * 9270.17  * 1523.79  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *    6.38  *54393.11  *    0.51  *
* Top Width (ft)         * 1756.75  * Top Width (ft)         *  251.94  *  415.00  * 1089.81  *
* Vel Total (ft/s)       *    5.84  * Avg. Vel. (ft/s)       *    0.14  *    5.87  *    0.13  *
* Max Chl Dpth (ft)      *   39.73  * Hydr. Depth (ft)       *    0.18  *   22.34  *    0.16  *
* Conv. Total (cfs)      *3578279.0  * Conv. (cfs)            *   419.7  *3577826.0  *    33.8  *
* Length Wtd. (ft)       *  335.18  * Wetted Per. (ft)       *  252.14  *  426.19  *   24.03  *
* Min Ch El (ft)         *  722.45  * Shear (lb/sq ft)       *    0.00  *    0.31  *    0.00  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    1.84  *    0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  888.78  * 7879.72  * 2474.17  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  278.79  *  322.15  *  560.99  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	764.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.050	0.030	0.027
W.S. Elev (ft)	763.74	Reach Len. (ft)	408.02	335.00	330.56
Crit W.S. (ft)	743.20	Flow Area (sq ft)	484.44	9917.31	2290.05
E.G. Slope (ft/ft)	0.000217	Area (sq ft)	484.44	9917.31	3290.33
Q Total (cfs)	63000.00	Flow (cfs)	300.56	58974.48	3724.95
Top Width (ft)	1843.73	Top Width (ft)	285.35	415.00	1143.38
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)	0.62	5.95	1.63
Max Chl Dpth (ft)	41.29	Hydr. Depth (ft)	1.70	23.90	2.73
Conv. Total (cfs)	4277004.0	Conv. (cfs)	20404.6	4003716.0	252883.2
Length Wtd. (ft)	335.39	Wetted Per. (ft)	287.11	426.19	837.77
Min Ch El (ft)	722.45	Shear (lb/sq ft)	0.02	0.32	0.04
Alpha	1.35	Stream Power (lb/ft s)	0.01	1.87	0.06
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1371.96	8392.23	3529.33
C & E Loss (ft)	0.01	Cum SA (acres)	324.18	322.51	813.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	766.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.050	0.030	0.028
W.S. Elev (ft)	766.23	Reach Len. (ft)	408.02	335.00	330.56
Crit W.S. (ft)	745.01	Flow Area (sq ft)	1196.65	10953.12	4380.75
E.G. Slope (ft/ft)	0.000190	Area (sq ft)	1196.65	10953.12	6150.32
Q Total (cfs)	75900.00	Flow (cfs)	1260.77	65049.02	9590.21
Top Width (ft)	1848.71	Top Width (ft)	285.35	415.00	1148.36
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)	1.05	5.94	2.19
Max Chl Dpth (ft)	43.78	Hydr. Depth (ft)	4.19	26.39	5.23
Conv. Total (cfs)	5512776.0	Conv. (cfs)	91572.6	4724646.0	696556.9
Length Wtd. (ft)	336.00	Wetted Per. (ft)	289.61	426.19	837.77
Min Ch El (ft)	722.45	Shear (lb/sq ft)	0.05	0.30	0.06
Alpha	1.46	Stream Power (lb/ft s)	0.05	1.81	0.14
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	2353.33	9252.21	5934.17
C & E Loss (ft)	0.01	Cum SA (acres)	385.37	323.89	1067.42

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	755.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.030	
W.S. Elev (ft)	755.46	Reach Len. (ft)	408.02	335.00	330.56
Crit W.S. (ft)	739.27	Flow Area (sq ft)		6728.80	
E.G. Slope (ft/ft)	0.000257	Area (sq ft)		6728.80	
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	335.11	Top Width (ft)		335.11	
Vel Total (ft/s)	5.75	Avg. Vel. (ft/s)		5.75	
Max Chl Dpth (ft)	33.01	Hydr. Depth (ft)		20.08	
Conv. Total (cfs)	2415174.0	Conv. (cfs)		2415174.0	
Length Wtd. (ft)	335.00	Wetted Per. (ft)		344.93	
Min Ch El (ft)	722.45	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.80	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	112.97	6079.79	553.87
C & E Loss (ft)	0.01	Cum SA (acres)	50.89	305.73	152.13

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 8.983

```
INPUT
Description: COE Riverstation=20418.05
LOMR cross section from 2003 contours.

FEMA Sec. M
Station Elevation Data    num=     102
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  802.72     .07  802.73   23.38  797.13   36.53     794   47.47     790
   53.01     788   58.65     786   64.11     784   74.74     780   76.37  779.32
   79.69     778   84.91  776.09    89.5  774.23   99.53     770  104.05  768.35
  104.92     768  124.73     766  142.38     764  148.26     762   150.2  761.67
   160.9     760  187.87     760  198.31     762  221.83  762.77  230.69  762.78
  240.07  762.48  252.54     762   323.4  760.82  369.04     760   423.4  757.98
  440.45     756  446.14     754  457.79     750  467.67     746  472.72     744
  476.47  742.71  478.46     742  484.48     740  490.69  738.37  492.22     738
  512.31     736  515.21  735.48  524.04     734   536.7   730.3  536.76  730.29
  537.76     730 571.775  726.35 583.775  722.35 627.775  722.35 639.775  726.35
  668.85     728  677.66     730  678.57  730.24  678.67  730.26  685.64     732
  688.73  732.73  693.87     734  698.81  735.17  702.21     736  711.72  737.01
  720.52     738  730.45     740  736.51     742  760.34     750  767.19     752
  773.48     754  815.95     758   836.1     760  885.85     762  977.79  762.54
  996.74  762.63 1022.72  762.64 1038.09  762.57 1118.92     762 1179.86     762
 1215.36   761.8 1240.65  761.73 1282.31  761.51 1308.11   761.2 1405.73     760
  1488.7     760 1610.85   760.1 1621.33  760.19 1629.21  760.23    1687     762
 1771.96     762 1807.74  760.94 1816.91  760.74 1821.29  760.62 1846.58  760.18
 1848.99  760.27 1851.83  760.25  1855.2  760.39  1860.2  760.52 1872.89  761.04
 1894.25     762 2081.24     762 2097.19     764 2102.29  764.95 2107.59     766
 2119.98     772 2136.56  780.09

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  440.45     .03   836.1     .05  885.85    .025 1240.65    .025
    1687     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        440.45   836.1           333.06     331   336.3              .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     230     763       F
 1022.72    1794     763       F
    1794    2120     775       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1687    1794     775

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  742.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.30  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  732.03  * Flow Area (sq ft)      *          * 3078.81  *          *
* E.G. Slope (ft/ft)     *0.000267  * Area (sq ft)           *          * 3078.81  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  259.78  * Top Width (ft)          *          *  259.78  *          *
* Vel Total (ft/s)       *    4.16  * Avg. Vel. (ft/s)        *          *    4.16  *          *
* Max Chl Dpth (ft)      *   19.95  * Hydr. Depth (ft)        *          *   11.85  *          *
* Conv. Total (cfs)      *783405.0  * Conv. (cfs)             *          *783405.0  *          *
* Length Wtd. (ft)       *  331.00  * Wetted Per. (ft)        *          *  264.42  *          *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)        *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.81  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *          * 2707.21  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  230.34  *    1.74  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  747.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  746.74  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
```

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* Crit W.S. (ft)         *  734.42  * Flow Area (sq ft)      *          * 4288.70  *          *
* E.G. Slope (ft/ft)     *0.000258  * Area (sq ft)           *          * 4288.70  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  284.78  * Top Width (ft)         *          *  284.78  *          *
* Vel Total (ft/s)       *    4.78  * Avg. Vel. (ft/s)       *          *    4.78  *          *
* Max Chl Dpth (ft)      *   24.39  * Hydr. Depth (ft)       *          *   15.06  *          *
* Conv. Total (cfs)      *1277016.0  * Conv. (cfs)            *          *1277016.0  *          *
* Length Wtd. (ft)       *  331.00  * Wetted Per. (ft)       *          *  290.96  *          *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.13  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.51  * 3742.25  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  258.72  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  750.30  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  736.21  * Flow Area (sq ft)      *          * 5337.14  *          *
* E.G. Slope (ft/ft)     *0.000238  * Area (sq ft)           *          * 5337.14  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  304.45  * Top Width (ft)         *          *  304.45  *          *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *          *    5.08  *          *
* Max Chl Dpth (ft)      *   27.95  * Hydr. Depth (ft)       *          *   17.53  *          *
* Conv. Total (cfs)      *1755469.0  * Conv. (cfs)            *          *1755469.0  *          *
* Length Wtd. (ft)       *  331.00  * Wetted Per. (ft)       *          *  311.88  *          *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.29  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   15.75  * 4636.76  *  105.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  279.76  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  753.57  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  738.07  * Flow Area (sq ft)      *          * 6367.19  *          *
* E.G. Slope (ft/ft)     *0.000234  * Area (sq ft)           *          * 6367.19  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  324.75  * Top Width (ft)         *          *  324.75  *          *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)       *          *    5.42  *          *
* Max Chl Dpth (ft)      *   31.22  * Hydr. Depth (ft)       *          *   19.61  *          *
* Conv. Total (cfs)      *2254065.0  * Conv. (cfs)            *          *2254065.0  *          *
* Length Wtd. (ft)       *  331.00  * Wetted Per. (ft)       *          *  333.22  *          *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.51  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   63.40  * 5545.12  *  347.57  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   30.11  *  296.13  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.              *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  759.43  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  740.06  * Flow Area (sq ft)      *   69.70  * 8463.82  *          *
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           *   69.70  * 8463.82  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   33.88  *45466.13  *          *
* Top Width (ft)         *  445.85  * Top Width (ft)         *   55.98  *  389.87  *          *
* Vel Total (ft/s)       *    5.33  * Avg. Vel. (ft/s)       *    0.49  *    5.37  *          *
* Max Chl Dpth (ft)      *   37.08  * Hydr. Depth (ft)       *    1.25  *   21.71  *          *
* Conv. Total (cfs)      *3214425.0  * Conv. (cfs)            *  2393.2  *3212031.0  *          *
* Length Wtd. (ft)       *  331.01  * Wetted Per. (ft)       *   56.12  *  399.08  *          *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *    0.02  *    0.27  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.01  *    1.43  *          *
```

```
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  342.62  * 6986.14  * 1362.91  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  150.44  *  314.52  *  353.89  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**************************************************************************************************
* E.G. Elev (ft)         *  762.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.050  *   0.030  *   0.050  *
* W.S. Elev (ft)         *  762.13  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  741.47  * Flow Area (sq ft)      *  388.86  * 9533.44  *   57.96  *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           *  473.04  * 9533.44  *  958.50  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  258.46  *54115.90  *   25.64  *
* Top Width (ft)         * 1589.59  * Top Width (ft)         *  245.94  *  395.65  *  948.01  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    0.66  *    5.68  *    0.44  *
* Max Chl Dpth (ft)      *   39.78  * Hydr. Depth (ft)       *    2.03  *   24.10  *    0.80  *
* Conv. Total (cfs)      *3899514.0  * Conv. (cfs)           * 18527.0  *3879149.0  *  1837.7  *
* Length Wtd. (ft)       *  331.11  * Wetted Per. (ft)       *  191.57  *  404.88  *   72.63  *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *    0.02  *    0.29  *    0.01  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.02  *    1.62  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  886.35  * 7807.42  * 2464.75  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  276.46  *  319.03  *  553.26  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**************************************************************************************************
* E.G. Elev (ft)         *  764.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.050  *   0.030  *   0.026  *
* W.S. Elev (ft)         *  763.69  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  742.72  * Flow Area (sq ft)      *  912.46  *10147.28  * 2066.75  *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           *  912.46  *10147.28  * 2679.24  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  784.96  *59086.05  * 3128.99  *
* Top Width (ft)         * 1844.38  * Top Width (ft)         *  297.15  *  395.65  * 1151.58  *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)       *    0.86  *    5.82  *    1.51  *
* Max Chl Dpth (ft)      *   41.34  * Hydr. Depth (ft)       *    3.07  *   25.65  *    2.43  *
* Conv. Total (cfs)      *4589425.0  * Conv. (cfs)           * 57182.8  *4304301.0  *227941.0  *
* Length Wtd. (ft)       *  331.39  * Wetted Per. (ft)       *  297.97  *  404.88  *  852.67  *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *    0.04  *    0.29  *    0.03  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.03  *    1.72  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1365.41  * 8315.08  * 3506.68  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  321.45  *  319.39  *  804.31  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**************************************************************************************************
* E.G. Elev (ft)         *  766.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.050  *   0.030  *   0.026  *
* W.S. Elev (ft)         *  766.19  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  744.46  * Flow Area (sq ft)      * 1679.80  *11137.92  * 4197.27  *
* E.G. Slope (ft/ft)     *0.000166  * Area (sq ft)           * 1679.80  *11137.92  * 5581.08  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1949.96  *64821.70  * 9128.35  *
* Top Width (ft)         * 1878.13  * Top Width (ft)         *  317.60  *  395.65  * 1164.88  *
* Vel Total (ft/s)       *    4.46  * Avg. Vel. (ft/s)       *    1.16  *    5.82  *    2.17  *
* Max Chl Dpth (ft)      *   43.84  * Hydr. Depth (ft)       *    5.29  *   28.15  *    4.93  *
* Conv. Total (cfs)      *5886383.0  * Conv. (cfs)           *151227.7  *5027211.0  *707944.0  *
* Length Wtd. (ft)       *  331.80  * Wetted Per. (ft)       *  318.59  *  404.88  *  855.17  *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *    0.05  *    0.29  *    0.05  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.06  *    1.66  *    0.11  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 2339.86  * 9167.26  * 5889.66  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  382.55  *  320.77  * 1058.64  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  755.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  755.40  * Reach Len. (ft)        *  333.06  *  331.00  *  336.30  *
* Crit W.S. (ft)         *  738.85  * Flow Area (sq ft)      *          * 6977.88  *          *
* E.G. Slope (ft/ft)     *0.000236  * Area (sq ft)           *          * 6977.88  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  346.18  * Top Width (ft)         *          *  346.18  *          *
* Vel Total (ft/s)       *    5.55  * Avg. Vel. (ft/s)       *          *    5.55  *          *
* Max Chl Dpth (ft)      *   33.05  * Hydr. Depth (ft)       *          *   20.16  *          *
* Conv. Total (cfs)      *2516817.0  * Conv. (cfs)            *          *2516817.0  *          *
* Length Wtd. (ft)       *  331.00  * Wetted Per. (ft)       *          *  355.09  *          *
* Min Ch El (ft)         *  722.35  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.61  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  112.97  * 6027.08  *  553.87  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   50.89  *  303.11  *  152.13  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.921

INPUT
Description: COE Riverstation=20749.49
LOMR cross section from 2003 contours.
Station Elevation Data    num=     102
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0  798.97     6.57     798    18.44     796     29.5     794    37.16  792.37
   47.06     790    52.72     788    58.05     786    63.64     784    75.73     780
   85.41  773.93    88.53     772    92.24     770    94.68  769.35    99.34     768
   103.4  767.53   118.58     766   150.32     764   160.75  762.91   168.19     762
  179.53     760   184.79  759.21   193.54     758   222.77     758   233.88     760
  277.41  760.22   285.94  760.23    337.2     760   370.05     760   382.95  759.59
  440.16     758   460.02     758   477.58  757.63   530.33     756   536.89     756
  576.84     754   581.19     752   585.74     750   596.89  746.11     608     742
  614.08     740   650.98     736    658.1     734   665.71     732   673.68  730.22
  673.77   730.2   674.68     730   679.41     728  705.515  726.26  717.515  722.26
 761.515  722.26  773.515  726.26   793.92     728   803.33     730   804.33  730.36
   804.4  730.39   808.88     732   814.75     734   824.24     736   853.62     740
   859.9     742   865.91     744   874.54  746.67   879.08     748   885.39     750
  900.44     754   913.09     756   930.35     758   942.99     760   988.03  760.66
    1032  761.67     1121  761.22  1124.26  761.18  1131.71   761.2  1146.34  761.03
 1154.18  760.99  1198.04  760.57  1250.68     760  1258.36     760  1311.81  759.56
 1319.09  759.46     1348  759.22  1403.88  758.36  1430.77     758  1437.69     758
 1441.39     758  1523.43     760  1565.15  760.02  1720.82  760.81  1836.48  761.32
 1948.67     762   1963.6     762     2005     762  2209.93  763.33  2216.79  763.54
 2232.52   763.8   2237.6     764  2294.87  764.09  2353.91     764  2376.11     764
 2396.65     766  2428.01     780

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************************
       0     .05  576.84     .03  942.99     .05  988.03    .025 1565.15     .04
    2005     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        576.84  942.99           322.39     288  320.56             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     440   762.5       F
    1032    1895     762       F
    1895    2428     775       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  742.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.16  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  732.02  * Flow Area (sq ft)      *          * 2885.34  *          *
```

```
* E.G. Slope (ft/ft)     *0.000320  * Area (sq ft)           *          * 2885.34  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  252.82  * Top Width (ft)         *          *  252.82  *          *
* Vel Total (ft/s)       *    4.44  * Avg. Vel. (ft/s)       *          *    4.44  *          *
* Max Chl Dpth (ft)      *   19.90  * Hydr. Depth (ft)       *          *   11.41  *          *
* Conv. Total (cfs)      *715277.8  * Conv. (cfs)             *          *715277.8  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)        *          *  257.69  *          *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)        *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.99  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *          * 2684.55  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  228.40  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  746.60  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  734.53  * Flow Area (sq ft)      *          * 4065.45  *          *
* E.G. Slope (ft/ft)     *0.000300  * Area (sq ft)           *          * 4065.45  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  278.85  * Top Width (ft)         *          *  278.85  *          *
* Vel Total (ft/s)       *    5.04  * Avg. Vel. (ft/s)       *          *    5.04  *          *
* Max Chl Dpth (ft)      *   24.34  * Hydr. Depth (ft)       *          *   14.58  *          *
* Conv. Total (cfs)      *1183844.0  * Conv. (cfs)            *          *1183844.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)        *          *  285.20  *          *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)        *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.35  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *    1.51  * 3710.51  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    2.36  *  256.58  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  750.17  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  736.43  * Flow Area (sq ft)      *          * 5100.28  *          *
* E.G. Slope (ft/ft)     *0.000273  * Area (sq ft)           *          * 5100.28  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  300.70  * Top Width (ft)         *          *  300.70  *          *
* Vel Total (ft/s)       *    5.31  * Avg. Vel. (ft/s)       *          *    5.31  *          *
* Max Chl Dpth (ft)      *   27.91  * Hydr. Depth (ft)       *          *   16.96  *          *
* Conv. Total (cfs)      *1640543.0  * Conv. (cfs)            *          *1640543.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)        *          *  308.19  *          *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)        *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.50  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   15.75  * 4597.10  *  105.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    9.30  *  277.46  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  753.45  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  738.41  * Flow Area (sq ft)      *          * 6117.40  *          *
* E.G. Slope (ft/ft)     *0.000263  * Area (sq ft)           *          * 6117.40  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  320.33  * Top Width (ft)         *          *  320.33  *          *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *          *    5.64  *          *
* Max Chl Dpth (ft)      *   31.19  * Hydr. Depth (ft)       *          *   19.10  *          *
* Conv. Total (cfs)      *2126851.0  * Conv. (cfs)            *          *2126851.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)        *          *  328.94  *          *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)        *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.72  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *   63.40  * 5497.69  *  347.57  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   30.11  *  293.68  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  759.33  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  740.62  * Flow Area (sq ft)      *  380.30  * 8119.16  *          *
* E.G. Slope (ft/ft)     *0.000206  * Area (sq ft)           *  461.80  * 8119.16  *  111.74  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  320.72  *45179.28  *          *
* Top Width (ft)         *  753.15  * Top Width (ft)         *  230.55  *  361.90  *  160.70  *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *    0.84  *    5.56  *          *
* Max Chl Dpth (ft)      *   37.07  * Hydr. Depth (ft)       *    2.78  *   22.44  *          *
* Conv. Total (cfs)      *3168226.0  * Conv. (cfs)           * 22332.0  *3145894.0  *          *
* Length Wtd. (ft)       *  288.12  * Wetted Per. (ft)       *  136.92  *  371.08  *          *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)       *    0.04  *    0.28  *          *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.03  *    1.57  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  340.59  * 6923.13  * 1362.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  149.34  *  311.66  *  353.27  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.56  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.050  *   0.030  *   0.028  *
* W.S. Elev (ft)         *  762.09  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  742.01  * Flow Area (sq ft)      *  758.40  * 9129.42  * 1687.18  *
* E.G. Slope (ft/ft)     *0.000185  * Area (sq ft)           * 1457.68  * 9129.42  * 1706.42  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  958.92  *51585.50  * 1855.58  *
* Top Width (ft)         * 1851.41  * Top Width (ft)         *  409.39  *  366.15  * 1075.87  *
* Vel Total (ft/s)       *    4.70  * Avg. Vel. (ft/s)       *    1.26  *    5.65  *    1.10  *
* Max Chl Dpth (ft)      *   39.83  * Hydr. Depth (ft)       *    5.54  *   24.93  *    1.77  *
* Conv. Total (cfs)      *4002778.0  * Conv. (cfs)           * 70557.7  *3795685.0  *136534.8  *
* Length Wtd. (ft)       *  289.04  * Wetted Per. (ft)       *  136.92  *  375.39  *  952.08  *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)       *    0.06  *    0.28  *    0.02  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.08  *    1.58  *    0.02  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  878.97  * 7736.51  * 2454.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  273.96  *  316.14  *  545.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.11  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.050  *   0.030  *   0.028  *
* W.S. Elev (ft)         *  763.65  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  743.30  * Flow Area (sq ft)      * 2108.38  * 9702.11  * 3176.20  *
* E.G. Slope (ft/ft)     *0.000175  * Area (sq ft)           * 2108.38  * 9702.11  * 3571.46  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2418.05  *55637.54  * 4944.41  *
* Top Width (ft)         * 2070.06  * Top Width (ft)         *  423.21  *  366.15  * 1280.70  *
* Vel Total (ft/s)       *    4.20  * Avg. Vel. (ft/s)       *    1.15  *    5.73  *    1.56  *
* Max Chl Dpth (ft)      *   41.39  * Hydr. Depth (ft)       *    4.98  *   26.50  *    3.34  *
* Conv. Total (cfs)      *4756649.0  * Conv. (cfs)           *182568.2  *4200766.0  *373314.9  *
* Length Wtd. (ft)       *  290.63  * Wetted Per. (ft)       *  423.91  *  375.39  *  952.08  *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)       *    0.05  *    0.28  *    0.04  *
* Alpha                  *    1.66  * Stream Power (lb/ft s) *    0.06  *    1.62  *    0.06  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1353.87  * 8239.66  * 3482.55  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  318.70  *  316.50  *  794.92  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  766.58  * Element               *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.050  *   0.030  *   0.029  *
* W.S. Elev (ft)         *  766.17  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  745.06  * Flow Area (sq ft)      * 3220.12  *10624.86  * 5575.40  *
* E.G. Slope (ft/ft)     *0.000151  * Area (sq ft)           * 3220.12  *10624.86  * 7152.23  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4302.17  *60111.84  *11485.99  *
* Top Width (ft)         * 2280.19  * Top Width (ft)         *  459.99  *  366.15  * 1454.05  *
* Vel Total (ft/s)       *    3.91  * Avg. Vel. (ft/s)       *    1.34  *    5.66  *    2.06  *
* Max Chl Dpth (ft)      *   43.91  * Hydr. Depth (ft)       *    7.00  *   29.02  *    5.86  *
* Conv. Total (cfs)      *6171232.0  * Conv. (cfs)            *349798.3  *4887537.0  *933896.3  *
* Length Wtd. (ft)       *  293.53  * Wetted Per. (ft)        *  460.78  *  375.39  *  952.08  *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)       *    0.07  *    0.27  *    0.06  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    0.09  *    1.51  *    0.11  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 2321.13  * 9084.57  * 5840.51  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  379.58  *  317.88  * 1048.53  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  755.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  755.28  * Reach Len. (ft)        *  322.39  *  288.00  *  320.56  *
* Crit W.S. (ft)         *  739.36  * Flow Area (sq ft)      *   16.27  * 6713.11  *          *
* E.G. Slope (ft/ft)     *0.000254  * Area (sq ft)           *   16.27  * 6713.11  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *    5.71  *38694.29  *          *
* Top Width (ft)         *  357.17  * Top Width (ft)         *   25.50  *  331.67  *          *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *    0.35  *    5.76  *          *
* Max Chl Dpth (ft)      *   33.02  * Hydr. Depth (ft)       *    0.64  *   20.24  *          *
* Conv. Total (cfs)      *2426580.0  * Conv. (cfs)            *   358.2  *2426222.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)        *   25.53  *  340.58  *          *
* Min Ch El (ft)         *  722.26  * Shear (lb/sq ft)       *    0.01  *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.80  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  112.91  * 5975.07  *  553.87  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   50.79  *  300.54  *  152.13  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.866

INPUT
Description: u/s Face B-21
LOMR cross section from 2003 contours.
COE
            Riverstation=21037.46
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  763.21   57.91  763.06    94.1  763.16  119.04   763.4  148.25   763.3
     196     762  431.06     762  463.81  761.48     518     761     533  756.15
     584  739.15     614  736.15     643  726.48     666  726.17     678  722.17
     700  722.17     722  722.17     734  726.17     757  726.48     786  736.15
     816  739.15     861  754.15  878.02  760.35  971.24  760.69  991.35  761.01
 1046.72  761.45 1061.21  761.69  1072.3     762 1168.67     762 1202.21     762
 1209.29     760 1217.52  757.46 1244.01  750.29 1266.83  744.55 1270.63  743.87
 1272.34  743.87 1274.84  744.18 1283.86  745.81 1289.54  746.34 1291.76  746.76
 1294.77   747.5 1311.17     752  1316.7     754 1320.85     756 1325.64     758
 1330.16  758.42 1335.53  758.68 1343.03  759.22 1364.06     760 1378.81     760
 1486.15  760.61 1592.14  761.86 1619.33     762 1645.98     762 1668.09  762.25
 1747.14     762    1913     762 2067.68     762 2075.15  761.05 2078.54  760.87
    2082  760.49 2088.19  760.23 2096.97  760.07 2105.38  760.19  2111.3   760.4
 2140.94     762 2148.48     762 2256.97  763.64 2288.02  763.75 2291.85  762.03
 2303.37     762 2335.39  762.35 2381.18  762.51 2470.84  762.45 2486.57  762.68
 2552.38     764 2581.18  764.99 2604.23     766 2635.27  779.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     533     .03     861     .05 1266.83    .025    1913     .05
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           518  878.02             41.2      38   37.18             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     931    1261     775       F
    1913 2635.27     775       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0      69     770    1175 2635.27     760

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.08  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  731.52  * Flow Area (sq ft)      *          * 2947.01  *          *
* E.G. Slope (ft/ft)     *0.000295  * Area (sq ft)           *          * 2947.01  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  249.59  * Top Width (ft)         *          *  249.59  *          *
* Vel Total (ft/s)       *    4.34  * Avg. Vel. (ft/s)       *          *    4.34  *          *
* Max Chl Dpth (ft)      *   19.91  * Hydr. Depth (ft)       *          *   11.81  *          *
* Conv. Total (cfs)      *745580.5  * Conv. (cfs)            *          *745580.5  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  255.28  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.92  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          * 2665.27  *    5.47  *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *  226.73  *    1.74  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  746.53  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  733.98  * Flow Area (sq ft)      *          * 4115.40  *          *
* E.G. Slope (ft/ft)     *0.000285  * Area (sq ft)           *          * 4115.40  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  276.25  * Top Width (ft)         *          *  276.25  *          *
* Vel Total (ft/s)       *    4.98  * Avg. Vel. (ft/s)       *          *    4.98  *          *
* Max Chl Dpth (ft)      *   24.36  * Hydr. Depth (ft)       *          *   14.90  *          *
* Conv. Total (cfs)      *1213310.0  * Conv. (cfs)            *          *1213310.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  283.39  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.29  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.51  * 3683.46  *   22.64  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.36  *  254.75  *   11.95  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  750.10  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.78  * Flow Area (sq ft)      *          * 5141.41  *          *
* E.G. Slope (ft/ft)     *0.000263  * Area (sq ft)           *          * 5141.41  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  297.71  * Top Width (ft)         *          *  297.71  *          *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)       *          *    5.27  *          *
* Max Chl Dpth (ft)      *   27.93  * Hydr. Depth (ft)       *          *   17.27  *          *
* Conv. Total (cfs)      *1670561.0  * Conv. (cfs)            *          *1670561.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  306.00  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.45  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   15.75  * 4563.25  *  105.70  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    9.30  *  275.49  *   48.63  *
*****************************************************************************************
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Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  753.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  753.38  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  737.94  * Flow Area (sq ft)      *          * 6148.95  *          *
* E.G. Slope (ft/ft)     *0.000256  * Area (sq ft)           *          * 6148.95  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  317.36  * Top Width (ft)          *          *  317.36  *          *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)        *          *    5.61  *          *
* Max Chl Dpth (ft)      *   31.21  * Hydr. Depth (ft)        *          *   19.38  *          *
* Conv. Total (cfs)      *2154883.0  * Conv. (cfs)            *          *2154883.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  326.72  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)        *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    1.69  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)     *   63.40  * 5457.14  *  347.57  *
* C & E Loss (ft)        *          * Cum SA (acres)           *   30.11  *  291.57  *  105.36  *
*************************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*************************************************************************************************
* E.G. Elev (ft)         *  759.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.032  *          *
* W.S. Elev (ft)         *  759.25  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  740.20  * Flow Area (sq ft)      *          * 8114.45  *          *
* E.G. Slope (ft/ft)     *0.000225  * Area (sq ft)           *          * 8114.45  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  351.61  * Top Width (ft)          *          *  351.61  *          *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)        *          *    5.61  *          *
* Max Chl Dpth (ft)      *   37.08  * Hydr. Depth (ft)        *          *   23.08  *          *
* Conv. Total (cfs)      *3031507.0  * Conv. (cfs)            *          *3031507.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  362.93  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)        *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    1.76  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)     *  338.88  * 6869.47  * 1362.06  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)           *  148.49  *  309.30  *  352.68  *
*************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  762.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.050  *   0.032  *   0.027  *
* W.S. Elev (ft)         *  761.96  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  741.63  * Flow Area (sq ft)      *   45.87  * 9080.91  *  564.62  *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           *   45.87  * 9080.91  *  879.88  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *   13.82  *53801.99  *  584.20  *
* Top Width (ft)         * 1117.16  * Top Width (ft)          *   84.12  *  360.02  *  673.02  *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)        *    0.30  *    5.92  *    1.03  *
* Max Chl Dpth (ft)      *   39.79  * Hydr. Depth (ft)        *    0.55  *   25.22  *    1.40  *
* Conv. Total (cfs)      *3581919.0  * Conv. (cfs)            *   909.8  *3542544.0  * 38465.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *   84.12  *  371.81  *  402.62  *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)        *    0.01  *    0.35  *    0.02  *
* Alpha                  *    1.10  * Stream Power (lb/ft s)   *    0.00  *    2.08  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)     *  873.41  * 7676.31  * 2444.95  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)           *  272.13  *  313.74  *  539.01  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
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         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  764.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.050  *   0.032  *   0.027  *
* W.S. Elev (ft)         *  763.45  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  742.92  * Flow Area (sq ft)      *  570.20  * 9619.14  * 1592.56  *
* E.G. Slope (ft/ft)     *0.000239  * Area (sq ft)           *  570.20  * 9619.14  * 3031.65  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  307.27  *60329.59  * 2363.14  *
* Top Width (ft)         * 2411.69  * Top Width (ft)         *  449.00  *  360.02  * 1602.67  *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *    0.54  *    6.27  *    1.48  *
* Max Chl Dpth (ft)      *   41.28  * Hydr. Depth (ft)       *    1.27  *   26.72  *    2.26  *
* Conv. Total (cfs)      *4071959.0  * Conv. (cfs)           * 19860.5  *3899359.0  *152739.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  449.38  *  371.81  *  704.99  *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *    0.02  *    0.39  *    0.03  *
* Alpha                  *    1.32  * Stream Power (lb/ft s) *    0.01  *    2.42  *    0.05  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1343.95  * 8175.79  * 3458.25  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  315.47  *  314.10  *  784.31  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*************************************************************************************************
* E.G. Elev (ft)         *  766.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.050  *   0.032  *   0.026  *
* W.S. Elev (ft)         *  765.97  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  744.71  * Flow Area (sq ft)      * 1700.10  *10525.12  * 3366.63  *
* E.G. Slope (ft/ft)     *0.000214  * Area (sq ft)           * 1700.10  *10525.12  * 7281.98  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1787.15  *66250.25  * 7862.60  *
* Top Width (ft)         * 2534.47  * Top Width (ft)         *  449.00  *  360.02  * 1725.45  *
* Vel Total (ft/s)       *    4.87  * Avg. Vel. (ft/s)       *    1.05  *    6.29  *    2.34  *
* Max Chl Dpth (ft)      *   43.80  * Hydr. Depth (ft)       *    3.79  *   29.23  *    4.78  *
* Conv. Total (cfs)      *5190379.0  * Conv. (cfs)           *122213.5  *4530486.0  *537679.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  451.90  *  371.81  *  704.99  *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *    0.05  *    0.38  *    0.06  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.05  *    2.38  *    0.15  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2302.92  * 9014.66  * 5787.40  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  376.21  *  315.48  * 1036.83  *
*************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*************************************************************************************************
* E.G. Elev (ft)         *  755.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  755.21  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  738.98  * Flow Area (sq ft)      *          * 6739.29  *          *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           *          * 6739.29  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  328.07  * Top Width (ft)         *          *  328.07  *          *
* Vel Total (ft/s)       *    5.74  * Avg. Vel. (ft/s)       *          *    5.74  *          *
* Max Chl Dpth (ft)      *   33.04  * Hydr. Depth (ft)       *          *   20.54  *          *
* Conv. Total (cfs)      *2437226.0  * Conv. (cfs)           *          *2437226.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  338.03  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.80  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  112.85  * 5930.60  *  553.87  *
```

```
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   50.70  *  298.35  *  152.13  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 8.863

INPUT
Description: B-21 Missouri-Pacific R.R. Bridge
COE Riverstation=21052.65
Distance from Upstream XS =       1
Deck/Roadway Width        =      36
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       0   763.3     745   542.9   763.3     745     543     764   754.1
     861     764   754.1   861.1   763.3     745    1700     762     745

Upstream Bridge Cross Section Data
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  763.21   57.91  763.06    94.1  763.16  119.04   763.4  148.25   763.3
     196     762  431.06     762  463.81  761.48     518     761     533  756.15
     584  739.15     614  736.15     643  726.48     666  726.17     678  722.17
     700  722.17     722  722.17     734  726.17     757  726.48     786  736.15
     816  739.15     861  754.15  878.02  760.35  971.24  760.69  991.35  761.01
 1046.72  761.45 1061.21  761.69  1072.3     762 1168.67     762 1202.21     762
 1209.29     760 1217.52  757.46 1244.01  750.29 1266.83  744.55 1270.63  743.87
 1272.34  743.87 1274.84  744.18 1283.86  745.81 1289.54  746.34 1291.76  746.76
 1294.77   747.5 1311.17     752  1316.7     754 1320.85     756 1325.64     758
 1330.16  758.42 1335.53  758.68 1343.03  759.22 1364.06     760 1378.81     760
 1486.15  760.61 1592.14  761.86 1619.33     762 1645.98     762 1668.09  762.25
 1747.14     762    1913     762 2067.68     762 2075.15  761.05 2078.54  760.87
    2082  760.49 2088.19  760.23 2096.97  760.07 2105.38  760.19  2111.3   760.4
 2140.94     762 2148.48     762 2256.97  763.64 2288.02  763.75 2291.85  762.03
 2303.37     762 2335.39  762.35 2381.18  762.51 2470.84  762.45 2486.57  762.68
 2552.38     764 2581.18  764.99 2604.23     766 2635.27  779.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     533     .03     861     .05 1266.83    .025    1913     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
           518  878.02            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     931    1261     775       F
    1913 2635.27     775       F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0      69     770    1175 2635.27     760

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       0   763.3     745   542.9   763.3     745     543     764   754.1
     861     764   754.1   861.1   763.3     745    1700     762     745

Downstream Bridge Cross Section Data
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

```
       0  763.21   57.91  763.06    94.1  763.16  119.04   763.4  148.25   763.3
     196     762  431.06     762  463.81  761.48     518     761     533  756.15
     584  739.15     614  736.15     643  726.48     666  726.17     678  722.17
     700  722.17     722  722.17     734  726.17     757  726.48     786  736.15
     816  739.15     861  754.15  878.02  760.35  971.24  760.69  991.35  761.01
 1046.72  761.45 1061.21  761.69  1072.3     762 1168.67     762 1202.21     762
 1209.29     760 1217.52  757.46 1244.01  750.29 1266.83  744.55 1270.63  743.87
 1272.34  743.87 1274.84  744.18 1283.86  745.81 1289.54  746.34 1291.76  746.76
 1294.77   747.5 1311.17     752  1316.7     754 1320.85     756 1325.64     758
 1330.16  758.42 1335.53  758.68 1343.03  759.22 1364.06     760 1378.81     760
 1486.15  760.61 1592.14  761.86 1619.33     762 1645.98     762 1668.09  762.25
 1747.14     762    1913     762 2067.68     762 2075.15  761.05 2078.54  760.87
    2082  760.49 2088.19  760.23 2096.97  760.07 2105.38  760.19  2111.3   760.4
 2140.94     762 2148.48     762 2256.97  763.64 2288.02  763.75 2291.85  762.03
 2303.37     762 2335.39  762.35 2381.18  762.51 2470.84  762.45 2486.57  762.68
 2552.38     764 2581.18  764.99 2604.23     766 2635.27  779.98

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0     .05      533     .03      861     .05 1266.83    .025     1913     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
           518  878.02             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     931    1261     775       F
    1913 2635.27     775       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0      70     770    1200 2635.27     760

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=   624.3    Downstream=   624.3
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     720       5     760
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     720       5     760

Pier Data
Pier Station     Upstream=     707    Downstream=     707
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     720       5     760
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     720       5     760

Pier Data
Pier Station     Upstream=  789.67    Downstream=  789.67
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     720       5     760
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     720       5     760
```

```
Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     742.37  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.08  * E.G. Elev (ft)         *     742.38  *     742.38  *
* Q Total (cfs)          *   12800.00  * W.S. Elev (ft)         *     742.04  *     742.04  *
* Q Bridge (cfs)         *   12800.00  * Crit W.S. (ft)         *     731.80  *     731.80  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.87  *      19.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.63  *       4.63  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2763.56  *    2763.56  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   22967.75  *   22967.75  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *      11.79  *      11.79  *
* Min El Prs (ft)        *     754.10  * W.P. Total (ft)        *     309.19  *     309.19  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)       *   589530.8  *   589530.8  *
* Delta WS (ft)          *       0.04  * Top Width (ft)          *     234.36  *     234.36  *
* BR Open Area (sq ft)   *    6022.97  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.63  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.26  *       0.26  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.22  *       1.22  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     746.91  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     746.53  * E.G. Elev (ft)         *     746.91  *     746.91  *
* Q Total (cfs)          *   20500.00  * W.S. Elev (ft)         *     746.47  *     746.47  *
* Q Bridge (cfs)         *   20500.00  * Crit W.S. (ft)         *     734.27  *     734.27  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.30  *      24.30  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.31  *       5.31  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3860.98  *    3860.98  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   39141.16  *   39141.16  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *      14.80  *      14.80  *
* Min El Prs (ft)        *     754.10  * W.P. Total (ft)        *     363.80  *     363.80  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)       *   923545.5  *   923545.5  *
* Delta WS (ft)          *       0.05  * Top Width (ft)          *     260.94  *     260.94  *
* BR Open Area (sq ft)   *    6022.97  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.31  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.33  *       0.33  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.73  *       1.73  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     750.53  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.10  * E.G. Elev (ft)         *     750.53  *     750.53  *
* Q Total (cfs)          *   27100.00  * W.S. Elev (ft)         *     750.04  *     750.04  *
* Q Bridge (cfs)         *   27100.00  * Crit W.S. (ft)         *     736.13  *     736.13  *
```

```
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.87  *      27.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.61  *       5.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4831.01  *    4831.01  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   55977.89  *   55977.89  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *      17.11  *      17.11  *
* Min El Prs (ft)        *     754.10  * W.P. Total (ft)        *     407.81  *     407.81  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  1243454.0  *  1243454.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     282.37  *     282.37  *
* BR Open Area (sq ft)   *    6022.97  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.61  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.35  *       0.35  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.97  *       1.97  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     753.87  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.38  * E.G. Elev (ft)         *     753.87  *     753.87  *
* Q Total (cfs)          *   34500.00  * W.S. Elev (ft)         *     753.31  *     753.31  *
* Q Bridge (cfs)         *   34500.00  * Crit W.S. (ft)         *     738.40  *     738.40  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.14  *      31.14  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.96  *       5.96  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5786.09  *    5786.09  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   74987.69  *   74987.69  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *      19.25  *      19.25  *
* Min El Prs (ft)        *     754.10  * W.P. Total (ft)        *     447.05  *     447.05  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  1579844.0  *  1579844.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     300.50  *     300.50  *
* BR Open Area (sq ft)   *    6022.97  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.96  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.39  *       0.39  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.30  *       2.30  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     759.74  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     759.25  * E.G. Elev (ft)         *     759.70  *     759.65  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     758.81  *     758.76  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     740.65  *     740.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.64  *      36.59  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.55  *       7.55  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6022.97  *    6022.97  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  112307.50  *  111989.50  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     754.10  * W.P. Total (ft)        *     757.88  *     757.88  *
* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *  1188025.0  *  1188025.0  *
* Delta WS (ft)          *       0.22  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    6022.97  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       7.55  * C & E Loss (ft)        *       0.00  *       0.12  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.73  *       0.73  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.50  *       5.50  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	762.49	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	761.96	E.G. Elev (ft)	762.42	762.35
Q Total (cfs)	54400.00	W.S. Elev (ft)	761.15	761.08
Q Bridge (cfs)	54400.00	Crit W.S. (ft)	742.14	742.14
Q Weir (cfs)		Max Chl Dpth (ft)	38.98	38.91
Weir Sta Lft (ft)		Vel Total (ft/s)	9.03	9.03
Weir Sta Rgt (ft)		Flow Area (sq ft)	6022.97	6022.97
Weir Submerg		Froude # Chl	0.31	0.31
Weir Max Depth (ft)		Specif Force (cu ft)	130983.30	130528.60
Min El Weir Flow (ft)	762.01	Hydr Depth (ft)		
Min El Prs (ft)	754.10	W.P. Total (ft)	757.88	757.88
Delta EG (ft)	0.36	Conv. Total (cfs)	1188025.0	1188025.0
Delta WS (ft)	0.38	Top Width (ft)		
BR Open Area (sq ft)	6022.97	Frctn Loss (ft)	0.08	0.00
BR Open Vel (ft/s)	9.03	C & E Loss (ft)	0.00	0.21
Coef of Q		Shear Total (lb/sq ft)	1.04	1.04
Br Sel Method	Energy only	Power Total (lb/ft s)	9.40	9.40

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	764.04	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	763.45	E.G. Elev (ft)	763.93	763.82
Q Total (cfs)	63000.00	W.S. Elev (ft)	762.23	762.13
Q Bridge (cfs)	62945.25	Crit W.S. (ft)	743.49	743.49
Q Weir (cfs)		Max Chl Dpth (ft)	40.06	39.96
Weir Sta Lft (ft)		Vel Total (ft/s)	10.36	10.42
Weir Sta Rgt (ft)		Flow Area (sq ft)	6078.71	6047.47
Weir Submerg		Froude # Chl	0.35	0.35
Weir Max Depth (ft)		Specif Force (cu ft)	142643.40	142033.50
Min El Weir Flow (ft)	762.01	Hydr Depth (ft)	17.17	24.73
Min El Prs (ft)	754.10	W.P. Total (ft)	1111.96	1002.38
Delta EG (ft)	0.53	Conv. Total (cfs)	1189058.0	1188359.0
Delta WS (ft)	0.59	Top Width (ft)	637.90	511.63
BR Open Area (sq ft)	6022.97	Frctn Loss (ft)	0.10	0.00
BR Open Vel (ft/s)	10.45	C & E Loss (ft)	0.00	0.32
Coef of Q		Shear Total (lb/sq ft)	0.96	1.06
Br Sel Method	Energy only	Power Total (lb/ft s)	9.93	11.03

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	766.51	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	765.97	E.G. Elev (ft)	766.45	766.33
Q Total (cfs)	75900.00	W.S. Elev (ft)	765.33	765.11
Q Bridge (cfs)	59816.10	Crit W.S. (ft)	745.35	745.35

```
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.16  *      42.94  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.94  *       8.22  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9559.30  *    9233.14  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  165195.30  *  163915.60  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *       6.31  *       6.10  *
* Min El Prs (ft)        *     754.10  * W.P. Total (ft)        *    2275.12  *    2273.91  *
* Delta EG (ft)          *       0.38  * Conv. Total (cfs)      *  1348936.0  *  1291591.0  *
* Delta WS (ft)          *       0.42  * Top Width (ft)         *    2519.88  *    2513.99  *
* BR Open Area (sq ft)   *    6022.97  * Frctn Loss (ft)        *       0.12  *       0.00  *
* BR Open Vel (ft/s)     *       9.93  * C & E Loss (ft)        *       0.01  *       0.19  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.83  *       0.88  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       6.59  *       7.20  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     755.72  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.21  * E.G. Elev (ft)         *     755.70  *     755.67  *
* Q Total (cfs)          *   38700.00  * W.S. Elev (ft)         *     755.06  *     755.03  *
* Q Bridge (cfs)         *   38700.00  * Crit W.S. (ft)         *     739.42  *     739.42  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.89  *      32.86  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.43  *       6.43  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6022.97  *    6022.97  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   86762.48  *   86532.35  *
* Min El Weir Flow (ft)  *     762.01  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     754.10  * W.P. Total (ft)        *     757.88  *     757.88  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1188025.0  *  1188025.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    6022.97  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       6.43  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.53  *       0.53  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.38  *       3.38  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.858

INPUT
Description: d/s Face B-21 XS Copied from U/S side.
LOMR cross section from
             2003 contours.
COE Riverstation=21067.84
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  763.21   57.91  763.06    94.1  763.16  119.04   763.4  148.25   763.3
     196     762  431.06     762  463.81  761.48     518     761     533  756.15
```

```
     584  739.15     614  736.15     643  726.48     666  726.17     678  722.17
     700  722.17     722  722.17     734  726.17     757  726.48     786  736.15
     816  739.15     861  754.15  878.02  760.35  971.24  760.69  991.35  761.01
 1046.72  761.45 1061.21  761.69  1072.3     762 1168.67     762 1202.21     762
 1209.29     760 1217.52  757.46 1244.01  750.29 1266.83  744.55 1270.63  743.87
 1272.34  743.87 1274.84  744.18 1283.86  745.81 1289.54  746.34 1291.76  746.76
 1294.77   747.5 1311.17     752  1316.7     754 1320.85     756 1325.64     758
 1330.16  758.42 1335.53  758.68 1343.03  759.22 1364.06     760 1378.81     760
 1486.15  760.61 1592.14  761.86 1619.33     762 1645.98     762 1668.09  762.25
 1747.14     762    1913     762 2067.68     762 2075.15  761.05 2078.54  760.87
    2082  760.49 2088.19  760.23 2096.97  760.07 2105.38  760.19  2111.3   760.4
 2140.94     762 2148.48     762 2256.97  763.64 2288.02  763.75 2291.85  762.03
 2303.37     762 2335.39  762.35 2381.18  762.51 2470.84  762.45 2486.57  762.68
 2552.38     764 2581.18  764.99 2604.23     766 2635.27  779.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     533     .03     861     .05 1266.83    .025    1913     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           518  878.02            54.21    50.5   49.36             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     931    1261     775       F
    1913 2635.27     775       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0      70     770    1200 2635.27     760

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  742.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.04  * Reach Len. (ft)        *   54.21  *   50.50  *   49.36  *
* Crit W.S. (ft)         *  731.52  * Flow Area (sq ft)      *          * 2937.19  *          *
* E.G. Slope (ft/ft)     *0.000298  * Area (sq ft)           *          * 2937.19  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  249.36  * Top Width (ft)         *          *  249.36  *          *
* Vel Total (ft/s)       *    4.36  * Avg. Vel. (ft/s)       *          *    4.36  *          *
* Max Chl Dpth (ft)      *   19.87  * Hydr. Depth (ft)       *          *   11.78  *          *
* Conv. Total (cfs)      *741926.4  * Conv. (cfs)            *          *741926.4  *          *
* Length Wtd. (ft)       *   50.50  * Wetted Per. (ft)       *          *  255.04  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.93  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *          * 2662.86  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  226.53  *    1.74  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  746.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  746.47  * Reach Len. (ft)        *   54.21  *   50.50  *   49.36  *
* Crit W.S. (ft)         *  733.98  * Flow Area (sq ft)      *          * 4101.08  *          *
* E.G. Slope (ft/ft)     *0.000288  * Area (sq ft)           *          * 4101.08  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  275.94  * Top Width (ft)         *          *  275.94  *          *
* Vel Total (ft/s)       *    5.00  * Avg. Vel. (ft/s)       *          *    5.00  *          *
* Max Chl Dpth (ft)      *   24.30  * Hydr. Depth (ft)       *          *   14.86  *          *
* Conv. Total (cfs)      *1207211.0  * Conv. (cfs)            *          *1207211.0  *          *
* Length Wtd. (ft)       *   50.50  * Wetted Per. (ft)       *          *  283.06  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.30  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    1.51  * 3680.09  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  254.52  *   11.95  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	750.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.030	
W.S. Elev (ft)	750.04	Reach Len. (ft)	54.21	50.50	49.36
Crit W.S. (ft)	735.78	Flow Area (sq ft)		5124.67	
E.G. Slope (ft/ft)	0.000266	Area (sq ft)		5124.67	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	297.37	Top Width (ft)		297.37	
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)		5.29	
Max Chl Dpth (ft)	27.87	Hydr. Depth (ft)		17.23	
Conv. Total (cfs)	1662794.0	Conv. (cfs)		1662794.0	
Length Wtd. (ft)	50.50	Wetted Per. (ft)		305.65	
Min Ch El (ft)	722.17	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.47	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	15.75	4559.03	105.70
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	275.24	48.63

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	753.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.030	
W.S. Elev (ft)	753.31	Reach Len. (ft)	54.21	50.50	49.36
Crit W.S. (ft)	737.94	Flow Area (sq ft)		6129.16	
E.G. Slope (ft/ft)	0.000259	Area (sq ft)		6129.16	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	316.99	Top Width (ft)		316.99	
Vel Total (ft/s)	5.63	Avg. Vel. (ft/s)		5.63	
Max Chl Dpth (ft)	31.14	Hydr. Depth (ft)		19.34	
Conv. Total (cfs)	2145066.0	Conv. (cfs)		2145066.0	
Length Wtd. (ft)	50.50	Wetted Per. (ft)		326.33	
Min Ch El (ft)	722.17	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		1.71	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	63.40	5452.08	347.57
C & E Loss (ft)	0.00	Cum SA (acres)	30.11	291.31	105.36

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	759.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.031	
W.S. Elev (ft)	759.03	Reach Len. (ft)	54.21	50.50	49.36
Crit W.S. (ft)	740.20	Flow Area (sq ft)		8037.40	
E.G. Slope (ft/ft)	0.000230	Area (sq ft)		8037.40	
Q Total (cfs)	45500.00	Flow (cfs)		45500.00	
Top Width (ft)	350.32	Top Width (ft)		350.32	
Vel Total (ft/s)	5.66	Avg. Vel. (ft/s)		5.66	
Max Chl Dpth (ft)	36.86	Hydr. Depth (ft)		22.94	
Conv. Total (cfs)	2998581.0	Conv. (cfs)		2998581.0	
Length Wtd. (ft)	50.51	Wetted Per. (ft)		361.57	
Min Ch El (ft)	722.17	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		1.81	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	338.88	6864.17	1362.06
C & E Loss (ft)	0.00	Cum SA (acres)	148.49	309.29	352.68

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	762.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.050	0.032	0.027
W.S. Elev (ft)	761.57	Reach Len. (ft)	54.21	50.50	49.36
Crit W.S. (ft)	741.63	Flow Area (sq ft)	18.24	8942.82	419.93

```
* E.G. Slope (ft/ft)     *0.000245  * Area (sq ft)           *   18.24  * 8942.82  *  636.49  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *    3.83  *53998.64  *  397.53  *
* Top Width (ft)         * 1021.95  * Top Width (ft)         *   59.96  *  360.02  *  601.97  *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)       *    0.21  *    6.04  *    0.95  *
* Max Chl Dpth (ft)      *   39.40  * Hydr. Depth (ft)       *    0.30  *   24.84  *    1.17  *
* Conv. Total (cfs)      *3478886.0  * Conv. (cfs)            *   245.1  *3453219.0  * 25422.1  *
* Length Wtd. (ft)       *   50.50  * Wetted Per. (ft)       *   59.97  *  371.81  *  359.68  *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *    0.00  *    0.37  *    0.02  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.00  *    2.22  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  873.41  * 7670.99  * 2444.93  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  272.13  *  313.73  *  539.00  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  763.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.050  *   0.032  *   0.027  *
* W.S. Elev (ft)         *  762.86  * Reach Len. (ft)        *   54.21  *   50.50  *   49.36  *
* Crit W.S. (ft)         *  742.92  * Flow Area (sq ft)      *  341.52  * 9407.99  * 1179.10  *
* E.G. Slope (ft/ft)     *0.000266  * Area (sq ft)           *  341.52  * 9407.99  * 2112.04  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  161.82  *61337.00  * 1501.18  *
* Top Width (ft)         * 2247.08  * Top Width (ft)         *  353.73  *  360.02  * 1533.33  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *    0.47  *    6.52  *    1.27  *
* Max Chl Dpth (ft)      *   40.69  * Hydr. Depth (ft)       *    0.97  *   26.13  *    1.67  *
* Conv. Total (cfs)      *3859631.0  * Conv. (cfs)            *  9914.0  *3757749.0  * 91968.1  *
* Length Wtd. (ft)       *   50.49  * Wetted Per. (ft)       *  353.74  *  371.81  *  704.99  *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *    0.02  *    0.42  *    0.03  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.01  *    2.74  *    0.04  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1343.94  * 8170.45  * 3458.04  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  315.46  *  314.09  *  783.78  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  766.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.050  *   0.032  *   0.026  *
* W.S. Elev (ft)         *  765.55  * Reach Len. (ft)        *   54.21  *   50.50  *   49.36  *
* Crit W.S. (ft)         *  744.71  * Flow Area (sq ft)      * 1509.54  *10374.29  * 3071.28  *
* E.G. Slope (ft/ft)     *0.000232  * Area (sq ft)           * 1509.54  *10374.29  * 6561.12  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1529.78  *67351.24  * 7018.98  *
* Top Width (ft)         * 2523.91  * Top Width (ft)         *  448.00  *  360.02  * 1715.89  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *    1.01  *    6.49  *    2.29  *
* Max Chl Dpth (ft)      *   43.38  * Hydr. Depth (ft)       *    3.37  *   28.82  *    4.36  *
* Conv. Total (cfs)      *4984174.0  * Conv. (cfs)            *100457.1  *4422797.0  *460919.7  *
* Length Wtd. (ft)       *   50.63  * Wetted Per. (ft)       *  450.48  *  371.81  *  704.99  *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)       *    0.05  *    0.40  *    0.06  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.05  *    2.62  *    0.14  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2302.15  * 9008.90  * 5783.28  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  375.82  *  315.16  * 1035.34  *
**********************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  755.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  755.11  * Reach Len. (ft)        *   54.21  *   50.50  *   49.36  *
* Crit W.S. (ft)         *  738.98  * Flow Area (sq ft)      *          * 6708.46  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 6708.46  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  327.53  * Top Width (ft)         *          *  327.53  *          *
* Vel Total (ft/s)       *    5.77  * Avg. Vel. (ft/s)       *          *    5.77  *          *
* Max Chl Dpth (ft)      *   32.94  * Hydr. Depth (ft)       *          *   20.48  *          *
```

```
* Conv. Total (cfs)      *2422875.0  * Conv. (cfs)            *          *2422875.0  *          *
* Length Wtd. (ft)       *   50.50  * Wetted Per. (ft)        *          *  337.46  *          *
* Min Ch El (ft)         *  722.17  * Shear (lb/sq ft)        *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.83  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *  112.85  * 5925.33  *  553.87  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   50.70  *  298.35  *  152.13  *
*****************************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.849

INPUT
Description: COE Riverstation=21126.09
LOMR cross section from 2003 contours.
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     780    4.96     782   10.41     782   13.61   781.6   20.28  781.29
   23.05  780.84   25.88  780.06   41.16     774   64.55  769.19    68.5     768
   95.34     768   97.09  767.37   99.56     766  100.05     766  101.13  765.51
  102.32  765.31  105.43     764  110.74     764  118.88  762.76   121.6     762
  126.34     762   131.9  761.27  136.37     760  145.34     760  149.06     758
  170.52     756  209.41     756  222.23     754  266.81     754  386.13  755.23
  405.29   755.2  412.08  754.84  418.69     754     520  753.81     564  739.15
     594  736.15     623  726.48     646  726.15     658  722.15     680  722.15
     702  722.15     714  726.15     737  726.48     766  736.15     796  739.15
     854  758.48  899.55     760  917.12  760.35  949.27  760.07  978.04  760.82
  989.52  760.86  998.86  761.14 1010.13  761.15 1021.55     762 1116.28     762
  1270.6     762 1276.56   761.4 1284.42  761.01 1307.66  760.62 1316.94  760.73
 1334.79  760.47 1396.69  760.71 1427.44  760.54  1542.3  761.23 1605.43     762
 1708.29   762.8 1725.89  762.75 1784.04     762    1919     762 2106.02     762
 2108.57     760 2114.86  759.76 2128.52  759.64 2176.87     762 2216.12     762
 2285.17  763.14 2309.26     764 2312.92     762 2397.17     762 2485.68  761.32
  2501.1  761.71 2504.38     762 2606.13     764 2644.76     766 2666.82     776
  2674.9     780

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     520     .03     854     .05 1307.66    .025    1919     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           520     854            21.32      23    24.1             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     500     763       F
     900    1306     775       F
    1919  2674.9     775       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  742.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.03  * Reach Len. (ft)        *   21.32  *   23.00  *   24.10  *
* Crit W.S. (ft)         *  731.50  * Flow Area (sq ft)      *          * 2935.09  *          *
* E.G. Slope (ft/ft)     *0.000298  * Area (sq ft)           *          * 2935.09  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  249.27  * Top Width (ft)         *          *  249.27  *          *
* Vel Total (ft/s)       *    4.36  * Avg. Vel. (ft/s)       *          *    4.36  *          *
* Max Chl Dpth (ft)      *   19.88  * Hydr. Depth (ft)       *          *   11.77  *          *
* Conv. Total (cfs)      *741223.5  * Conv. (cfs)            *          *741223.5  *          *
* Length Wtd. (ft)       *   23.00  * Wetted Per. (ft)       *          *  254.94  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.93  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *          * 2659.45  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  226.24  *    1.74  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	746.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.030	
W.S. Elev (ft)	746.46	Reach Len. (ft)	21.32	23.00	24.10
Crit W.S. (ft)	733.98	Flow Area (sq ft)		4098.72	
E.G. Slope (ft/ft)	0.000289	Area (sq ft)		4098.72	
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	275.87	Top Width (ft)		275.87	
Vel Total (ft/s)	5.00	Avg. Vel. (ft/s)		5.00	
Max Chl Dpth (ft)	24.31	Hydr. Depth (ft)		14.86	
Conv. Total (cfs)	1206291.0	Conv. (cfs)		1206291.0	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		282.98	
Min Ch El (ft)	722.15	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.31	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.51	3675.34	22.64
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	254.20	11.95

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	750.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.030	
W.S. Elev (ft)	750.03	Reach Len. (ft)	21.32	23.00	24.10
Crit W.S. (ft)	735.77	Flow Area (sq ft)		5122.38	
E.G. Slope (ft/ft)	0.000266	Area (sq ft)		5122.38	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	297.30	Top Width (ft)		297.30	
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)		5.29	
Max Chl Dpth (ft)	27.88	Hydr. Depth (ft)		17.23	
Conv. Total (cfs)	1661812.0	Conv. (cfs)		1661812.0	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		305.58	
Min Ch El (ft)	722.15	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.47	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	15.75	4553.09	105.70
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	274.89	48.63

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	753.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.030	
W.S. Elev (ft)	753.30	Reach Len. (ft)	21.32	23.00	24.10
Crit W.S. (ft)	737.92	Flow Area (sq ft)		6126.78	
E.G. Slope (ft/ft)	0.000259	Area (sq ft)		6126.78	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	316.93	Top Width (ft)		316.93	
Vel Total (ft/s)	5.63	Avg. Vel. (ft/s)		5.63	
Max Chl Dpth (ft)	31.15	Hydr. Depth (ft)		19.33	
Conv. Total (cfs)	2143946.0	Conv. (cfs)		2143946.0	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		326.27	
Min Ch El (ft)	722.15	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		1.71	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	63.40	5444.98	347.57
C & E Loss (ft)	0.00	Cum SA (acres)	30.11	290.94	105.36

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	759.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.050	0.030	0.050
W.S. Elev (ft)	759.02	Reach Len. (ft)	21.32	23.00	24.10
Crit W.S. (ft)	740.17	Flow Area (sq ft)	103.85	7996.82	4.39
E.G. Slope (ft/ft)	0.000198	Area (sq ft)	1611.92	7996.82	4.39
Q Total (cfs)	45500.00	Flow (cfs)	130.21	45369.02	0.77

```
* Top Width (ft)          *  723.07  * Top Width (ft)          *  372.84  *  334.00  *   16.23  *
* Vel Total (ft/s)        *    5.61  * Avg. Vel. (ft/s)        *    1.25  *    5.67  *    0.17  *
* Max Chl Dpth (ft)       *   36.87  * Hydr. Depth (ft)        *    5.19  *   23.94  *    0.27  *
* Conv. Total (cfs)       *3233955.0  * Conv. (cfs)            *  9255.1  *3224646.0  *    54.6  *
* Length Wtd. (ft)        *   23.00  * Wetted Per. (ft)        *   20.00  *  344.26  *   16.24  *
* Min Ch El (ft)          *  722.15  * Shear (lb/sq ft)        *    0.06  *    0.29  *    0.00  *
* Alpha                   *    1.02  * Stream Power (lb/ft s) *    0.08  *    1.63  *    0.00  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *  337.87  * 6854.87  * 1362.06  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  148.26  *  308.90  *  352.67  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  762.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.57  * Wt. n-Val.              *   0.050  *   0.030  *   0.034  *
* W.S. Elev (ft)          *  761.55  * Reach Len. (ft)        *   21.32  *   23.00  *   24.10  *
* Crit W.S. (ft)          *  741.62  * Flow Area (sq ft)      *  154.39  * 8840.83  *  300.49  *
* E.G. Slope (ft/ft)      *0.000200  * Area (sq ft)           * 2576.06  * 8840.83  *  514.92  *
* Q Total (cfs)           *54400.00  * Flow (cfs)             *  253.60  *53935.29  *  211.12  *
* Top Width (ft)          * 1278.82  * Top Width (ft)          *  390.22  *  334.00  *  554.60  *
* Vel Total (ft/s)        *    5.85  * Avg. Vel. (ft/s)        *    1.64  *    6.10  *    0.70  *
* Max Chl Dpth (ft)       *   39.40  * Hydr. Depth (ft)        *    7.72  *   26.47  *    0.97  *
* Conv. Total (cfs)       *3844450.0  * Conv. (cfs)            * 17922.1  *3811608.0  * 14919.5  *
* Length Wtd. (ft)        *   22.98  * Wetted Per. (ft)        *   20.00  *  344.26  *  308.44  *
* Min Ch El (ft)          *  722.15  * Shear (lb/sq ft)        *    0.10  *    0.32  *    0.01  *
* Alpha                   *    1.08  * Stream Power (lb/ft s) *    0.16  *    1.96  *    0.01  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *  871.79  * 7660.68  * 2444.28  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  271.85  *  313.33  *  538.34  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  763.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.68  * Wt. n-Val.              *   0.050  *   0.030  *   0.030  *
* W.S. Elev (ft)          *  762.82  * Reach Len. (ft)        *   21.32  *   23.00  *   24.10  *
* Crit W.S. (ft)          *  742.91  * Flow Area (sq ft)      *  179.75  * 9264.29  *  909.45  *
* E.G. Slope (ft/ft)      *0.000224  * Area (sq ft)           * 3079.44  * 9264.29  * 2023.73  *
* Q Total (cfs)           *63000.00  * Flow (cfs)             *  345.92  *61730.12  *  923.95  *
* Top Width (ft)          * 2381.53  * Top Width (ft)          *  401.49  *  334.00  * 1646.04  *
* Vel Total (ft/s)        *    6.08  * Avg. Vel. (ft/s)        *    1.92  *    6.66  *    1.02  *
* Max Chl Dpth (ft)       *   40.67  * Hydr. Depth (ft)        *    8.99  *   27.74  *    1.38  *
* Conv. Total (cfs)       *4205487.0  * Conv. (cfs)            * 23091.6  *4120717.0  * 61677.4  *
* Length Wtd. (ft)        *   22.98  * Wetted Per. (ft)        *   20.00  *  344.26  *  659.04  *
* Min Ch El (ft)          *  722.15  * Shear (lb/sq ft)        *    0.13  *    0.38  *    0.02  *
* Alpha                   *    1.18  * Stream Power (lb/ft s) *    0.24  *    2.51  *    0.02  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    * 1341.81  * 8159.63  * 3455.70  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  314.99  *  313.69  *  781.98  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  766.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.50  * Wt. n-Val.              *   0.050  *   0.030  *   0.027  *
* W.S. Elev (ft)          *  765.60  * Reach Len. (ft)        *   21.32  *   23.00  *   24.10  *
* Crit W.S. (ft)          *  744.69  * Flow Area (sq ft)      * 4224.61  *10193.12  * 2742.09  *
* E.G. Slope (ft/ft)      *0.000171  * Area (sq ft)           * 4224.61  *10193.12  * 6862.69  *
* Q Total (cfs)           *75900.00  * Flow (cfs)             * 7632.16  *63099.55  * 5168.30  *
* Top Width (ft)          * 2536.04  * Top Width (ft)          *  419.06  *  334.00  * 1782.98  *
* Vel Total (ft/s)        *    4.42  * Avg. Vel. (ft/s)        *    1.81  *    6.19  *    1.88  *
* Max Chl Dpth (ft)       *   43.45  * Hydr. Depth (ft)        *   10.08  *   30.52  *    4.16  *
* Conv. Total (cfs)       *5812287.0  * Conv. (cfs)            *584457.3  *4832051.0  *395779.0  *
* Length Wtd. (ft)        *   22.93  * Wetted Per. (ft)        *  420.61  *  344.26  *  659.04  *
* Min Ch El (ft)          *  722.15  * Shear (lb/sq ft)        *    0.11  *    0.32  *    0.04  *
* Alpha                   *    1.66  * Stream Power (lb/ft s) *    0.19  *    1.95  *    0.08  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    * 2298.58  * 8996.98  * 5775.68  *
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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  375.28  *  314.76  * 1033.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  755.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.050  *   0.030  *          *
* W.S. Elev (ft)         *  755.10  * Reach Len. (ft)        *   21.32  *   23.00  *   24.10  *
* Crit W.S. (ft)         *  738.96  * Flow Area (sq ft)      *   25.40  * 6703.80  *          *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           *  237.48  * 6703.80  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)              *   13.95  *38686.05  *          *
* Top Width (ft)         *  594.88  * Top Width (ft)         *  271.02  *  323.85  *          *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *    0.55  *    5.77  *          *
* Max Chl Dpth (ft)      *   32.95  * Hydr. Depth (ft)       *    1.27  *   20.70  *          *
* Conv. Total (cfs)      *2455358.0  * Conv. (cfs)            *   885.3  *2454473.0  *          *
* Length Wtd. (ft)       *   23.00  * Wetted Per. (ft)       *   20.00  *  333.56  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *    0.02  *    0.31  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.01  *    1.80  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  112.70  * 5917.55  *  553.87  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   50.53  *  297.97  *  152.13  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.845

INPUT
Description: u/s Face B-19
LOMR cross section from 2003 contours.
COE
             Riverstation=21148.68
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  761.94   94.75     762   106.1  760.71   110.6     760  142.41     760
  150.39  760.32  163.89   760.2  169.77     760  187.84     760  230.53  759.15
  235.14     758  320.03     758  394.74  756.83  471.37  756.17  509.75  756.16
  519.17  756.49  526.31  757.14     528  756.15     579  739.15     609  736.15
     638  726.48     661  726.15     673  722.15     695  722.15     717  722.15
     729  726.15     752  726.48     781  736.15     811  739.15     849  758.15
  860.63     758  865.01  758.27  926.09  758.43  939.92     760  1028.8  760.09
 1032.06  760.32 1142.37  761.06 1160.98  761.49 1164.26     762 1308.06     762
 1318.89  762.18 1365.86     762 1396.23   761.4 1413.37   761.3 1427.16   761.4
 1485.64  761.04 1546.31   761.3 1622.08     762 1757.68  762.75  1829.8     762
 1894.46     762 1925.57  761.44 1930.48  761.78  1931.6     762  2122.1     762
 2138.43  761.15  2152.5  760.75 2163.64     760 2174.54     760 2213.77  761.43
 2241.15     762  2348.3     762 2349.53  761.57 2356.92     760 2368.23     760
 2370.36     762 2409.59     762 2423.21   761.2 2447.67  760.53 2472.78  760.19
 2513.43  760.24 2531.09     760  2552.3     760 2554.37  760.53 2561.73     762
 2661.95     764 2694.12     766    2707  771.39 2717.04     776  2721.1     778

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     528     .03     849     .05 1365.86    .025  1931.6     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           528     849            23.24      24   26.27              .1       .3
Ineffective Flow     num=        3
   Sta L   Sta R    Elev  Permanent
       0     542     759       F
     842     909     760       F
     909    1357     775       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0      89     770    1940  2721.1     775
```

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	742.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	742.02	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	731.51	Flow Area (sq ft)		2928.91	
E.G. Slope (ft/ft)	0.000296	Area (sq ft)		2928.91	
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	246.34	Top Width (ft)		246.34	
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)		4.37	
Max Chl Dpth (ft)	19.87	Hydr. Depth (ft)		11.89	
Conv. Total (cfs)	743915.4	Conv. (cfs)		743915.4	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		252.23	
Min Ch El (ft)	722.15	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.94	
Frctn Loss (ft)		Cum Volume (acre-ft)		2657.91	5.47
C & E Loss (ft)		Cum SA (acres)		226.11	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	746.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.030	
W.S. Elev (ft)	746.45	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	733.97	Flow Area (sq ft)		4068.53	
E.G. Slope (ft/ft)	0.000286	Area (sq ft)		4068.53	
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	268.48	Top Width (ft)		268.48	
Vel Total (ft/s)	5.04	Avg. Vel. (ft/s)		5.04	
Max Chl Dpth (ft)	24.30	Hydr. Depth (ft)		15.15	
Conv. Total (cfs)	1211150.0	Conv. (cfs)		1211150.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		276.13	
Min Ch El (ft)	722.15	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.33	
Frctn Loss (ft)		Cum Volume (acre-ft)	1.51	3673.18	22.64
C & E Loss (ft)		Cum SA (acres)	2.36	254.06	11.95

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	750.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	750.01	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	735.77	Flow Area (sq ft)		5057.87	
E.G. Slope (ft/ft)	0.000265	Area (sq ft)		5057.87	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	286.31	Top Width (ft)		286.31	
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.36	
Max Chl Dpth (ft)	27.86	Hydr. Depth (ft)		17.67	
Conv. Total (cfs)	1664304.0	Conv. (cfs)		1664304.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		295.38	
Min Ch El (ft)	722.15	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.52	
Frctn Loss (ft)		Cum Volume (acre-ft)	15.75	4550.40	105.70
C & E Loss (ft)		Cum SA (acres)	9.30	274.74	48.63

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	753.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.030	
W.S. Elev (ft)	753.27	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	737.92	Flow Area (sq ft)		6013.74	
E.G. Slope (ft/ft)	0.000254	Area (sq ft)		6018.56	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	302.62	Top Width (ft)		302.62	

```
* Vel Total (ft/s)       *    5.74  * Avg. Vel. (ft/s)       *          *    5.74  *          *
* Max Chl Dpth (ft)      *   31.12  * Hydr. Depth (ft)       *          *   20.23  *          *
* Conv. Total (cfs)      *2162959.0  * Conv. (cfs)            *          *2162959.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  307.33  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.78  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   63.40  * 5441.77  *  347.57  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   30.11  *  290.78  *  105.36  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  758.97  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  740.15  * Flow Area (sq ft)      *          * 7721.05  *          *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           *  542.19  * 7811.23  *   53.39  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  699.62  * Top Width (ft)         *  296.76  *  321.00  *   81.87  *
* Vel Total (ft/s)       *    5.89  * Avg. Vel. (ft/s)       *          *    5.89  *          *
* Max Chl Dpth (ft)      *   36.82  * Hydr. Depth (ft)       *          *   25.74  *          *
* Conv. Total (cfs)      *3258753.0  * Conv. (cfs)            *          *3258753.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  310.40  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.78  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  337.35  * 6850.70  * 1362.04  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  148.09  *  308.72  *  352.64  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.              *   0.050  *   0.030  *   0.048  *
* W.S. Elev (ft)         *  761.55  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  741.58  * Flow Area (sq ft)      * 1517.05  * 8639.44  *  250.59  *
* E.G. Slope (ft/ft)     *0.000198  * Area (sq ft)           * 1517.05  * 8639.44  *  575.28  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              * 1469.29  *52729.26  *  201.45  *
* Top Width (ft)         * 1255.62  * Top Width (ft)         *  429.31  *  321.00  *  505.31  *
* Vel Total (ft/s)       *    5.23  * Avg. Vel. (ft/s)       *    0.97  *    6.10  *    0.80  *
* Max Chl Dpth (ft)      *   39.40  * Hydr. Depth (ft)       *    3.53  *   26.91  *    0.99  *
* Conv. Total (cfs)      *3869127.0  * Conv. (cfs)            *104501.5  *3750298.0  * 14327.5  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  429.89  *  332.99  *  252.95  *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *    0.04  *    0.32  *    0.01  *
* Alpha                  *    1.32  * Stream Power (lb/ft s) *    0.04  *    1.95  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  870.79  * 7656.07  * 2443.98  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  271.65  *  313.15  *  538.05  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.              *   0.050  *   0.030  *   0.035  *
* W.S. Elev (ft)         *  762.84  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  742.87  * Flow Area (sq ft)      * 2077.60  * 9051.83  *  846.67  *
* E.G. Slope (ft/ft)     *0.000217  * Area (sq ft)           * 2077.60  * 9051.83  * 1654.91  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              * 2555.34  *59643.64  *  801.02  *
* Top Width (ft)         * 1851.00  * Top Width (ft)         *  439.00  *  321.00  * 1091.00  *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *    1.23  *    6.59  *    0.95  *
```

```
* Max Chl Dpth (ft)      *   40.69  * Hydr. Depth (ft)       *    4.73  *   28.20  *    1.32  *
* Conv. Total (cfs)      *4281482.0  * Conv. (cfs)            *173660.7  *4053384.0  * 54437.5  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  440.45  *  332.99  *  643.90  *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *    0.06  *    0.37  *    0.02  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.08  *    2.42  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1340.55  * 8154.80  * 3454.68  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  314.78  *  313.51  *  781.22  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  766.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.050  *   0.030  *   0.029  *
* W.S. Elev (ft)         *  765.48  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  744.65  * Flow Area (sq ft)      * 3237.21  * 9899.75  * 2545.14  *
* E.G. Slope (ft/ft)     *0.000197  * Area (sq ft)           * 3237.21  * 9899.75  * 4536.77  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 5085.05  *66060.44  * 4754.51  *
* Top Width (ft)         * 1851.00  * Top Width (ft)         *  439.00  *  321.00  * 1091.00  *
* Vel Total (ft/s)       *    4.84  * Avg. Vel. (ft/s)       *    1.57  *    6.67  *    1.87  *
* Max Chl Dpth (ft)      *   43.33  * Hydr. Depth (ft)       *    7.37  *   30.84  *    3.96  *
* Conv. Total (cfs)      *5406683.0  * Conv. (cfs)            *362230.2  *4705769.0  *338683.9  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  443.09  *  332.99  *  646.54  *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *    0.09  *    0.37  *    0.05  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.14  *    2.44  *    0.09  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 2296.76  * 8991.68  * 5772.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  375.07  *  314.59  * 1032.56  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  755.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  755.07  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  738.94  * Flow Area (sq ft)      *          * 6549.16  *          *
* E.G. Slope (ft/ft)     *0.000244  * Area (sq ft)           *          * 6568.58  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  311.58  * Top Width (ft)         *          *  311.58  *          *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *          *    5.91  *          *
* Max Chl Dpth (ft)      *   32.92  * Hydr. Depth (ft)       *          *   21.83  *          *
* Conv. Total (cfs)      *2476850.0  * Conv. (cfs)            *          *2476850.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  310.40  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.90  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  112.64  * 5914.05  *  553.87  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   50.46  *  297.80  *  152.13  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 8.843

INPUT
Description: Bridge B-19 St. Louis to San Francisco RR Bridge
COE Riverstation
             21160.59
Distance from Upstream XS =       1
Deck/Roadway Width        =      22
```

```
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
     150     759     740   541.9     759     740     542     761     755
     606  761.21  755.21   606.1  763.21  755.21   806.5  763.87  755.87
   806.6  759.87  757.37    1000     760   757.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  761.94   94.75     762   106.1  760.71   110.6     760  142.41     760
  150.39  760.32  163.89   760.2  169.77     760  187.84     760  230.53  759.15
  235.14     758  320.03     758  394.74  756.83  471.37  756.17  509.75  756.16
  519.17  756.49  526.31  757.14     528  756.15     579  739.15     609  736.15
     638  726.48     661  726.15     673  722.15     695  722.15     717  722.15
     729  726.15     752  726.48     781  736.15     811  739.15     849  758.15
  860.63     758  865.01  758.27  926.09  758.43  939.92     760  1028.8  760.09
 1032.06  760.32 1142.37  761.06 1160.98  761.49 1164.26     762 1308.06     762
 1318.89  762.18 1365.86     762 1396.23   761.4 1413.37   761.3 1427.16   761.4
 1485.64  761.04 1546.31   761.3 1622.08     762 1757.68  762.75  1829.8     762
 1894.46     762 1925.57  761.44 1930.48  761.78  1931.6     762  2122.1     762
 2138.43  761.15  2152.5  760.75 2163.64     760 2174.54     760 2213.77  761.43
 2241.15     762  2348.3     762 2349.53  761.57 2356.92     760 2368.23     760
 2370.36     762 2409.59     762 2423.21   761.2 2447.67  760.53 2472.78  760.19
 2513.43  760.24 2531.09     760  2552.3     760 2554.37  760.53 2561.73     762
 2661.95     764 2694.12     766    2707  771.39 2717.04     776  2721.1     778

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     528     .03     849     .05 1365.86    .025  1931.6     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
           528     849             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     542     759        F
     842     909     760        F
     909    1357     775        F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0      89     770    1940  2721.1     775

Downstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
     150     759     740   541.9     759     740     542     761     755
     606  761.21  755.21   606.1  763.21  755.21   806.5  763.87  755.87
   806.6  759.87  757.37    1000     760   757.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  761.94   95.02     762  103.36  761.05     110     760  141.67     760
  147.89  760.25  173.59     760  206.47  759.33   232.4   759.1  236.85     758
  336.07     758  336.72  758.12  420.78   756.8     522  756.15     573  739.15
     603  736.15     632  726.48     655  726.15     667  722.15     689  722.15
     711  722.15     723  726.15     746  726.48     775  736.15     805  739.15
     843  758.15   846.1     758  872.08  759.62  924.96     760  949.35  760.61
  961.08  761.13  989.97     762 1026.56  761.99 1132.33  761.44 1143.07     760
 1160.81     760 1164.31  760.79 1172.11     762 1315.92     762 1326.75  762.18
 1373.72     762 1404.09   761.4 1435.02   761.4 1493.49  761.04 1554.18   761.3
 1629.94     762 1765.54  762.75 1837.66     762 1902.32     762 1933.43  761.44
 1938.34  761.78 1939.46     762 2129.96     762 2146.29  761.15 2160.35  760.75
  2171.5     760  2182.4     760 2221.65  761.43 2249.01     762 2356.16     762
  2357.4  761.57 2364.79     760  2376.1     760 2378.22     762 2417.45     762
 2431.07   761.2 2455.53  760.53 2480.64  760.19  2521.3  760.24 2538.96     760
 2560.17     760  2569.6     762 2669.82     764 2701.99     766 2714.86  771.39
 2728.96     778
```

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     522     .03     843     .05 1373.72    .025 1939.46     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
           522     843            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     542   758.9       F
     842     904   759.9       F
     904    1365     775       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
       0      90     770    1947 2728.96     775

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  6

Pier Data
Pier Station     Upstream=     606    Downstream=     606
Upstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
      16  717.32      16  723.07       7  723.07       7  746.57       6  746.57
       6  756.57
Downstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
      16  717.32      16  723.07       7  723.07       7  746.57       6  746.57
       6  756.57

Pier Data
Pier Station     Upstream=     706    Downstream=     706
Upstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
      16     712      16     716       7     716       7  746.57       6  746.57
       6     758
Downstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
      16     712      16     716       7     716       7  746.57       6  746.57
       6     758

Pier Data
Pier Station     Upstream=  804.75    Downstream=  804.75
Upstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
       9  719.57       9  723.57       7  723.57       7  753.07       5  753.07
       5  756.57
Downstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
       9  719.57       9  723.57       7  723.57       7  753.07       5  753.07
       5  756.57

Pier Data
Pier Station     Upstream=  817.25    Downstream=  817.25
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
***************************************************************
       1   721.9       1   755.4     1.5   755.4     1.5   756.9
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
***************************************************************
       1   721.9       1   755.4     1.5   755.4     1.5   756.9
```

```
Pier Data
Pier Station     Upstream=     830    Downstream=     830
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1   727.9       1   755.4     1.5   755.4     1.5   756.9
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1   727.9       1   755.4     1.5   755.4     1.5   756.9

Pier Data
Pier Station     Upstream=     843    Downstream=     843
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1   731.9       1   755.4     1.5   755.4     1.5   756.9
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1   731.9       1   755.4     1.5   755.4     1.5   756.9

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =     .95
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     742.32  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.02  * E.G. Elev (ft)         *     742.34  *     742.34  *
* Q Total (cfs)          *   12800.00  * W.S. Elev (ft)         *     741.99  *     741.99  *
* Q Bridge (cfs)         *   12800.00  * Crit W.S. (ft)         *     731.89  *     731.90  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.84  *      19.84  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.70  *       4.71  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2721.05  *    2718.26  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   22639.48  *   22601.52  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *      12.08  *      12.07  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *     288.84  *     288.28  *
* Delta EG (ft)          *       0.02  * Conv. Total (cfs)      *   601166.6  *   600918.5  *
* Delta WS (ft)          *       0.02  * Top Width (ft)         *     225.22  *     225.22  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.71  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.27  *       0.27  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.25  *       1.26  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     746.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     746.45  * E.G. Elev (ft)         *     746.87  *     746.87  *
* Q Total (cfs)          *   20500.00  * W.S. Elev (ft)         *     746.41  *     746.41  *
* Q Bridge (cfs)         *   20500.00  * Crit W.S. (ft)         *     734.43  *     734.42  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.26  *      24.26  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.45  *       5.45  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3760.44  *    3760.65  *
```

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* Weir Submerg           *             * Froude # Chl           *        0.25  *        0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    38518.44  *    38473.94  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *       15.27  *       15.27  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *      346.34  *      339.78  *
* Delta EG (ft)          *       0.03  * Conv. Total (cfs)      *   913278.6  *   925084.6  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *      246.31  *      246.31  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *              *              *
* BR Open Vel (ft/s)     *       5.45  * C & E Loss (ft)        *              *              *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.34  *       0.34  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.86  *       1.85  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     750.46  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.01  * E.G. Elev (ft)         *     750.50  *     750.50  *
* Q Total (cfs)          *   27100.00  * W.S. Elev (ft)         *     749.97  *     749.97  *
* Q Bridge (cfs)         *   27100.00  * Crit W.S. (ft)         *     736.27  *     736.19  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.82  *      27.82  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.80  *       5.80  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4675.18  *    4676.35  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   54935.05  *   54891.10  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *      17.63  *      17.67  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *     397.61  *     387.96  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *  1197391.0  *  1217663.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     265.12  *     264.69  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *              *              *
* BR Open Vel (ft/s)     *       5.80  * C & E Loss (ft)        *              *              *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.38  *       0.37  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.18  *       2.16  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     753.79  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.27  * E.G. Elev (ft)         *     753.83  *     753.83  *
* Q Total (cfs)          *   34500.00  * W.S. Elev (ft)         *     753.23  *     753.23  *
* Q Bridge (cfs)         *   34500.00  * Crit W.S. (ft)         *     738.44  *     738.56  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.08  *      31.08  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.20  *       6.22  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5560.93  *    5547.65  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   73362.90  *   73321.52  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *      19.99  *      20.38  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *     444.23  *     425.34  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *  1484959.0  *  1522518.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     278.19  *     272.20  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *              *              *
* BR Open Vel (ft/s)     *       6.22  * C & E Loss (ft)        *              *              *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.42  *       0.42  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.62  *       2.60  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     759.51  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     758.97  * E.G. Elev (ft)         *     759.48  *     759.45  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     758.66  *     758.62  *
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* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     740.60  *     740.60  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.51  *      36.47  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.29  *       7.33  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6239.28  *    6208.56  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  109984.70  *  109604.70  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *     761.70  *     748.43  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *  1255772.0  *  1260155.0  *
* Delta WS (ft)          *       0.16  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       7.33  * C & E Loss (ft)        *       0.00  *       0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.67  *       0.68  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.90  *       4.95  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*******************************************************************************************
* E.G. US. (ft)          *     762.11  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     761.55  * E.G. Elev (ft)         *     762.06  *     762.02  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     761.00  *     760.94  *
* Q Bridge (cfs)         *   52797.41  * Crit W.S. (ft)         *     742.10  *     742.14  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.85  *      38.79  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.65  *       7.71  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7115.04  *    7056.06  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  128947.30  *  128360.80  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *      13.15  *      13.18  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *    1322.83  *    1292.34  *
* Delta EG (ft)          *       0.24  * Conv. Total (cfs)      *  1236512.0  *  1248858.0  *
* Delta WS (ft)          *       0.27  * Top Width (ft)         *     765.67  *     617.43  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       8.50  * C & E Loss (ft)        *       0.00  *       0.15  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.65  *       0.65  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.97  *       4.99  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*******************************************************************************************
* E.G. US. (ft)          *     763.48  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     762.84  * E.G. Elev (ft)         *     763.42  *     763.37  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     762.24  *     762.15  *
* Q Bridge (cfs)         *   57868.49  * Crit W.S. (ft)         *     743.48  *     743.48  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.09  *      40.00  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.75  *       7.88  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8124.73  *    7997.93  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  141240.00  *  140460.60  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *       7.66  *       7.77  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *    1845.34  *    1789.10  *
* Delta EG (ft)          *       0.27  * Conv. Total (cfs)      *  1281565.0  *  1285624.0  *
* Delta WS (ft)          *       0.31  * Top Width (ft)         *    1508.87  *    1481.26  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       9.32  * C & E Loss (ft)        *       0.00  *       0.16  *
```

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* Coef of Q              *             * Shear Total (lb/sq ft) *       0.66  *       0.67  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.15  *       5.28  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     766.09  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     765.48  * E.G. Elev (ft)         *     766.08  *     766.04  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     765.41  *     765.35  *
* Q Bridge (cfs)         *   49162.88  * Crit W.S. (ft)         *     745.39  *     745.39  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.26  *      43.20  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.18  *       6.25  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12280.62  *   12138.29  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  171757.10  *  170775.20  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *       8.75  *       8.70  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *    2196.34  *    2164.61  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  1821944.0  *  1811675.0  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *    1851.00  *    1857.00  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       7.92  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.61  *       0.61  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.74  *       3.84  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     755.61  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.07  * E.G. Elev (ft)         *     755.65  *     755.66  *
* Q Total (cfs)          *   38700.00  * W.S. Elev (ft)         *     755.02  *     755.02  *
* Q Bridge (cfs)         *   38700.00  * Crit W.S. (ft)         *     739.36  *     739.44  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.87  *      32.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.38  *       6.41  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6061.54  *    6037.67  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   84784.23  *   84723.93  *
* Min El Weir Flow (ft)  *     759.01  * Hydr Depth (ft)        *      22.06  *      22.40  *
* Min El Prs (ft)        *     757.40  * W.P. Total (ft)        *     471.47  *     453.41  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *  1647704.0  *  1680080.0  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *     275.33  *     269.57  *
* BR Open Area (sq ft)   *    6208.56  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.41  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.44  *       0.44  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.83  *       2.83  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 8.840

INPUT
Description: d/s Face B-19
LOMR cross section from 2003 contours.
COE
Riverstation=21172.50
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	761.94	95.02	762	103.36	761.05	110	760	141.67	760
147.89	760.25	173.59	760	206.47	759.33	232.4	759.1	236.85	758
336.07	758	336.72	758.12	420.78	756.8	522	756.15	573	739.15
603	736.15	632	726.48	655	726.15	667	722.15	689	722.15
711	722.15	723	726.15	746	726.48	775	736.15	805	739.15
843	758.15	846.1	758	872.08	759.62	924.96	760	949.35	760.61
961.08	761.13	989.97	762	1026.56	761.99	1132.33	761.44	1143.07	760
1160.81	760	1164.31	760.79	1172.11	762	1315.92	762	1326.75	762.18
1373.72	762	1404.09	761.4	1435.02	761.4	1493.49	761.04	1554.18	761.3
1629.94	762	1765.54	762.75	1837.66	762	1902.32	762	1933.43	761.44
1938.34	761.78	1939.46	762	2129.96	762	2146.29	761.15	2160.35	760.75
2171.5	760	2182.4	760	2221.65	761.43	2249.01	762	2356.16	762
2357.4	761.57	2364.79	760	2376.1	760	2378.22	762	2417.45	762
2431.07	761.2	2455.53	760.53	2480.64	760.19	2521.3	760.24	2538.96	760
2560.17	760	2569.6	762	2669.82	764	2701.99	766	2714.86	771.39
2728.96	778								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	522	.03	843	.05	1373.72	.025	1939.46	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
522	843	334.41	288	348.67	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	542	758.9	F
842	904	759.9	F
904	1365	775	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	90	770	1947	2728.96	775

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	742.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	741.99	Reach Len. (ft)	334.41	288.00	348.67
Crit W.S. (ft)	731.51	Flow Area (sq ft)		2923.10	
E.G. Slope (ft/ft)	0.000298	Area (sq ft)		2923.10	
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	246.22	Top Width (ft)		246.22	
Vel Total (ft/s)	4.38	Avg. Vel. (ft/s)		4.38	
Max Chl Dpth (ft)	19.84	Hydr. Depth (ft)		11.87	
Conv. Total (cfs)	741704.3	Conv. (cfs)		741704.3	
Length Wtd. (ft)	288.00	Wetted Per. (ft)		252.10	
Min Ch El (ft)	722.15	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.94	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		2656.40	5.47
C & E Loss (ft)	0.00	Cum SA (acres)		225.99	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	746.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.030	
W.S. Elev (ft)	746.41	Reach Len. (ft)	334.41	288.00	348.67

```
* Crit W.S. (ft)         *  733.93  * Flow Area (sq ft)      *          * 4059.38  *          *
* E.G. Slope (ft/ft)     *0.000288  * Area (sq ft)           *          * 4059.38  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  268.31  * Top Width (ft)         *          *  268.31  *          *
* Vel Total (ft/s)       *    5.05  * Avg. Vel. (ft/s)       *          *    5.05  *          *
* Max Chl Dpth (ft)      *   24.26  * Hydr. Depth (ft)       *          *   15.13  *          *
* Conv. Total (cfs)      *1207147.0  * Conv. (cfs)            *          *1207147.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)       *          *  275.94  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.34  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    1.51  * 3671.10  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  253.92  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  749.97  * Reach Len. (ft)        *  334.41  *  288.00  *  348.67  *
* Crit W.S. (ft)         *  735.77  * Flow Area (sq ft)      *          * 5046.64  *          *
* E.G. Slope (ft/ft)     *0.000265  * Area (sq ft)           *          * 5047.01  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  286.12  * Top Width (ft)         *          *  286.12  *          *
* Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *          *    5.37  *          *
* Max Chl Dpth (ft)      *   27.82  * Hydr. Depth (ft)       *          *   17.73  *          *
* Conv. Total (cfs)      *1664762.0  * Conv. (cfs)            *          *1664762.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)       *          *  293.62  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.53  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   15.75  * 4547.81  *  105.70  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.30  *  274.59  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  753.23  * Reach Len. (ft)        *  334.41  *  288.00  *  348.67  *
* Crit W.S. (ft)         *  737.92  * Flow Area (sq ft)      *          * 5984.34  *          *
* E.G. Slope (ft/ft)     *0.000251  * Area (sq ft)           *          * 6005.41  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  302.41  * Top Width (ft)         *          *  302.41  *          *
* Vel Total (ft/s)       *    5.77  * Avg. Vel. (ft/s)       *          *    5.77  *          *
* Max Chl Dpth (ft)      *   31.08  * Hydr. Depth (ft)       *          *   20.55  *          *
* Conv. Total (cfs)      *2175778.0  * Conv. (cfs)            *          *2175778.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)       *          *  300.91  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.80  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   63.40  * 5438.70  *  347.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   30.11  *  290.62  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.37  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  758.82  * Reach Len. (ft)        *  334.41  *  288.00  *  348.67  *
* Crit W.S. (ft)         *  740.17  * Flow Area (sq ft)      *          * 7640.40  *          *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           *  433.91  * 7761.31  *    7.65  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  625.65  * Top Width (ft)         *  288.45  *  321.00  *   16.20  *
* Vel Total (ft/s)       *    5.96  * Avg. Vel. (ft/s)       *          *    5.96  *          *
* Max Chl Dpth (ft)      *   36.67  * Hydr. Depth (ft)       *          *   25.47  *          *
* Conv. Total (cfs)      *3199580.0  * Conv. (cfs)            *          *3199580.0  *          *
* Length Wtd. (ft)       *  288.00  * Wetted Per. (ft)       *          *  310.79  *          *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.85  *          *
```

```
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  337.34  * 6847.23  * 1362.04  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  148.09  *  308.72  *  352.64  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  761.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.050  *   0.030  *   0.049  *
* W.S. Elev (ft)         *  761.29  * Reach Len. (ft)        *  334.41  *  288.00  *  348.67  *
* Crit W.S. (ft)         *  741.51  * Flow Area (sq ft)      * 1339.34  * 8554.27  *  135.91  *
* E.G. Slope (ft/ft)     *0.000207  * Area (sq ft)           * 1339.34  * 8554.27  *  226.63  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1238.75  *53073.84  *   87.42  *
* Top Width (ft)         *  996.77  * Top Width (ft)         *  420.72  *  321.00  *  255.05  *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)       *    0.92  *    6.20  *    0.64  *
* Max Chl Dpth (ft)      *   39.14  * Hydr. Depth (ft)       *    3.18  *   26.65  *    0.86  *
* Conv. Total (cfs)      *3781059.0  * Conv. (cfs)           * 86098.9  *3688884.0  *  6075.9  *
* Length Wtd. (ft)       *  288.58  * Wetted Per. (ft)       *  420.99  *  332.99  *  158.78  *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *    0.04  *    0.33  *    0.01  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    0.04  *    2.06  *    0.01  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  870.38  * 7652.54  * 2443.88  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  271.42  *  313.12  *  537.93  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  763.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.050  *   0.030  *   0.035  *
* W.S. Elev (ft)         *  762.53  * Reach Len. (ft)        *  334.41  *  288.00  *  348.67  *
* Crit W.S. (ft)         *  742.87  * Flow Area (sq ft)      * 1870.13  * 8952.99  *  597.13  *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           * 1870.13  * 8952.99  * 1036.50  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2232.88  *60275.39  *  491.74  *
* Top Width (ft)         * 1795.79  * Top Width (ft)         *  432.00  *  321.00  * 1042.79  *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)       *    1.19  *    6.73  *    0.82  *
* Max Chl Dpth (ft)      *   40.38  * Hydr. Depth (ft)       *    4.33  *   27.89  *    1.03  *
* Conv. Total (cfs)      *4159785.0  * Conv. (cfs)           *147433.0  *3979884.0  * 32468.8  *
* Length Wtd. (ft)       *  289.08  * Wetted Per. (ft)       *  432.84  *  332.99  *  582.43  *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *    0.06  *    0.39  *    0.01  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.07  *    2.59  *    0.01  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1339.85  * 8151.19  * 3454.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  314.54  *  313.44  *  780.70  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  766.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.050  *   0.030  *   0.028  *
* W.S. Elev (ft)         *  765.40  * Reach Len. (ft)        *  334.41  *  288.00  *  348.67  *
* Crit W.S. (ft)         *  744.66  * Flow Area (sq ft)      * 3108.68  * 9873.30  * 2433.85  *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           * 3108.68  * 9873.30  * 4194.90  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4862.83  *66536.67  * 4500.50  *
* Top Width (ft)         * 1857.00  * Top Width (ft)         *  432.00  *  321.00  * 1104.00  *
* Vel Total (ft/s)       *    4.92  * Avg. Vel. (ft/s)       *    1.56  *    6.74  *    1.85  *
* Max Chl Dpth (ft)      *   43.25  * Hydr. Depth (ft)       *    7.20  *   30.76  *    3.79  *
* Conv. Total (cfs)      *5344101.0  * Conv. (cfs)           *342390.8  *4684831.0  *316878.7  *
* Length Wtd. (ft)       *  292.04  * Wetted Per. (ft)       *  435.71  *  332.99  *  646.51  *
* Min Ch El (ft)         *  722.15  * Shear (lb/sq ft)       *    0.09  *    0.37  *    0.05  *
* Alpha                  *    1.66  * Stream Power (lb/ft s) *    0.14  *    2.52  *    0.09  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 2295.30  * 8987.65  * 5770.20  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  374.83  *  314.41  * 1031.96  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  755.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.55  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)          *  755.02  * Reach Len. (ft)        *  334.41  *  288.00  *  348.67  *
* Crit W.S. (ft)          *  738.96  * Flow Area (sq ft)      *          * 6508.41  *          *
* E.G. Slope (ft/ft)      *0.000243  * Area (sq ft)           *          * 6554.40  *          *
* Q Total (cfs)           *38700.00  * Flow (cfs)              *          *38700.00  *          *
* Top Width (ft)          *  311.35  * Top Width (ft)         *          *  311.35  *          *
* Vel Total (ft/s)        *    5.95  * Avg. Vel. (ft/s)       *          *    5.95  *          *
* Max Chl Dpth (ft)       *   32.87  * Hydr. Depth (ft)       *          *   22.08  *          *
* Conv. Total (cfs)       *2480593.0  * Conv. (cfs)            *          *2480593.0  *          *
* Length Wtd. (ft)        *  288.00  * Wetted Per. (ft)       *          *  304.91  *          *
* Min Ch El (ft)          *  722.15  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.93  *          *
* Frctn Loss (ft)         *    0.07  * Cum Volume (acre-ft)   *  112.64  * 5910.70  *  553.87  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   50.46  *  297.65  *  152.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.786

INPUT
Description: COE Riverstation=21460.35
LOMR cross section from 2003 contours.
Station Elevation Data    num=     102
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  789.97    9.21     786   10.82     786   24.17  785.57   53.92  784.93
   56.31  784.96   58.81  784.89   68.69  784.91   78.83  785.13   91.63  785.69
   96.92     786  100.24  786.96  103.42     788  106.43     788  109.73     786
  114.18     784  116.81  782.99  119.14     782  121.15  781.22  123.98     780
  130.51  776.75  139.88     772  143.97     770  149.47     768  152.41  767.23
  153.84  767.18  157.54  766.51  160.06  766.62  165.33     766  172.53     766
  219.04  766.51  270.97     766  276.15     766  294.38   765.5  342.73     764
  396.51     762  447.39     760  474.37     758  498.34     756   516.5     754
  532.52     750  539.13     748  545.14     746  550.15     744  558.83     740
  564.07     738  593.31     736  605.41     732  609.83  730.37  609.85  730.36
  616.17     728  658.05  726.06  670.05  722.06  714.05  722.06  726.05  726.06
  754.21  730.35  754.25  730.36  770.16     736  793.93     738  800.34     740
   819.4   746.9  828.22     750  840.29     754  862.77     756  871.95     758
  878.01     760  886.64     762   944.2  762.12  998.74     762 1002.47  761.95
 1003.68     762 1110.86     762 1177.88  763.36 1205.15  763.54 1234.24     764
 1255.65     764 1272.23  763.77 1285.75  763.73  1396.9     762 1588.82     762
    1780     762 2009.08     762 2016.43  761.45 2023.82     762 2073.13     762
 2075.59  761.57 2092.63     760    2276     760 2276.36  760.38 2293.57     762
 2305.92  762.67 2444.47  763.02 2616.31     762 2694.48  761.97 3016.91     762
 3058.76  763.81 3062.14     764 3085.31  766.08 3107.86     768 3112.27     770
 3123.29   775.2 3132.25   779.5

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  447.39    .027  886.64     .05 1003.68    .065 1110.86     .08
    1780     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        447.39  886.64           646.04     524  419.28             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     944 3132.25   762.5       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************
    1105    1780     775    2105 3132.25     775

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  742.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  741.93  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
```

```
* Crit W.S. (ft)         *  731.68  * Flow Area (sq ft)      *          * 2981.66  *          *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           *          * 2981.66  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  251.02  * Top Width (ft)         *          *  251.02  *          *
* Vel Total (ft/s)       *    4.29  * Avg. Vel. (ft/s)       *          *    4.29  *          *
* Max Chl Dpth (ft)      *   19.87  * Hydr. Depth (ft)       *          *   11.88  *          *
* Conv. Total (cfs)      *841813.9  * Conv. (cfs)            *          *841813.9  *          *
* Length Wtd. (ft)       *  524.00  * Wetted Per. (ft)       *          *  256.61  *          *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.72  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *          * 2636.88  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  224.34  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.35  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *  734.03  * Flow Area (sq ft)      *          * 4140.76  *          *
* E.G. Slope (ft/ft)     *0.000224  * Area (sq ft)           *          * 4140.76  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  273.79  * Top Width (ft)         *          *  273.79  *          *
* Vel Total (ft/s)       *    4.95  * Avg. Vel. (ft/s)       *          *    4.95  *          *
* Max Chl Dpth (ft)      *   24.29  * Hydr. Depth (ft)       *          *   15.12  *          *
* Conv. Total (cfs)      *1369543.0  * Conv. (cfs)            *          *1369543.0  *          *
* Length Wtd. (ft)       *  524.00  * Wetted Per. (ft)       *          *  281.05  *          *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.02  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    1.51  * 3643.99  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  252.13  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.35  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  749.92  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 5156.06  *          *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           *          * 5156.06  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  295.21  * Top Width (ft)         *          *  295.21  *          *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *          *    5.26  *          *
* Max Chl Dpth (ft)      *   27.86  * Hydr. Depth (ft)       *          *   17.47  *          *
* Conv. Total (cfs)      *1874692.0  * Conv. (cfs)            *          *1874692.0  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *          *  303.63  *          *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.16  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   15.75  * 4514.08  *  105.70  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    9.30  *  272.67  *   48.63  *
*****************************************************************************************

Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.67  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  753.19  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *  738.02  * Flow Area (sq ft)      *          * 6157.36  *          *
* E.G. Slope (ft/ft)     *0.000207  * Area (sq ft)           *          * 6157.36  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  318.07  * Top Width (ft)         *          *  318.07  *          *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)       *          *    5.60  *          *
* Max Chl Dpth (ft)      *   31.13  * Hydr. Depth (ft)       *          *   19.36  *          *
* Conv. Total (cfs)      *2396323.0  * Conv. (cfs)            *          *2396323.0  *          *
* Length Wtd. (ft)       *  524.00  * Wetted Per. (ft)       *          *  327.43  *          *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.36  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   63.40  * 5398.49  *  347.57  *
```

```
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   30.11  *  288.57  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  758.81  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 8196.37  *          *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)           *          * 8196.37  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  410.96  * Top Width (ft)         *          *  410.96  *          *
* Vel Total (ft/s)       *    5.55  * Avg. Vel. (ft/s)       *          *    5.55  *          *
* Max Chl Dpth (ft)      *   36.75  * Hydr. Depth (ft)       *          *   19.94  *          *
* Conv. Total (cfs)      *3263408.0  * Conv. (cfs)            *          *3263408.0  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *          *  421.21  *          *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.31  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  335.67  * 6794.48  * 1362.01  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  146.98  *  306.30  *  352.57  *
*****************************************************************************************

Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.050  *   0.027  *          *
* W.S. Elev (ft)         *  761.26  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   20.19  * 9243.13  *          *
* E.G. Slope (ft/ft)     *0.000201  * Area (sq ft)           *   20.19  * 9243.13  *   24.20  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *    6.25  *54393.75  *          *
* Top Width (ft)         *  494.16  * Top Width (ft)         *   32.05  *  436.06  *   26.05  *
* Vel Total (ft/s)       *    5.87  * Avg. Vel. (ft/s)       *    0.31  *    5.88  *          *
* Max Chl Dpth (ft)      *   39.20  * Hydr. Depth (ft)       *    0.63  *   21.20  *          *
* Conv. Total (cfs)      *3834551.0  * Conv. (cfs)            *   440.8  *3834110.0  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *   32.08  *  446.68  *          *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *    0.01  *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.53  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  865.16  * 7593.71  * 2442.88  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  269.68  *  310.61  *  536.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.13  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.050  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  762.49  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *  742.62  * Flow Area (sq ft)      *   78.73  * 9780.10  *   24.40  *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           *   78.73  * 9780.10  *  307.05  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *   40.35  *62953.49  *    6.16  *
* Top Width (ft)         * 1046.54  * Top Width (ft)         *   63.93  *  439.25  *  543.36  *
* Vel Total (ft/s)       *    6.37  * Avg. Vel. (ft/s)       *    0.51  *    6.44  *    0.25  *
* Max Chl Dpth (ft)      *   40.43  * Hydr. Depth (ft)       *    1.23  *   22.27  *    0.43  *
* Conv. Total (cfs)      *4195098.0  * Conv. (cfs)            *  2686.9  *4192001.0  *   410.1  *
* Length Wtd. (ft)       *  524.01  * Wetted Per. (ft)       *   63.97  *  449.96  *   57.36  *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *    0.02  *    0.31  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.01  *    1.97  *    0.00  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 1332.37  * 8089.26  * 3448.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  312.64  *  310.93  *  774.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  765.95  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.050  *   0.027  *   0.052  *
```

```
* W.S. Elev (ft)         *  765.27  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  365.34  *11003.34  * 1820.22  *
* E.G. Slope (ft/ft)     *0.000210  * Area (sq ft)           *  365.34  *11003.34  * 1820.22  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  290.47  *73949.97  * 1659.56  *
* Top Width (ft)         * 1128.21  * Top Width (ft)         *  145.60  *  439.25  *  543.36  *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *    0.80  *    6.72  *    0.91  *
* Max Chl Dpth (ft)      *   43.21  * Hydr. Depth (ft)       *    2.51  *   25.05  *    3.35  *
* Conv. Total (cfs)      *5236338.0  * Conv. (cfs)           * 20039.5  *5101805.0  *114493.3  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *  145.69  *  449.96  *  555.32  *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *    0.03  *    0.32  *    0.04  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *    0.03  *    2.16  *    0.04  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   * 2281.96  * 8918.64  * 5746.12  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  372.62  *  311.90  * 1025.37  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  755.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  754.98  * Reach Len. (ft)        *  646.04  *  524.00  *  419.28  *
* Crit W.S. (ft)         *  738.80  * Flow Area (sq ft)      *          * 6746.23  *          *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           *          * 6746.23  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  343.73  * Top Width (ft)         *          *  343.73  *          *
* Vel Total (ft/s)       *    5.74  * Avg. Vel. (ft/s)       *          *    5.74  *          *
* Max Chl Dpth (ft)      *   32.92  * Hydr. Depth (ft)       *          *   19.63  *          *
* Conv. Total (cfs)      *2651810.0  * Conv. (cfs)           *          *2651810.0  *          *
* Length Wtd. (ft)       *  524.00  * Wetted Per. (ft)       *          *  353.42  *          *
* Min Ch El (ft)         *  722.06  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.46  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *  112.64  * 5866.73  *  553.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   50.46  *  295.49  *  152.13  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.687

INPUT
Description: COE Riverstation=21984.63
LOMR cross section from 2003 contours.
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  799.97    8.82   797.7   23.54     794   29.33     792   33.53   789.7
    43.6     784   49.73     782   69.02  776.38   96.69     768   99.29  767.31
  103.97     766  109.19  764.66  111.56     764  120.18  761.92  127.85     760
   131.8  758.56  133.26     758     138     756  148.18     750   155.4     746
  159.67     744  164.49     742  169.43     740  180.49     738   192.8     736
  204.88     732  209.58  730.37  209.64  730.35  210.64     730 247.995  725.91
 259.995  721.91 303.995  721.91 315.995  725.91  339.89     728  345.14  729.32
  348.01     730  349.01  730.33  362.33  734.71  366.36     736  387.02     738
  400.56     740  406.27     742   417.3     746  428.13     750  442.17     754
   465.4     756  477.23     758  486.73     760  507.79  761.05  508.68  761.07
   512.9  761.28  514.69  761.29  534.19   761.9  550.71  761.85  562.43  761.77
  632.23   761.7  698.77     762  819.49     762  979.55     760 1017.46     760
  1049.3  760.53 1076.75  761.14 1111.26     762 1205.01     762    1680     762
  1927.8     762 1929.65   761.9 1956.64  761.29 1967.01  761.29 1975.44  761.35
 2003.62  761.36 2013.94  761.44 2021.75  761.45 2058.38     762 2064.69     762
 2083.45  763.03 2090.25  763.32 2093.33  763.36  2095.2  763.48 2112.92  763.96
 2427.23     762 2451.79  762.28 2610.94  763.21 2632.85  763.49  2659.3  763.24
 2731.26     763 2751.85  763.11  2891.8  762.67 2903.25  763.27 2904.36  763.27
 2908.11  763.39 2911.98  763.41 2932.59   764.3 2970.24     766 2977.61     766
 2979.49  766.73  2982.1     768 2983.42  768.59 2984.32  769.04 2985.18  769.31
  2985.5  769.46

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
```

```
*******************************************************************************
       0    .065  127.85    .027  486.73     .05  698.77    .065 1017.46     .08
    1680     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         127.85  486.73           523.84     483  464.64             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     534  2985.5   762.5       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     735     895     775    1000    1645     775    1970  2985.5     775

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.76  * Reach Len. (ft)        *  523.84  *  483.00  *  464.64  *
* Crit W.S. (ft)         *  731.76  * Flow Area (sq ft)      *          * 2824.81  *          *
* E.G. Slope (ft/ft)     *0.000261  * Area (sq ft)           *          * 2824.81  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  240.52  * Top Width (ft)          *          *  240.52  *          *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)       *          *    4.53  *          *
* Max Chl Dpth (ft)      *   19.85  * Hydr. Depth (ft)        *          *   11.74  *          *
* Conv. Total (cfs)      *792254.9  * Conv. (cfs)             *          *792254.9  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)        *          *  245.54  *          *
* Min Ch El (ft)         *  721.91  * Shear (lb/sq ft)        *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.85  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *          * 2601.96  *    5.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *  221.38  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.18  * Reach Len. (ft)        *  523.84  *  483.00  *  464.64  *
* Crit W.S. (ft)         *  734.18  * Flow Area (sq ft)      *          * 3937.33  *          *
* E.G. Slope (ft/ft)     *0.000251  * Area (sq ft)           *          * 3937.33  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  262.72  * Top Width (ft)          *          *  262.72  *          *
* Vel Total (ft/s)       *    5.21  * Avg. Vel. (ft/s)       *          *    5.21  *          *
* Max Chl Dpth (ft)      *   24.27  * Hydr. Depth (ft)        *          *   14.99  *          *
* Conv. Total (cfs)      *1295135.0  * Conv. (cfs)             *          *1295135.0  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)        *          *  269.45  *          *
* Min Ch El (ft)         *  721.91  * Shear (lb/sq ft)        *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.19  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    1.51  * 3595.41  *   22.64  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  248.90  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  749.70  * Reach Len. (ft)        *  523.84  *  483.00  *  464.64  *
* Crit W.S. (ft)         *  735.95  * Flow Area (sq ft)      *          * 4888.68  *          *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           *          * 4888.68  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  278.58  * Top Width (ft)          *          *  278.58  *          *
* Vel Total (ft/s)       *    5.54  * Avg. Vel. (ft/s)       *          *    5.54  *          *
* Max Chl Dpth (ft)      *   27.79  * Hydr. Depth (ft)        *          *   17.55  *          *
* Conv. Total (cfs)      *1781755.0  * Conv. (cfs)             *          *1781755.0  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)        *          *  286.85  *          *
* Min Ch El (ft)         *  721.91  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.36  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   15.75  * 4453.67  *  105.70  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    9.30  *  269.22  *   48.63  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	753.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.027	
W.S. Elev (ft)	753.01	Reach Len. (ft)	523.84	483.00	464.64
Crit W.S. (ft)	738.00	Flow Area (sq ft)		5840.69	
E.G. Slope (ft/ft)	0.000225	Area (sq ft)		5840.69	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	295.64	Top Width (ft)		295.64	
Vel Total (ft/s)	5.91	Avg. Vel. (ft/s)		5.91	
Max Chl Dpth (ft)	31.10	Hydr. Depth (ft)		19.76	
Conv. Total (cfs)	2299332.0	Conv. (cfs)		2299332.0	
Length Wtd. (ft)	483.00	Wetted Per. (ft)		305.29	
Min Ch El (ft)	721.91	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.59	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	63.40	5326.33	347.57
C & E Loss (ft)	0.02	Cum SA (acres)	30.11	284.88	105.36

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	759.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.027	
W.S. Elev (ft)	758.55	Reach Len. (ft)	523.84	483.00	464.64
Crit W.S. (ft)	740.25	Flow Area (sq ft)		7626.34	
E.G. Slope (ft/ft)	0.000200	Area (sq ft)		7626.34	
Q Total (cfs)	45500.00	Flow (cfs)		45500.00	
Top Width (ft)	348.05	Top Width (ft)		348.05	
Vel Total (ft/s)	5.97	Avg. Vel. (ft/s)		5.97	
Max Chl Dpth (ft)	36.64	Hydr. Depth (ft)		21.91	
Conv. Total (cfs)	3216517.0	Conv. (cfs)		3216517.0	
Length Wtd. (ft)	483.00	Wetted Per. (ft)		359.47	
Min Ch El (ft)	721.91	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.58	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	335.67	6699.31	1362.01
C & E Loss (ft)	0.03	Cum SA (acres)	146.98	301.73	352.57

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	761.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.	0.065	0.027	0.050
W.S. Elev (ft)	760.99	Reach Len. (ft)	523.84	483.00	464.64
Crit W.S. (ft)	741.69	Flow Area (sq ft)	1.97	8493.87	9.90
E.G. Slope (ft/ft)	0.000208	Area (sq ft)	1.97	8493.87	69.72
Q Total (cfs)	54400.00	Flow (cfs)	0.40	54396.94	2.66
Top Width (ft)	482.74	Top Width (ft)	3.97	358.88	119.89
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)	0.20	6.40	0.27
Max Chl Dpth (ft)	39.08	Hydr. Depth (ft)	0.50	23.67	0.50
Conv. Total (cfs)	3771208.0	Conv. (cfs)	27.7	3770996.0	184.4
Length Wtd. (ft)	483.00	Wetted Per. (ft)	4.09	370.70	19.95
Min Ch El (ft)	721.91	Shear (lb/sq ft)	0.01	0.30	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.00	1.91	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	865.00	7487.02	2442.43
C & E Loss (ft)	0.04	Cum SA (acres)	269.41	305.83	536.10

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	762.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.	0.065	0.027	0.050
W.S. Elev (ft)	762.22	Reach Len. (ft)	523.84	483.00	464.64

```
* Crit W.S. (ft)         *  742.95  * Flow Area (sq ft)      *    9.88  * 8935.37  *   55.12  *
* E.G. Slope (ft/ft)     *0.000235  * Area (sq ft)           *    9.88  * 8935.37  *  414.91  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *    3.64  *62968.54  *   27.83  *
* Top Width (ft)         * 1046.08  * Top Width (ft)         *    8.93  *  358.88  *  678.27  *
* Vel Total (ft/s)       *    7.00  * Avg. Vel. (ft/s)       *    0.37  *    7.05  *    0.50  *
* Max Chl Dpth (ft)      *   40.31  * Hydr. Depth (ft)       *    1.11  *   24.90  *    1.17  *
* Conv. Total (cfs)      *4105363.0  * Conv. (cfs)           *   237.0  *4103313.0  *  1813.5  *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)       *    9.20  *  370.70  *   47.31  *
* Min Ch El (ft)         *  721.91  * Shear (lb/sq ft)       *    0.02  *    0.35  *    0.02  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.01  *    2.50  *    0.01  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1331.71  * 7976.69  * 3445.40  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  312.10  *  306.13  *  768.48  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  765.77  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.065  *   0.027  *   0.054  *
* W.S. Elev (ft)         *  764.93  * Reach Len. (ft)        *  523.84  *  483.00  *  464.64  *
* Crit W.S. (ft)         *  744.80  * Flow Area (sq ft)      *   49.04  * 9907.42  * 2252.04  *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           *   49.04  * 9907.42  * 2252.04  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   30.54  *73812.30  * 2057.16  *
* Top Width (ft)         * 1056.87  * Top Width (ft)         *   19.72  *  358.88  *  678.27  *
* Vel Total (ft/s)       *    6.22  * Avg. Vel. (ft/s)       *    0.62  *    7.45  *    0.91  *
* Max Chl Dpth (ft)      *   43.02  * Hydr. Depth (ft)       *    2.49  *   27.61  *    3.32  *
* Conv. Total (cfs)      *5011805.0  * Conv. (cfs)           *  2016.5  *4873950.0  *135837.9  *
* Length Wtd. (ft)       *  482.48  * Wetted Per. (ft)       *   20.33  *  370.70  *  696.62  *
* Min Ch El (ft)         *  721.91  * Shear (lb/sq ft)       *    0.03  *    0.38  *    0.05  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.02  *    2.85  *    0.04  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 2278.89  * 8792.87  * 5726.52  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  371.39  *  307.10  * 1019.49  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  755.37  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  754.80  * Reach Len. (ft)        *  523.84  *  483.00  *  464.64  *
* Crit W.S. (ft)         *  738.89  * Flow Area (sq ft)      *          * 6379.83  *          *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           *          * 6379.83  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  311.43  * Top Width (ft)         *          *  311.43  *          *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *          *    6.07  *          *
* Max Chl Dpth (ft)      *   32.89  * Hydr. Depth (ft)       *          *   20.49  *          *
* Conv. Total (cfs)      *2572277.0  * Conv. (cfs)           *          *2572277.0  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)       *          *  321.73  *          *
* Min Ch El (ft)         *  721.91  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.70  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  112.64  * 5787.78  *  553.87  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   50.46  *  291.54  *  152.13  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.595

INPUT
Description: COE Riverstation=22467.47
LOMR cross section from 2003 contours.
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  800.04   14.25     798   39.17     794   54.62  791.82   68.47     790
```

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   74.04  789.18   83.22     788   90.13  786.89   91.92  786.63   95.49     786
   114.4     778  121.98  774.68  123.44     774  126.98     772  146.74  759.92
  150.22     758  157.32     754  161.01  752.62  162.45     752  201.33     750
  214.45     746  233.44     740  241.02     738  261.48     736  271.92     734
  282.89  730.34  283.05  730.28  283.89     730  323.23  725.78  335.23  721.78
  379.23  721.78  391.23  725.78  420.88     728  424.18  729.07   427.8  730.31
  427.86  730.33  432.77     732  434.67  732.59  439.54     734  447.74     736
  464.14     738  478.42     740  484.92     742  509.66     750  514.58     752
   519.7     754  537.68     756  550.63     758  559.07     760  566.59     762
  592.46     762  610.84     761  643.82  760.98  664.68  761.22  667.72  761.29
  869.44  761.68  926.11     762 1039.39  762.25 1123.32     762 1152.15     762
 1217.68     760 1273.49     760 1316.49     760 1349.89  760.32 1429.73     762
 1568.94     762 1590.59  762.19 1595.26     762 1863.65     762 1925.02  761.56
 1961.03     762 1977.98   762.4 1984.55   762.5 2014.38  763.15 2040.33  763.64
 2067.28     764 2072.58     764 2092.02  763.72 2122.42  763.46 2249.88     762
  2256.7     762 2279.46  762.62 2386.66     762  2483.9  763.05 2489.38  763.03
 3026.08  765.92 3090.62  766.75 3165.82   765.9 3175.33  765.85 3175.73  765.89
  3176.4  765.78 3176.79     766 3178.22  766.54 3181.71     768 3185.95     768
 3196.94   769.4 3203.63     770 3211.03     774 3214.88     776 3219.31     778
 3223.78  779.91

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .065  146.74    .027  566.59     .05  869.44    .065 1273.49     .08
 1925.02     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        146.74  566.59           656.75     612  572.68             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
     592    1375   762.5       F
    1375    1767     775       F
    1767    2202   762.5       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
     895    1095     775    1767    1891     775    2202 3223.78     775

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  741.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  741.66  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)          *  731.53  * Flow Area (sq ft)      *          * 2959.79  *          *
* E.G. Slope (ft/ft)      *0.000242  * Area (sq ft)           *          * 2959.79  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  255.64  * Top Width (ft)         *          *  255.64  *          *
* Vel Total (ft/s)        *    4.32  * Avg. Vel. (ft/s)       *          *    4.32  *          *
* Max Chl Dpth (ft)       *   19.88  * Hydr. Depth (ft)       *          *   11.58  *          *
* Conv. Total (cfs)       *823460.7  * Conv. (cfs)            *          *823460.7  *          *
* Length Wtd. (ft)        *  612.00  * Wetted Per. (ft)       *          *  260.40  *          *
* Min Ch El (ft)          *  721.78  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.74  *          *
* Frctn Loss (ft)         *    0.15  * Cum Volume (acre-ft)   *          * 2569.89  *    5.47  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *          *  218.63  *    1.74  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  746.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.38  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  746.10  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)          *  733.92  * Flow Area (sq ft)      *          * 4154.89  *          *
* E.G. Slope (ft/ft)      *0.000231  * Area (sq ft)           *          * 4154.89  *          *
* Q Total (cfs)           *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)          *  283.45  * Top Width (ft)         *          *  283.45  *          *
* Vel Total (ft/s)        *    4.93  * Avg. Vel. (ft/s)       *          *    4.93  *          *
* Max Chl Dpth (ft)       *   24.32  * Hydr. Depth (ft)       *          *   14.66  *          *
* Conv. Total (cfs)       *1350149.0  * Conv. (cfs)            *          *1350149.0  *          *
* Length Wtd. (ft)        *  612.00  * Wetted Per. (ft)       *          *  289.58  *          *
* Min Ch El (ft)          *  721.78  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.02  *          *
```

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* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *    1.51  * 3550.54  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  245.87  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  749.63  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)         *  735.72  * Flow Area (sq ft)      *          * 5195.89  *          *
* E.G. Slope (ft/ft)     *0.000212  * Area (sq ft)           *          * 5195.89  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  305.96  * Top Width (ft)         *          *  305.96  *          *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *          *    5.22  *          *
* Max Chl Dpth (ft)      *   27.85  * Hydr. Depth (ft)       *          *   16.98  *          *
* Conv. Total (cfs)      *1860112.0  * Conv. (cfs)            *          *1860112.0  *          *
* Length Wtd. (ft)       *  612.00  * Wetted Per. (ft)       *          *  313.18  *          *
* Min Ch El (ft)         *  721.78  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.15  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *   15.75  * 4397.76  *  105.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  265.98  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.96  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)         *  737.68  * Flow Area (sq ft)      *          * 6311.04  *          *
* E.G. Slope (ft/ft)     *0.000221  * Area (sq ft)           *          * 6311.04  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  356.94  * Top Width (ft)         *          *  356.94  *          *
* Vel Total (ft/s)       *    5.47  * Avg. Vel. (ft/s)       *          *    5.47  *          *
* Max Chl Dpth (ft)      *   31.18  * Hydr. Depth (ft)       *          *   17.68  *          *
* Conv. Total (cfs)      *2322055.0  * Conv. (cfs)            *          *2322055.0  *          *
* Length Wtd. (ft)       *  612.00  * Wetted Per. (ft)       *          *  365.08  *          *
* Min Ch El (ft)         *  721.78  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.30  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *   63.40  * 5258.96  *  347.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   30.11  *  281.26  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  758.54  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)         *  739.81  * Flow Area (sq ft)      *          * 8430.81  *          *
* E.G. Slope (ft/ft)     *0.000173  * Area (sq ft)           *          * 8430.81  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  403.64  * Top Width (ft)         *          *  403.64  *          *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *          *    5.40  *          *
* Max Chl Dpth (ft)      *   36.76  * Hydr. Depth (ft)       *          *   20.89  *          *
* Conv. Total (cfs)      *3461803.0  * Conv. (cfs)            *          *3461803.0  *          *
* Length Wtd. (ft)       *  612.00  * Wetted Per. (ft)       *          *  413.68  *          *
* Min Ch El (ft)         *  721.78  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.19  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  335.67  * 6610.29  * 1362.01  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  146.98  *  297.56  *  352.57  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.50  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.065  *   0.027  *          *
* W.S. Elev (ft)         *  760.99  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)         *  741.21  * Flow Area (sq ft)      *    0.93  * 9436.84  *          *
* E.G. Slope (ft/ft)     *0.000177  * Area (sq ft)           *    0.93  * 9436.84  *  151.44  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *    0.17  *54399.83  *          *
* Top Width (ft)         *  623.76  * Top Width (ft)         *    1.74  *  416.04  *  205.98  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *    0.18  *    5.76  *          *
* Max Chl Dpth (ft)      *   39.21  * Hydr. Depth (ft)       *    0.53  *   22.68  *          *
* Conv. Total (cfs)      *4091693.0  * Conv. (cfs)            *    12.6  *4091681.0  *          *
* Length Wtd. (ft)       *  612.00  * Wetted Per. (ft)       *    2.04  *  426.74  *          *
* Min Ch El (ft)         *  721.78  * Shear (lb/sq ft)       *    0.01  *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.41  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  864.98  * 7387.62  * 2441.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  269.38  *  301.53  *  534.36  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  762.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.065  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  762.22  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)         *  742.53  * Flow Area (sq ft)      *    4.34  * 9954.44  *    5.67  *
* E.G. Slope (ft/ft)     *0.000201  * Area (sq ft)           *    4.34  * 9954.44  *  820.33  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *    1.39  *62997.73  *    0.88  *
* Top Width (ft)         * 1503.51  * Top Width (ft)         *    3.77  *  419.85  * 1079.89  *
* Vel Total (ft/s)       *    6.32  * Avg. Vel. (ft/s)       *    0.32  *    6.33  *    0.15  *
* Max Chl Dpth (ft)      *   40.44  * Hydr. Depth (ft)       *    1.15  *   23.71  *    0.22  *
* Conv. Total (cfs)      *4445314.0  * Conv. (cfs)            *    98.0  *4445154.0  *    62.0  *
* Length Wtd. (ft)       *  611.85  * Wetted Per. (ft)       *    4.42  *  430.68  *   25.41  *
* Min Ch El (ft)         *  721.78  * Shear (lb/sq ft)       *    0.01  *    0.29  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.83  *    0.00  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 1331.63  * 7871.97  * 3438.81  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  312.02  *  301.81  *  759.10  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  765.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.065  *   0.027  *   0.059  *
* W.S. Elev (ft)         *  764.96  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)         *  744.29  * Flow Area (sq ft)      *   20.75  *11102.05  * 2978.47  *
* E.G. Slope (ft/ft)     *0.000190  * Area (sq ft)           *   20.75  *11102.05  * 4166.42  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   10.89  *73535.27  * 2353.84  *
* Top Width (ft)         * 1739.50  * Top Width (ft)         *    8.24  *  419.85  * 1311.41  *
* Vel Total (ft/s)       *    5.38  * Avg. Vel. (ft/s)       *    0.52  *    6.62  *    0.79  *
* Max Chl Dpth (ft)      *   43.18  * Hydr. Depth (ft)       *    2.52  *   26.44  *    3.24  *
* Conv. Total (cfs)      *5503139.0  * Conv. (cfs)            *   789.7  *5331684.0  *170665.2  *
* Length Wtd. (ft)       *  610.65  * Wetted Per. (ft)       *    9.66  *  430.68  *  931.07  *
* Min Ch El (ft)         *  721.78  * Shear (lb/sq ft)       *    0.03  *    0.31  *    0.04  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.01  *    2.03  *    0.03  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 2278.47  * 8676.39  * 5692.29  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  371.22  *  302.78  * 1008.87  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  755.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *         *   0.027  *          *
* W.S. Elev (ft)         *  754.76  * Reach Len. (ft)        *  656.75  *  612.00  *  572.68  *
* Crit W.S. (ft)         *  738.56  * Flow Area (sq ft)      *          * 6963.15  *          *
* E.G. Slope (ft/ft)     *0.000211  * Area (sq ft)           *          * 6963.15  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  370.55  * Top Width (ft)         *          *  370.55  *          *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *          *    5.56  *          *
```

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* Max Chl Dpth (ft)      *   32.98  * Hydr. Depth (ft)       *          *   18.79  *          *
* Conv. Total (cfs)      *2666681.0  * Conv. (cfs)            *          *2666681.0  *          *
* Length Wtd. (ft)       *  612.00  * Wetted Per. (ft)       *          *  379.32  *          *
* Min Ch El (ft)         *  721.78  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.34  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  112.64  * 5713.81  *  553.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   50.46  *  287.76  *  152.13  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 8.479

INPUT
Description: COE Riverstation=23079.76
LOMR cross section from 2003 contours.
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	800	.12	800	9.52	797.19	13.32	796	19.15	794
23.59	792	30.28	788	36.84	784	40.96	782	52.29	776.56
62.61	771.63	67.79	769.22	70.45	768	74.2	766	84.6	760
95	754	98.88	752	102.51	750	126.65	748.4	131.33	748
136.77	748	137.6	748.29	142.04	750	144.69	750	156.08	748.48
160.14	748	163.36	747.57	175.56	746	178.78	744.95	181.94	744
187.75	742	193.72	740	201.23	738	221.3	736	233.93	734
242.81	730.41	242.84	730.4	243.84	730	283.485	725.61	295.485	721.61
339.485	721.61	351.485	725.61	381.42	727.55	383.14	728.27	387.66	730
388.66	730.36	388.76	730.4	398.85	734	411.5	736	432.01	738
437.86	740	443.91	741.75	452.07	744	457.78	746	460.58	747.4
461.87	748	466.38	750	475.89	753.12	478.63	754	510.94	756
529.98	760	552.51	761.25	569.36	761.19	646.43	760.82	664.46	760.63
673.7	760.43	705.29	760	708.12	758.62	709.34	758	711.91	758
715.83	758.88	720.94	760	838.59	760	847.76	760.12	855.77	760
925.32	760	964.3	759.63	1000.34	759.55	1056.26	760	1339.76	760
1589.37	761.81	1609.41	761.94	1616.16	762	2009.43	762	2154.4	764
2226.59	764	2306.03	763.46	2311.88	763.33	2317.49	763.16	2320.4	763.25
2324.65	763.11	2388.27	763.73	2397.92	763.7	3216.28	767.62	3245.62	768
3249.62	768	3256.32	770	3278.89	772	3282.58	774	3286.42	776
3289.09	777.33	3294.58	779.88						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.065	84.6	.027	529.98	.05	838.59	.065	1339.76	.08
2009.43	.05								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
84.6 529.98 591.78 559 521.05 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
553	1550	761.5	F
1550	1660	775	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
102.51	142.04	750	840	1255	775	1832	1960	775
2275	3294.58	775						

CROSS SECTION OUTPUT Profile #2-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  741.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.52  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  731.34  * Flow Area (sq ft)      *          * 2965.29  *          *
* E.G. Slope (ft/ft)     *0.000238  * Area (sq ft)           *          * 2965.29  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  253.90  * Top Width (ft)         *          *  253.90  *          *
* Vel Total (ft/s)       *    4.32  * Avg. Vel. (ft/s)       *          *    4.32  *          *
* Max Chl Dpth (ft)      *   19.91  * Hydr. Depth (ft)       *          *   11.68  *          *
* Conv. Total (cfs)      *828963.4  * Conv. (cfs)            *          *828963.4  *          *
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* Length Wtd. (ft)       *  559.00  * Wetted Per. (ft)       *          *  259.01  *          *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.74  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *          * 2528.27  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  215.05  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.33  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  745.95  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  733.68  * Flow Area (sq ft)      *          * 4155.87  *          *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           *          * 4155.87  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  281.95  * Top Width (ft)         *          *  281.95  *          *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *          *    4.93  *          *
* Max Chl Dpth (ft)      *   24.34  * Hydr. Depth (ft)       *          *   14.74  *          *
* Conv. Total (cfs)      *1354252.0  * Conv. (cfs)            *          *1354252.0  *          *
* Length Wtd. (ft)       *  559.00  * Wetted Per. (ft)       *          *  288.44  *          *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.02  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    1.51  * 3492.16  *   22.64  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  241.90  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.92  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  749.50  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  735.60  * Flow Area (sq ft)      *          * 5216.18  *          *
* E.G. Slope (ft/ft)     *0.000220  * Area (sq ft)           *          * 5216.18  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  316.79  * Top Width (ft)         *          *  316.79  *          *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)       *          *    5.20  *          *
* Max Chl Dpth (ft)      *   27.89  * Hydr. Depth (ft)       *          *   16.47  *          *
* Conv. Total (cfs)      *1829158.0  * Conv. (cfs)            *          *1829158.0  *          *
* Length Wtd. (ft)       *  559.00  * Wetted Per. (ft)       *          *  324.30  *          *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.15  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *   15.75  * 4324.62  *  105.70  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.30  *  261.61  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.28  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.84  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  737.60  * Flow Area (sq ft)      *          * 6427.89  *          *
* E.G. Slope (ft/ft)     *0.000224  * Area (sq ft)           *          * 6427.89  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  377.76  * Top Width (ft)         *          *  377.76  *          *
* Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *          *    5.37  *          *
* Max Chl Dpth (ft)      *   31.23  * Hydr. Depth (ft)       *          *   17.02  *          *
* Conv. Total (cfs)      *2304536.0  * Conv. (cfs)            *          *2304536.0  *          *
* Length Wtd. (ft)       *  559.00  * Wetted Per. (ft)       *          *  386.58  *          *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.25  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *   63.40  * 5169.47  *  347.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   30.11  *  276.10  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
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CROSS SECTION OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. Elev (ft)         *  758.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  758.45  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  739.64  * Flow Area (sq ft)      *          * 8721.57  *          *
* E.G. Slope (ft/ft)     *0.000171  * Area (sq ft)           *          * 8721.57  *    1.81  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  440.78  * Top Width (ft)         *          *  435.32  *    5.46  *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *          *    5.22  *          *
* Max Chl Dpth (ft)      *   36.84  * Hydr. Depth (ft)       *          *   20.03  *          *
* Conv. Total (cfs)      *3483314.0  * Conv. (cfs)           *          *3483314.0  *          *
* Length Wtd. (ft)       *  559.00  * Wetted Per. (ft)       *          *  446.11  *          *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.09  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  335.67  * 6489.80  * 1362.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  146.98  *  291.67  *  352.54  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  761.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.065  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  760.91  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  741.04  * Flow Area (sq ft)      *    0.71  * 9807.44  *    7.40  *
* E.G. Slope (ft/ft)     *0.000170  * Area (sq ft)           *    0.71  * 9807.44  *  310.43  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *    0.11  *54398.19  *    1.69  *
* Top Width (ft)         *  884.58  * Top Width (ft)         *    1.57  *  445.38  *  437.63  *
* Vel Total (ft/s)       *    5.54  * Avg. Vel. (ft/s)       *    0.16  *    5.55  *    0.23  *
* Max Chl Dpth (ft)      *   39.30  * Hydr. Depth (ft)       *    0.45  *   22.02  *    0.45  *
* Conv. Total (cfs)      *4169847.0  * Conv. (cfs)           *     8.7  *4169708.0  *   129.7  *
* Length Wtd. (ft)       *  558.89  * Wetted Per. (ft)       *    1.81  *  456.75  *   16.36  *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *    0.00  *    0.23  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.27  *    0.00  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  864.97  * 7252.43  * 2438.21  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  269.35  *  295.48  *  530.13  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  762.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.065  *   0.027  *   0.057  *
* W.S. Elev (ft)         *  762.15  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  742.26  * Flow Area (sq ft)      *    4.00  *10360.06  * 1053.40  *
* E.G. Slope (ft/ft)     *0.000187  * Area (sq ft)           *    4.00  *10360.06  * 1085.38  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *    1.19  *62511.15  *  487.66  *
* Top Width (ft)         * 1396.21  * Top Width (ft)         *    3.72  *  445.38  *  947.11  *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)       *    0.30  *    6.03  *    0.46  *
* Max Chl Dpth (ft)      *   40.54  * Hydr. Depth (ft)       *    1.07  *   23.26  *    1.26  *
* Conv. Total (cfs)      *4604331.0  * Conv. (cfs)           *    87.0  *4568604.0  * 35640.3  *
* Length Wtd. (ft)       *  558.29  * Wetted Per. (ft)       *    4.30  *  456.75  *  842.42  *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *    0.01  *    0.27  *    0.01  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *    0.00  *    1.60  *    0.01  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   * 1331.56  * 7729.26  * 3426.28  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  311.97  *  295.73  *  745.77  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  765.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.065  *   0.027  *   0.061  *
* W.S. Elev (ft)         *  764.89  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  744.13  * Flow Area (sq ft)      *   20.74  *11582.38  * 3710.46  *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           *   20.74  *11582.38  * 4044.34  *
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* Q Total (cfs)          *75900.00  * Flow (cfs)             *   10.37  *72995.41  * 2894.21  *
* Top Width (ft)         * 1655.88  * Top Width (ft)         *    8.48  *  445.38  * 1202.02  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    0.50  *    6.30  *    0.78  *
* Max Chl Dpth (ft)      *   43.28  * Hydr. Depth (ft)       *    2.45  *   26.01  *    3.40  *
* Conv. Total (cfs)      *5720785.0  * Conv. (cfs)            *   781.9  *5501858.0  *218144.4  *
* Length Wtd. (ft)       *  556.75  * Wetted Per. (ft)       *    9.79  *  456.75  * 1109.54  *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *    0.02  *    0.28  *    0.04  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.01  *    1.76  *    0.03  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   * 2278.16  * 8517.03  * 5638.32  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  371.10  *  296.70  *  992.35  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  755.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *          *    0.027  *          *
* W.S. Elev (ft)         *  754.64  * Reach Len. (ft)        *  591.78  *  559.00  *  521.05  *
* Crit W.S. (ft)         *  738.45  * Flow Area (sq ft)      *          * 7121.91  *          *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           *          * 7121.91  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  395.15  * Top Width (ft)         *          *  395.15  *          *
* Vel Total (ft/s)       *    5.43  * Avg. Vel. (ft/s)       *          *    5.43  *          *
* Max Chl Dpth (ft)      *   33.03  * Hydr. Depth (ft)       *          *   18.02  *          *
* Conv. Total (cfs)      *2652101.0  * Conv. (cfs)            *          *2652101.0  *          *
* Length Wtd. (ft)       *  559.00  * Wetted Per. (ft)       *          *  404.63  *          *
* Min Ch El (ft)         *  721.61  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.27  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  112.64  * 5614.86  *  553.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   50.46  *  282.38  *  152.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.373

INPUT
Description: COE Riverstation=23638.38
LOMR cross section from 2003 contours.
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  800.01   17.97  797.27    53.4  791.68   65.25     790  100.76     786
  113.16     784  127.95     780  143.08  775.35  147.83  773.95  152.83  772.68
  162.86  770.37  164.19     770  172.31     766  176.83     764  189.87     760
  200.33  754.83  209.73     750   217.8     748  235.45     746  247.14     740
  272.43  730.38  272.53  730.34  273.42     730  280.42     728  310.71  725.45
  322.71  721.45  366.71  721.45  378.71  725.45  407.04     728  414.76  730.27
  414.87   730.3  427.59     734  436.48     736  453.58     738  465.44     740
  471.77     742   496.3     750   501.9     752  511.04     754   534.6     756
  545.87     758  559.73     760  602.21     760  613.88  759.56  633.35  758.64
  655.44     758  665.05  757.38  672.63  756.97   681.8  756.59  696.23  756.24
  714.07     756  735.59  754.94  746.78  754.07   749.8  753.89  755.84  753.69
  765.88  753.57  771.37  753.65  779.29  754.02   800.2  755.27  807.34     756
  814.25  756.08  827.73     756  867.92     756  914.42     758  959.34     758
 1008.67  759.77 1011.14     760 1099.12     760 1133.15   760.5 1174.21  760.56
 1254.43     760 1268.87     760 1287.99     758  1326.8     758 1342.06     760
 1413.73  761.75 1436.22  761.66 1441.19  761.56 1444.78  761.57 1449.32  761.45
 1457.98  761.47 1462.62  761.35 1470.49  761.37 1540.88     760 1656.27     760
 1691.48  760.47 1751.15  760.49 1875.65     760 1998.67     760 2019.35     762
 2211.43     764 2353.81     764 2397.66  762.79 2797.71  764.64 3053.25  768.05
 3257.85     770 3265.17  770.86 3280.82     772 3300.41     774 3307.96  776.96
 3315.44     780

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .065  189.87    .027  559.73     .05   800.2    .065  1326.8     .08
```

```
 1998.67     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        189.87  559.73              557  521.22     454              .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
     602     775     760       F
     775     945   761.5       F
     945    1195     775       F
    1195    2020   761.5       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
     640     960     758     975    1035     775    1370    1417     775
    2295 3315.44     775

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.34  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  731.18  * Flow Area (sq ft)      *          * 2788.89  *          *
* E.G. Slope (ft/ft)     *0.000251  * Area (sq ft)           *          * 2788.89  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  225.14  * Top Width (ft)         *          *  225.14  *          *
* Vel Total (ft/s)       *    4.59  * Avg. Vel. (ft/s)       *          *    4.59  *          *
* Max Chl Dpth (ft)      *   19.89  * Hydr. Depth (ft)       *          *   12.39  *          *
* Conv. Total (cfs)      *808514.1  * Conv. (cfs)            *          *808514.1  *          *
* Length Wtd. (ft)       *  521.22  * Wetted Per. (ft)       *          *  230.67  *          *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.87  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *          * 2491.34  *    5.47  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *  211.98  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  745.75  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  733.61  * Flow Area (sq ft)      *          * 3830.35  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 3830.35  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  247.31  * Top Width (ft)         *          *  247.31  *          *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *          *    5.35  *          *
* Max Chl Dpth (ft)      *   24.30  * Hydr. Depth (ft)       *          *   15.49  *          *
* Conv. Total (cfs)      *1284649.0  * Conv. (cfs)            *          *1284649.0  *          *
* Length Wtd. (ft)       *  521.22  * Wetted Per. (ft)       *          *  254.60  *          *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.28  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    1.51  * 3440.92  *   22.64  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.36  *  238.50  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  749.27  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  735.40  * Flow Area (sq ft)      *          * 4767.34  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 4767.34  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  281.42  * Top Width (ft)         *          *  281.42  *          *
* Vel Total (ft/s)       *    5.68  * Avg. Vel. (ft/s)       *          *    5.68  *          *
* Max Chl Dpth (ft)      *   27.82  * Hydr. Depth (ft)       *          *   16.94  *          *
* Conv. Total (cfs)      *1697801.0  * Conv. (cfs)            *          *1697801.0  *          *
* Length Wtd. (ft)       *  521.20  * Wetted Per. (ft)       *          *  289.61  *          *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.49  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   15.75  * 4260.56  *  105.70  *
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* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    9.30  *  257.77  *   48.63  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.14  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.58  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  737.25  * Flow Area (sq ft)      *          * 5727.89  *          *
* E.G. Slope (ft/ft)     *0.000244  * Area (sq ft)           *          * 5727.89  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  299.82  * Top Width (ft)         *          *  299.82  *          *
* Vel Total (ft/s)       *    6.02  * Avg. Vel. (ft/s)       *          *    6.02  *          *
* Max Chl Dpth (ft)      *   31.13  * Hydr. Depth (ft)       *          *   19.10  *          *
* Conv. Total (cfs)      *2206755.0  * Conv. (cfs)            *          *2206755.0  *          *
* Length Wtd. (ft)       *  521.00  * Wetted Per. (ft)       *          *  309.25  *          *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.70  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   63.40  * 5091.47  *  347.57  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   30.11  *  271.75  *  105.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  758.19  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  739.57  * Flow Area (sq ft)      *          * 7563.06  *          *
* E.G. Slope (ft/ft)     *0.000210  * Area (sq ft)           *          * 7563.06  *   67.23  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  711.65  * Top Width (ft)         *          *  353.67  *  357.98  *
* Vel Total (ft/s)       *    6.02  * Avg. Vel. (ft/s)       *          *    6.02  *          *
* Max Chl Dpth (ft)      *   36.74  * Hydr. Depth (ft)       *          *   21.38  *          *
* Conv. Total (cfs)      *3140866.0  * Conv. (cfs)            *          *3140866.0  *          *
* Length Wtd. (ft)       *  520.46  * Wetted Per. (ft)       *          *  364.85  *          *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.63  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  335.67  * 6385.31  * 1361.59  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  146.98  *  286.61  *  350.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.065  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  760.63  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  741.13  * Flow Area (sq ft)      *    0.64  * 8449.53  *  431.56  *
* E.G. Slope (ft/ft)     *0.000218  * Area (sq ft)           *    0.64  * 8449.53  * 1445.43  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *    0.10  *54099.09  *  300.81  *
* Top Width (ft)         * 1616.53  * Top Width (ft)         *    2.05  *  369.86  * 1244.62  *
* Vel Total (ft/s)       *    6.12  * Avg. Vel. (ft/s)       *    0.15  *    6.40  *    0.70  *
* Max Chl Dpth (ft)      *   39.18  * Hydr. Depth (ft)       *    0.31  *   22.85  *    2.00  *
* Conv. Total (cfs)      *3687182.0  * Conv. (cfs)            *     6.6  *3666787.0  * 20388.6  *
* Length Wtd. (ft)       *  520.24  * Wetted Per. (ft)       *    2.14  *  381.59  *  215.31  *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *    0.00  *    0.30  *    0.03  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    0.00  *    1.93  *    0.02  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  864.96  * 7135.28  * 2427.71  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  269.33  *  290.25  *  520.07  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
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* E.G. Elev (ft)         *  762.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.065  *   0.027  *   0.061  *
* W.S. Elev (ft)         *  761.87  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  742.51  * Flow Area (sq ft)      *    5.68  * 8907.86  * 2678.35  *
* E.G. Slope (ft/ft)     *0.000233  * Area (sq ft)           *    5.68  * 8907.86  * 3048.36  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *    1.84  *61122.93  * 1875.24  *
* Top Width (ft)         * 1727.20  * Top Width (ft)         *    6.09  *  369.86  * 1351.25  *
* Vel Total (ft/s)       *    5.43  * Avg. Vel. (ft/s)       *    0.32  *    6.86  *    0.70  *
* Max Chl Dpth (ft)      *   40.42  * Hydr. Depth (ft)       *    0.93  *   24.08  *    2.31  *
* Conv. Total (cfs)      *4127211.0  * Conv. (cfs)            *   120.5  *4004242.0  *122849.1  *
* Length Wtd. (ft)       *  519.29  * Wetted Per. (ft)       *    6.37  *  381.59  * 1162.96  *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *    0.01  *    0.34  *    0.03  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.00  *    2.33  *    0.02  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1331.50  * 7605.63  * 3401.56  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  311.90  *  290.50  *  732.03  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  765.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.             *   0.065  *   0.027  *   0.064  *
* W.S. Elev (ft)         *  764.66  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  744.43  * Flow Area (sq ft)      *   35.24  * 9942.29  * 6305.07  *
* E.G. Slope (ft/ft)     *0.000210  * Area (sq ft)           *   35.24  * 9942.29  * 7206.47  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   20.39  *69731.50  * 6148.10  *
* Top Width (ft)         * 2012.67  * Top Width (ft)         *   14.54  *  369.86  * 1628.27  *
* Vel Total (ft/s)       *    4.66  * Avg. Vel. (ft/s)       *    0.58  *    7.01  *    0.98  *
* Max Chl Dpth (ft)      *   43.21  * Hydr. Depth (ft)       *    2.42  *   26.88  *    4.38  *
* Conv. Total (cfs)      *5234254.0  * Conv. (cfs)            *  1406.2  *4808859.0  *423988.6  *
* Length Wtd. (ft)       *  516.22  * Wetted Per. (ft)       *   15.28  *  381.59  * 1446.26  *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *    0.03  *    0.34  *    0.06  *
* Alpha                  *    2.08  * Stream Power (lb/ft s) *    0.02  *    2.40  *    0.06  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 2277.78  * 8378.92  * 5571.03  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  370.94  *  291.47  *  975.42  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  754.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  754.37  * Reach Len. (ft)        *  557.00  *  521.22  *  454.00  *
* Crit W.S. (ft)         *  738.17  * Flow Area (sq ft)      *          * 6277.15  *          *
* E.G. Slope (ft/ft)     *0.000241  * Area (sq ft)           *          * 6277.15  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  314.21  * Top Width (ft)         *          *  314.21  *          *
* Vel Total (ft/s)       *    6.17  * Avg. Vel. (ft/s)       *          *    6.17  *          *
* Max Chl Dpth (ft)      *   32.92  * Hydr. Depth (ft)       *          *   19.98  *          *
* Conv. Total (cfs)      *2490753.0  * Conv. (cfs)            *          *2490753.0  *          *
* Length Wtd. (ft)       *  520.83  * Wetted Per. (ft)       *          *  324.23  *          *
* Min Ch El (ft)         *  721.45  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.80  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  112.64  * 5528.89  *  553.87  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   50.46  *  277.83  *  152.13  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.275

INPUT
Description: Expanded section u/s of Staduim Dr.
LOMR cross section from 2003
             contours.
```

```
COE Riverstation=24159.60
Preliminary Model
            Riverstation=16714.56
Station Elevation Data    num=      89
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0      800    33.4      798    45.5      796    61.6      794   126.6      792
   157.1      790   180.2      788   198.2      786   222.3      784   226.9      782
     243      780   256.5      778   264.5      776   272.3      774   282.1      772
   292.6      770   302.2      768   321.3      766   344.7      764     374      762
   437.6      760   481.2      758     639      758   715.9      758   741.6      756
   760.3      754   765.9      752   771.2      750   777.4      748     784      746
   790.2      744     796      742   801.8      740   810.2      738     823      736
   839.3      734   845.4      732   851.6      730   858.8      728   864.9      726
   891.1  725.315   903.1  721.315   947.1  721.315   959.1  725.315   985.3      726
   992.6      728   998.7      730  1005.1      732  1011.6      734  1022.4      736
  1040.2      738  1052.5      740  1058.7      742  1064.4      744  1069.7      746
    1074      748  1078.4      750  1100.3    750.4  1111.2      750  1127.2      748
  1146.7      748  1155.7      750  1162.3      752  1168.8      754  1202.9      756
  1222.3      758  1248.2      760  1363.2      762  1401.7      764  1464.5      764
  1500.2      762  1716.4      760    1744      760  1946.9      760    2144    761.6
  2430.3      760  2617.2      762  2723.3      762  2738.1      764  3184.6      764
  3519.9      766  3726.7      768  3749.5      770  3755.2      772    3761      774
  3765.8      776    3776      776  3783.4      778 3790.24      780

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .065     639     .05   760.3    .027  1078.4     .05  1363.2    .065
    1744     .08  2430.3     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          760.3  1078.4           230.75  281.29  245.17             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       0     388   757.8       F
    1293    1420   757.8       F
    1420    1463     775       F
    1463    2825   761.5       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2825 3790.24     775

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  741.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.27  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  741.25  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)          *  730.63  * Flow Area (sq ft)      *          * 3063.53  *          *
* E.G. Slope (ft/ft)      *0.000219  * Area (sq ft)           *          * 3063.53  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  258.23  * Top Width (ft)         *          *  258.23  *          *
* Vel Total (ft/s)        *    4.18  * Avg. Vel. (ft/s)       *          *    4.18  *          *
* Max Chl Dpth (ft)       *   19.94  * Hydr. Depth (ft)       *          *   11.86  *          *
* Conv. Total (cfs)       *865608.5  * Conv. (cfs)            *          *865608.5  *          *
* Length Wtd. (ft)        *  281.29  * Wetted Per. (ft)       *          *  263.34  *          *
* Min Ch El (ft)          *  721.32  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.66  *          *
* Frctn Loss (ft)         *    0.07  * Cum Volume (acre-ft)   *          * 2456.33  *    5.47  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *          *  209.09  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  746.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  745.69  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)          *  733.01  * Flow Area (sq ft)      *          * 4264.72  *          *
* E.G. Slope (ft/ft)      *0.000212  * Area (sq ft)           *          * 4264.72  *          *
* Q Total (cfs)           *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)          *  283.89  * Top Width (ft)         *          *  283.89  *          *
* Vel Total (ft/s)        *    4.81  * Avg. Vel. (ft/s)       *          *    4.81  *          *
```

```
* Max Chl Dpth (ft)      *   24.37  * Hydr. Depth (ft)       *          *   15.02  *          *
* Conv. Total (cfs)      *1407206.0  * Conv. (cfs)            *          *1407206.0  *          *
* Length Wtd. (ft)       *  281.29  * Wetted Per. (ft)       *          *  290.49  *          *
* Min Ch El (ft)         *  721.32  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.93  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *    1.51  * 3392.49  *   22.64  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.36  *  235.33  *   11.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.027  *   0.050  *
* W.S. Elev (ft)         *  749.23  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)         *  734.83  * Flow Area (sq ft)      *          * 5304.59  *   33.33  *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *          * 5304.59  *   33.33  *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27086.59  *   13.41  *
* Top Width (ft)         *  337.94  * Top Width (ft)         *          *  303.10  *   34.84  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *          *    5.11  *    0.40  *
* Max Chl Dpth (ft)      *   27.91  * Hydr. Depth (ft)       *          *   17.50  *    0.96  *
* Conv. Total (cfs)      *1935301.0  * Conv. (cfs)            *          *1934343.0  *   957.9  *
* Length Wtd. (ft)       *  281.28  * Wetted Per. (ft)       *          *  311.01  *   35.05  *
* Min Ch El (ft)         *  721.32  * Shear (lb/sq ft)       *          *    0.21  *    0.01  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *    1.07  *    0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   15.75  * 4200.30  *  105.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    9.30  *  254.27  *   48.45  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.027  *   0.050  *
* W.S. Elev (ft)         *  752.55  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)         *  736.73  * Flow Area (sq ft)      *          * 6331.08  *  264.88  *
* E.G. Slope (ft/ft)     *0.000183  * Area (sq ft)           *          * 6331.08  *  264.88  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34275.36  *  224.64  *
* Top Width (ft)         *  399.70  * Top Width (ft)         *          *  314.03  *   85.67  *
* Vel Total (ft/s)       *    5.23  * Avg. Vel. (ft/s)       *          *    5.41  *    0.85  *
* Max Chl Dpth (ft)      *   31.23  * Hydr. Depth (ft)       *          *   20.16  *    3.09  *
* Conv. Total (cfs)      *2551213.0  * Conv. (cfs)            *          *2534601.0  * 16611.9  *
* Length Wtd. (ft)       *  281.17  * Wetted Per. (ft)       *          *  322.68  *   86.41  *
* Min Ch El (ft)         *  721.32  * Shear (lb/sq ft)       *          *    0.22  *    0.03  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *          *    1.21  *    0.03  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   63.40  * 5019.33  *  346.19  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   30.11  *  268.08  *  104.92  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.051  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  758.18  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)         *  738.97  * Flow Area (sq ft)      *  132.53  * 8120.64  *  902.42  *
* E.G. Slope (ft/ft)     *0.000136  * Area (sq ft)           *  132.53  * 8120.64  *  902.42  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   34.81  *44417.01  * 1048.17  *
* Top Width (ft)         *  747.37  * Top Width (ft)         *  283.03  *  318.10  *  146.24  *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)       *    0.26  *    5.47  *    1.16  *
* Max Chl Dpth (ft)      *   36.87  * Hydr. Depth (ft)       *    0.47  *   25.53  *    6.17  *
* Conv. Total (cfs)      *3896761.0  * Conv. (cfs)            *  2981.6  *3804011.0  * 89768.9  *
* Length Wtd. (ft)       *  280.85  * Wetted Per. (ft)       *  283.22  *  327.01  *  147.36  *
* Min Ch El (ft)         *  721.32  * Shear (lb/sq ft)       *    0.00  *    0.21  *    0.05  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.00  *    1.16  *    0.06  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  334.82  * 6291.48  * 1356.54  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  145.17  *  282.59  *  347.74  *
*****************************************************************************************
```

```
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  761.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.056  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  760.62  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)         *  740.45  * Flow Area (sq ft)      *  889.89  * 8896.74  * 1306.33  *
* E.G. Slope (ft/ft)     *0.000139  * Area (sq ft)           *  889.89  * 8896.74  * 1546.21  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  535.16  *52297.69  * 1567.15  *
* Top Width (ft)         * 1408.93  * Top Width (ft)         *  342.43  *  318.10  *  748.40  *
* Vel Total (ft/s)       *    4.90  * Avg. Vel. (ft/s)       *    0.60  *    5.88  *    1.20  *
* Max Chl Dpth (ft)      *   39.31  * Hydr. Depth (ft)       *    2.60  *   27.97  *    6.36  *
* Conv. Total (cfs)      *4607087.0  * Conv. (cfs)           * 45322.2  *4429044.0  *132720.2  *
* Length Wtd. (ft)       *  279.78  * Wetted Per. (ft)       *  342.67  *  327.01  *  206.66  *
* Min Ch El (ft)         *  721.32  * Shear (lb/sq ft)       *    0.02  *    0.24  *    0.06  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.01  *    1.39  *    0.07  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  859.26  * 7031.51  * 2412.12  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  267.12  *  286.14  *  509.68  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  762.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.057  *   0.027  *   0.054  *
* W.S. Elev (ft)         *  761.84  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)         *  741.72  * Flow Area (sq ft)      * 1331.05  * 9284.60  * 2867.21  *
* E.G. Slope (ft/ft)     *0.000158  * Area (sq ft)           * 1331.05  * 9284.60  * 2867.21  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1026.32  *59687.74  * 2285.95  *
* Top Width (ft)         * 2059.55  * Top Width (ft)         *  381.20  *  318.10  * 1360.25  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    0.77  *    6.43  *    0.80  *
* Max Chl Dpth (ft)      *   40.52  * Hydr. Depth (ft)       *    3.49  *   29.19  *    2.11  *
* Conv. Total (cfs)      *5019406.0  * Conv. (cfs)           * 81769.8  *4755508.0  *182128.4  *
* Length Wtd. (ft)       *  279.10  * Wetted Per. (ft)       *  381.46  *  327.01  * 1361.48  *
* Min Ch El (ft)         *  721.32  * Shear (lb/sq ft)       *    0.03  *    0.28  *    0.02  *
* Alpha                  *    1.79  * Stream Power (lb/ft s) *    0.03  *    1.80  *    0.02  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1322.95  * 7496.79  * 3370.73  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  309.42  *  286.39  *  717.90  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*************************************************************************************************
* E.G. Elev (ft)         *  765.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.058  *   0.027  *   0.059  *
* W.S. Elev (ft)         *  764.65  * Reach Len. (ft)        *  230.75  *  281.29  *  245.17  *
* Crit W.S. (ft)         *  743.45  * Flow Area (sq ft)      * 2467.97  *10179.24  * 7304.34  *
* E.G. Slope (ft/ft)     *0.000146  * Area (sq ft)           * 2467.97  *10179.24  * 7332.38  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2513.04  *66889.19  * 6497.77  *
* Top Width (ft)         * 2487.93  * Top Width (ft)         *  423.23  *  318.10  * 1746.60  *
* Vel Total (ft/s)       *    3.80  * Avg. Vel. (ft/s)       *    1.02  *    6.57  *    0.89  *
* Max Chl Dpth (ft)      *   43.34  * Hydr. Depth (ft)       *    5.83  *   32.00  *    4.29  *
* Conv. Total (cfs)      *6290273.0  * Conv. (cfs)           *208270.3  *5543495.0  *538507.5  *
* Length Wtd. (ft)       *  276.32  * Wetted Per. (ft)       *  423.59  *  327.01  * 1705.73  *
* Min Ch El (ft)         *  721.32  * Shear (lb/sq ft)       *    0.05  *    0.28  *    0.04  *
* Alpha                  *    2.64  * Stream Power (lb/ft s) *    0.05  *    1.86  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 2261.77  * 8258.54  * 5495.27  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  368.14  *  287.36  *  957.84  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	754.82	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.47	Wt. n-Val.	0.050	0.027	0.050	
W.S. Elev (ft)	754.35	Reach Len. (ft)	230.75	281.29	245.17	
Crit W.S. (ft)	737.67	Flow Area (sq ft)	0.57	6901.98	425.57	
E.G. Slope (ft/ft)	0.000174	Area (sq ft)	0.57	6901.98	425.57	
Q Total (cfs)	38700.00	Flow (cfs)	0.07	38253.96	445.97	
Top Width (ft)	417.73	Top Width (ft)	3.27	318.10	96.36	
Vel Total (ft/s)	5.28	Avg. Vel. (ft/s)	0.12	5.54	1.05	
Max Chl Dpth (ft)	33.03	Hydr. Depth (ft)	0.17	21.70	4.42	
Conv. Total (cfs)	2934824.0	Conv. (cfs)	5.3	2900999.0	33819.9	
Length Wtd. (ft)	281.08	Wetted Per. (ft)	3.29	327.01	97.32	
Min Ch El (ft)	721.32	Shear (lb/sq ft)	0.00	0.23	0.05	
Alpha	1.09	Stream Power (lb/ft s)	0.00	1.27	0.05	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	112.64	5450.04	551.65	
C & E Loss (ft)	0.04	Cum SA (acres)	50.44	274.05	151.63	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 8.221

INPUT
Description: u/s Face of Stadium Dr.

COE Riverstation=24440.89
Preliminary
Model Riverstation=16433.28
Station Elevation Data num= 256

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.64	1.64	804.5	2.74	804.45	7.13	804	24.34	802
31.67	801.33	33.97	801.15	38.95	800.67	40.7	800.53	41.14	800.48
46.06	800	70.61	798	99.72	795.41	117.43	794	134.14	792
137.63	791.68	141.02	791.29	148.04	790.64	151.96	790	162.56	789.01
171.71	788	183.76	786	184.13	786	190.18	785.44	210.6	784.4
211.37	784.38	217.18	784	219.32	784	222.6	783.66	224.16	783.59
247.18	782	250.97	781.39	257.78	780.82	261.71	780.38	266.38	780
271.53	779.1	271.92	778.98	272.35	778.9	275.26	778.47	276.94	778.16
278.64	778	279.34	778	280.59	777.9	280.92	777.86	286.85	777.5
288.57	777.25	292.66	776.94	295.03	776.45	296.21	776.34	297.48	776
311.01	774.89	314.31	774.67	319.97	774	340.34	772	354.47	770
379.43	768	383.63	768	440.07	765.93	440.35	765.93	510.77	764
520.91	764.08	592.83	762.77	635.57	762	646.84	762	746.5	760
757.28	760	758.68	760	763.26	758.68	765.18	758	789.85	757.2
793.41	757.15	801.28	756.9	863.58	756.05	863.99	756.04	996.56	756
997.28	756.02	1002.78	756	1011.1	755.92	1011.27	755.91	1013.75	755.87
1014.13	755.84	1015.51	755.8	1020.18	755.74	1020.95	755.66	1024.12	755.6
1025.25	755.46	1028.09	755.39	1029.08	755.24	1031.51	755.16	1032.04	755.08
1034.12	755	1034.35	754.98	1035.35	754.85	1038.82	754.26	1039.37	754.22
1040.32	754	1043.18	752.87	1044.58	752	1044.89	752	1046.03	751.69
1052.08	750.2	1052.31	750.15	1052.44	750.11	1052.85	750	1066.69	746
1091.61	738	1096.72	736.23	1097.44	736	1115.85	729.28	1119.54	728
1139.21	726	1159.32	721.31	1181.32	721.31	1203.32	721.31	1223.43	726
1230.85	728	1237.17	730	1246.43	733.58	1247.55	734	1257.57	738
1263.02	740	1267.17	741.91	1267.38	742	1268.06	742.32	1274.04	744.92
1281.97	748	1283.96	748.93	1290.88	752	1292.66	752.82	1295.36	754
1296.82	754.67	1299.9	756	1301.88	756.43	1302.76	756.47	1304.3	756.72
1306.73	757.04	1308.14	757.08	1308.92	757.16	1310.3	757.22	1312.35	757.36
1312.74	757.4	1312.91	757.42	1317.18	757.79	1317.71	757.85	1319.71	758
1341.04	758	1348.27	758.19	1452.41	759.23	1504.76	760	1512.87	760
1527.05	760.52	1580.63	761.49	1625.89	762	1879.28	762	1879.69	762.01
1880.12	762	1911.7	762	1916.82	762.09	1995.02	762.83	2071.77	762.46
2128.34	762	2155.52	762.59	2209.82	762.18	2210.19	762.21	2212.83	762.12
2279.47	762.12	2279.91	762.11	2282.15	762	2564.1	762	2804.87	762
2867.9	762.86	2920.62	764	3208.26	764	3501.39	764.9	3596.68	764
3643.96	764.16	3777.23	763.75	3801.68	763.18	3875.81	762.48	3890.16	762.78
3895.33	763.07	3900.22	763.04	3912.17	764	3938.16	774	3944.37	776
3951.27	778	3973.24	778	3989.08	773.5	3998.93	770.78	4008.52	768

```
 4028.14     766 4036.76     766 4041.95  765.74 4042.91  765.72 4047.06  765.52
 4047.94   765.5 4053.81   765.3 4055.15  765.28 4056.51  765.23 4058.14  765.22
 4059.98  765.15 4061.74  765.14 4064.69  765.02 4067.46  765.03 4071.78  764.86
 4110.57     764 4133.95  764.01 4147.63   764.1 4229.44     766 4247.57     766
 4279.56     768 4282.16     768 4309.55  769.57 4309.83  769.58  4315.8  770.02
  4315.9  770.03 4339.73     772 4345.93  772.37 4346.73  772.39  4358.4  772.87
 4360.92  773.05 4364.63  773.16  4367.7  773.38 4376.39  773.88 4376.64   773.9
 4378.22     774 4379.04     774  4384.9  774.78 4387.39  775.17 4387.73  775.25
 4391.11     776  4394.2  777.76 4394.64     778 4397.09  779.53 4397.95     780
 4399.29  780.78 4401.17     782 4401.55  782.23 4403.51  783.35 4404.48     784
 4411.01  787.94 4411.49  788.23 4414.15  789.73 4414.61     790 4417.25  791.49
 4418.13     792  4420.4  793.59 4421.06     794 4423.52  795.74 4423.93     796
 4426.57  797.91 4426.72     798 4428.43     798    4432  798.38 4436.28  798.66
  4436.6  798.67

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  757.28     .04 1002.78    .027 1319.71     .04 1580.63     .05
  2564.1     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1002.78 1319.71            77.11   86.71   95.73             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       1     502     765       F
     502    1035   757.8       F
    1303    2000   757.8       F
    3900    4400     779       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
    2004    2189     780    2245    2550     780    3040    3910     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  741.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  741.00  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)          *  731.10  * Flow Area (sq ft)      *          * 2411.20  *          *
* E.G. Slope (ft/ft)      *0.000312  * Area (sq ft)           *          * 2411.20  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)          *  182.92  * Top Width (ft)          *          *  182.92  *          *
* Vel Total (ft/s)        *    5.31  * Avg. Vel. (ft/s)        *          *    5.31  *          *
* Max Chl Dpth (ft)       *   19.69  * Hydr. Depth (ft)        *          *   13.18  *          *
* Conv. Total (cfs)       *724589.4  * Conv. (cfs)             *          *724589.4  *          *
* Length Wtd. (ft)        *   13.00  * Wetted Per. (ft)        *          *  188.97  *          *
* Min Ch El (ft)          *  721.31  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.32  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *          * 2438.65  *    5.47  *
* C & E Loss (ft)         *          * Cum SA (acres)          *          *  207.66  *    1.74  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  745.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.62  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  745.33  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)          *  733.77  * Flow Area (sq ft)      *          * 3252.83  *          *
* E.G. Slope (ft/ft)      *0.000348  * Area (sq ft)           *          * 3252.83  *          *
* Q Total (cfs)           *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)          *  206.30  * Top Width (ft)          *          *  206.30  *          *
* Vel Total (ft/s)        *    6.30  * Avg. Vel. (ft/s)        *          *    6.30  *          *
* Max Chl Dpth (ft)       *   24.02  * Hydr. Depth (ft)        *          *   15.77  *          *
* Conv. Total (cfs)       *1098725.0  * Conv. (cfs)             *          *1098725.0  *          *
* Length Wtd. (ft)        *   13.00  * Wetted Per. (ft)        *          *  213.93  *          *
* Min Ch El (ft)          *  721.31  * Shear (lb/sq ft)        *          *    0.33  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    2.08  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *    1.51  * 3368.21  *   22.64  *
* C & E Loss (ft)         *          * Cum SA (acres)          *    2.36  *  233.74  *   11.95  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	749.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.027	
W.S. Elev (ft)	748.82	Reach Len. (ft)	13.00	13.00	13.00
Crit W.S. (ft)	735.69	Flow Area (sq ft)		4009.60	
E.G. Slope (ft/ft)	0.000345	Area (sq ft)		4009.60	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	226.79	Top Width (ft)		226.79	
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)		6.76	
Max Chl Dpth (ft)	27.51	Hydr. Depth (ft)		17.68	
Conv. Total (cfs)	1459939.0	Conv. (cfs)		1459939.0	
Length Wtd. (ft)	13.00	Wetted Per. (ft)		235.61	
Min Ch El (ft)	721.31	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)		2.47	
Frctn Loss (ft)		Cum Volume (acre-ft)	15.75	4170.23	105.44
C & E Loss (ft)		Cum SA (acres)	9.30	252.56	48.35

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	752.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0.027	
W.S. Elev (ft)	752.08	Reach Len. (ft)	13.00	13.00	13.00
Crit W.S. (ft)	737.61	Flow Area (sq ft)		4781.59	
E.G. Slope (ft/ft)	0.000348	Area (sq ft)		4781.59	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	246.62	Top Width (ft)		246.62	
Vel Total (ft/s)	7.22	Avg. Vel. (ft/s)		7.22	
Max Chl Dpth (ft)	30.77	Hydr. Depth (ft)		19.39	
Conv. Total (cfs)	1849739.0	Conv. (cfs)		1849739.0	
Length Wtd. (ft)	13.00	Wetted Per. (ft)		256.57	
Min Ch El (ft)	721.31	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		2.92	
Frctn Loss (ft)		Cum Volume (acre-ft)	63.40	4983.45	345.44
C & E Loss (ft)		Cum SA (acres)	30.11	266.27	104.68

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	758.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.		0.027	
W.S. Elev (ft)	757.72	Reach Len. (ft)	13.00	13.00	13.00
Crit W.S. (ft)	740.14	Flow Area (sq ft)		6244.33	
E.G. Slope (ft/ft)	0.000278	Area (sq ft)	325.83	6318.51	
Q Total (cfs)	45500.00	Flow (cfs)		45500.00	
Top Width (ft)	542.56	Top Width (ft)	228.96	313.59	
Vel Total (ft/s)	7.29	Avg. Vel. (ft/s)		7.29	
Max Chl Dpth (ft)	36.41	Hydr. Depth (ft)		23.30	
Conv. Total (cfs)	2726926.0	Conv. (cfs)		2726926.0	
Length Wtd. (ft)	13.00	Wetted Per. (ft)		279.35	
Min Ch El (ft)	721.31	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		2.83	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	333.61	6244.86	1354.00
C & E Loss (ft)	0.04	Cum SA (acres)	143.81	280.55	347.33

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	761.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.040	0.027	0.040

```
* W.S. Elev (ft)         *  760.22  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  741.93  * Flow Area (sq ft)      *  930.14  * 7110.35  *  254.08  *
* E.G. Slope (ft/ft)     *0.000301  * Area (sq ft)           *  930.14  * 7110.35  *  254.08  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1447.45  *52759.87  *  192.69  *
* Top Width (ft)         *  783.33  * Top Width (ft)         *  267.24  *  316.93  *  199.16  *
* Vel Total (ft/s)       *    6.56  * Avg. Vel. (ft/s)       *    1.56  *    7.42  *    0.76  *
* Max Chl Dpth (ft)      *   38.91  * Hydr. Depth (ft)       *    3.48  *   22.44  *    1.28  *
* Conv. Total (cfs)      *3134297.0  * Conv. (cfs)           * 83395.7  *3039800.0  * 11101.8  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  267.57  *  328.40  *  199.18  *
* Min Ch El (ft)         *  721.31  * Shear (lb/sq ft)       *    0.07  *    0.41  *    0.02  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    0.10  *    3.02  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  854.44  * 6979.82  * 2407.05  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  265.51  *  284.09  *  507.02  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  762.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  761.40  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  743.56  * Flow Area (sq ft)      * 1279.40  * 7483.57  *  518.29  *
* E.G. Slope (ft/ft)     *0.000329  * Area (sq ft)           * 1279.40  * 7483.57  *  518.29  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2406.62  *60034.36  *  559.02  *
* Top Width (ft)         *  898.67  * Top Width (ft)         *  325.92  *  316.93  *  255.82  *
* Vel Total (ft/s)       *    6.79  * Avg. Vel. (ft/s)       *    1.88  *    8.02  *    1.08  *
* Max Chl Dpth (ft)      *   40.09  * Hydr. Depth (ft)       *    3.93  *   23.61  *    2.03  *
* Conv. Total (cfs)      *3473885.0  * Conv. (cfs)           *132703.5  *3310357.0  * 30824.9  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  326.26  *  328.40  *  255.85  *
* Min Ch El (ft)         *  721.31  * Shear (lb/sq ft)       *    0.08  *    0.47  *    0.04  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *    0.15  *    3.75  *    0.04  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1316.04  * 7442.65  * 3361.20  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  307.55  *  284.34  *  713.35  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  765.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.              *   0.041  *   0.027  *   0.044  *
* W.S. Elev (ft)         *  764.28  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  745.77  * Flow Area (sq ft)      * 2468.36  * 8397.10  * 3097.40  *
* E.G. Slope (ft/ft)     *0.000280  * Area (sq ft)           * 2468.38  * 8397.10  * 3110.28  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 5158.12  *67077.10  * 3664.78  *
* Top Width (ft)         * 2109.79  * Top Width (ft)         *  502.23  *  316.93  * 1290.63  *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *    2.09  *    7.99  *    1.18  *
* Max Chl Dpth (ft)      *   42.97  * Hydr. Depth (ft)       *    4.93  *   26.50  *    2.52  *
* Conv. Total (cfs)      *4538476.0  * Conv. (cfs)           *308432.4  *4010907.0  *219136.9  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  501.15  *  328.40  * 1238.51  *
* Min Ch El (ft)         *  721.31  * Shear (lb/sq ft)       *    0.09  *    0.45  *    0.04  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    0.18  *    3.57  *    0.05  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 2248.70  * 8198.56  * 5465.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  365.69  *  285.31  *  949.29  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  754.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.              *         *   0.027  *         *
* W.S. Elev (ft)         *  753.87  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
```

```
* Crit W.S. (ft)         *  738.63  * Flow Area (sq ft)      *          * 5227.36  *          *
* E.G. Slope (ft/ft)     *0.000340  * Area (sq ft)           *          * 5227.36  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)              *          *38700.00  *          *
* Top Width (ft)         *  254.39  * Top Width (ft)          *          *  254.39  *          *
* Vel Total (ft/s)       *    7.40  * Avg. Vel. (ft/s)        *          *    7.40  *          *
* Max Chl Dpth (ft)      *   32.56  * Hydr. Depth (ft)        *          *   20.55  *          *
* Conv. Total (cfs)      *2099517.0  * Conv. (cfs)             *          *2099517.0  *          *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)        *          *  265.14  *          *
* Min Ch El (ft)         *  721.31  * Shear (lb/sq ft)        *          *    0.42  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.10  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *  112.64  * 5410.88  *  550.46  *
* C & E Loss (ft)        *          * Cum SA (acres)          *   50.43  *  272.20  *  151.36  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 8.213

INPUT
Description: Stadium Dr Bridge
COE River Station=24484.25
Preliminary Model
             River Station=16390
Distance from Upstream XS =      13
Deck/Roadway Width        =      62
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=      23
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
  800.95   756.5          950.95     757         1056.02     757   753.5
 1298.02   758.5     755 1448.02   759.5         1598.02     762
 1748.02  762.35         1898.02     763         2048.02   763.5
 2198.02   763.5         2348.02   763.5         2498.02     763
 2648.02   762.5         2798.02     763         2948.02     765
 3098.02     765         3248.02     765         3398.02     765
 3548.02     765         3698.02   763.5         3848.02     761
 3998.02     760         4148.02   764.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=     256
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  804.64    1.64   804.5    2.74  804.45    7.13     804   24.34     802
   31.67  801.33   33.97  801.15   38.95  800.67    40.7  800.53   41.14  800.48
   46.06     800   70.61     798   99.72  795.41  117.43     794  134.14     792
  137.63  791.68  141.02  791.29  148.04  790.64  151.96     790  162.56  789.01
  171.71     788  183.76     786  184.13     786  190.18  785.44   210.6   784.4
  211.37  784.38  217.18     784  219.32     784   222.6  783.66  224.16  783.59
  247.18     782  250.97  781.39  257.78  780.82  261.71  780.38  266.38     780
  271.53   779.1  271.92  778.98  272.35   778.9  275.26  778.47  276.94  778.16
  278.64     778  279.34     778  280.59   777.9  280.92  777.86  286.85   777.5
  288.57  777.25  292.66  776.94  295.03  776.45  296.21  776.34  297.48     776
  311.01  774.89  314.31  774.67  319.97     774  340.34     772  354.47     770
  379.43     768  383.63     768  440.07  765.93  440.35  765.93  510.77     764
  520.91  764.08  592.83  762.77  635.57     762  646.84     762   746.5     760
  757.28     760  758.68     760  763.26  758.68  765.18     758  789.85   757.2
  793.41  757.15  801.28   756.9  863.58  756.05  863.99  756.04  996.56     756
  997.28  756.02 1002.78     756  1011.1  755.92 1011.27  755.91 1013.75  755.87
 1014.13  755.84 1015.51   755.8 1020.18  755.74 1020.95  755.66 1024.12   755.6
 1025.25  755.46 1028.09  755.39 1029.08  755.24 1031.51  755.16 1032.04  755.08
 1034.12     755 1034.35  754.98 1035.35  754.85 1038.82  754.26 1039.37  754.22
 1040.32     754 1043.18  752.87 1044.58     752 1044.89     752 1046.03  751.69
 1052.08   750.2 1052.31  750.15 1052.44  750.11 1052.85     750 1066.69     746
 1091.61     738 1096.72  736.23 1097.44     736 1115.85  729.28 1119.54     728
 1139.21     726 1159.32  721.31 1181.32  721.31 1203.32  721.31 1223.43     726
 1230.85     728 1237.17     730 1246.43  733.58 1247.55     734 1257.57     738
 1263.02     740 1267.17  741.91 1267.38     742 1268.06  742.32 1274.04  744.92
 1281.97     748 1283.96  748.93 1290.88     752 1292.66  752.82 1295.36     754
```

```
 1296.82  754.67  1299.9     756 1301.88  756.43 1302.76  756.47  1304.3  756.72
 1306.73  757.04 1308.14  757.08 1308.92  757.16  1310.3  757.22 1312.35  757.36
 1312.74   757.4 1312.91  757.42 1317.18  757.79 1317.71  757.85 1319.71     758
 1341.04     758 1348.27  758.19 1452.41  759.23 1504.76     760 1512.87     760
 1527.05  760.52 1580.63  761.49 1625.89     762 1879.28     762 1879.69  762.01
 1880.12     762  1911.7     762 1916.82  762.09 1995.02  762.83 2071.77  762.46
 2128.34     762 2155.52  762.59 2209.82  762.18 2210.19  762.21 2212.83  762.12
 2279.47  762.12 2279.91  762.11 2282.15     762  2564.1     762 2804.87     762
  2867.9  762.86 2920.62     764 3208.26     764 3501.39   764.9 3596.68     764
 3643.96  764.16 3777.23  763.75 3801.68  763.18 3875.81  762.48 3890.16  762.78
 3895.33  763.07 3900.22  763.04 3912.17     764 3938.16     774 3944.37     776
 3951.27     778 3973.24     778 3989.08   773.5 3998.93  770.78 4008.52     768
 4028.14     766 4036.76     766 4041.95  765.74 4042.91  765.72 4047.06  765.52
 4047.94   765.5 4053.81   765.3 4055.15  765.28 4056.51  765.23 4058.14  765.22
 4059.98  765.15 4061.74  765.14 4064.69  765.02 4067.46  765.03 4071.78  764.86
 4110.57     764 4133.95  764.01 4147.63   764.1 4229.44     766 4247.57     766
 4279.56     768 4282.16     768 4309.55  769.57 4309.83  769.58  4315.8  770.02
  4315.9  770.03 4339.73     772 4345.93  772.37 4346.73  772.39  4358.4  772.87
 4360.92  773.05 4364.63  773.16  4367.7  773.38 4376.39  773.88 4376.64   773.9
 4378.22     774 4379.04     774  4384.9  774.78 4387.39  775.17 4387.73  775.25
 4391.11     776  4394.2  777.76 4394.64     778 4397.09  779.53 4397.95     780
 4399.29  780.78 4401.17     782 4401.55  782.23 4403.51  783.35 4404.48     784
 4411.01  787.94 4411.49  788.23 4414.15  789.73 4414.61     790 4417.25  791.49
 4418.13     792  4420.4  793.59 4421.06     794 4423.52  795.74 4423.93     796
 4426.57  797.91 4426.72     798 4428.43     798    4432  798.38 4436.28  798.66
  4436.6  798.67

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  757.28     .04 1002.78    .027 1319.71     .04 1580.63     .05
  2564.1     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1002.78 1319.71            .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       1     502     765        F
     502    1035   757.8        F
    1303    2000   757.8        F
    3900    4400     779        F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
    2004    2189     780    2245    2550     780    3040    3910     780

Downstream  Deck/Roadway Coordinates
    num=      22
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
  875.27   756.5         1025.27   756.5         1177.14     757   753.5
 1419.14   758.5     755 1569.14   759.5         1719.14     762
 1869.14   762.5         2019.14     763         2169.14   763.5
 2319.14   763.5         2469.14     763         2619.14   762.5
 2769.14   762.5         2919.14     764         3069.14     765
 3219.14     765         3369.14     765         3519.14     765
 3669.14     764         3819.14   762.5         3969.14     760
 4119.14     764

Downstream Bridge Cross Section Data
Station Elevation Data    num=     300
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0  799.85    32.3     796    45.4  794.08      46     794    79.9     790
   97.12  788.16   99.81     788  113.33     788  115.64  786.64  116.76     786
  118.71   785.6  127.14     784  145.23     782  171.86     780  172.91     780
  216.87     778  217.94     778  218.41  777.98     234     776  249.48     776
  258.72     774  261.11  773.66  265.39  773.17  266.45  773.16  268.82  772.94
  271.04  772.94  273.12  772.78  277.67  772.63  286.59  772.63  291.26  772.54
  291.91  772.55  294.75  772.47  295.01  772.47  299.31  772.38  299.58  772.36
  305.15  772.27  306.41  772.22  312.53  772.15  315.76     772  321.25     772
  326.09  771.63  330.24   771.1  334.17  770.96  336.59  770.68  344.34     770
  349.34     770  359.21  768.95  361.57  768.73  373.59     768     374  767.99
   374.1  767.98  374.33  767.98  422.44  766.27  423.41  766.27  478.37  764.46
   483.3  764.36  491.13     764  514.43     764  629.19  763.24  729.57     762
  755.52     762  759.09  762.17  780.03     762  809.09  760.99  841.72     760
```

```
  857.79   758.9  867.98   758.1  868.44  758.08  869.44     758  874.79  756.59
  876.33     756  887.99     756  888.37  756.07  890.66  756.28  890.83  756.25
  893.24  756.43  911.16  756.11   947.3  756.28  959.72     756 1115.46     756
 1132.04  756.36 1137.97  756.38 1164.66  756.01 1164.88     756 1165.13  755.62
 1166.36     754 1167.91  752.92 1168.83     752 1174.92  748.81 1176.51     748
  1176.9  747.85  1187.8     744 1188.04  743.91 1188.38   743.8 1205.32     738
 1218.93     732 1221.44  730.97 1224.01     730 1232.32     728 1248.56  726.07
 1249.09     726 1266.34  721.29 1288.34  721.29 1310.34  721.29 1327.59     726
 1338.41  726.77 1338.96     726 1349.57     728 1356.25     730  1367.7     734
 1370.57  735.05 1377.24  737.65 1378.11     738 1378.88  738.18 1387.92  739.79
 1389.03  739.89 1389.39     740 1398.37  744.65 1400.71     746 1400.94  746.14
 1403.74     748  1404.1  748.23 1406.98     750 1408.06  750.64 1410.74     752
 1412.96  752.72 1413.96  752.97 1415.29  753.24 1418.08  753.89 1421.97  755.01
 1424.95     756 1426.35  756.25 1428.39  756.57 1434.77     758 1439.26  758.17
 1439.63  758.17 1440.24  758.18 1443.02  758.29 1444.52  758.31 1491.64  759.55
 1576.31     760 1646.11     760  1648.4     760 1683.58  760.72 1687.33  760.72
 1734.94  761.98 1735.04  761.98 1735.58     762 1997.76     762 2006.88  762.11
 2007.31  762.09 2037.67  763.78 2044.42  763.75 2045.44  763.77 2046.86  763.77
 2047.34  763.78  2047.7  763.78 2048.05  763.79 2064.25  763.83 2269.18     762
 2299.67  762.65 2321.47  762.24  2324.5  762.27 2326.46  762.35 2333.72     762
 2541.81     762 2542.69  762.06  2550.3  762.57 2553.29  762.58 2553.62   762.6
 2555.48   762.6 2606.04  763.58 2611.61  763.58 2636.85  762.22 2649.19     762
 2883.11     762 2939.74  762.81 2998.55     764 3034.68     764 3036.43  764.05
 3036.65  764.05 3041.45   764.2 3061.16     764 3297.72  764.13 3410.35  764.98
 3594.56  765.41 3637.56  765.33 3693.62   764.2 3715.07     764 3774.09     764
 3804.94  762.75 3810.36  762.66 3810.47  762.66  3814.6  762.58  3814.8  762.57
  3815.5  762.57 3819.56   762.5 3826.81  762.49 3828.87  762.45 3834.43  762.51
 3836.91  762.62 3850.38  762.58 3853.31  762.72 3858.56  762.72 3897.08  763.14
 3903.93   763.4 3904.86  763.49 3906.99  763.56 3919.92  763.72 3921.81  763.72
  3932.2  763.85 3932.98  763.85 3945.03  764.01 3959.64  764.08 3960.65  764.12
 3972.97   764.2 3973.83  764.24  3976.2  764.43 3983.12   764.5 3983.31  764.53
 3983.59  764.58 3984.01  764.64 3987.28  764.66 3987.76  764.76 3988.57   764.9
 3990.02  764.94 3992.58   765.5 3994.63     766 3999.49  767.69 4000.34     768
 4000.85     768 4017.57  769.85 4018.04     770 4023.63     772 4028.78     774
 4035.44     776 4068.37     776 4068.56  775.91 4068.97  775.77 4072.22  774.52
 4074.53     774 4074.99  773.88 4075.32   773.8 4080.79   772.6 4082.84  772.18
 4083.65     772  4084.5  771.76 4084.66  771.72 4084.98  771.65  4086.3  771.27
 4087.79  770.91 4089.43  770.44 4091.12     770 4092.48  769.62 4093.12  769.48
 4097.24  768.37 4101.13  767.18 4104.75     766 4108.26  765.09 4112.04  764.21
 4112.48   764.1 4117.43  763.05 4122.78  762.12 4123.54     762 4142.54     762
 4183.28     764 4254.93     766  4255.6     766 4256.28  767.74 4256.38     768
 4257.16     770 4257.48  770.81 4257.94     772 4258.75     774 4259.58     776
 4259.81  776.54 4260.44     778 4260.77  778.76 4261.33     780 4262.28     782
  4262.6  782.67 4263.23     784 4264.18     786 4264.69  787.09 4265.96  789.92
 4266.05   790.1 4267.61  793.59 4267.72  793.85 4267.79     794 4267.99   794.1
 4268.68  794.29 4274.54     796 4295.74  798.26  4296.6  798.32  4302.6  798.86
 4305.85  799.03 4308.98  799.26 4314.97  799.54 4317.55   799.7 4320.42  799.82

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .065  809.09     .04 1164.88    .027 1434.77     .04 1646.11      .1
 2636.85     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1164.88 1434.77            .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       1     578     765       F
     578    1163   757.5       F
    1426    2000   757.5       F
    3985    4260     777       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
    2082    2278     780    2326    2628     780    3120    3989     780

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  2
```

```
Abutment Data
Upstream     num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1056.02   753.5 1056.03   743.5 1062.02   743.5 1130.02   721.5 1150.02     721
 1162.02     717
Downstream     num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1177.14     755 1177.15   743.5 1183.14   743.5 1251.14   721.5 1271.14     721
 1283.14     717

Abutment Data
Upstream     num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1192.02     717 1204.02     721 1224.02   721.5 1292.02   743.5 1298.01   743.5
 1298.02     755
Downstream     num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1313.14     717 1325.14     721 1345.14   721.5 1413.14   743.5 1419.13   743.5
 1419.14     755

Number of Piers =  2

Pier Data
Pier Station     Upstream= 1135.02    Downstream= 1256.14
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    4.75   713.5    4.75   744.5    5.75   744.5    5.75     754
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    4.75   713.5    4.75   744.5    5.75   744.5    5.75     754

Pier Data
Pier Station     Upstream= 1219.02    Downstream= 1340.17
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    4.75   713.5    4.75   744.5    5.75   744.5    5.75     754
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    4.75   713.5    4.75   744.5    5.75   744.5    5.75     754

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. US. (ft)          *     741.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     741.00  * E.G. Elev (ft)         *     741.47  *     741.43  *
* Q Total (cfs)          *   12800.00  * W.S. Elev (ft)         *     740.97  *     740.97  *
* Q Bridge (cfs)         *   12800.00  * Crit W.S. (ft)         *     731.38  *     731.40  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.66  *      19.68  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.66  *       5.42  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2261.21  *    2363.46  *
```

```
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   20396.41  *   20813.30  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *      13.05  *      12.77  *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *     240.26  *     253.31  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *   554726.2  *   576463.5  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     173.28  *     185.13  *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.66  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.31  *       0.29  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.77  *       1.56  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     745.94  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     745.33  * E.G. Elev (ft)         *     745.99  *     745.92  *
* Q Total (cfs)          *   20500.00  * W.S. Elev (ft)         *     745.29  *     745.29  *
* Q Bridge (cfs)         *   20500.00  * Crit W.S. (ft)         *     734.18  *     734.05  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.98  *      24.00  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.71  *       6.39  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3057.17  *    3205.78  *
* Weir Submerg           *             * Froude # Chl           *       0.33  *       0.31  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   33856.66  *   34718.07  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *      15.71  *      15.73  *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *     284.40  *     295.06  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *   819498.2  *   865469.4  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     194.57  *     203.82  *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.71  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.42  *       0.38  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.82  *       2.43  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     749.53  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     748.82  * E.G. Elev (ft)         *     749.47  *     749.40  *
* Q Total (cfs)          *   27100.00  * W.S. Elev (ft)         *     748.66  *     748.66  *
* Q Bridge (cfs)         *   27100.00  * Crit W.S. (ft)         *     736.18  *     735.96  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.35  *      27.37  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.23  *       6.92  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3746.81  *    3917.57  *
* Weir Submerg           *             * Froude # Chl           *       0.32  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   47128.40  *   48467.04  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *      17.48  *      18.09  *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *     318.85  *     325.30  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  1065812.0  *  1132764.0  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *     214.39  *     216.57  *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       7.23  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.47  *       0.43  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       3.43  *       2.98  *
*********************************************************************************************

Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     752.89  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     752.08  * E.G. Elev (ft)         *     752.95  *     752.89  *
* Q Total (cfs)          *   34500.00  * W.S. Elev (ft)         *     752.03  *     752.03  *
```

```
* Q Bridge (cfs)         *   34500.00  * Crit W.S. (ft)         *     738.19  *     737.86  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      30.72  *      30.74  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.69  *       7.41  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4488.08  *    4657.49  *
* Weir Submerg           *             * Froude # Chl           *       0.31  *       0.29  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   63162.43  *   65043.00  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *      20.08  *      20.95  *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *     351.20  *     355.87  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  1350088.0  *  1423504.0  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *     223.52  *     222.33  *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       7.69  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.52  *       0.48  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.00  *       3.56  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     758.54  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     757.72  * E.G. Elev (ft)         *     758.13  *     758.01  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     756.84  *     756.80  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     740.81  *     740.50  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.53  *      35.51  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.12  *       8.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4987.85  *    5159.13  *
* Weir Submerg           *             * Froude # Chl           *       0.33  *       0.31  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   91225.01  *   93597.41  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *     601.80  *     616.69  *
* Delta EG (ft)          *       0.29  * Conv. Total (cfs)      *  1124228.0  *  1170076.0  *
* Delta WS (ft)          *       0.27  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *       0.10  *       0.01  *
* BR Open Vel (ft/s)     *       9.12  * C & E Loss (ft)        *       0.03  *       0.11  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.85  *       0.79  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.73  *       6.97  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     761.05  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     760.22  * E.G. Elev (ft)         *     760.72  *     760.54  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     759.37  *     759.25  *
* Q Bridge (cfs)         *   50731.57  * Crit W.S. (ft)         *     742.66  *     742.25  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.06  *      37.96  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.85  *       8.54  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6144.27  *    6368.79  *
* Weir Submerg           *             * Froude # Chl           *       0.30  *       0.29  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  107777.20  *  110345.00  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *       9.21  *      10.15  *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *    1269.34  *    1244.79  *
* Delta EG (ft)          *       0.36  * Conv. Total (cfs)      *  1044391.0  *  1095691.0  *
* Delta WS (ft)          *       0.39  * Top Width (ft)         *     667.31  *     627.73  *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *       0.16  *       0.01  *
* BR Open Vel (ft/s)     *      10.17  * C & E Loss (ft)        *       0.02  *       0.12  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.82  *       0.79  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.26  *       6.73  *
*****************************************************************************************
```

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Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     762.35  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     761.40  * E.G. Elev (ft)         *     762.31  *     762.15  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     760.98  *     760.86  *
* Q Bridge (cfs)         *   52151.89  * Crit W.S. (ft)         *     744.31  *     743.81  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.67  *      39.57  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.57  *       8.34  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7354.76  *    7552.15  *
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  120835.90  *  123797.80  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *       8.77  *       9.02  *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *    1441.24  *    1454.36  *
* Delta EG (ft)          *       0.30  * Conv. Total (cfs)      *  1270762.0  *  1307218.0  *
* Delta WS (ft)          *       0.35  * Top Width (ft)         *     839.09  *     837.25  *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *       0.15  *       0.01  *
* BR Open Vel (ft/s)     *      10.46  * C & E Loss (ft)        *       0.01  *       0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.78  *       0.75  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       6.71  *       6.28  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     765.16  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     764.28  * E.G. Elev (ft)         *     764.92  *     764.82  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     763.95  *     763.86  *
* Q Bridge (cfs)         *   45332.83  * Crit W.S. (ft)         *     746.56  *     745.87  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      42.64  *      42.57  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.80  *       6.74  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11154.73  *   11268.40  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  147684.70  *  151604.90  *
* Min El Weir Flow (ft)  *     757.01  * Hydr Depth (ft)        *       6.03  *       6.16  *
* Min El Prs (ft)        *     755.00  * W.P. Total (ft)        *    2456.03  *    2448.01  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *  1868983.0  *  1882580.0  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *    1852.76  *    1931.89  *
* BR Open Area (sq ft)   *    4987.85  * Frctn Loss (ft)        *       0.10  *       0.01  *
* BR Open Vel (ft/s)     *       9.09  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.47  *       0.47  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.18  *       3.15  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	754.72	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	753.87	E.G. Elev (ft)	754.79	754.72
Q Total (cfs)	38700.00	W.S. Elev (ft)	753.81	753.81
Q Bridge (cfs)	38700.00	Crit W.S. (ft)	739.25	738.93
Q Weir (cfs)		Max Chl Dpth (ft)	32.50	32.52
Weir Sta Lft (ft)		Vel Total (ft/s)	7.93	7.66
Weir Sta Rgt (ft)		Flow Area (sq ft)	4881.08	5050.49
Weir Submerg		Froude # Chl	0.30	0.29
Weir Max Depth (ft)		Specif Force (cu ft)	72790.06	74950.99
Min El Weir Flow (ft)	757.01	Hydr Depth (ft)	27.56	28.24
Min El Prs (ft)	755.00	W.P. Total (ft)	417.35	426.04
Delta EG (ft)	0.10	Conv. Total (cfs)	1384070.0	1445072.0
Delta WS (ft)	0.05	Top Width (ft)	177.14	178.83
BR Open Area (sq ft)	4987.85	Frctn Loss (ft)		
BR Open Vel (ft/s)	7.93	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.57	0.53
Br Sel Method	Yarnell	Power Total (lb/ft s)	4.53	4.07

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 8.205

INPUT
Description: COE Riverstation=24527.60
Preliminary Model
Riverstation=16346.56

d/s Face of Stadium Dr.
Station Elevation Data num= 300

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	799.85	32.3	796	45.4	794.08	46	794	79.9	790
97.12	788.16	99.81	788	113.33	788	115.64	786.64	116.76	786
118.71	785.6	127.14	784	145.23	782	171.86	780	172.91	780
216.87	778	217.94	778	218.41	777.98	234	776	249.48	776
258.72	774	261.11	773.66	265.39	773.17	266.45	773.16	268.82	772.94
271.04	772.94	273.12	772.78	277.67	772.63	286.59	772.63	291.26	772.54
291.91	772.55	294.75	772.47	295.01	772.47	299.31	772.38	299.58	772.36
305.15	772.27	306.41	772.22	312.53	772.15	315.76	772	321.25	772
326.09	771.63	330.24	771.1	334.17	770.96	336.59	770.68	344.34	770
349.34	770	359.21	768.95	361.57	768.73	373.59	768	374	767.99
374.1	767.98	374.33	767.98	422.44	766.27	423.41	766.27	478.37	764.46
483.3	764.36	491.13	764	514.43	764	629.19	763.24	729.57	762
755.52	762	759.09	762.17	780.03	762	809.09	760.99	841.72	760
857.79	758.9	867.98	758.1	868.44	758.08	869.44	758	874.79	756.59
876.33	756	887.99	756	888.37	756.07	890.66	756.28	890.83	756.25
893.24	756.43	911.16	756.11	947.3	756.28	959.72	756	1115.46	756
1132.04	756.36	1137.97	756.38	1164.66	756.01	1164.88	756	1165.13	755.62
1166.36	754	1167.91	752.92	1168.83	752	1174.92	748.81	1176.51	748
1176.9	747.85	1187.8	744	1188.04	743.91	1188.38	743.8	1205.32	738
1218.93	732	1221.44	730.97	1224.01	730	1232.32	728	1248.56	726.07
1249.09	726	1266.34	721.29	1288.34	721.29	1310.34	721.29	1327.59	726
1338.41	726.77	1338.96	726	1349.57	728	1356.25	730	1367.7	734
1370.57	735.05	1377.24	737.65	1378.11	738	1378.88	738.18	1387.92	739.79
1389.03	739.89	1389.39	740	1398.37	744.65	1400.71	746	1400.94	746.14
1403.74	748	1404.1	748.23	1406.98	750	1408.06	750.64	1410.74	752
1412.96	752.72	1413.96	752.97	1415.29	753.24	1418.08	753.89	1421.97	755.01
1424.95	756	1426.35	756.25	1428.39	756.57	1434.77	758	1439.26	758.17
1439.63	758.17	1440.24	758.18	1443.02	758.29	1444.52	758.31	1491.64	759.55
1576.31	760	1646.11	760	1648.4	760	1683.58	760.72	1687.33	760.72
1734.94	761.98	1735.04	761.98	1735.58	762	1997.76	762	2006.88	762.11

```
 2007.31  762.09 2037.67  763.78 2044.42  763.75 2045.44  763.77 2046.86  763.77
 2047.34  763.78  2047.7  763.78 2048.05  763.79 2064.25  763.83 2269.18     762
 2299.67  762.65 2321.47  762.24  2324.5  762.27 2326.46  762.35 2333.72     762
 2541.81     762 2542.69  762.06  2550.3  762.57 2553.29  762.58 2553.62   762.6
 2555.48   762.6 2606.04  763.58 2611.61  763.58 2636.85  762.22 2649.19     762
 2883.11     762 2939.74  762.81 2998.55     764 3034.68     764 3036.43  764.05
 3036.65  764.05 3041.45   764.2 3061.16     764 3297.72  764.13 3410.35  764.98
 3594.56  765.41 3637.56  765.33 3693.62   764.2 3715.07     764 3774.09     764
 3804.94  762.75 3810.36  762.66 3810.47  762.66  3814.6  762.58  3814.8  762.57
  3815.5  762.57 3819.56   762.5 3826.81  762.49 3828.87  762.45 3834.43  762.51
 3836.91  762.62 3850.38  762.58 3853.31  762.72 3858.56  762.72 3897.08  763.14
 3903.93   763.4 3904.86  763.49 3906.99  763.56 3919.92  763.72 3921.81  763.72
  3932.2  763.85 3932.98  763.85 3945.03  764.01 3959.64  764.08 3960.65  764.12
 3972.97   764.2 3973.83  764.24  3976.2  764.43 3983.12   764.5 3983.31  764.53
 3983.59  764.58 3984.01  764.64 3987.28  764.66 3987.76  764.76 3988.57   764.9
 3990.02  764.94 3992.58   765.5 3994.63     766 3999.49  767.69 4000.34     768
 4000.85     768 4017.57  769.85 4018.04     770 4023.63     772 4028.78     774
 4035.44     776 4068.37     776 4068.56  775.91 4068.97  775.77 4072.22  774.52
 4074.53     774 4074.99  773.88 4075.32   773.8 4080.79   772.6 4082.84  772.18
 4083.65     772  4084.5  771.76 4084.66  771.72 4084.98  771.65  4086.3  771.27
 4087.79  770.91 4089.43  770.44 4091.12     770 4092.48  769.62 4093.12  769.48
 4097.24  768.37 4101.13  767.18 4104.75     766 4108.26  765.09 4112.04  764.21
 4112.48   764.1 4117.43  763.05 4122.78  762.12 4123.54     762 4142.54     762
 4183.28     764 4254.93     766  4255.6     766 4256.28  767.74 4256.38     768
 4257.16     770 4257.48  770.81 4257.94     772 4258.75     774 4259.58     776
 4259.81  776.54 4260.44     778 4260.77  778.76 4261.33     780 4262.28     782
  4262.6  782.67 4263.23     784 4264.18     786 4264.69  787.09 4265.96  789.92
 4266.05   790.1 4267.61  793.59 4267.72  793.85 4267.79     794 4267.99   794.1
 4268.68  794.29 4274.54     796 4295.74  798.26  4296.6  798.32  4302.6  798.86
 4305.85  799.03 4308.98  799.26 4314.97  799.54 4317.55   799.7 4320.42  799.82

Manning's n Values        num=       6
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
       0    .065  809.09     .04 1164.88    .027 1434.77     .04 1646.11      .1
 2636.85     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1164.88 1434.77            90.55  200.48  324.81             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       1     578     765       F
     578    1163   757.5       F
    1426    2000   757.5       F
    3985    4260     777       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
    2082    2278     780    2326    2628     780    3120    3989     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  741.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.97  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  731.11  * Flow Area (sq ft)      *          * 2514.06  *          *
* E.G. Slope (ft/ft)     *0.000295  * Area (sq ft)           *          * 2514.06  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  194.63  * Top Width (ft)         *          *  194.63  *          *
* Vel Total (ft/s)       *    5.09  * Avg. Vel. (ft/s)       *          *    5.09  *          *
* Max Chl Dpth (ft)      *   19.68  * Hydr. Depth (ft)       *          *   12.92  *          *
* Conv. Total (cfs)      *745198.8  * Conv. (cfs)             *          *745198.8  *          *
* Length Wtd. (ft)       *  200.48  * Wetted Per. (ft)        *          *  201.13  *          *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)        *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.17  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *          * 2434.01  *    5.47  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *  207.31  *    1.74  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  745.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.027  *          *
```

```
* W.S. Elev (ft)         *  745.29  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  733.62  * Flow Area (sq ft)      *          * 3398.95  *          *
* E.G. Slope (ft/ft)     *0.000319  * Area (sq ft)           *          * 3398.95  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  215.32  * Top Width (ft)         *          *  215.32  *          *
* Vel Total (ft/s)       *    6.03  * Avg. Vel. (ft/s)       *          *    6.03  *          *
* Max Chl Dpth (ft)      *   24.00  * Hydr. Depth (ft)       *          *   15.79  *          *
* Conv. Total (cfs)      *1147826.0  * Conv. (cfs)            *          *1147826.0  *          *
* Length Wtd. (ft)       *  200.48  * Wetted Per. (ft)       *          *  223.61  *          *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.83  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *    1.51  * 3361.93  *   22.64  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    2.36  *  233.34  *   11.95  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  749.32  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  748.66  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  735.45  * Flow Area (sq ft)      *          * 4150.08  *          *
* E.G. Slope (ft/ft)     *0.000314  * Area (sq ft)           *          * 4150.08  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  229.58  * Top Width (ft)         *          *  229.58  *          *
* Vel Total (ft/s)       *    6.53  * Avg. Vel. (ft/s)       *          *    6.53  *          *
* Max Chl Dpth (ft)      *   27.37  * Hydr. Depth (ft)       *          *   18.08  *          *
* Conv. Total (cfs)      *1529472.0  * Conv. (cfs)            *          *1529472.0  *          *
* Length Wtd. (ft)       *  200.48  * Wetted Per. (ft)       *          *  239.48  *          *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.22  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   15.75  * 4162.53  *  105.44  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    9.30  *  252.13  *   48.35  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  752.79  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.03  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  737.29  * Flow Area (sq ft)      *          * 4945.28  *          *
* E.G. Slope (ft/ft)     *0.000306  * Area (sq ft)           *          * 4945.28  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  242.05  * Top Width (ft)         *          *  242.05  *          *
* Vel Total (ft/s)       *    6.98  * Avg. Vel. (ft/s)       *          *    6.98  *          *
* Max Chl Dpth (ft)      *   30.74  * Hydr. Depth (ft)       *          *   20.43  *          *
* Conv. Total (cfs)      *1971394.0  * Conv. (cfs)            *          *1971394.0  *          *
* Length Wtd. (ft)       *  200.48  * Wetted Per. (ft)       *          *  253.67  *          *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)       *          *    0.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.60  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   63.40  * 4974.27  *  345.44  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   30.11  *  265.82  *  104.68  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  757.89  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  757.06  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  739.86  * Flow Area (sq ft)      *    1.96  * 6219.94  *          *
* E.G. Slope (ft/ft)     *0.000276  * Area (sq ft)           *  282.58  * 6222.11  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    1.24  *45498.76  *          *
* Top Width (ft)         *  557.58  * Top Width (ft)         *  291.88  *  265.70  *          *
* Vel Total (ft/s)       *    7.31  * Avg. Vel. (ft/s)       *    0.63  *    7.31  *          *
* Max Chl Dpth (ft)      *   35.77  * Hydr. Depth (ft)       *    1.04  *   23.82  *          *
* Conv. Total (cfs)      *2737573.0  * Conv. (cfs)            *    74.8  *2737498.0  *          *
* Length Wtd. (ft)       *  200.44  * Wetted Per. (ft)       *    1.88  *  275.03  *          *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)       *    0.02  *    0.39  *          *
```

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* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.01  *    2.85  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  333.52  * 6234.42  * 1354.00  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  143.74  *  280.47  *  347.33  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.52  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  741.56  * Flow Area (sq ft)      * 1021.35  * 6882.61  *   40.76  *
* E.G. Slope (ft/ft)     *0.000279  * Area (sq ft)           * 1021.35  * 6882.61  *   40.76  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1384.26  *52995.17  *   20.57  *
* Top Width (ft)         *  641.56  * Top Width (ft)         *  316.09  *  269.89  *   55.58  *
* Vel Total (ft/s)       *    6.85  * Avg. Vel. (ft/s)       *    1.36  *    7.70  *    0.50  *
* Max Chl Dpth (ft)      *   38.23  * Hydr. Depth (ft)       *    3.23  *   25.50  *    0.73  *
* Conv. Total (cfs)      *3256219.0  * Conv. (cfs)            * 82857.8  *3172130.0  *  1231.1  *
* Length Wtd. (ft)       *  198.65  * Wetted Per. (ft)       *  316.48  *  283.99  *   55.60  *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)       *    0.06  *    0.42  *    0.01  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *    0.08  *    3.25  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  853.00  * 6968.38  * 2406.96  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  264.95  *  283.50  *  506.85  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  762.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.             *   0.040  *   0.027  *   0.041  *
* W.S. Elev (ft)         *  761.05  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  743.09  * Flow Area (sq ft)      * 1531.87  * 7295.37  *  337.96  *
* E.G. Slope (ft/ft)     *0.000296  * Area (sq ft)           * 1531.87  * 7295.37  *  337.96  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2589.54  *60151.92  *  258.53  *
* Top Width (ft)         *  892.13  * Top Width (ft)         *  357.38  *  269.89  *  264.85  *
* Vel Total (ft/s)       *    6.87  * Avg. Vel. (ft/s)       *    1.69  *    8.25  *    0.76  *
* Max Chl Dpth (ft)      *   39.76  * Hydr. Depth (ft)       *    4.29  *   27.03  *    1.28  *
* Conv. Total (cfs)      *3660993.0  * Conv. (cfs)            *150481.0  *3495488.0  * 15023.7  *
* Length Wtd. (ft)       *  197.89  * Wetted Per. (ft)       *  357.80  *  283.99  *  264.89  *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)       *    0.08  *    0.47  *    0.02  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.13  *    3.92  *    0.02  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 1313.66  * 7430.28  * 3360.61  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  306.89  *  283.75  *  712.91  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *   0.041  *   0.027  *   0.051  *
* W.S. Elev (ft)         *  763.81  * Reach Len. (ft)        *   90.55  *  200.48  *  324.81  *
* Crit W.S. (ft)         *  745.19  * Flow Area (sq ft)      * 2811.54  * 8041.34  * 2298.73  *
* E.G. Slope (ft/ft)     *0.000273  * Area (sq ft)           * 2815.55  * 8041.34  * 2375.69  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 5817.86  *67972.43  * 2109.70  *
* Top Width (ft)         * 2002.76  * Top Width (ft)         *  621.66  *  269.89  * 1111.21  *
* Vel Total (ft/s)       *    5.77  * Avg. Vel. (ft/s)       *    2.07  *    8.45  *    0.92  *
* Max Chl Dpth (ft)      *   42.52  * Hydr. Depth (ft)       *    4.79  *   29.79  *    2.20  *
* Conv. Total (cfs)      *4590767.0  * Conv. (cfs)            *351889.9  *4111273.0  *127604.2  *
* Length Wtd. (ft)       *  198.29  * Wetted Per. (ft)       *  587.33  *  283.99  * 1050.16  *
* Min Ch El (ft)         *  721.29  * Shear (lb/sq ft)       *    0.08  *    0.48  *    0.04  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.17  *    4.08  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 2243.80  * 8184.47  * 5461.80  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  364.59  *  284.72  *  947.16  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
```

E.G. Elev (ft)	754.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.		0.027	
W.S. Elev (ft)	753.81	Reach Len. (ft)	90.55	200.48	324.81
Crit W.S. (ft)	738.27	Flow Area (sq ft)		5383.06	
E.G. Slope (ft/ft)	0.000306	Area (sq ft)		5383.06	
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	251.11	Top Width (ft)		251.11	
Vel Total (ft/s)	7.19	Avg. Vel. (ft/s)		7.19	
Max Chl Dpth (ft)	32.52	Hydr. Depth (ft)		21.44	
Conv. Total (cfs)	2213276.0	Conv. (cfs)		2213276.0	
Length Wtd. (ft)	200.48	Wetted Per. (ft)		263.61	
Min Ch El (ft)	721.29	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		2.80	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	112.64	5400.90	550.46
C & E Loss (ft)	0.08	Cum SA (acres)	50.43	271.83	151.36

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 8.167

INPUT
Description: COE Riverstation=24728.08
Preliminary Model
Riverstation=16146.09

Expanded section d/s of Staduim Dr.
Station Elevation Data num= 119

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	800	10.37	798	58.54	790	69.84	788	85.69	786
90.95	784.29	91.9	784	98.31	782.88	143.15	776.29	144.99	776
161.53	774	192.83	771.79	193.04	771.78	235.71	768.81	239.72	768.66
242.78	768.49	246.27	768.45	247.12	768.4	249.97	768.41	266.99	768
268.26	768	337.26	765.51	360.3	764.88	387.89	764.58	410.56	764.44
429.8	764	452.31	764	549.45	762.56	728.6	762	790.5	760
807.3	760	827.26	758.51	846	758	860.41	758	908.25	757
957.53	756	970.67	756	1072.86	754	1104.5	752	1116.72	748
1145.53	740	1153.88	738	1174.21	736	1182.12	734	1187.97	732
1193.65	730	1203.14	728	1226.76	726	1248	721.24	1270	721.24
1292	721.24	1312.42	726	1329.01	728	1340.79	732	1340.9	732.04
1352.6	736	1367.24	738	1379.15	740	1407.06	748	1430.41	756
1441.79	758	1458.03	759.57	1463.62	760	1616.33	761.05	1801.66	760
1900.47	760	2006.36	761.73	2013.74	761.73	2095.47	760.78	2131.16	760
2155.52	760.26	2203.4	760.36	2204.7	760.38	2448.63	761.57	2490.68	761.07
2505.41	761.07	2597.69	760.85	2702.96	762	2893.95	762	2941.79	762.22
2959.95	763.06	2975.42	764	3142.3	766	3265.02	766	3291.27	766.25
3293.01	766.22	3295.11	766.25	3311.93	766.1	3352.02	766.36	3463.32	768
3481.99	768	3484.02	768.07	3484.48	768.08	3492.74	768.18	3493.44	768.21
3496.46	768.3	3497.69	768.36	3504.88	768.53	3537.08	770	3606.07	771.45
3641.01	772	3692.01	772	3812.7	774	3884.03	774	3903.33	774.27
3905.54	774.23	3914.41	774.45	3917.35	774.66	3918.49	774.65	3928.72	775.44
3932.31	775.59	3935.94	776	3940.34	778	3946.88	781.02	3953.07	783.99
3957.12	786	3962.4	788.82	3974.93	796	3978.3	798		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.065	1072.86	.027	1430.41	.05	1463.62	.1	2505.41	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1072.86 1430.41 276.05 268.15 356.63 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1058	757.8	F
1616.33	3978.3	761.05	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
886	963	780	2036	2169	780	2580	2733	780

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	741.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.027	
W.S. Elev (ft)	740.97	Reach Len. (ft)	276.05	268.15	356.63
Crit W.S. (ft)	730.82	Flow Area (sq ft)		2810.90	
E.G. Slope (ft/ft)	0.000265	Area (sq ft)		2810.90	
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	240.51	Top Width (ft)		240.51	
Vel Total (ft/s)	4.55	Avg. Vel. (ft/s)		4.55	
Max Chl Dpth (ft)	19.73	Hydr. Depth (ft)		11.69	
Conv. Total (cfs)	786595.4	Conv. (cfs)		786595.4	
Length Wtd. (ft)	268.15	Wetted Per. (ft)		245.15	
Min Ch El (ft)	721.24	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.86	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		2421.76	5.47
C & E Loss (ft)	0.00	Cum SA (acres)		206.30	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	745.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.027	
W.S. Elev (ft)	745.33	Reach Len. (ft)	276.05	268.15	356.63
Crit W.S. (ft)	733.26	Flow Area (sq ft)		3925.80	
E.G. Slope (ft/ft)	0.000263	Area (sq ft)		3925.80	
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	271.40	Top Width (ft)		271.40	
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)		5.22	
Max Chl Dpth (ft)	24.09	Hydr. Depth (ft)		14.47	
Conv. Total (cfs)	1264567.0	Conv. (cfs)		1264567.0	
Length Wtd. (ft)	268.15	Wetted Per. (ft)		277.24	
Min Ch El (ft)	721.24	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		1.21	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.51	3345.07	22.64
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	232.22	11.95

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	749.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.027	
W.S. Elev (ft)	748.73	Reach Len. (ft)	276.05	268.15	356.63
Crit W.S. (ft)	735.07	Flow Area (sq ft)		4890.82	
E.G. Slope (ft/ft)	0.000247	Area (sq ft)		4890.82	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	294.72	Top Width (ft)		294.72	
Vel Total (ft/s)	5.54	Avg. Vel. (ft/s)		5.54	
Max Chl Dpth (ft)	27.49	Hydr. Depth (ft)		16.59	
Conv. Total (cfs)	1724653.0	Conv. (cfs)		1724653.0	
Length Wtd. (ft)	268.15	Wetted Per. (ft)		301.54	
Min Ch El (ft)	721.24	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.39	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	15.75	4141.73	105.44
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	250.92	48.35

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	752.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.027	
W.S. Elev (ft)	752.14	Reach Len. (ft)	276.05	268.15	356.63
Crit W.S. (ft)	737.05	Flow Area (sq ft)		5930.00	
E.G. Slope (ft/ft)	0.000232	Area (sq ft)		5930.00	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	316.89	Top Width (ft)		316.89	

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* Vel Total (ft/s)       *    5.82  * Avg. Vel. (ft/s)       *          *    5.82  *          *
* Max Chl Dpth (ft)      *   30.90  * Hydr. Depth (ft)       *          *   18.71  *          *
* Conv. Total (cfs)      *2262803.0  * Conv. (cfs)            *          *2262803.0  *          *
* Length Wtd. (ft)       *  268.15  * Wetted Per. (ft)       *          *  324.80  *          *
* Min Ch El (ft)         *  721.24  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.54  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   63.40  * 4949.24  *  345.44  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   30.11  *  264.54  *  104.68  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.              *   0.065  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  757.22  * Reach Len. (ft)        *  276.05  *  268.15  *  356.63  *
* Crit W.S. (ft)         *  739.41  * Flow Area (sq ft)      *   45.65  * 7695.81  *    4.22  *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)           *  235.91  * 7695.81  *    4.22  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   31.08  *45467.67  *    1.26  *
* Top Width (ft)         *  474.34  * Top Width (ft)         *  109.86  *  357.55  *    6.93  *
* Vel Total (ft/s)       *    5.87  * Avg. Vel. (ft/s)       *    0.68  *    5.91  *    0.30  *
* Max Chl Dpth (ft)      *   35.98  * Hydr. Depth (ft)       *    3.07  *   21.52  *    0.61  *
* Conv. Total (cfs)      *3227843.0  * Conv. (cfs)            *  2204.8  *3225550.0  *    89.1  *
* Length Wtd. (ft)       *  268.15  * Wetted Per. (ft)       *   14.86  *  366.16  *    7.03  *
* Min Ch El (ft)         *  721.24  * Shear (lb/sq ft)       *    0.04  *    0.26  *    0.01  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.03  *    1.54  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  332.98  * 6202.39  * 1353.98  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  143.32  *  279.03  *  347.30  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.              *   0.065  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  759.67  * Reach Len. (ft)        *  276.05  *  268.15  *  356.63  *
* Crit W.S. (ft)         *  740.94  * Flow Area (sq ft)      *  615.06  * 8573.79  *   44.90  *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           *  615.06  * 8573.79  *   44.90  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  480.93  *53894.27  *   24.80  *
* Top Width (ft)         *  570.68  * Top Width (ft)         *  184.18  *  357.55  *   28.96  *
* Vel Total (ft/s)       *    5.89  * Avg. Vel. (ft/s)       *    0.78  *    6.29  *    0.55  *
* Max Chl Dpth (ft)      *   38.43  * Hydr. Depth (ft)       *    3.34  *   23.98  *    1.55  *
* Conv. Total (cfs)      *3898147.0  * Conv. (cfs)            * 34462.0  *3861908.0  *  1777.4  *
* Length Wtd. (ft)       *  268.23  * Wetted Per. (ft)       *  190.13  *  366.16  *   29.21  *
* Min Ch El (ft)         *  721.24  * Shear (lb/sq ft)       *    0.04  *    0.28  *    0.02  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *    0.03  *    1.79  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  851.30  * 6932.81  * 2406.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  264.43  *  282.06  *  506.53  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.              *   0.065  *   0.027  *   0.075  *
* W.S. Elev (ft)         *  761.21  * Reach Len. (ft)        *  276.05  *  268.15  *  356.63  *
* Crit W.S. (ft)         *  742.30  * Flow Area (sq ft)      *  947.21  * 9123.45  *  613.39  *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           *  947.21  * 9123.45  *  613.39  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  867.97  *61961.37  *  170.66  *
* Top Width (ft)         * 1451.44  * Top Width (ft)         *  242.81  *  357.55  *  851.08  *
* Vel Total (ft/s)       *    5.90  * Avg. Vel. (ft/s)       *    0.92  *    6.79  *    0.28  *
* Max Chl Dpth (ft)      *   39.97  * Hydr. Depth (ft)       *    3.90  *   25.52  *    0.72  *
* Conv. Total (cfs)      *4355103.0  * Conv. (cfs)            * 60001.7  *4283304.0  * 11797.5  *
* Length Wtd. (ft)       *  268.40  * Wetted Per. (ft)       *  251.87  *  366.16  *  852.61  *
* Min Ch El (ft)         *  721.24  * Shear (lb/sq ft)       *    0.05  *    0.33  *    0.01  *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *    0.05  *    2.21  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1311.08  * 7392.50  * 3357.06  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  306.27  *  282.31  *  708.75  *
*****************************************************************************************
```

```
Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  764.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.065  *   0.027  *   0.083  *
* W.S. Elev (ft)         *  763.94  * Reach Len. (ft)        *  276.05  *  268.15  *  356.63  *
* Crit W.S. (ft)         *  744.16  * Flow Area (sq ft)      * 2028.41  *10099.30  * 3778.00  *
* E.G. Slope (ft/ft)     *0.000201  * Area (sq ft)           * 2028.41  *10099.30  * 3778.00  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1906.93  *71943.24  * 2049.83  *
* Top Width (ft)         * 2155.02  * Top Width (ft)         *  539.46  *  357.55  * 1258.01  *
* Vel Total (ft/s)       *    4.77  * Avg. Vel. (ft/s)       *    0.94  *    7.12  *    0.54  *
* Max Chl Dpth (ft)      *   42.70  * Hydr. Depth (ft)       *    3.76  *   28.25  *    3.00  *
* Conv. Total (cfs)      *5352835.0  * Conv. (cfs)           *134485.6  *5073785.0  *144563.9  *
* Length Wtd. (ft)       *  270.99  * Wetted Per. (ft)       *  554.00  *  366.16  * 1269.46  *
* Min Ch El (ft)         *  721.24  * Shear (lb/sq ft)       *    0.05  *    0.35  *    0.04  *
* Alpha                  *    2.11  * Stream Power (lb/ft s) *    0.04  *    2.47  *    0.02  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 2238.77  * 8142.72  * 5438.85  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  363.38  *  283.28  *  938.33  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  754.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  753.94  * Reach Len. (ft)        *  276.05  *  268.15  *  356.63  *
* Crit W.S. (ft)         *  738.10  * Flow Area (sq ft)      *          * 6529.27  *          *
* E.G. Slope (ft/ft)     *0.000242  * Area (sq ft)           *          * 6529.27  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  350.54  * Top Width (ft)         *          *  350.54  *          *
* Vel Total (ft/s)       *    5.93  * Avg. Vel. (ft/s)       *          *    5.93  *          *
* Max Chl Dpth (ft)      *   32.70  * Hydr. Depth (ft)       *          *   18.63  *          *
* Conv. Total (cfs)      *2485995.0  * Conv. (cfs)           *          *2485995.0  *          *
* Length Wtd. (ft)       *  268.15  * Wetted Per. (ft)       *          *  358.81  *          *
* Min Ch El (ft)         *  721.24  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.63  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  112.64  * 5373.49  *  550.46  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   50.43  *  270.44  *  151.36  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 8.116

INPUT
Description: COE Riverstation=24996.23
Preliminary Model Riverstation=15877.94
Station Elevation Data    num=     220
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0      800     .49  799.77     4.09     798     4.72   797.7    11.44   794.4
    12.3      794   18.26     792    25.59  790.96    34.54     790    41.74  788.42
   42.24    788.3   43.77     788     47.1  787.29    48.91  786.87    52.33  786.16
   52.59    786.1   53.12     786    54.83   785.7    57.21  785.22    60.09  784.56
   62.34      784   64.21  783.35    73.47     780    77.51  778.62    77.65  778.57
   79.45      778   79.81     778    85.29  776.91    87.62  776.53    96.21  774.82
  101.01      774  118.14     772   134.93  770.42   156.02  768.22   158.69     768
  167.83   767.11   182.5     766   190.07  765.78   191.72  765.77   194.12  765.68
  201.56   765.25  209.59  765.05   211.06  764.91   215.41  764.74   229.81     764
  248.33      764  259.94  763.74   271.55  763.75   278.96  763.59   279.15  763.58
   282.6   763.58  290.62  763.11   295.45     763   296.62  762.94   301.23  762.74
  310.79   762.49  312.24  762.41   316.85  762.36    317.8   762.3   321.91  762.15
  339.31   762.13  355.08  762.09   388.26  762.26   388.81  762.25    401.2  762.25
  401.84   762.24  415.94  762.25   430.88     762   490.24     762   496.36  761.68
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  496.47  761.67  531.92   760.5  599.47  760.51  602.23  760.48  671.66   760.8
  701.41  761.71  703.55   761.7  717.12     762   751.4     762   795.2     762
  808.47   761.8  808.76   761.8  950.38     760  976.19     760 1014.51  759.43
 1032.62  759.42 1042.91  758.78 1090.52     758 1169.28     758 1169.62  757.55
 1170.62     756 1194.18     754 1213.84     748 1224.35  744.47 1238.26     740
 1248.46     738 1270.28     736 1283.37     732 1289.61     730 1302.04     728
 1322.71     726    1346  721.16    1368  721.16    1390  721.16 1412.38     726
 1420.45     728 1426.57  729.93 1426.78     730 1444.09     736 1459.19     738
 1475.97     740 1504.35     748 1526.72     756 1541.95     758 1568.81     758
 1602.19  759.21 1605.36   759.2 1607.04  759.32 1609.08  759.32 1610.78  759.41
 1613.44  759.42 1614.91  759.47  1615.5  759.48 1617.29  759.47 1618.26  759.43
 1619.28  759.46 1620.49  759.41 1621.03  759.42 1621.26  759.43 1622.73  759.32
 1624.89  759.08 1629.18  758.53 1629.31  758.52 1633.09     758 1637.02  757.82
 1672.77   757.5 1673.26  757.47 1673.93  757.45 1674.82  757.48  1693.2  757.25
 1725.35  757.43 1726.61  757.41 1729.04  757.42  1735.5  757.31 1739.32  757.35
 1752.62  757.15 1759.17  757.24 1772.96  757.16 1807.02  757.38 1807.93  757.34
 1810.96  757.39 1817.01  757.34 1820.68  757.24 1825.67  757.25  1829.7  757.13
 1872.38  756.99 1882.42  756.99 1896.07  757.05 1898.86   757.1 1915.23  757.01
 1976.21     758 2009.59     758 2044.32     760 2048.23     760 2055.95  760.18
 2062.92     760 2510.23     760 2596.02  760.22 2656.08  761.01 2686.69   761.4
 2711.73  761.36 2733.25     762  2972.6     764 3120.56     764 3127.17     762
 3150.85     762 3163.36     764 3249.13     766 3353.07  767.15  3384.1  767.78
 3460.66     768 3532.73     768 3533.45  768.01 3631.21     768 3634.89   768.8
 3640.62  770.57 3645.02     772 3650.26  773.28 3661.56   776.3 3661.92   776.4
 3667.27  777.68 3668.82     778  3674.2     778 3686.28     774 3693.16  772.97
 3697.98   772.5 3699.31  772.35 3704.96     772 3738.82     772 3744.55     774
 3808.92     774 3812.57  773.28 3820.05     772 3827.18  770.71 3831.33  770.03
 3831.49     770 3835.47  769.38 3835.74  769.35 3838.01  769.07 3838.31  769.06
 3843.31  769.42 3844.72     770 3857.03     776 3857.18  776.07 3880.49  787.59
 3888.93  791.96 3889.06  792.04 3896.11  795.76 3896.58     796 3898.15     796

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05   751.4    .065 1169.28    .027 1541.95      .1 2656.08     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1169.28 1541.95           289.02   479.2  525.36             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       0     675     765       F
     675     795     762       F
     795    1099   757.8       F
  1615.5    3200  761.25       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     668     923     780    1699    1817     780    2107    2302     780
    2696    3074     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.89  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  730.78  * Flow Area (sq ft)      *          * 2766.06  *          *
* E.G. Slope (ft/ft)     *0.000284  * Area (sq ft)           *          * 2766.06  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  243.62  * Top Width (ft)         *          *  243.62  *          *
* Vel Total (ft/s)       *    4.63  * Avg. Vel. (ft/s)       *          *    4.63  *          *
* Max Chl Dpth (ft)      *   19.73  * Hydr. Depth (ft)       *          *   11.35  *          *
* Conv. Total (cfs)      *759583.6  * Conv. (cfs)            *          *759583.6  *          *
* Length Wtd. (ft)       *  479.20  * Wetted Per. (ft)       *          *  248.16  *          *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.91  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *          * 2404.59  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  204.81  *    1.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.027  *          *
```

```
* W.S. Elev (ft)         *  745.25  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  733.30  * Flow Area (sq ft)      *          * 3891.71  *          *
* E.G. Slope (ft/ft)     *0.000272  * Area (sq ft)           *          * 3891.71  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  272.56  * Top Width (ft)         *          *  272.56  *          *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)       *          *    5.27  *          *
* Max Chl Dpth (ft)      *   24.09  * Hydr. Depth (ft)       *          *   14.28  *          *
* Conv. Total (cfs)      *1242882.0  * Conv. (cfs)            *          *1242882.0  *          *
* Length Wtd. (ft)       *  479.20  * Wetted Per. (ft)       *          *  278.39  *          *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.25  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    1.51  * 3321.01  *   22.64  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  230.55  *   11.95  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  749.14  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  748.66  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  735.12  * Flow Area (sq ft)      *          * 4859.33  *          *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           *          * 4859.33  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  294.52  * Top Width (ft)         *          *  294.52  *          *
* Vel Total (ft/s)       *    5.58  * Avg. Vel. (ft/s)       *          *    5.58  *          *
* Max Chl Dpth (ft)      *   27.50  * Hydr. Depth (ft)       *          *   16.50  *          *
* Conv. Total (cfs)      *1706753.0  * Conv. (cfs)            *          *1706753.0  *          *
* Length Wtd. (ft)       *  479.20  * Wetted Per. (ft)       *          *  301.39  *          *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.42  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   15.75  * 4111.72  *  105.44  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  249.11  *   48.35  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  752.60  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.07  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  737.17  * Flow Area (sq ft)      *          * 5899.91  *          *
* E.G. Slope (ft/ft)     *0.000235  * Area (sq ft)           *          * 5899.91  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  315.24  * Top Width (ft)         *          *  315.24  *          *
* Vel Total (ft/s)       *    5.85  * Avg. Vel. (ft/s)       *          *    5.85  *          *
* Max Chl Dpth (ft)      *   30.91  * Hydr. Depth (ft)       *          *   18.72  *          *
* Conv. Total (cfs)      *2250992.0  * Conv. (cfs)            *          *2250992.0  *          *
* Length Wtd. (ft)       *  479.20  * Wetted Per. (ft)       *          *  323.22  *          *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.57  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   63.40  * 4912.83  *  345.44  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   30.11  *  262.59  *  104.68  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  757.70  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  757.15  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  739.64  * Flow Area (sq ft)      *          * 7616.10  *          *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           *          * 7616.10  *    9.41  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  460.22  * Top Width (ft)         *          *  365.58  *   94.64  *
* Vel Total (ft/s)       *    5.97  * Avg. Vel. (ft/s)       *          *    5.97  *          *
* Max Chl Dpth (ft)      *   35.99  * Hydr. Depth (ft)       *          *   20.83  *          *
* Conv. Total (cfs)      *3118323.0  * Conv. (cfs)            *          *3118323.0  *          *
* Length Wtd. (ft)       *  479.19  * Wetted Per. (ft)       *          *  375.32  *          *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *          *    0.27  *          *
```

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* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.61  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  332.24  * 6155.26  * 1353.92  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  142.98  *  276.81  *  346.88  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.065  *   0.027  *   0.100  *
* W.S. Elev (ft)         *  759.59  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  741.15  * Flow Area (sq ft)      *  192.00  * 8524.80  *   79.38  *
* E.G. Slope (ft/ft)     *0.000214  * Area (sq ft)           *  192.00  * 8524.80  *  675.26  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   70.79  *54311.07  *   18.15  *
* Top Width (ft)         *  915.83  * Top Width (ft)         *  165.83  *  372.67  *  377.33  *
* Vel Total (ft/s)       *    6.18  * Avg. Vel. (ft/s)       *    0.37  *    6.37  *    0.23  *
* Max Chl Dpth (ft)      *   38.43  * Hydr. Depth (ft)       *    1.16  *   22.87  *    1.08  *
* Conv. Total (cfs)      *3718982.0  * Conv. (cfs)            *  4839.2  *3712902.0  *  1240.6  *
* Length Wtd. (ft)       *  478.63  * Wetted Per. (ft)       *  165.86  *  382.90  *   73.58  *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *    0.02  *    0.30  *    0.01  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.01  *    1.89  *    0.00  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  848.74  * 6880.18  * 2403.69  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  263.33  *  279.81  *  504.87  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.73  * Wt. n-Val.             *   0.065  *   0.027  *   0.100  *
* W.S. Elev (ft)         *  761.12  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  742.44  * Flow Area (sq ft)      *  536.44  * 9094.19  *  191.75  *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           *  618.03  * 9094.19  * 1681.70  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  311.28  *62607.03  *   81.69  *
* Top Width (ft)         * 1583.84  * Top Width (ft)         *  401.22  *  372.67  *  809.95  *
* Vel Total (ft/s)       *    6.41  * Avg. Vel. (ft/s)       *    0.58  *    6.88  *    0.43  *
* Max Chl Dpth (ft)      *   39.96  * Hydr. Depth (ft)       *    2.18  *   24.40  *    2.61  *
* Conv. Total (cfs)      *4161323.0  * Conv. (cfs)            * 20561.1  *4135366.0  *  5395.8  *
* Length Wtd. (ft)       *  478.97  * Wetted Per. (ft)       *  247.09  *  382.90  *   73.58  *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *    0.03  *    0.34  *    0.04  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    0.02  *    2.34  *    0.02  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1306.12  * 7336.43  * 3347.67  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  304.23  *  280.06  *  701.95  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.065  *   0.027  *   0.098  *
* W.S. Elev (ft)         *  763.88  * Reach Len. (ft)        *  289.02  *  479.20  *  525.36  *
* Crit W.S. (ft)         *  744.26  * Flow Area (sq ft)      * 1214.98  *10120.97  * 4054.73  *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           * 2122.67  *10120.97  * 4054.73  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1164.49  *72192.11  * 2543.41  *
* Top Width (ft)         * 1915.84  * Top Width (ft)         *  660.49  *  372.67  *  882.68  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *    0.96  *    7.13  *    0.63  *
* Max Chl Dpth (ft)      *   42.72  * Hydr. Depth (ft)       *    4.93  *   27.16  *    4.59  *
* Conv. Total (cfs)      *5196321.0  * Conv. (cfs)            * 79724.0  *4942468.0  *174128.4  *
* Length Wtd. (ft)       *  478.04  * Wetted Per. (ft)       *  249.84  *  382.90  *  906.70  *
* Min Ch El (ft)         *  721.16  * Shear (lb/sq ft)       *    0.06  *    0.35  *    0.06  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *    0.06  *    2.51  *    0.04  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 2225.62  * 8080.48  * 5406.79  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  359.58  *  281.03  *  929.56  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	754.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.027	
W.S. Elev (ft)	753.86	Reach Len. (ft)	289.02	479.20	525.36
Crit W.S. (ft)	738.23	Flow Area (sq ft)		6474.25	
E.G. Slope (ft/ft)	0.000227	Area (sq ft)		6474.25	
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	326.12	Top Width (ft)		326.12	
Vel Total (ft/s)	5.98	Avg. Vel. (ft/s)		5.98	
Max Chl Dpth (ft)	32.70	Hydr. Depth (ft)		19.85	
Conv. Total (cfs)	2567625.0	Conv. (cfs)		2567625.0	
Length Wtd. (ft)	479.20	Wetted Per. (ft)		334.68	
Min Ch El (ft)	721.16	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.64	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	112.64	5333.47	550.46
C & E Loss (ft)	0.00	Cum SA (acres)	50.43	268.36	151.36

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 8.025

INPUT
Description: COE Riverstation=25475.43
Preliminary Model Riverstation=15398.74
Station Elevation Data num= 375

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	800	6.72	798	7.11	797.84	11.68	796	11.94	795.89
16.63	794	16.73	793.96	21.57	792	21.75	791.93	26.52	790
31.48	788	35.18	786.48	36.33	786	37.14	785.65	44.88	782.18
45.27	782	45.56	781.87	49.75	780	53.14	778.58	54.59	778
56.4	777.71	56.74	777.68	57.31	777.64	62.08	777	65.51	776.8
66.91	776.65	68.07	776.59	71.64	776.38	74.41	776.2	74.65	776.18
78.26	775.96	78.32	775.96	80.91	775.79	83.03	775.64	83.36	775.62
85.09	775.5	86.41	775.4	97.58	774.59	104.06	774	108.04	772.39
109.01	772	111.4	771.41	116.87	770	119.81	769.33	123.08	768.66
125.03	768.24	126.23	768	127.54	767.83	129.17	767.61	130.65	767.42
132.82	767.24	134.79	767.03	136.72	766.83	141.56	766.48	142.89	766.35
147.97	766	150.17	765.84	150.99	765.8	157.59	765.32	161.99	765.08
166.55	764.74	180.9	764	180.97	764	184.49	763.81	184.97	763.8
187.05	763.67	188.66	763.54	190.04	763.53	192.28	763.39	195.14	763.23
198.51	763.07	201.28	763.06	212.55	762.78	216.24	762.64	231.07	762.11
231.71	762.09	234.23	762	237.41	761.53	242.08	760.85	248.17	760
250.58	759.29	254.9	758	255.59	757.78	257.14	757.24	259.74	756.36
260.7	756	264.64	754.75	266.82	754	268.21	753.61	273.44	752
275.83	751.93	291.18	751.51	294.26	751.4	299.93	751.24	302.27	751.17
304.23	751.12	311.21	750.92	320.23	750.68	324.69	750.53	327.22	750.46
333.71	750.36	334.99	750.37	337.57	750.27	339.96	750.19	340.71	750.19
347.09	750	353.65	750	385.12	749.22	386.95	749.18	387.2	749.18
387.27	749.17	387.4	749.17	387.78	749.16	394.77	749.16	403.06	749.52
419.84	750	421.09	750.05	421.21	750.05	425.16	750.18	432.52	750.35
433.71	750.35	434.9	750.38	437.94	750.4	439.53	750.42	441.34	750.45
485.33	752	518.82	752	530.17	752.18	530.62	752.18	570.65	752.43
602.6	753.01	605.48	753.04	606.21	753.05	608.74	753.12	643.01	754
710.45	754	765.17	756	767.1	756.41	777.55	758	920.51	758
951.01	758.41	951.59	758.41	958.95	758.35	959.53	758.34	968.91	758.28
969.32	758.28	992.43	758.12	992.71	758.12	1006.07	758.03	1006.6	758.03
1009.85	758	1020.46	757.85	1021.5	757.85	1034.43	757.69	1035.18	757.69
1045.44	757.58	1046.36	757.58	1066.43	757.47	1067.89	757.48	1071.14	757.47
1073.16	757.48	1078.39	757.46	1080.66	757.47	1088.35	757.45	1116.43	757.19
1117.94	757.17	1135.86	756.77	1144.48	756.66	1170.65	756	1173.12	755.33
1177.91	754	1179.87	753.45	1185.08	752	1189.82	750.65	1192.15	750
1199.14	748	1200.01	747.71	1205.12	746	1207.22	745.28	1210.99	744
1216.25	742.19	1216.81	742	1217.72	741.68	1222.55	740	1224.16	739.43
1228.25	738	1244.49	736.54	1250.7	736	1258.55	734.33	1260.13	734
1260.89	733.73	1265.7	732	1267.98	731.17	1271.23	730	1276.73	728
1307.9	726	1327.8	721.03	1349.8	721.03	1371.8	721.03	1391.29	726

1393.29	726.31	1404.47	728	1410.32	729.63	1411.63	730	1412.31	730.2
1425.42	734	1430.47	735.3	1433.09	736	1439.47	736.62	1453.34	738
1460.36	739.54	1462.48	740	1466.38	741.2	1475.29	744	1480.89	745.78
1481.97	746.12	1487.82	748	1497	750.98	1506.17	754	1507.85	754.56
1512.11	756	1520.43	757.04	1521.48	757.16	1529.12	758	1650.03	760
1778.63	760	1829.89	758.93	1835.31	758.94	1879.06	760	2426.54	760
2435.51	759.35	2440.61	759.05	2447.74	758.56	2454.91	758.18	2458.56	758
2501.03	758	2507.94	757.89	2509.7	757.87	2521.8	757.66	2560.07	757.14
2564.11	757.13	2576.61	756.97	2580.49	756.94	2598.25	756.71	2599.15	756.69
2622.13	756.4	2622.99	756.38	2624.2	756.36	2625.47	756.33	2644.59	756
2652.99	756	2664.05	755.87	2664.78	755.87	2670.96	756	2800.98	756
2814.69	756.53	2818.77	756.66	2827.17	756.97	2850.68	757.65	2853.64	757.74
2856.98	757.82	2858	757.83	2861.39	757.91	2864.83	758	2865.38	758.08
2865.58	758.12	2869.56	758.8	2871.63	759.31	2872.96	759.58	2874.52	760
2995.25	760	3005.84	760.07	3007.02	760.07	3062.62	760.1	3079.27	760
3192.01	760	3233.94	761.88	3237.24	762	3317.91	762	3332.93	760.76
3340.09	760	3342.28	758.74	3343.18	758.23	3343.58	758	3362.8	758
3369.15	759.1	3374.21	760	3414.04	760	3421.82	760.18	3422.17	760.22
3422.47	760.21	3423	760.28	3424.04	760.4	3427.54	760.82	3429.01	760.98
3430.89	761.21	3437.24	762	3446.9	763.06	3455.06	764	3457.14	764.07
3457.83	764.06	3489.1	765.11	3489.35	765.11	3500.69	765.15	3503.81	765.18
3530.43	765.01	3537.47	764.88	3540.06	764.8	3542.92	764.72	3558.45	764
3558.63	764	3559.52	763.73	3562.59	762.88	3566.79	762	3568.5	761.17
3571.15	760	3571.3	759.93	3571.41	759.9	3573.14	759.27	3574.67	758.74
3575.37	758.49	3575.8	758.33	3576.65	758	3580.21	756.64	3581.12	756.28
3581.82	756	3584.36	754.99	3586.89	754	3588.03	753.55	3590.65	752.52
3591.75	752	3595.96	750	3603.8	748.95	3612.1	748	3613.34	747.91
3618.36	747.58	3620.78	747.41	3644.35	747.44	3651.87	747.9	3652.57	747.93
3653.48	748	3660.09	750	3665.79	752	3669.43	753.28	3671.51	754
3672.35	754.37	3676.07	756	3678.81	757.44	3682.43	759.35	3683.67	760
3684.1	760.23	3687.44	762	3688.91	762.77	3691.23	764	3697.79	767.45
3698.83	768	3699.75	768.48	3702.65	770	3706.33	771.91	3710.27	774
3713.56	775.78	3713.96	776	3717.38	778	3717.76	778.24	3720.63	780
3723.42	781.82	3723.7	782	3723.82	782.07	3726.79	784	3728.89	785.2
3730.32	786	3733.03	787.41	3736.66	789.26	3738.1	790	3741.59	792

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	570.65	.06	1170.65	.027	1529.12	.1	2814.69	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1170.65	1529.12	442.18	429.89	376.29	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	855	765	F
855	922	762	F
922	951.01	759.41	F
951.01	1113	757.8	F
1650.03	3720	761	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
115	185	790	595	710	780	2198	2273	780
2890	3335	780						

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	741.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.027	
W.S. Elev (ft)	740.76	Reach Len. (ft)	442.18	429.89	376.29
Crit W.S. (ft)	730.76	Flow Area (sq ft)		2812.29	
E.G. Slope (ft/ft)	0.000270	Area (sq ft)		2812.29	
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	244.60	Top Width (ft)		244.60	
Vel Total (ft/s)	4.55	Avg. Vel. (ft/s)		4.55	
Max Chl Dpth (ft)	19.73	Hydr. Depth (ft)		11.50	
Conv. Total (cfs)	778285.0	Conv. (cfs)		778285.0	
Length Wtd. (ft)	429.89	Wetted Per. (ft)		249.40	
Min Ch El (ft)	721.03	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.87	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		2373.91	5.47
C & E Loss (ft)	0.00	Cum SA (acres)		202.13	1.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	745.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.027	
W.S. Elev (ft)	745.13	Reach Len. (ft)	442.18	429.89	376.29
Crit W.S. (ft)	733.21	Flow Area (sq ft)		3938.05	
E.G. Slope (ft/ft)	0.000260	Area (sq ft)		3938.05	
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	271.17	Top Width (ft)		271.17	
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)		5.21	
Max Chl Dpth (ft)	24.10	Hydr. Depth (ft)		14.52	
Conv. Total (cfs)	1270760.0	Conv. (cfs)		1270760.0	
Length Wtd. (ft)	429.89	Wetted Per. (ft)		277.37	
Min Ch El (ft)	721.03	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		1.20	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.51	3277.94	22.64
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	227.56	11.95

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	749.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.027	
W.S. Elev (ft)	748.55	Reach Len. (ft)	442.18	429.89	376.29
Crit W.S. (ft)	735.01	Flow Area (sq ft)		4900.82	
E.G. Slope (ft/ft)	0.000243	Area (sq ft)		4900.82	43.09
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	340.23	Top Width (ft)		292.27	47.96
Vel Total (ft/s)	5.53	Avg. Vel. (ft/s)		5.53	
Max Chl Dpth (ft)	27.52	Hydr. Depth (ft)		16.77	
Conv. Total (cfs)	1738187.0	Conv. (cfs)		1738187.0	
Length Wtd. (ft)	429.89	Wetted Per. (ft)		299.55	
Min Ch El (ft)	721.03	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.37	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	15.75	4058.03	105.18
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	245.88	48.06

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	752.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.027	
W.S. Elev (ft)	751.97	Reach Len. (ft)	442.18	429.89	376.29
Crit W.S. (ft)	737.09	Flow Area (sq ft)		5938.78	
E.G. Slope (ft/ft)	0.000230	Area (sq ft)	314.92	5938.78	260.48
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	598.43	Top Width (ft)	209.76	314.79	73.87
Vel Total (ft/s)	5.81	Avg. Vel. (ft/s)		5.81	
Max Chl Dpth (ft)	30.94	Hydr. Depth (ft)		18.87	
Conv. Total (cfs)	2276358.0	Conv. (cfs)		2276358.0	
Length Wtd. (ft)	429.89	Wetted Per. (ft)		323.09	
Min Ch El (ft)	721.03	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.53	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	62.35	4847.71	343.87
C & E Loss (ft)	0.00	Cum SA (acres)	29.42	259.12	104.23

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	757.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.060	0.027	
W.S. Elev (ft)	757.05	Reach Len. (ft)	442.18	429.89	376.29
Crit W.S. (ft)	739.31	Flow Area (sq ft)	23.50	7625.53	

```
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           * 2097.64  * 7625.53  *  917.74  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    5.16  *45494.84  *          *
* Top Width (ft)         * 1154.37  * Top Width (ft)         *  445.96  *  349.87  *  358.54  *
* Vel Total (ft/s)       *    5.95  * Avg. Vel. (ft/s)       *    0.22  *    5.97  *          *
* Max Chl Dpth (ft)      *   36.02  * Hydr. Depth (ft)       *    0.50  *   21.80  *          *
* Conv. Total (cfs)      *3216485.0  * Conv. (cfs)            *   364.8  *3216120.0  *          *
* Length Wtd. (ft)       *  429.83  * Wetted Per. (ft)       *   47.36  *  359.44  *          *
* Min Ch El (ft)         *  721.03  * Shear (lb/sq ft)       *    0.01  *    0.27  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    1.58  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  325.28  * 6071.43  * 1348.33  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  141.50  *  272.87  *  344.15  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.060  *   0.027  *   0.100  *
* W.S. Elev (ft)         *  759.50  * Reach Len. (ft)        *  442.18  *  429.89  *  376.29  *
* Crit W.S. (ft)         *  740.83  * Flow Area (sq ft)      *  476.82  * 8498.14  *   67.65  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           * 3763.46  * 8498.14  * 2226.96  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  260.16  *54128.02  *   11.82  *
* Top Width (ft)         * 1889.81  * Top Width (ft)         *  805.77  *  358.47  *  725.57  *
* Vel Total (ft/s)       *    6.02  * Avg. Vel. (ft/s)       *    0.55  *    6.37  *    0.17  *
* Max Chl Dpth (ft)      *   38.47  * Hydr. Depth (ft)       *    1.92  *   23.71  *    0.75  *
* Conv. Total (cfs)      *3811051.0  * Conv. (cfs)            * 18225.8  *3791997.0  *   828.2  *
* Length Wtd. (ft)       *  429.67  * Wetted Per. (ft)       *  248.67  *  368.09  *   90.45  *
* Min Ch El (ft)         *  721.03  * Shear (lb/sq ft)       *    0.02  *    0.29  *    0.01  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *    0.01  *    1.87  *    0.00  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  835.62  * 6786.55  * 2386.19  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  260.10  *  275.79  *  498.22  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.060  *   0.027  *   0.066  *
* W.S. Elev (ft)         *  761.11  * Reach Len. (ft)        *  442.18  *  429.89  *  376.29  *
* Crit W.S. (ft)         *  742.13  * Flow Area (sq ft)      *  877.24  * 9075.40  * 4263.01  *
* E.G. Slope (ft/ft)     *0.000193  * Area (sq ft)           * 5067.73  * 9075.40  * 4263.01  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  700.25  *58848.40  * 3451.35  *
* Top Width (ft)         * 2671.83  * Top Width (ft)         *  815.33  *  358.47  * 1498.03  *
* Vel Total (ft/s)       *    4.43  * Avg. Vel. (ft/s)       *    0.80  *    6.48  *    0.81  *
* Max Chl Dpth (ft)      *   40.08  * Hydr. Depth (ft)       *    3.53  *   25.32  *    2.85  *
* Conv. Total (cfs)      *4529435.0  * Conv. (cfs)            * 50344.7  *4230953.0  *248137.7  *
* Length Wtd. (ft)       *  424.42  * Wetted Per. (ft)       *  248.67  *  368.09  * 1508.09  *
* Min Ch El (ft)         *  721.03  * Shear (lb/sq ft)       *    0.04  *    0.30  *    0.03  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    0.03  *    1.93  *    0.03  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1287.26  * 7236.49  * 3311.82  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  300.19  *  276.04  *  688.03  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.060  *   0.027  *   0.074  *
* W.S. Elev (ft)         *  763.90  * Reach Len. (ft)        *  442.18  *  429.89  *  376.29  *
* Crit W.S. (ft)         *  743.93  * Flow Area (sq ft)      * 1966.89  *10076.53  * 8499.61  *
* E.G. Slope (ft/ft)     *0.000173  * Area (sq ft)           * 7411.74  *10076.53  * 8499.61  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2172.45  *66345.34  * 7382.22  *
* Top Width (ft)         * 2766.26  * Top Width (ft)         *  870.65  *  358.47  * 1537.14  *
* Vel Total (ft/s)       *    3.69  * Avg. Vel. (ft/s)       *    1.10  *    6.58  *    0.87  *
* Max Chl Dpth (ft)      *   42.87  * Hydr. Depth (ft)       *    6.23  *   28.11  *    5.53  *
* Conv. Total (cfs)      *5762507.0  * Conv. (cfs)            *164937.4  *5037095.0  *560475.3  *
* Length Wtd. (ft)       *  420.82  * Wetted Per. (ft)       *  315.67  *  368.09  * 1559.66  *
```

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* Min Ch El (ft)         *  721.03  * Shear (lb/sq ft)       *    0.07  *    0.30  *    0.06  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    0.07  *    1.95  *    0.05  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 2193.99  * 7969.39  * 5331.08  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  354.50  *  277.01  *  914.97  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  754.31  * Element              *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.            *          *   0.027  *          *
* W.S. Elev (ft)         *  753.76  * Reach Len. (ft)       *  442.18  *  429.89  *  376.29  *
* Crit W.S. (ft)         *  738.13  * Flow Area (sq ft)     *          * 6514.26  *          *
* E.G. Slope (ft/ft)     *0.000223  * Area (sq ft)          *  863.98  * 6514.26  *  401.34  *
* Q Total (cfs)          *38700.00  * Flow (cfs)            *          *38700.00  *          *
* Top Width (ft)         *  737.32  * Top Width (ft)        *  327.33  *  326.68  *   83.32  *
* Vel Total (ft/s)       *    5.94  * Avg. Vel. (ft/s)      *          *    5.94  *          *
* Max Chl Dpth (ft)      *   32.73  * Hydr. Depth (ft)      *          *   19.94  *          *
* Conv. Total (cfs)      *2589819.0  * Conv. (cfs)           *          *2589819.0  *          *
* Length Wtd. (ft)       *  429.89  * Wetted Per. (ft)      *          *  335.51  *          *
* Min Ch El (ft)         *  721.03  * Shear (lb/sq ft)      *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.61  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  109.77  * 5262.02  *  548.04  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   49.35  *  264.77  *  150.86  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.944

INPUT
Description: COE Riverstation=25905.32
Preliminary Model Riverstation=14968.84
Station Elevation Data    num=     252
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  782.05   49.99     782   57.27  781.88  140.48  781.42  280.77     780
  362.48     780  363.02  779.97  397.88     778  422.95  770.12  443.15     764
  456.86     760  464.98     758  488.35     756  502.94     754  521.74     748
  533.04     744  545.29     740  551.98     738  575.47     736  578.74  735.09
  583.08     734  594.77     730  602.36     728  619.86     726  643.44  720.91
  665.44  720.91  687.44  720.91  711.02     726  722.92     728  730.55     730
  737.57     732  737.83  732.07  751.77     736  776.11     738  802.28     746
  830.46     754  915.93     756  975.12     758  985.17     760 1002.16     760
 1010.76     758 1027.97     758 1029.13  758.08 1029.31  758.07 1029.43  758.06
 1031.41  758.03 1150.51  758.32 1218.53   757.8 1220.31  757.81 1268.53  757.56
 1381.42  757.93 1531.94  758.05 1532.39  758.06 1627.86  757.77 1639.03     758
 1651.34     758 1653.07  758.08 1653.34  758.08  1657.7  758.28 1658.47  758.28
    1662  758.43 1662.97  758.43 1682.07  758.91 1696.15  759.04 1705.76  759.28
 1711.05  759.29 1716.96  759.44 1721.34  759.45 1734.67  759.79 1736.18  759.79
  1743.3     760  1774.7     760 1779.22  759.83  1779.7   759.8 1784.77  759.58
 1796.81  758.86    1798  758.77 1799.07  758.66 1807.74  758.13 1808.08  758.09
 1809.78     758  1810.2     758 1835.61  757.83 1861.11  757.48 1864.21  757.37
 1957.46  756.07 1992.59  755.87 1993.28  755.85 2026.31  755.61 2027.96  755.62
 2114.81  754.83 2169.69  753.91 2198.91  753.69 2353.28  753.13 2404.17  753.72
 2405.02  753.72 2408.19  753.78 2415.88  753.52 2416.36  753.45 2416.59  753.42
 2417.41  753.51  2417.7  753.46 2418.09   753.4 2419.45  753.13 2420.01  753.18
 2420.37   753.1  2421.1  752.96 2422.86  752.65 2423.28  752.63 2426.72     752
 2427.31  751.16 2428.06     750 2428.87   748.9 2429.62     748  2433.4  746.22
 2433.84     746 2434.26   745.8    2438  744.09 2438.22     744 2441.87  742.35
 2442.68     742 2444.07     742 2448.69     742 2456.99     746 2460.98     748
 2463.46  750.97  2467.7     756 2571.97     756 2573.29  756.09 2573.52   756.1
  2582.5  756.62 2583.94  756.64 2585.75  756.72 2591.61  756.81 2593.93  756.77
 2599.19   756.8 2601.92  756.75 2608.18  756.79 2613.73  756.75  2634.4  757.06
 2644.38  757.04  2646.5  757.11  2648.4  756.97  2651.1  757.15 2652.79  757.03
 2654.27   757.1 2656.06  757.01 2658.03  757.04 2659.95  756.95 2661.98  756.94
 2664.16   756.8 2665.65  756.77 2668.03  756.58  2668.8  756.56  2673.1  756.17
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 2673.29  756.16 2675.03     756 2679.53     756 2683.76   756.2 2684.15  756.18
 2684.43  756.16 2688.53  756.31 2688.97  756.29 2692.16   756.4 2692.65  756.37
 2696.37  756.43 2697.82  756.42  2698.3   756.4 2705.34  756.47 2706.51  756.53
 2707.86  756.57 2730.45   757.5  2738.3  757.67  2743.1  757.73 2743.39  757.73
 2747.32  757.79 2747.65  757.79 2751.63  757.84 2751.95  757.85 2759.43  757.94
 2759.58  757.95 2770.96  758.07 2771.11  758.08 2783.96  758.22 2785.87  758.32
 2786.41  758.33 2793.05  758.13 2793.55  758.15 2795.84  758.08 2796.14   758.1
 2803.19  757.97  2803.3  757.97 2807.93  757.89 2808.23  757.89 2813.35  757.81
 2813.94  757.81 2818.48  757.74 2818.95  757.74 2822.25  757.69  2823.1  757.69
 2829.12  757.59 2830.42   757.6 2834.63  757.53 2837.24  757.53 2837.48  757.52
 2842.19  757.45 2842.45  757.45 2849.34  757.35  2852.4  757.33 2853.65  757.34
 2856.36  757.31 2858.44  757.33 2861.87  757.29 2864.36  757.31 2874.02  757.24
 2909.66  757.48    2914  757.57 2929.51  757.67 2937.96     758 2948.54     758
 2954.47  756.94 2955.85  756.52 2957.97     756 2960.31     756 2962.82  756.45
 2969.96     758 2974.76     760 3004.04     760 3017.83     762 3018.33  762.11
  3024.9     764 3052.01  764.79 3093.91  765.22 3095.59  765.05 3100.18  765.56
 3101.05  765.47 3104.27     766 3105.37  766.48 3109.05     768 3112.77  769.72
 3121.01  773.46 3126.73  775.98 3130.93  777.75 3135.02  779.36 3147.98     784
  3151.6  785.36 3153.38     786 3154.99   786.7  3158.1     788 3158.26  788.07
 3162.43     790 3175.56     790

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  397.88     .04  488.35    .027  830.46     .05 2444.07     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        488.35  830.46           329.62  302.08  213.62             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  985.17 3175.56     761       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1670    1750     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  740.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.63  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  730.59  * Flow Area (sq ft)      *          * 2757.31  *          *
* E.G. Slope (ft/ft)     *0.000284  * Area (sq ft)           *          * 2757.31  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  241.35  * Top Width (ft)         *          *  241.35  *          *
* Vel Total (ft/s)       *    4.64  * Avg. Vel. (ft/s)       *          *    4.64  *          *
* Max Chl Dpth (ft)      *   19.72  * Hydr. Depth (ft)       *          *   11.42  *          *
* Conv. Total (cfs)      *760129.4  * Conv. (cfs)             *          *760129.4  *          *
* Length Wtd. (ft)       *  302.08  * Wetted Per. (ft)        *          *  245.94  *          *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)        *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.92  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *          * 2346.43  *    5.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  199.73  *    1.74  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  745.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  745.00  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  733.09  * Flow Area (sq ft)      *          * 3871.99  *          *
* E.G. Slope (ft/ft)     *0.000272  * Area (sq ft)           *          * 3871.99  *   37.39  *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  287.68  * Top Width (ft)         *          *  268.78  *   18.90  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *          *    5.29  *          *
* Max Chl Dpth (ft)      *   24.09  * Hydr. Depth (ft)       *          *   14.41  *          *
* Conv. Total (cfs)      *1243314.0  * Conv. (cfs)             *          *1243314.0  *          *
* Length Wtd. (ft)       *  302.08  * Wetted Per. (ft)        *          *  274.73  *          *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)        *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.27  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.51  * 3239.40  *   22.48  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  224.90  *   11.87  *
*********************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  748.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  748.42  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  734.99  * Flow Area (sq ft)      *          * 4829.58  *          *
* E.G. Slope (ft/ft)     *0.000253  * Area (sq ft)           *          * 4829.58  *  126.41  *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  322.48  * Top Width (ft)          *          *  290.41  *   32.07  *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)        *          *    5.61  *          *
* Max Chl Dpth (ft)      *   27.51  * Hydr. Depth (ft)        *          *   16.63  *          *
* Conv. Total (cfs)      *1704332.0  * Conv. (cfs)            *          *1704332.0  *          *
* Length Wtd. (ft)       *  302.08  * Wetted Per. (ft)        *          *  297.43  *          *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)        *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.44  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   15.75  * 4010.02  *  104.45  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    9.30  *  243.00  *   47.71  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  752.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  751.85  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  737.14  * Flow Area (sq ft)      *          * 5863.55  *          *
* E.G. Slope (ft/ft)     *0.000238  * Area (sq ft)           *          * 5863.55  *  245.51  *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  350.59  * Top Width (ft)          *          *  313.21  *   37.38  *
* Vel Total (ft/s)       *    5.88  * Avg. Vel. (ft/s)        *          *    5.88  *          *
* Max Chl Dpth (ft)      *   30.94  * Hydr. Depth (ft)        *          *   18.72  *          *
* Conv. Total (cfs)      *2237046.0  * Conv. (cfs)            *          *2237046.0  *          *
* Length Wtd. (ft)       *  302.08  * Wetted Per. (ft)        *          *  321.25  *          *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)        *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.59  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *   60.76  * 4789.47  *  341.69  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   28.35  *  256.03  *  103.75  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  756.96  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  739.37  * Flow Area (sq ft)      *    5.34  * 7548.79  *  180.66  *
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           *    5.34  * 7548.79  * 2077.77  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *    1.71  *45395.07  *  103.22  *
* Top Width (ft)         * 1268.70  * Top Width (ft)          *   11.17  *  342.11  *  915.42  *
* Vel Total (ft/s)       *    5.88  * Avg. Vel. (ft/s)        *    0.32  *    6.01  *    0.57  *
* Max Chl Dpth (ft)      *   36.05  * Hydr. Depth (ft)        *    0.48  *   22.07  *    1.59  *
* Conv. Total (cfs)      *3220796.0  * Conv. (cfs)            *   120.8  *3213368.0  *  7306.8  *
* Length Wtd. (ft)       *  301.74  * Wetted Per. (ft)        *   11.21  *  350.91  *  113.79  *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)        *    0.01  *    0.27  *    0.02  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    0.00  *    1.61  *    0.01  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *  314.60  * 5996.55  * 1335.39  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  139.18  *  269.46  *  338.65  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
```

```
* E.G. Elev (ft)         *  760.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  759.40  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  740.89  * Flow Area (sq ft)      *   60.10  * 8385.46  *  523.24  *
* E.G. Slope (ft/ft)     *0.000198  * Area (sq ft)           *   60.10  * 8385.46  * 6005.14  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   50.68  *53850.47  *  498.85  *
* Top Width (ft)         * 2373.70  * Top Width (ft)         *   29.06  *  342.11  * 2002.53  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *    0.84  *    6.42  *    0.95  *
* Max Chl Dpth (ft)      *   38.49  * Hydr. Depth (ft)       *    2.07  *   24.51  *    3.45  *
* Conv. Total (cfs)      *3867697.0  * Conv. (cfs)            *  3603.4  *3828627.0  * 35467.0  *
* Length Wtd. (ft)       *  300.73  * Wetted Per. (ft)       *   29.31  *  350.91  *  151.90  *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)       *    0.03  *    0.30  *    0.04  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    0.02  *    1.90  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  816.21  * 6703.23  * 2350.63  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  255.86  *  272.33  *  486.43  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.040  *   0.027  *   0.052  *
* W.S. Elev (ft)         *  761.14  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  742.18  * Flow Area (sq ft)      *  116.19  * 8978.68  * 9591.03  *
* E.G. Slope (ft/ft)     *0.000154  * Area (sq ft)           *  116.19  * 8978.68  * 9591.03  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  117.33  *53280.93  * 9601.74  *
* Top Width (ft)         * 2478.90  * Top Width (ft)         *   35.38  *  342.11  * 2101.41  *
* Vel Total (ft/s)       *    3.37  * Avg. Vel. (ft/s)       *    1.01  *    5.93  *    1.00  *
* Max Chl Dpth (ft)      *   40.23  * Hydr. Depth (ft)       *    3.28  *   26.25  *    4.56  *
* Conv. Total (cfs)      *5073270.0  * Conv. (cfs)            *  9448.7  *4290612.0  *773209.7  *
* Length Wtd. (ft)       *  289.13  * Wetted Per. (ft)       *   35.87  *  350.91  * 2115.36  *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)       *    0.03  *    0.25  *    0.04  *
* Alpha                  *    2.63  * Stream Power (lb/ft s) *    0.03  *    1.46  *    0.04  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 1260.95  * 7147.40  * 3251.98  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  295.88  *  272.58  *  672.48  *
**********************************************************************************************

Warning: Multiple water surfaces were found that could balance the energy equation. The program
         selected the water surface whose main channel velocity head was the closest to the previously
         computed cross section.
Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.040  *   0.027  *   0.052  *
* W.S. Elev (ft)         *  763.98  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  744.03  * Flow Area (sq ft)      *  230.81  * 9952.71  *15595.42  *
* E.G. Slope (ft/ft)     *0.000124  * Area (sq ft)           *  230.81  * 9952.71  *15595.42  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  279.89  *56766.54  *18853.57  *
* Top Width (ft)         * 2501.63  * Top Width (ft)         *   45.14  *  342.11  * 2114.38  *
* Vel Total (ft/s)       *    2.94  * Avg. Vel. (ft/s)       *    1.21  *    5.70  *    1.21  *
* Max Chl Dpth (ft)      *   43.07  * Hydr. Depth (ft)       *    5.11  *   29.09  *    7.38  *
* Conv. Total (cfs)      *6811084.0  * Conv. (cfs)            * 25117.0  *5094093.0  *1691874.0  *
* Length Wtd. (ft)       *  280.31  * Wetted Per. (ft)       *   46.04  *  350.91  * 2134.37  *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)       *    0.04  *    0.22  *    0.06  *
* Alpha                  *    2.85  * Stream Power (lb/ft s) *    0.05  *    1.25  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 2155.20  * 7870.56  * 5227.01  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  349.85  *  273.55  *  899.20  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  754.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  753.65  * Reach Len. (ft)        *  329.62  *  302.08  *  213.62  *
* Crit W.S. (ft)         *  738.21  * Flow Area (sq ft)      *          * 6437.26  *          *
```

```
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           *          * 6437.26  *  371.30  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  566.16  * Top Width (ft)         *          *  325.18  *  240.98  *
* Vel Total (ft/s)       *    6.01  * Avg. Vel. (ft/s)       *          *    6.01  *          *
* Max Chl Dpth (ft)      *   32.74  * Hydr. Depth (ft)       *          *   19.80  *          *
* Conv. Total (cfs)      *2547979.0  * Conv. (cfs)             *          *2547979.0  *          *
* Length Wtd. (ft)       *  302.08  * Wetted Per. (ft)       *          *  333.74  *          *
* Min Ch El (ft)         *  720.91  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.67  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  105.39  * 5198.11  *  544.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   47.69  *  261.55  *  149.46  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.887

INPUT
Description: COE Riverstation=26207.40
Preliminary Model Riverstation=14666.76
Station Elevation Data    num=     256
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  778.78   51.72  778.65   56.04  778.67  187.39     778  221.89     768
  234.63  764.13  248.39  760.09  248.72     760  258.75     758  285.03     756
  296.42     754  315.76     748  337.97     740  351.91     738  367.54     736
  380.71     732  393.22     728  409.78     726   431.4  720.82   453.4  720.82
   475.4  720.82  496.99     726   513.4     728  521.37     730  521.66  730.09
  539.49     736  562.53     738  572.46     740  598.84     748  615.47     754
  650.15  754.48  650.69  754.48  764.92  755.82  786.38     756  813.93     756
  840.62  756.84  914.29     758  915.28  758.04  926.36  758.36  936.56  758.54
  949.41  758.84  951.36  758.91  953.23  758.94  955.16  759.01  956.85  759.03
  964.32  759.21  970.93  759.51  972.07  759.54  980.95  760.04  988.73   760.4
  989.34   760.4  992.83  760.56  994.23  760.55  997.79  760.72 1019.37     760
 1085.23     760 1351.91  758.44 1372.78   758.4 1449.66  758.47 1481.87  758.21
 1489.41  758.22 1490.69  758.24 1526.38  758.39 1545.11  758.66 1690.26   758.5
 1737.67     758  1746.5  757.73 1747.53  757.72 1772.35  757.78 1773.13  757.81
  1773.7  757.81  1774.1  757.82 1777.68  757.71 1778.67  757.62 1779.91  757.59
 1781.19  757.47 1783.69  757.36 1785.28  757.21 1788.13  757.05 1790.86   756.8
 1792.98  756.65 1793.52   756.6 1795.92  756.41 1799.24  756.33 1800.33  756.24
 1804.42  756.17 1804.71  756.15 1812.27  756.06 1812.38  756.05  1812.8  756.03
 1823.12     756 1824.03  755.98 1856.43  755.76 1936.61  754.29  1937.7  754.29
 1964.73   753.8 2022.04     754  2041.2  754.73 2043.13  754.83 2048.18  754.96
 2050.61   755.1 2058.69  755.29 2061.45  755.45 2072.84  755.72 2074.43   755.8
 2082.47     756 2126.73     756  2194.2     754  2195.2  753.95 2195.36  753.95
 2201.32  753.66 2202.52  753.62 2206.77  753.42 2221.47  752.85 2222.37   752.8
 2229.13  752.55 2229.75  752.51 2239.92  752.16 2240.47  752.12 2251.38   751.7
 2254.16   751.4 2260.47  751.01 2264.32   750.5 2265.96  750.37 2268.49     750
 2269.88  749.03 2271.61     748 2272.66  747.36 2274.69     746 2276.72     744
 2277.29  743.39 2280.18     740 2282.55     738 2283.65  737.72  2291.1     736
 2296.63     736 2301.32     738 2302.66  739.38 2303.25     740  2304.9     742
  2306.5     744 2306.67  744.21 2308.08     746 2308.41  746.43 2309.64     748
 2310.24  748.78  2311.2     750    2312  751.04 2312.75     752 2317.83     754
 2324.32     756 2395.22     756 2415.31  757.18 2426.01     758 2470.33     758
 2511.29  758.62 2514.25   758.6 2516.29  758.66 2525.05  758.62 2526.94  758.67
 2530.95  758.65 2534.37  758.75 2536.82  758.74 2539.06  758.83 2540.41  758.82
 2543.98  758.99 2544.74  758.99 2550.37  759.27 2552.05  759.28 2559.67  759.72
 2560.45  759.73 2564.39     760 2597.57  761.35 2601.32  761.48 2601.55  761.48
 2603.74  761.56 2615.03  761.16  2626.7     760 2628.13  759.84 2629.12  759.75
 2641.02  758.53 2643.87  758.33  2645.4  758.18 2646.72  758.15 2647.54  758.09
 2647.69  758.09 2647.83  758.08 2651.25  758.41 2653.73  758.81 2655.74  759.06
 2661.45     760 2673.82  761.36 2675.66  761.54 2676.79  761.63 2680.31     762
 2703.48  763.79 2705.82     764 2712.36     766 2717.95     768 2720.09  769.21
  2728.9     774 2729.11  774.12 2747.11  783.95  2750.9     786 2752.95  786.37
 2759.38  787.67 2760.84     788 2769.96     788 2770.83  788.03 2776.38  788.05
 2778.05  788.05 2779.86  788.01 2780.04  787.77 2780.72     786 2781.31  784.48
 2781.48     784  2781.6  784.91 2784.77  784.86 2787.27     782 2802.82     778
 2809.78     776  2817.1  773.15 2822.99  770.99 2825.85     770 2836.05     766
 2836.66  765.78  2841.8   764.1 2842.14     764 2847.44  763.71 2849.42  763.65
 2875.03     762 2927.24     762 2939.71   762.7 2958.42     764 3035.09     764
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 3064.09     766 3075.35  770.31  3079.5  771.84 3079.95     772 3091.73     776
 3093.43  776.55 3097.47     778  3101.8  779.34  3103.7     780  3109.6  781.64
 3110.52     782 3117.26     784 3117.44  784.06 3117.93  784.17 3122.56  785.36
  3125.8     786 3126.51  787.12 3127.04     788 3127.83  789.42 3128.16     790
 3164.36     790

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  187.39     .04  285.03    .027  615.47     .04 1690.26     .05
 2271.61    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        285.03  615.47          359.39  321.58  121.88             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  992.83    2770     761       F
    2770    3090     770       F

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  740.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.52  * Reach Len. (ft)        *  359.39  *  321.58  *  121.88  *
* Crit W.S. (ft)         *  730.64  * Flow Area (sq ft)      *          * 2669.61  *          *
* E.G. Slope (ft/ft)     *0.000310  * Area (sq ft)           *          * 2669.61  *   78.36  *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  261.55  * Top Width (ft)         *          *  237.62  *   23.93  *
* Vel Total (ft/s)       *    4.79  * Avg. Vel. (ft/s)       *          *    4.79  *          *
* Max Chl Dpth (ft)      *   19.70  * Hydr. Depth (ft)       *          *   11.23  *          *
* Conv. Total (cfs)      *727573.9  * Conv. (cfs)            *          *727573.9  *          *
* Length Wtd. (ft)       *  321.58  * Wetted Per. (ft)       *          *  242.24  *          *
* Min Ch El (ft)         *  720.82  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.02  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *          * 2327.61  *    5.27  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  198.07  *    1.68  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  745.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.89  * Reach Len. (ft)        *  359.39  *  321.58  *  121.88  *
* Crit W.S. (ft)         *  733.20  * Flow Area (sq ft)      *          * 3766.11  *          *
* E.G. Slope (ft/ft)     *0.000292  * Area (sq ft)           *          * 3766.11  *  199.00  *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  295.55  * Top Width (ft)         *          *  264.17  *   31.38  *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *          *    5.44  *          *
* Max Chl Dpth (ft)      *   24.07  * Hydr. Depth (ft)       *          *   14.26  *          *
* Conv. Total (cfs)      *1200417.0  * Conv. (cfs)            *          *1200417.0  *          *
* Length Wtd. (ft)       *  321.58  * Wetted Per. (ft)       *          *  270.20  *          *
* Min Ch El (ft)         *  720.82  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.38  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    1.51  * 3212.92  *   21.90  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  223.05  *   11.74  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. Elev (ft)         *  748.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  748.32  * Reach Len. (ft)        *  359.39  *  321.58  *  121.88  *
* Crit W.S. (ft)         *  735.05  * Flow Area (sq ft)      *          * 4708.57  *          *
* E.G. Slope (ft/ft)     *0.000269  * Area (sq ft)           *          * 4708.57  *  318.65  *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  323.80  * Top Width (ft)         *          *  284.99  *   38.81  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *          *    5.76  *          *
* Max Chl Dpth (ft)      *   27.50  * Hydr. Depth (ft)       *          *   16.52  *          *
```

```
* Conv. Total (cfs)      *1653468.0  * Conv. (cfs)            *          *1653468.0  *          *
* Length Wtd. (ft)       *  321.58  * Wetted Per. (ft)        *          *  292.13  *          *
* Min Ch El (ft)         *  720.82  * Shear (lb/sq ft)        *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.56  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *   15.75  * 3976.94  *  103.35  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    9.30  *  241.01  *   47.54  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  752.31  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)         *  751.75  * Reach Len. (ft)         *  359.39  *  321.58  *  121.88  *
* Crit W.S. (ft)         *  737.15  * Flow Area (sq ft)       *          * 5721.04  *          *
* E.G. Slope (ft/ft)     *0.000250  * Area (sq ft)            *          * 5721.04  *  477.00  *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  367.94  * Top Width (ft)          *          *  305.54  *   62.40  *
* Vel Total (ft/s)       *    6.03  * Avg. Vel. (ft/s)        *          *    6.03  *          *
* Max Chl Dpth (ft)      *   30.93  * Hydr. Depth (ft)        *          *   18.72  *          *
* Conv. Total (cfs)      *2180966.0  * Conv. (cfs)            *          *2180966.0  *          *
* Length Wtd. (ft)       *  321.04  * Wetted Per. (ft)        *          *  313.81  *          *
* Min Ch El (ft)         *  720.82  * Shear (lb/sq ft)        *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.72  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   60.76  * 4749.30  *  339.92  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   28.35  *  253.88  *  103.51  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  757.45  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  756.87  * Reach Len. (ft)         *  359.39  *  321.58  *  121.88  *
* Crit W.S. (ft)         *  739.60  * Flow Area (sq ft)       *    4.95  * 7361.05  *  345.21  *
* E.G. Slope (ft/ft)     *0.000206  * Area (sq ft)            *    4.95  * 7361.05  * 2192.78  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *    1.51  *45254.77  *  243.71  *
* Top Width (ft)         * 1188.69  * Top Width (ft)          *   11.41  *  330.44  *  846.84  *
* Vel Total (ft/s)       *    5.90  * Avg. Vel. (ft/s)        *    0.31  *    6.15  *    0.71  *
* Max Chl Dpth (ft)      *   36.05  * Hydr. Depth (ft)        *    0.43  *   22.28  *    1.52  *
* Conv. Total (cfs)      *3166329.0  * Conv. (cfs)            *   105.3  *3149264.0  * 16959.8  *
* Length Wtd. (ft)       *  317.72  * Wetted Per. (ft)        *   11.44  *  339.61  *  226.97  *
* Min Ch El (ft)         *  720.82  * Shear (lb/sq ft)        *    0.01  *    0.28  *    0.02  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.00  *    1.72  *    0.01  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *  314.57  * 5944.85  * 1324.92  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  139.09  *  267.12  *  334.33  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.97  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.33  * Reach Len. (ft)         *  359.39  *  321.58  *  121.88  *
* Crit W.S. (ft)         *  741.11  * Flow Area (sq ft)       *   65.75  * 8175.31  * 1076.62  *
* E.G. Slope (ft/ft)     *0.000201  * Area (sq ft)            *   65.75  * 8175.31  * 5119.77  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *   54.61  *53150.41  * 1194.98  *
* Top Width (ft)         * 2092.78  * Top Width (ft)          *   32.96  *  330.44  * 1729.38  *
* Vel Total (ft/s)       *    5.84  * Avg. Vel. (ft/s)        *    0.83  *    6.50  *    1.11  *
* Max Chl Dpth (ft)      *   38.51  * Hydr. Depth (ft)        *    1.99  *   24.74  *    3.06  *
* Conv. Total (cfs)      *3839213.0  * Conv. (cfs)            *  3854.3  *3751025.0  * 84334.2  *
* Length Wtd. (ft)       *  312.69  * Wetted Per. (ft)        *   33.17  *  339.61  *  351.60  *
* Min Ch El (ft)         *  720.82  * Shear (lb/sq ft)        *    0.02  *    0.30  *    0.04  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.02  *    1.96  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *  815.74  * 6645.81  * 2323.35  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  255.63  *  270.00  *  477.28  *
*****************************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	761.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.040	0.027	0.049
W.S. Elev (ft)	761.04	Reach Len. (ft)	359.39	321.58	121.88
Crit W.S. (ft)	742.42	Flow Area (sq ft)	128.53	8739.78	8398.11
E.G. Slope (ft/ft)	0.000166	Area (sq ft)	128.53	8739.78	8398.11
Q Total (cfs)	63000.00	Flow (cfs)	133.12	53948.57	8918.31
Top Width (ft)	2399.51	Top Width (ft)	39.88	330.44	2029.19
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)	1.04	6.17	1.06
Max Chl Dpth (ft)	40.22	Hydr. Depth (ft)	3.22	26.45	4.14
Conv. Total (cfs)	4895962.0	Conv. (cfs)	10344.9	4192542.0	693074.5
Length Wtd. (ft)	284.86	Wetted Per. (ft)	40.30	339.61	2042.60
Min Ch El (ft)	720.82	Shear (lb/sq ft)	0.03	0.27	0.04
Alpha	2.46	Stream Power (lb/ft s)	0.03	1.64	0.05
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	1260.02	7085.96	3207.87
C & E Loss (ft)	0.04	Cum SA (acres)	295.59	270.25	662.35

Warning: Multiple water surfaces were found that could balance the energy equation. The program selected the water surface whose main channel velocity head was the closest to the previously computed cross section.
Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	764.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.040	0.027	0.048
W.S. Elev (ft)	763.92	Reach Len. (ft)	359.39	321.58	121.88
Crit W.S. (ft)	744.26	Flow Area (sq ft)	257.45	9691.09	14354.46
E.G. Slope (ft/ft)	0.000130	Area (sq ft)	257.45	9691.09	14513.88
Q Total (cfs)	75900.00	Flow (cfs)	323.44	56878.68	18697.87
Top Width (ft)	2583.24	Top Width (ft)	49.68	330.44	2203.11
Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)	1.26	5.87	1.30
Max Chl Dpth (ft)	43.10	Hydr. Depth (ft)	5.18	29.33	6.87
Conv. Total (cfs)	6645936.0	Conv. (cfs)	28321.2	4980396.0	1637218.0
Length Wtd. (ft)	265.23	Wetted Per. (ft)	50.52	339.61	2103.01
Min Ch El (ft)	720.82	Shear (lb/sq ft)	0.04	0.23	0.06
Alpha	2.69	Stream Power (lb/ft s)	0.05	1.36	0.07
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	2153.35	7802.44	5153.18
C & E Loss (ft)	0.03	Cum SA (acres)	349.49	271.22	888.61

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	754.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.027	
W.S. Elev (ft)	753.55	Reach Len. (ft)	359.39	321.58	121.88
Crit W.S. (ft)	738.24	Flow Area (sq ft)		6280.16	
E.G. Slope (ft/ft)	0.000242	Area (sq ft)		6280.16	634.62
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	428.89	Top Width (ft)		316.32	112.57
Vel Total (ft/s)	6.16	Avg. Vel. (ft/s)		6.16	
Max Chl Dpth (ft)	32.73	Hydr. Depth (ft)		19.85	
Conv. Total (cfs)	2487941.0	Conv. (cfs)		2487941.0	
Length Wtd. (ft)	320.17	Wetted Per. (ft)		325.17	
Min Ch El (ft)	720.82	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.80	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	105.39	5154.02	542.23
C & E Loss (ft)	0.01	Cum SA (acres)	47.69	259.33	148.59

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 7.826

INPUT
Description: COE Riverstation=26528.98
Preliminary Model
Riverstation=14345.17

FEMA Section L
Station Elevation Data num= 342

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	776	53.41	776	110.54	774.91	221.99	774	248.74	773.19
253.71	772.99	264.05	772.73	278.32	772	284.66	770.06	284.84	770
285.05	769.94	291.58	768	316.38	760	323.35	758	339.18	756
362.87	754	362.99	753.97	369.78	752	383.15	748	419.17	738
438.09	736.41	438.4	736.39	442.99	736	466.33	728	480.4	726
498.52	720.73	520.52	720.73	542.52	720.73	560.64	726	590.32	728
597.29	730	613.45	736	633.07	738	645.68	740	670.1	748
690.26	749	702.14	749.18	718.62	749.73	741.44	750.09	752.16	750.26
752.32	750.26	765.68	750.6	767.94	750.74	770.72	750.82	796.06	752
820.16	753.37	827.14	754	838.52	755.44	844.05	756	867.12	756.14
879.03	756	879.57	755.92	879.68	755.94	897.07	754	937.06	754.5
1070.06	755.94	1072.45	756	1118.59	756.01	1118.71	756.02	1125.51	756.12
1126.99	756.17	1190.78	757.96	1191.09	757.96	1229.03	758.82	1347.95	759.79
1448.55	759.54	1494.28	759.65	1503.27	759.62	1538.01	760	1633.27	760
1727.76	760.7	1748.32	760.69	1827.34	760	1909.24	760	1928.26	759.38
1931.71	759.35	1995.25	758	2092.02	758	2092.72	757.98	2096.07	757.84
2096.26	757.84	2103.99	757.53	2140.58	757.79	2140.91	757.8	2143.43	757.85
2143.86	757.87	2144.29	757.88	2144.69	757.9	2145.05	757.91	2145.37	757.91
2145.63	757.92	2145.86	757.92	2148.02	757.87	2148.4	757.87	2148.84	757.88
2289.67	756	2299.81	756	2321.97	755.15	2345.81	754	2400.04	752
2403.74	750	2404.41	749.52	2406.68	748	2408.24	746.52	2415.06	740
2417.38	738	2422.97	736	2434.91	736	2443.91	738	2444.85	738.73
2446.52	740	2447.69	741.14	2448.61	742	2450.65	744	2451.11	744.46
2451.91	745.17	2452.9	746	2454.1	746.79	2454.38	746.94	2455.12	747.28
2455.24	747.35	2455.81	747.46	2455.94	747.47	2456.61	747.47	2457.29	747.51
2459.04	747.52	2459.77	747.55	2463	747.54	2463.66	747.58	2467.89	747.52
2468.51	747.58	2468.86	747.63	2469.04	747.67	2473.79	747.54	2474.02	747.57
2474.39	747.58	2474.69	747.57	2475.97	747.47	2480.11	747.26	2481.54	747.14
2484.17	746.96	2490.14	746.44	2490.61	746.39	2493.35	746.15	2493.47	746.13
2496.21	745.85	2496.58	745.82	2499.21	745.49	2500.31	745.39	2502.62	745.08
2504.02	744.93	2507.19	744.48	2509.97	744	2510.29	743.97	2514.28	743.7
2515.11	743.7	2519.12	743.48	2521.35	743.47	2526.02	743.28	2530.31	743.07
2531.62	743.03	2536.21	742.72	2538.2	742.62	2547.2	741.94	2560.21	740.92
2563.1	740.78	2573.78	740	2574.2	740	2577.34	738.91	2579.73	738
2605.45	738	2609.15	740	2611.42	741.3	2612.74	742	2614.23	742.27
2615.06	742.39	2618.34	742.95	2620.82	743.22	2621.55	743.32	2622.19	743.39
2623.73	743.49	2626.36	743.74	2626.8	743.77	2629.13	744	2629.6	744.04
2632.48	744.31	2636.2	744.76	2639.56	745.27	2643.51	746	2643.73	746.03
2647.38	746.47	2653.29	746.94	2664.1	747.38	2665.25	747.39	2666.88	747.45
2669.09	747.46	2670.53	747.5	2674.41	747.5	2675.63	747.53	2680.6	747.53
2682.1	747.56	2689.29	747.53	2690.27	747.51	2694.61	747.48	2701.03	747.33
2702.39	747.26	2704.46	747.22	2709.24	747.4	2710.55	747.53	2711.4	747.45
2713.03	747.68	2713.55	747.62	2715.29	747.95	2715.62	748	2717.42	748.2
2718.87	748.29	2720.06	748.29	2721.29	748.22	2721.65	748.25	2723.02	748.15
2724.91	748.05	2725.01	748.06	2727.36	748.01	2729.88	748.02	2733.74	748.09
2735.43	748.17	2737.15	748.32	2737.78	748.34	2740.08	748.58	2740.84	748.6
2743.01	748.83	2744.1	748.85	2744.76	748.89	2745.31	748.95	2745.79	749.03
2747.44	749.2	2750.64	749.84	2750.88	749.87	2751.42	750	2754.33	750.81
2757.63	751.94	2757.74	751.97	2761.54	753.78	2761.94	754	2765.33	756
2766.7	757.24	2767.49	758	2768.67	759.47	2769.1	760	2779.92	762
2789.02	763.64	2791.28	764	2799.41	766	2807.01	768	2808.41	768.83
2810.53	770	2811.86	770.78	2814.05	772	2817.8	773.94	2821.85	776
2828.32	779.49	2836.35	784	2839.21	785.19	2841.27	786	2858.14	786
2864.65	784	2867.47	782	2867.89	781.71	2870.15	780.11	2870.3	780
2872.86	778.24	2873.23	778	2876.36	776	2879.82	774	2883.52	772
2887.4	770	2891.49	768	2892.28	767.53	2894.94	766	2896.85	764.86
2900.41	762.79	2908.89	758.02	2909.04	757.94	2912.55	756	2914.59	754.67
2915.59	754	2915.95	753.7	2918.28	752	2923.63	752	2927.26	754
2931.12	756	2933.57	756.75	2937.33	758	2955.3	760	2981.79	762
2990.92	762	2992.97	761.64	3012.32	761.61	3027.33	763.95	3027.5	763.97

```
 3027.65     764 3116.94     764 3126.04  764.45 3207.69     766 3232.09     766
 3517.27     770 3638.72  772.21 3640.69   772.2 3739.39     774 3759.08     776
 3769.52     776 3772.04   775.1 3777.16  775.77 3777.45     776 3778.77  776.96
 3780.28     778 3783.02  779.81  3783.3     780 3786.41     782  3789.1  783.43
 3790.11     784  3805.1     784 3809.92  784.17 3810.64  784.17 3825.64  784.52
 3898.47     786 3929.48  786.09 3929.88   786.1 3942.56  786.16 3953.47  786.24
 3961.48  786.34 3974.85  786.81  3986.3  787.55 3997.07   787.9 4002.72  787.99
 4003.36  787.98 4003.66  787.99 4046.52  787.89 4050.28     788  4056.1     788
 4100.77  788.79  4138.9  789.82

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  278.32     .04  362.87    .027   670.1     .04 2400.04    .085
 2779.92     .15  2955.3     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        362.87   670.1           444.31  313.76  137.17              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 1748.32    2851     761       F
    2851    3700     770       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3798    3884     800

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  740.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.41  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  730.75  * Flow Area (sq ft)      *          * 2641.63  *          *
* E.G. Slope (ft/ft)     *0.000319  * Area (sq ft)           *          * 2641.63  *  185.59  *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  310.36  * Top Width (ft)         *          *  236.42  *   73.94  *
* Vel Total (ft/s)       *    4.85  * Avg. Vel. (ft/s)       *          *    4.85  *          *
* Max Chl Dpth (ft)      *   19.68  * Hydr. Depth (ft)       *          *   11.17  *          *
* Conv. Total (cfs)      *716262.3  * Conv. (cfs)             *          *716262.3  *          *
* Length Wtd. (ft)       *  313.76  * Wetted Per. (ft)       *          *  241.56  *          *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.06  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *          * 2308.00  *    4.91  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *  196.32  *    1.54  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  745.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.78  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  733.24  * Flow Area (sq ft)      *          * 3740.30  *          *
* E.G. Slope (ft/ft)     *0.000301  * Area (sq ft)           *          * 3740.30  *  711.56  *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  438.27  * Top Width (ft)         *          *  265.55  *  172.73  *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *          *    5.48  *          *
* Max Chl Dpth (ft)      *   24.05  * Hydr. Depth (ft)       *          *   14.09  *          *
* Conv. Total (cfs)      *1181545.0  * Conv. (cfs)             *          *1181545.0  *          *
* Length Wtd. (ft)       *  313.76  * Wetted Per. (ft)       *          *  271.98  *          *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.42  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.51  * 3185.21  *   20.62  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    2.36  *  221.09  *   11.46  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  748.74  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  748.23  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  735.07  * Flow Area (sq ft)      *          * 4694.06  *    0.52  *
* E.G. Slope (ft/ft)     *0.000275  * Area (sq ft)           *          * 4694.06  * 1480.05  *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27099.93  *    0.08  *
* Top Width (ft)         *  618.14  * Top Width (ft)         *          *  287.71  *  330.43  *
* Vel Total (ft/s)       *    5.77  * Avg. Vel. (ft/s)       *          *    5.77  *    0.14  *
* Max Chl Dpth (ft)      *   27.50  * Hydr. Depth (ft)       *          *   16.32  *    0.11  *
* Conv. Total (cfs)      *1633831.0  * Conv. (cfs)           *          *1633826.0  *     4.5  *
* Length Wtd. (ft)       *  313.51  * Wetted Per. (ft)       *          *  295.13  *    4.59  *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *          *    0.27  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.58  *    0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   15.75  * 3942.24  *  100.84  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    9.30  *  238.89  *   47.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.23  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  751.67  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  737.22  * Flow Area (sq ft)      *          * 5704.98  *  216.76  *
* E.G. Slope (ft/ft)     *0.000243  * Area (sq ft)           *          * 5704.98  * 2888.16  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34312.84  *  187.16  *
* Top Width (ft)         *  774.34  * Top Width (ft)         *          *  299.22  *  475.12  *
* Vel Total (ft/s)       *    5.83  * Avg. Vel. (ft/s)       *          *    6.01  *    0.86  *
* Max Chl Dpth (ft)      *   30.94  * Hydr. Depth (ft)       *          *   19.07  *    1.82  *
* Conv. Total (cfs)      *2214052.0  * Conv. (cfs)           *          *2202041.0  * 12011.3  *
* Length Wtd. (ft)       *  310.03  * Wetted Per. (ft)       *          *  307.15  *  118.98  *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *          *    0.28  *    0.03  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *          *    1.69  *    0.02  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   60.76  * 4707.13  *  335.21  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   28.35  *  251.65  *  102.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.38  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  756.83  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  739.60  * Flow Area (sq ft)      *   46.15  * 7281.04  * 1449.40  *
* E.G. Slope (ft/ft)     *0.000183  * Area (sq ft)           *   46.15  * 7281.04  * 6377.64  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   30.63  *43949.29  * 1520.08  *
* Top Width (ft)         * 1379.71  * Top Width (ft)         *   30.28  *  307.23  * 1042.20  *
* Vel Total (ft/s)       *    5.18  * Avg. Vel. (ft/s)       *    0.66  *    6.04  *    1.05  *
* Max Chl Dpth (ft)      *   36.10  * Hydr. Depth (ft)       *    1.52  *   23.70  *    3.02  *
* Conv. Total (cfs)      *3362751.0  * Conv. (cfs)           *  2263.8  *3248143.0  *112343.8  *
* Length Wtd. (ft)       *  300.17  * Wetted Per. (ft)       *   30.41  *  315.48  *  480.90  *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *    0.02  *    0.26  *    0.03  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.01  *    1.59  *    0.04  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  314.35  * 5890.80  * 1312.93  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  138.92  *  264.77  *  331.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.89  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.32  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  741.12  * Flow Area (sq ft)      *  142.24  * 8046.26  * 2774.95  *
* E.G. Slope (ft/ft)     *0.000174  * Area (sq ft)           *  142.24  * 8046.26  * 9540.54  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  151.03  *50563.57  * 3685.39  *
* Top Width (ft)         * 1850.19  * Top Width (ft)         *   44.13  *  307.23  * 1498.83  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    1.06  *    6.28  *    1.33  *
```

```
* Max Chl Dpth (ft)      *   38.59  * Hydr. Depth (ft)       *    3.22  *   26.19  *    4.47  *
* Conv. Total (cfs)      *4127919.0  * Conv. (cfs)           * 11460.7  *3836808.0  *279650.6  *
* Length Wtd. (ft)       *  293.10  * Wetted Per. (ft)       *   44.53  *  315.48  *  621.04  *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *    0.03  *    0.28  *    0.05  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.04  *    1.74  *    0.06  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  814.88  * 6585.93  * 2302.85  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  255.31  *  267.65  *  472.77  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.              *   0.040  *   0.027  *   0.064  *
* W.S. Elev (ft)         *  761.09  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  742.44  * Flow Area (sq ft)      *  225.28  * 8588.23  *12691.91  *
* E.G. Slope (ft/ft)     *0.000128  * Area (sq ft)           *  225.28  * 8588.23  *12927.78  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  256.67  *48421.26  *14322.07  *
* Top Width (ft)         * 2528.23  * Top Width (ft)         *   49.86  *  307.23  * 2171.14  *
* Vel Total (ft/s)       *    2.93  * Avg. Vel. (ft/s)       *    1.14  *    5.64  *    1.13  *
* Max Chl Dpth (ft)      *   40.36  * Hydr. Depth (ft)       *    4.52  *   27.95  *    6.03  *
* Conv. Total (cfs)      *5564892.0  * Conv. (cfs)           * 22671.8  *4277128.0  *1265092.0  *
* Length Wtd. (ft)       *  268.96  * Wetted Per. (ft)       *   50.52  *  315.48  * 2119.99  *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *    0.04  *    0.22  *    0.05  *
* Alpha                  *    2.88  * Stream Power (lb/ft s) *    0.04  *    1.23  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1258.56  * 7022.00  * 3178.04  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  295.22  *  267.90  *  656.48  *
**********************************************************************************************

Warning: Multiple water surfaces were found that could balance the energy equation. The program
         selected the water surface whose main channel velocity head was the closest to the previously
         computed cross section.
Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.              *   0.040  *   0.027  *   0.056  *
* W.S. Elev (ft)         *  763.96  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  744.28  * Flow Area (sq ft)      *  381.02  * 9469.32  *18750.96  *
* E.G. Slope (ft/ft)     *0.000103  * Area (sq ft)           *  381.02  * 9469.32  *19298.23  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  493.70  *51117.73  *24288.57  *
* Top Width (ft)         * 2615.84  * Top Width (ft)         *   58.75  *  307.23  * 2249.86  *
* Vel Total (ft/s)       *    2.65  * Avg. Vel. (ft/s)       *    1.30  *    5.40  *    1.30  *
* Max Chl Dpth (ft)      *   43.22  * Hydr. Depth (ft)       *    6.49  *   30.82  *    8.84  *
* Conv. Total (cfs)      *7473338.0  * Conv. (cfs)           * 48611.5  *5033202.0  *2391524.0  *
* Length Wtd. (ft)       *  253.37  * Wetted Per. (ft)       *   59.86  *  315.48  * 2136.26  *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *    0.04  *    0.19  *    0.06  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    0.05  *    1.04  *    0.07  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2150.71  * 7731.72  * 5105.88  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  349.05  *  268.87  *  882.38  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  754.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  753.48  * Reach Len. (ft)        *  444.31  *  313.76  *  137.17  *
* Crit W.S. (ft)         *  738.30  * Flow Area (sq ft)      *          * 6252.61  *  463.09  *
* E.G. Slope (ft/ft)     *0.000227  * Area (sq ft)           *          * 6252.61  * 3825.89  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38153.46  *  546.54  *
* Top Width (ft)         *  867.92  * Top Width (ft)         *          *  305.43  *  562.49  *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *          *    6.10  *    1.18  *
* Max Chl Dpth (ft)      *   32.75  * Hydr. Depth (ft)       *          *   20.47  *    3.06  *
* Conv. Total (cfs)      *2566337.0  * Conv. (cfs)           *          *2530094.0  * 36243.3  *
* Length Wtd. (ft)       *  306.82  * Wetted Per. (ft)       *          *  313.61  *  151.44  *
* Min Ch El (ft)         *  720.73  * Shear (lb/sq ft)       *          *    0.28  *    0.04  *
```

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* Alpha                  *    1.11  * Stream Power (lb/ft s) *          *    1.73  *    0.05  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  105.39  * 5107.76  *  535.99  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   47.69  *  257.03  *  147.65  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.766

INPUT
Description: COE Riverstation=26842.74
Preliminary Model Riverstation=14031.42
Station Elevation Data    num=     268
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   800.32     2.85   798.76      7.6      796    14.31      792    18.22      790
   27.33   785.75     30.9      784    31.63   783.74       32   783.64    37.41      782
   38.81    781.7       46      780    53.95      778    55.67   777.49    61.26      776
   71.47      774    95.66      772   155.97   770.02   156.44   770.01    156.7      770
  160.86      770   165.64   769.58   188.66   768.44   194.02   768.17   194.87   768.14
  197.25      768   200.93   767.47   208.09      766   216.14   763.05   225.24      760
  230.66      758   252.28      756    262.9      754   274.15   750.01   302.84   740.02
     303   739.96   308.74      738   322.46      736   347.02      734   356.62      732
  363.98   730.05   364.15      730   371.37      728   379.34      726   395.56      724
   410.5   720.64    432.5   720.64    454.5   720.64   469.36      724   486.36      726
  486.77    726.1   495.17      728   501.41      730   514.49      734   527.96      736
  547.11      738   573.69      746   576.01   746.04   678.32   747.85   736.06      748
  793.87   748.91   859.83   749.55    878.8      750   906.25      750   975.56   751.39
   998.2      752   1000.8      752     1056    752.9  1125.29   753.91  1125.64   753.92
 1125.96   753.92  1226.22   756.23     1258   756.61  1313.76   756.67  1409.21   757.92
 1409.68   757.92  1415.25      758  1492.33      758  1545.64      760   1726.8      760
 1782.88   759.31  1822.04   758.97  1858.96   758.96  1865.63   758.81  1866.46   758.82
 1877.69   758.55  1878.37   758.56  1890.39   758.45  1890.93   758.43  1900.23    758.4
 1900.78   758.39  1912.19   758.35  1912.68   758.34  1957.95      758  1987.19   757.52
 1989.59   757.51  2008.68   757.21  2055.49   757.22  2057.26   757.16  2077.42   757.19
 2077.95   757.26  2083.19   757.25  2083.79   757.18  2224.18      756  2278.04   754.09
 2282.51      754  2287.84      754  2291.32   753.84  2291.57   753.82  2297.36    753.8
 2297.52   753.79  2297.65   753.78  2297.91   753.76  2302.74   753.66  2303.17   753.63
 2304.43   753.57  2304.98   753.53  2310.35   753.17   2322.4      754  2326.69      754
  2326.9   753.92  2327.56   753.63  2327.98   753.62  2328.62   753.54  2330.26   753.12
 2332.45   752.78  2336.73      752  2337.84   751.77  2342.86   750.48  2344.46      750
 2350.37      748  2354.63      746   2355.9   745.32  2358.52      744  2359.66    743.8
 2363.53   743.35  2364.15   743.35  2378.43      742  2380.29      742  2383.84      740
 2387.75    738.9   2388.5   738.72  2388.96   738.62  2392.19      738  2400.13      736
 2418.64      736  2436.62    737.3  2442.32      738  2501.69      738  2508.67      740
 2515.02      742  2515.72   742.23  2521.43      744  2522.16   744.24  2534.26      748
 2541.62      750  2544.05   750.62  2550.12   751.92  2550.55      752  2561.61   753.82
 2561.83   753.85  2567.58   754.74  2568.99   754.97  2569.33   755.01  2570.25   755.15
 2570.69   755.21  2574.84    755.7  2575.37   755.77  2579.21   756.22  2586.57   757.23
 2588.36   757.51  2592.75      758  2595.03   758.14  2595.26   758.15  2621.35   759.62
 2626.52   759.83  2629.99   759.83  2632.33   759.76  2632.85   759.73  2635.16   759.67
 2635.68   759.63  2638.35   759.65  2638.79   759.62  2641.86   759.66  2642.31   759.64
 2643.07   759.57  2646.17   759.51  2647.86   759.28  2650.47   759.04  2655.82   758.35
 2658.07   758.38  2658.59   758.34  2658.96   758.32  2661.65   758.68  2668.36      760
 2669.33   760.42  2673.28      762  2679.06   762.48  2679.23   762.49  2683.06   762.77
 2689.54   763.18  2696.65   763.37  2700.63   763.84   2700.8   763.84   2701.8      764
 2715.34   766.07  2725.93      768  2727.49   769.03  2730.51   770.93   2732.3      772
 2735.26   773.83  2735.55      774  2744.68   779.76  2745.07      780   2745.2   780.09
 2751.44      784  2752.12   784.17  2758.88      786   2769.7      786  2775.36   784.61
 2777.67      784  2795.23   772.37  2801.81      768  2805.17   766.44  2806.08      766
 2811.37   763.56  2827.27      756  2829.41    755.2  2832.99      754  2837.68   752.16
 2838.07      752  2854.61      752   2854.8   752.09  2867.18   757.61  2867.88      758
 2871.67   758.25  2902.17      760  2903.17      760  2938.41      762  2970.69      762
 2984.28      764   3078.4      764   3219.9      766   3224.5      766   3231.8   766.41
 3232.66   766.66  3372.66      768  3474.35      770  3551.49      772  3635.18      772
 3641.21      774  3644.34   774.24  3644.65   774.24  3654.83      774  3679.02      774
 3688.23      780  3689.24   780.64  3697.56      786  3713.77   787.51  3728.69    787.8
 3730.52   787.91  3745.08   788.03   3745.5   788.04  3781.92   788.56  3846.17      790
 3883.19      790   3896.3   790.99  3904.33   790.95
```

```
Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06  188.66     .04  252.28    .027  573.69     .04 2291.57    .075
 2683.06     .15 2871.67     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        252.28  573.69           451.79  466.32  161.76             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  1726.8    2766     761       F
    2766    3650     770       F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  740.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.36  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  730.15  * Flow Area (sq ft)      *          * 2873.51  *          *
* E.G. Slope (ft/ft)     *0.000263  * Area (sq ft)           *          * 2873.51  *  350.97  *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  379.65  * Top Width (ft)         *          *  253.06  *  126.59  *
* Vel Total (ft/s)       *    4.45  * Avg. Vel. (ft/s)        *          *    4.45  *          *
* Max Chl Dpth (ft)      *   19.72  * Hydr. Depth (ft)        *          *   11.36  *          *
* Conv. Total (cfs)      *789947.1  * Conv. (cfs)             *          *789947.1  *          *
* Length Wtd. (ft)       *  466.32  * Wetted Per. (ft)        *          *  257.38  *          *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)        *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.82  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)    *          * 2288.14  *    4.06  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  194.56  *    1.23  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  745.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.75  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  732.73  * Flow Area (sq ft)      *          * 4044.20  *          *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           *          * 4044.20  *  989.37  *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  447.00  * Top Width (ft)         *          *  280.25  *  166.75  *
* Vel Total (ft/s)       *    5.07  * Avg. Vel. (ft/s)        *          *    5.07  *          *
* Max Chl Dpth (ft)      *   24.11  * Hydr. Depth (ft)        *          *   14.43  *          *
* Conv. Total (cfs)      *1301586.0  * Conv. (cfs)            *          *1301586.0  *          *
* Length Wtd. (ft)       *  466.31  * Wetted Per. (ft)        *          *  285.97  *          *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)        *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.11  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)    *    1.51  * 3157.18  *   17.94  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    2.36  *  219.13  *   10.92  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  748.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  748.20  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  734.74  * Flow Area (sq ft)      *          * 5041.53  *  150.76  *
* E.G. Slope (ft/ft)     *0.000221  * Area (sq ft)           *          * 5041.53  * 1747.55  *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27024.63  *   75.37  *
* Top Width (ft)         *  654.70  * Top Width (ft)         *          *  294.34  *  360.35  *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)        *          *    5.36  *    0.50  *
* Max Chl Dpth (ft)      *   27.56  * Hydr. Depth (ft)        *          *   17.13  *    0.86  *
* Conv. Total (cfs)      *1822066.0  * Conv. (cfs)            *          *1816998.0  *  5067.7  *
* Length Wtd. (ft)       *  464.43  * Wetted Per. (ft)        *          *  300.83  *  175.15  *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)        *          *    0.23  *    0.01  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *          *    1.24  *    0.01  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *   15.75  * 3907.17  *   95.76  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    9.30  *  236.80  *   45.94  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  751.68  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  736.74  * Flow Area (sq ft)      *          * 6084.27  * 1216.37  *
* E.G. Slope (ft/ft)     *0.000187  * Area (sq ft)           *          * 6084.27  * 3500.38  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *33229.75  * 1270.25  *
* Top Width (ft)         *  927.91  * Top Width (ft)         *          *  304.26  *  623.65  *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)       *          *    5.46  *    1.04  *
* Max Chl Dpth (ft)      *   31.04  * Hydr. Depth (ft)       *          *   20.00  *    2.95  *
* Conv. Total (cfs)      *2522205.0  * Conv. (cfs)           *          *2429341.0  * 92864.8  *
* Length Wtd. (ft)       *  446.64  * Wetted Per. (ft)       *          *  311.34  *  412.85  *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)       *          *    0.23  *    0.03  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *          *    1.25  *    0.04  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   60.76  * 4664.67  *  325.15  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   28.35  *  249.47  *  101.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  756.91  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  738.87  * Flow Area (sq ft)      *    4.48  * 7721.12  * 4153.64  *
* E.G. Slope (ft/ft)     *0.000132  * Area (sq ft)           *    4.48  * 7721.12  * 8115.96  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    1.13  *39993.80  * 5505.08  *
* Top Width (ft)         * 1598.29  * Top Width (ft)         *    9.84  *  321.41  * 1267.04  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    0.25  *    5.18  *    1.33  *
* Max Chl Dpth (ft)      *   36.27  * Hydr. Depth (ft)       *    0.46  *   24.02  *    5.48  *
* Conv. Total (cfs)      *3962058.0  * Conv. (cfs)           *    98.2  *3482588.0  *479371.9  *
* Length Wtd. (ft)       *  416.34  * Wetted Per. (ft)       *    9.88  *  329.07  *  758.52  *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)       *    0.00  *    0.19  *    0.05  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *    0.00  *    1.00  *    0.06  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  314.10  * 5836.77  * 1290.11  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  138.71  *  262.51  *  328.05  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.42  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  740.29  * Flow Area (sq ft)      *   55.16  * 8529.10  * 6360.76  *
* E.G. Slope (ft/ft)     *0.000121  * Area (sq ft)           *   55.16  * 8529.10  *12143.97  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   37.35  *45180.70  * 9181.96  *
* Top Width (ft)         * 2238.46  * Top Width (ft)         *   25.48  *  321.41  * 1891.57  *
* Vel Total (ft/s)       *    3.64  * Avg. Vel. (ft/s)       *    0.68  *    5.30  *    1.44  *
* Max Chl Dpth (ft)      *   38.78  * Hydr. Depth (ft)       *    2.16  *   26.54  *    6.65  *
* Conv. Total (cfs)      *4949782.0  * Conv. (cfs)           *  3398.1  *4110930.0  *835453.9  *
* Length Wtd. (ft)       *  401.36  * Wetted Per. (ft)       *   25.83  *  329.07  *  956.73  *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)       *    0.02  *    0.20  *    0.05  *
* Alpha                  *    1.79  * Stream Power (lb/ft s) *    0.01  *    1.04  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  813.87  * 6526.24  * 2268.70  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  254.96  *  265.38  *  467.43  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  761.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.040  *   0.027  *   0.051  *
* W.S. Elev (ft)         *  761.13  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  741.55  * Flow Area (sq ft)      *  102.76  * 9077.57  *15320.60  *
* E.G. Slope (ft/ft)     *0.000097  * Area (sq ft)           *  102.76  * 9077.57  *15742.56  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *   83.69  *45022.63  *17893.68  *
* Top Width (ft)         * 2555.85  * Top Width (ft)         *   30.41  *  321.41  * 2204.03  *
* Vel Total (ft/s)       *    2.57  * Avg. Vel. (ft/s)       *    0.81  *    4.96  *    1.17  *
* Max Chl Dpth (ft)      *   40.49  * Hydr. Depth (ft)       *    3.38  *   28.24  *    7.30  *
* Conv. Total (cfs)      *6382065.0  * Conv. (cfs)           *  8477.8  *4560911.0  *1812677.0  *
* Length Wtd. (ft)       *  369.23  * Wetted Per. (ft)       *   31.05  *  329.07  * 2103.58  *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)       *    0.02  *    0.17  *    0.04  *
* Alpha                  *    2.72  * Stream Power (lb/ft s) *    0.02  *    0.83  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1256.89  * 6958.38  * 3132.90  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  294.81  *  265.63  *  649.59  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.040  *   0.027  *   0.048  *
* W.S. Elev (ft)         *  763.99  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  743.32  * Flow Area (sq ft)      *  201.82  * 9996.69  *21352.55  *
* E.G. Slope (ft/ft)     *0.000079  * Area (sq ft)           *  201.82  * 9996.69  *22202.85  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  196.44  *47565.89  *28137.67  *
* Top Width (ft)         * 2661.94  * Top Width (ft)         *   38.71  *  321.41  * 2301.83  *
* Vel Total (ft/s)       *    2.41  * Avg. Vel. (ft/s)       *    0.97  *    4.76  *    1.32  *
* Max Chl Dpth (ft)      *   43.35  * Hydr. Depth (ft)       *    5.21  *   31.10  *   10.03  *
* Conv. Total (cfs)      *8546889.0  * Conv. (cfs)           * 22120.5  *5356263.0  *3168505.0  *
* Length Wtd. (ft)       *  347.37  * Wetted Per. (ft)       *   39.82  *  329.07  * 2134.46  *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)       *    0.02  *    0.15  *    0.05  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    0.02  *    0.71  *    0.06  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 2147.74  * 7661.61  * 5040.54  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  348.55  *  266.60  *  875.22  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  753.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  753.52  * Reach Len. (ft)        *  451.79  *  466.32  *  161.76  *
* Crit W.S. (ft)         *  737.66  * Flow Area (sq ft)      *          * 6647.53  * 2069.99  *
* E.G. Slope (ft/ft)     *0.000169  * Area (sq ft)           *          * 6647.53  * 4791.86  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *36203.19  * 2496.81  *
* Top Width (ft)         * 1099.48  * Top Width (ft)         *          *  309.44  *  790.05  *
* Vel Total (ft/s)       *    4.44  * Avg. Vel. (ft/s)       *          *    5.45  *    1.21  *
* Max Chl Dpth (ft)      *   32.88  * Hydr. Depth (ft)       *          *   21.48  *    3.94  *
* Conv. Total (cfs)      *2974930.0  * Conv. (cfs)           *          *2782996.0  *191933.7  *
* Length Wtd. (ft)       *  435.33  * Wetted Per. (ft)       *          *  316.83  *  524.92  *
* Min Ch El (ft)         *  720.64  * Shear (lb/sq ft)       *          *    0.22  *    0.04  *
* Alpha                  *    1.41  * Stream Power (lb/ft s) *          *    1.21  *    0.05  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  105.39  * 5061.30  *  522.42  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   47.69  *  254.82  *  145.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.678

INPUT
Description: COE Riverstation=27309.06
```

Preliminary Model Riverstation=13565.10
Station Elevation Data num= 310

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	802.07	.72	802	4.87	800.04	5.04	799.97	9.25	798
14.02	797.08	19.51	796.58	21.74	796.28	24.47	796	27.17	796
27.6	795.97	27.74	795.97	31.02	795.86	31.29	795.86	36.15	795.69
70.52	794	71.5	794	102.6	792	102.83	792	103.22	791.76
105.95	790	108.83	788	110.15	787.03	111.6	786	114.23	784
115.69	783.48	119.07	782	119.81	781.96	120.48	781.91	151.07	780
189.46	778	190.45	778	242.22	776	251.55	776	298.04	774
308.26	772	311.58	769.51	313.7	768	314.05	767.76	316.57	766.12
316.8	766	318.62	765.29	319.48	765.03	320.69	764.79	321.29	764.64
321.76	764.51	323.25	764.26	324.49	764	324.93	763.89	325.06	763.87
326.32	763.53	326.73	763.47	327.12	763.39	328.86	762.91	330.45	762.44
330.86	762.33	331.83	762	333.2	761.58	333.72	761.44	335.88	760.74
337.91	760	338.76	759.31	340.44	758	342.44	757.22	348.5	756
348.88	756	365.59	755.78	366.59	755.78	376.81	755.65	501	756
599.5	756	620.01	756.23	649.78	756	731.11	754.01	731.26	754.01
731.66	754	745.98	754	757.81	753.57	806.66	752.58	816.98	752
830.18	748	853.7	740	859.87	738	867.23	736	890.63	734
891.34	733.77	897.29	732	907.97	728	913.71	726	926.67	724
943.6	720.51	965.6	720.51	987.6	720.51	1004.52	724	1009.19	725.63
1010.75	726	1013.91	726.17	1040.26	728	1048.02	730	1067.44	736
1092.74	738	1102	740	1113.03	744	1152.83	746	1230.42	747.28
1479.77	747.29	1532.85	747.73	1663.8	748.45	1721.58	749.51	1736.99	749.92
1737.54	749.92	1740.18	750	1767.07	751.45	1827.84	753.33	1862.73	754.84
1869.15	755.06	1891.34	755.45	1893.43	755.46	1922.67	756.02	1922.8	756.03
1929.47	756.13	1929.91	756.13	1939.93	756.3	1940.87	756.33	2008.79	757.1
2011.56	757.08	2019.4	757.15	2021.78	757.11	2075.97	757.11	2078.4	757.07
2080.77	757.1	2085.09	757.03	2087.65	757.08	2093.86	756.97	2096.49	757.03
2102.94	756.93	2105.56	757	2110.9	756.92	2113.85	757	2117.43	756.95
2139.91	757.26	2160.6	757.18	2255.56	756	2384.8	756	2471.11	755.17
2506.05	755.27	2511.2	755.21	2514.26	755.24	2550.44	754.77	2550.78	754.77
2577.64	754	2589.99	754	2590.43	753.92	2598.37	752	2599.24	751.49
2605.02	748	2608.11	746.95	2609.92	746.37	2610.26	746.28	2610.52	746.22
2610.71	746.18	2611.69	746	2619.04	746	2620.15	745.7	2623.15	745.77
2623.52	745.73	2626.73	745.81	2627.8	745.86	2628.12	745.85	2628.88	745.91
2629.84	745.96	2631.27	745.99	2632.91	745.99	2634.32	745.95	2635.4	745.83
2635.61	745.78	2635.92	745.64	2636.68	745.42	2637.85	744.7	2638.92	744
2641.55	742.05	2643.74	740.3	2644.17	740	2646.61	738	2648.34	736.55
2651.53	734	2663.85	734	2666.21	735.56	2666.91	736	2669.85	738
2671.18	740	2702.29	740	2722.48	741.03	2723.06	740.96	2723.79	740.89
2724.95	740.93	2727.39	740.68	2728.14	740.69	2732.31	740.2	2732.53	740.2
2734.01	740	2734.37	739.75	2735.3	739.14	2737.21	738.15	2737.31	738.09
2737.52	738	2740.08	737.51	2740.55	737.44	2742.41	737.13	2743.49	737
2744.56	736.84	2745.08	736.77	2746.98	736.57	2747.34	736.52	2747.79	736.47
2750.4	736.22	2750.71	736.18	2752.62	736	2775.62	736	2776.33	736.1
2783.46	737.35	2784.64	737.58	2787.02	738	2790.64	740	2791.28	740.44
2793.23	741.74	2793.66	742	2795.12	742.93	2796.67	743.82	2796.82	743.91
2797.02	744	2798.64	744.83	2800.63	745.71	2801.32	746	2802.7	746.54
2804.12	747.14	2806.3	748	2807.52	748.45	2808.96	749.2	2809.75	749.57
2810	749.71	2810.41	750	2811.61	750.78	2815.79	753.8	2816.06	754
2818	755.41	2818.79	756	2821.85	757.24	2824.11	758	2827.03	758.23
2840.93	759.45	2844.94	760	2863.11	762	2864.41	762.08	2864.97	762.09
2903.95	764	2958.99	764	2960.52	764	2966.88	764.68	2993.75	768
3008.1	772	3012.29	773.74	3012.95	774	3018.81	777.66	3019.37	778
3029.01	784	3050.64	784	3054.51	782	3057.66	780.07	3057.77	780
3065.13	775.52	3074.5	770	3074.8	769.83	3077.94	768	3092.55	760
3100.03	756	3106.7	754.02	3113.6	752	3135.28	752	3138.17	753.58
3139.07	754	3141.64	755.36	3143.04	756	3145.51	756.95	3148.05	758
3183.53	760	3184.02	760	3227.25	762	3279.57	762	3299.22	764
3384.98	764	3429.99	764.35	3557.68	765.91	3558.4	765.91	3690.78	768
3805.16	770.4	3884.66	771.84	3912.63	772	3914.36	772.73	3917.7	774
3938.08	776	3957.95	776	3962.4	778.42	3965.2	780	3968.6	782
3970.24	783.03	3971.72	784	3974.69	786	3980.88	790	3987.58	790.56

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	816.98	.027	1113.03	.04	2590.43	.1	2821.85	.065
2958.99	.15	3148.05	.05						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
816.98	1113.03	109.87	772.82	151.25	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
0	133	775.8	F
133	650	757.4	F
2085	3043	760.5	F
3043	3950	770	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	740.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.027	
W.S. Elev (ft)	740.23	Reach Len. (ft)	109.87	772.82	151.25
Crit W.S. (ft)	730.04	Flow Area (sq ft)		2867.39	
E.G. Slope (ft/ft)	0.000260	Area (sq ft)		2867.39	330.16
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	371.54	Top Width (ft)		249.62	121.92
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)		4.46	
Max Chl Dpth (ft)	19.72	Hydr. Depth (ft)		11.49	
Conv. Total (cfs)	793231.8	Conv. (cfs)		793231.8	
Length Wtd. (ft)	772.82	Wetted Per. (ft)		254.43	
Min Ch El (ft)	720.51	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.82	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		2257.41	2.80
C & E Loss (ft)	0.00	Cum SA (acres)		191.87	0.77

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	745.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	744.62	Reach Len. (ft)	109.87	772.82	151.25
Crit W.S. (ft)	732.53	Flow Area (sq ft)		4018.36	3.88
E.G. Slope (ft/ft)	0.000245	Area (sq ft)		4018.36	997.36
Q Total (cfs)	20500.00	Flow (cfs)		20498.96	1.04
Top Width (ft)	445.62	Top Width (ft)		272.93	172.70
Vel Total (ft/s)	5.10	Avg. Vel. (ft/s)		5.10	0.27
Max Chl Dpth (ft)	24.11	Hydr. Depth (ft)		14.72	0.31
Conv. Total (cfs)	1308792.0	Conv. (cfs)		1308725.0	66.2
Length Wtd. (ft)	772.80	Wetted Per. (ft)		279.12	12.44
Min Ch El (ft)	720.51	Shear (lb/sq ft)		0.22	0.00
Alpha	1.00	Stream Power (lb/ft s)		1.12	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	1.51	3114.02	14.25
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	216.17	10.29

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	748.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	748.10	Reach Len. (ft)	109.87	772.82	151.25
Crit W.S. (ft)	734.35	Flow Area (sq ft)		4984.11	482.60
E.G. Slope (ft/ft)	0.000216	Area (sq ft)		4984.11	2113.98
Q Total (cfs)	27100.00	Flow (cfs)		26838.16	261.84
Top Width (ft)	971.60	Top Width (ft)		283.17	688.43
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		5.38	0.54
Max Chl Dpth (ft)	27.59	Hydr. Depth (ft)		17.60	0.99
Conv. Total (cfs)	1844807.0	Conv. (cfs)		1826983.0	17824.5
Length Wtd. (ft)	769.82	Wetted Per. (ft)		289.94	486.78
Min Ch El (ft)	720.51	Shear (lb/sq ft)		0.23	0.01
Alpha	1.17	Stream Power (lb/ft s)		1.25	0.01
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	15.75	3853.51	88.59
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	233.71	43.99

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

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*****************************************************************************************
* E.G. Elev (ft)          *  752.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.38  * Wt. n-Val.              *          *   0.027  *   0.040  *
* W.S. Elev (ft)          *  751.65  * Reach Len. (ft)        *  109.87  *  772.82  *  151.25  *
* Crit W.S. (ft)          *  736.36  * Flow Area (sq ft)      *          * 6010.61  * 2642.34  *
* E.G. Slope (ft/ft)      *0.000166  * Area (sq ft)           *          * 6010.61  * 5012.88  *
* Q Total (cfs)           *34500.00  * Flow (cfs)              *          *31310.87  * 3189.13  *
* Top Width (ft)          * 1169.22  * Top Width (ft)         *          *  294.89  *  874.33  *
* Vel Total (ft/s)        *    3.99  * Avg. Vel. (ft/s)       *          *    5.21  *    1.21  *
* Max Chl Dpth (ft)       *   31.14  * Hydr. Depth (ft)       *          *   20.38  *    4.00  *
* Conv. Total (cfs)       *2675674.0  * Conv. (cfs)            *          *2428338.0  *247335.7  *
* Length Wtd. (ft)        *  743.88  * Wetted Per. (ft)       *          *  302.19  *  660.61  *
* Min Ch El (ft)          *  720.51  * Shear (lb/sq ft)       *          *    0.21  *    0.04  *
* Alpha                   *    1.56  * Stream Power (lb/ft s) *          *    1.08  *    0.05  *
* Frctn Loss (ft)         *    0.14  * Cum Volume (acre-ft)   *   60.76  * 4599.93  *  309.34  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   28.35  *  246.27  *   98.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  757.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.              *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)          *  756.92  * Reach Len. (ft)        *  109.87  *  772.82  *  151.25  *
* Crit W.S. (ft)          *  738.65  * Flow Area (sq ft)      *  472.40  * 7572.10  * 6583.22  *
* E.G. Slope (ft/ft)      *0.000101  * Area (sq ft)           *  774.16  * 7572.10  *10825.42  *
* Q Total (cfs)           *45500.00  * Flow (cfs)              *  235.65  *35845.91  * 9418.43  *
* Top Width (ft)          * 2336.91  * Top Width (ft)         *  473.07  *  296.05  * 1567.79  *
* Vel Total (ft/s)        *    3.11  * Avg. Vel. (ft/s)       *    0.50  *    4.73  *    1.43  *
* Max Chl Dpth (ft)       *   36.41  * Hydr. Depth (ft)       *    2.83  *   25.58  *    7.48  *
* Conv. Total (cfs)       *4517387.0  * Conv. (cfs)            * 23396.2  *3558898.0  *935092.3  *
* Length Wtd. (ft)        *  701.63  * Wetted Per. (ft)       *  167.04  *  303.40  *  880.48  *
* Min Ch El (ft)          *  720.51  * Shear (lb/sq ft)       *    0.02  *    0.16  *    0.05  *
* Alpha                   *    1.87  * Stream Power (lb/ft s) *    0.01  *    0.75  *    0.07  *
* Frctn Loss (ft)         *    0.09  * Cum Volume (acre-ft)   *  310.06  * 5754.91  * 1254.94  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  136.21  *  259.20  *  322.79  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  759.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.26  * Wt. n-Val.              *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)          *  759.46  * Reach Len. (ft)        *  109.87  *  772.82  *  151.25  *
* Crit W.S. (ft)          *  740.12  * Flow Area (sq ft)      * 1981.69  * 8322.41  * 9031.37  *
* E.G. Slope (ft/ft)      *0.000089  * Area (sq ft)           * 1981.69  * 8322.41  *15292.28  *
* Q Total (cfs)           *54400.00  * Flow (cfs)              * 1191.03  *39242.62  *13966.35  *
* Top Width (ft)          * 2582.79  * Top Width (ft)         *  478.40  *  296.05  * 1808.33  *
* Vel Total (ft/s)        *    2.81  * Avg. Vel. (ft/s)       *    0.60  *    4.72  *    1.55  *
* Max Chl Dpth (ft)       *   38.95  * Hydr. Depth (ft)       *    4.14  *   28.11  *    9.29  *
* Conv. Total (cfs)       *5774906.0  * Conv. (cfs)            *126435.5  *4165853.0  *1482617.0  *
* Length Wtd. (ft)        *  657.69  * Wetted Per. (ft)       *  479.24  *  303.40  *  972.17  *
* Min Ch El (ft)          *  720.51  * Shear (lb/sq ft)       *    0.02  *    0.15  *    0.05  *
* Alpha                   *    2.10  * Stream Power (lb/ft s) *    0.01  *    0.72  *    0.08  *
* Frctn Loss (ft)         *    0.07  * Cum Volume (acre-ft)   *  803.31  * 6436.04  * 2217.76  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  252.34  *  262.08  *  460.56  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  761.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.20  * Wt. n-Val.              *   0.060  *   0.027  *   0.051  *
* W.S. Elev (ft)          *  761.16  * Reach Len. (ft)        *  109.87  *  772.82  *  151.25  *
* Crit W.S. (ft)          *  741.41  * Flow Area (sq ft)      * 2797.66  * 8825.61  *17920.75  *
* E.G. Slope (ft/ft)      *0.000072  * Area (sq ft)           * 2797.66  * 8825.61  *18409.12  *
* Q Total (cfs)           *63000.00  * Flow (cfs)              * 1891.87  *38927.17  *22180.96  *
```

```
* Top Width (ft)          * 2639.51  * Top Width (ft)          *  482.39  *  296.05  * 1861.06  *
* Vel Total (ft/s)        *    2.13  * Avg. Vel. (ft/s)        *    0.68  *    4.41  *    1.24  *
* Max Chl Dpth (ft)       *   40.65  * Hydr. Depth (ft)        *    5.80  *   29.81  *   10.28  *
* Conv. Total (cfs)       *7435056.0  * Conv. (cfs)            *223272.5  *4594059.0  *2617725.0  *
* Length Wtd. (ft)        *  590.29  * Wetted Per. (ft)        *  483.62  *  303.40  * 1757.01  *
* Min Ch El (ft)          *  720.51  * Shear (lb/sq ft)        *    0.03  *    0.13  *    0.05  *
* Alpha                   *    2.77  * Stream Power (lb/ft s) *    0.02  *    0.58  *    0.06  *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)   * 1241.85  * 6862.55  * 3069.48  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  292.15  *  262.33  *  642.04  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  764.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.17  * Wt. n-Val.              *   0.060  *   0.027  *   0.049  *
* W.S. Elev (ft)          *  764.01  * Reach Len. (ft)        *  109.87  *  772.82  *  151.25  *
* Crit W.S. (ft)          *  743.18  * Flow Area (sq ft)      * 4186.42  * 9669.55  *22948.13  *
* E.G. Slope (ft/ft)      *0.000060  * Area (sq ft)           * 4186.42  * 9669.55  *23952.03  *
* Q Total (cfs)           *75900.00  * Flow (cfs)             * 3348.19  *41569.11  *30982.71  *
* Top Width (ft)          * 2937.10  * Top Width (ft)         *  492.53  *  296.05  * 2148.51  *
* Vel Total (ft/s)        *    2.06  * Avg. Vel. (ft/s)        *    0.80  *    4.30  *    1.35  *
* Max Chl Dpth (ft)       *   43.50  * Hydr. Depth (ft)        *    8.50  *   32.66  *   12.42  *
* Conv. Total (cfs)       *9767193.0  * Conv. (cfs)            *430861.2  *5349322.0  *3987011.0  *
* Length Wtd. (ft)        *  541.17  * Wetted Per. (ft)        *  494.16  *  303.40  * 1862.25  *
* Min Ch El (ft)          *  720.51  * Shear (lb/sq ft)        *    0.03  *    0.12  *    0.05  *
* Alpha                   *    2.56  * Stream Power (lb/ft s) *    0.03  *    0.52  *    0.06  *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)   * 2124.99  * 7556.34  * 4954.84  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  345.79  *  263.30  *  866.95  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  753.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.              *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)          *  753.51  * Reach Len. (ft)        *  109.87  *  772.82  *  151.25  *
* Crit W.S. (ft)          *  737.34  * Flow Area (sq ft)      *   34.02  * 6561.73  * 3928.22  *
* E.G. Slope (ft/ft)      *0.000141  * Area (sq ft)           *   34.02  * 6561.73  * 6743.89  *
* Q Total (cfs)           *38700.00  * Flow (cfs)             *    7.15  *33314.04  * 5378.81  *
* Top Width (ft)          * 1324.22  * Top Width (ft)         *   56.29  *  296.05  *  971.89  *
* Vel Total (ft/s)        *    3.68  * Avg. Vel. (ft/s)        *    0.21  *    5.08  *    1.37  *
* Max Chl Dpth (ft)       *   33.00  * Hydr. Depth (ft)        *    0.60  *   22.16  *    5.46  *
* Conv. Total (cfs)       *3256385.0  * Conv. (cfs)            *   602.0  *2803187.0  *452596.3  *
* Length Wtd. (ft)        *  728.50  * Wetted Per. (ft)        *   56.31  *  303.40  *  719.16  *
* Min Ch El (ft)          *  720.51  * Shear (lb/sq ft)        *    0.01  *    0.19  *    0.05  *
* Alpha                   *    1.66  * Stream Power (lb/ft s) *    0.00  *    0.97  *    0.07  *
* Frctn Loss (ft)         *    0.13  * Cum Volume (acre-ft)   *  105.21  * 4990.59  *  501.00  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *   47.40  *  251.58  *  142.25  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.532

INPUT
Description: COE Riverstation=28081.88
Preliminary Model
             Riverstation=12792.28

This section has been modified between
             984 and 1660 to match the COE '03 As-Builts of the I-70 Fill Area
             and Fill Area 6.
Station Elevation Data    num=     253
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	804.02	.22	804	.38	803.95	6.32	802	10.31	800
31.6	798	31.95	797.8	35.24	796	35.46	795.87	38.83	794
42.21	792.2	42.65	792	46.71	790.43	47.87	790	52.46	788.5
53.91	788	57.59	786.82	65.8	784	68	783.31	71.78	782
73.25	781.78	84.06	780	86.33	780	88.81	779.44	90.74	779.1
91.11	778.99	94.25	778.52	96.17	778	97.92	778	99.14	777.81
99.58	777.73	101.86	777.38	103.02	776.95	104.8	776	105.07	775.74
106.79	774	116.39	772	130.59	770	149.11	768	211.54	762
214.49	761.64	214.98	761.64	219.7	761.3	232.8	760.06	233.16	760.03
233.48	760	233.96	760	234.99	759.87	238.03	759.61	239.72	759.58
244.67	759.23	247.55	759.13	254.29	758.73	261.2	758.61	262.21	758.61
271.24	758	276.17	758	347.07	754	389.61	754	390.98	753.97
392.77	754	421.2	754	424.05	754.08	432.39	754.09	433.76	754.07
442.69	754.09	443.12	754.08	493.67	754.21	494.97	754.23	527.18	754.32
529.05	754.35	553.51	754.4	555.47	754.43	591.09	754.36	593.15	754.41
672.14	754	678.84	753.79	679.45	753.78	684.88	753.59	701.07	753.33
719.19	753.71	724.44	754	739	756.5	1383	756.5	1641	756
1660.87	754	1679.38	748	1692.55	744.09	1692.87	744	1706.49	740
1713.96	738	1739.35	736	1754.93	730	1761.2	728	1775.89	726
1787.31	724.02	1787.45	724	1801.3	720.29	1823.3	720.29	1845.3	720.29
1859.15	724	1863.32	726	1894.21	728	1901.13	730	1907.19	731.94
1907.37	732	1907.57	732.06	1913.65	734	1928.09	736	1947.34	738
1958.95	742.08	1970.97	746	1982.36	749.6	1982.53	749.61	1987.11	750
1996.56	750.1	1997.66	750.13	2003.27	750.18	2004.26	750.22	2011.9	750.31
2013.49	750.4	2018.46	750.49	2021.42	750.68	2027.58	750.84	2033.84	751.32
2038.76	751.5	2043.07	752	2059.17	752.47	2077.12	752.94	2081.73	753.16
2086.33	753.24	2091.41	753.48	2094.43	753.55	2103.54	754	2107.03	754.06
2107.57	754.08	2229.44	756	2268.93	756	2336.04	756.78	2394.36	756
2394.52	756	2523.57	754	2524.66	754	2562.65	752	2596.75	750
2598.75	749.75	2599.75	749.56	2603.31	749.04	2606.31	748.41	2607.12	748.27
2608.3	748	2615.19	747	2621.08	746	2640.72	744	2666.82	742
2669.67	742	2687.15	740	2687.96	739.23	2689.3	738	2690.22	736.92
2690.93	736	2691.58	735.05	2692.19	734	2702.67	734	2703.11	734.4
2704.8	736	2707.11	738	2709.54	740	2712.82	741.79	2713.26	742
2722.24	747.4	2723.26	748	2726.57	749.6	2727.43	750	2730.74	751.6
2731.61	752	2734.9	753.59	2735.8	754	2739.45	755.59	2740.43	756
2744.65	756.7	2750.19	757.75	2751.13	757.91	2751.56	758	2765.96	759.06
2782.17	760	2783.25	760	2785.21	760.12	2880.65	764	2960.16	768
2979.58	770	2989.35	772	2995.21	773.94	2995.4	774	3008.77	782
3009.57	782.47	3011.83	783.83	3012.13	784	3033.61	784	3038.1	782
3056.65	770.15	3056.89	770	3060.01	768	3068.78	764	3077.51	760.02
3086.02	756.01	3099.85	752	3124.14	754	3127.83	756	3129.06	756.86
3130.51	758	3138.43	758.38	3172.68	760	3235.8	762	3299.92	762
3322.61	764	3406.27	764	3517.35	764.84	3620.11	766	3741.39	768
3789.27	770	3856.65	770	3875.69	770.23	3887.09	770.71	3889.31	770.67
3899.53	771.59	3899.78	771.59	3900.15	771.6	3904.11	772	3908.3	773.67
3909.17	774	3934.85	776	3937.5	776	3942.62	774.07	3942.8	774
3945.76	774	3954.35	776	3956.28	776.7	3960.61	778	3962.02	778.61
3964.97	780	3966.42	780.73	3974.71	785.43	3982.58	790	3986.26	792
3991.38	793.53	3992.71	794	4017.86	794	4031.75	794.28	4093.89	794.63
4139.31	796	4151.82	800	4151.84	800				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1660.87	.027	1987.11	.04	2524.66	.1	2751.13	.065
2960.16	.15	3138.43	.05						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1660.87	1987.11	95.24	361.45	259.38	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
0	349	775.8	F
349	1474	757.2	F
2282	3024	760.5	F
3024	3990	770	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
408.71	516.83	780	1474	1586	754

CROSS SECTION OUTPUT Profile #2-yr

* E.G. Elev (ft)	* 740.33	* Element	* Left OB	* Channel	* Right OB *

```
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  739.99  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  730.24  * Flow Area (sq ft)      *          * 2762.16  *          *
* E.G. Slope (ft/ft)     *0.000291  * Area (sq ft)           *          * 2762.16  *   96.01  *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  268.87  * Top Width (ft)         *          *  246.49  *   22.37  *
* Vel Total (ft/s)       *    4.63  * Avg. Vel. (ft/s)       *          *    4.63  *          *
* Max Chl Dpth (ft)      *   19.70  * Hydr. Depth (ft)       *          *   11.21  *          *
* Conv. Total (cfs)      *750977.1  * Conv. (cfs)            *          *750977.1  *          *
* Length Wtd. (ft)       *  361.45  * Wetted Per. (ft)       *          *  251.55  *          *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.92  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *          * 2207.47  *    2.06  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  187.47  *    0.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.40  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  732.66  * Flow Area (sq ft)      *          * 3909.85  *          *
* E.G. Slope (ft/ft)     *0.000271  * Area (sq ft)           *          * 3909.85  *  315.69  *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  355.02  * Top Width (ft)         *          *  274.56  *   80.46  *
* Vel Total (ft/s)       *    5.24  * Avg. Vel. (ft/s)       *          *    5.24  *          *
* Max Chl Dpth (ft)      *   24.11  * Hydr. Depth (ft)       *          *   14.24  *          *
* Conv. Total (cfs)      *1244852.0  * Conv. (cfs)            *          *1244852.0  *          *
* Length Wtd. (ft)       *  361.45  * Wetted Per. (ft)       *          *  280.98  *          *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.24  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    1.51  * 3043.69  *   11.98  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  211.31  *    9.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  747.89  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  734.47  * Flow Area (sq ft)      *          * 4907.22  *          *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           *          * 4907.22  *  659.73  *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  411.21  * Top Width (ft)         *          *  297.20  *  114.01  *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)       *          *    5.52  *          *
* Max Chl Dpth (ft)      *   27.60  * Hydr. Depth (ft)       *          *   16.51  *          *
* Conv. Total (cfs)      *1722427.0  * Conv. (cfs)            *          *1722427.0  *          *
* Length Wtd. (ft)       *  361.45  * Wetted Per. (ft)       *          *  304.67  *          *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.37  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   15.75  * 3765.77  *   83.77  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  228.56  *   42.59  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  751.36  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  736.40  * Flow Area (sq ft)      *          * 5979.24  *   43.99  *
* E.G. Slope (ft/ft)     *0.000227  * Area (sq ft)           *          * 5979.24  * 1156.46  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34476.72  *   23.28  *
* Top Width (ft)         *  522.65  * Top Width (ft)         *          *  318.10  *  204.56  *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)       *          *    5.77  *    0.53  *
```

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* Max Chl Dpth (ft)      *   31.07  * Hydr. Depth (ft)       *          *   18.80  *    0.92  *
* Conv. Total (cfs)      *2288248.0  * Conv. (cfs)            *          *2286704.0  *  1544.0  *
* Length Wtd. (ft)       *  361.42  * Wetted Per. (ft)       *          *  326.40  *   47.89  *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *          *    0.26  *    0.01  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *    1.50  *    0.01  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   60.76  * 4493.57  *  298.63  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   28.35  *  240.83  *   96.37  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.              *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  756.57  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  738.87  * Flow Area (sq ft)      *   99.28  * 7667.71  *  780.95  *
* E.G. Slope (ft/ft)     *0.000173  * Area (sq ft)           *  904.00  * 7667.71  * 3281.88  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   21.21  *44748.59  *  730.21  *
* Top Width (ft)         * 2344.19  * Top Width (ft)         * 1251.23  *  326.24  *  766.73  *
* Vel Total (ft/s)       *    5.32  * Avg. Vel. (ft/s)       *    0.21  *    5.84  *    0.94  *
* Max Chl Dpth (ft)      *   36.28  * Hydr. Depth (ft)       *    0.53  *   23.50  *    2.65  *
* Conv. Total (cfs)      *3459250.0  * Conv. (cfs)            *  1612.3  *3402122.0  * 55515.9  *
* Length Wtd. (ft)       *  360.27  * Wetted Per. (ft)       *  186.97  *  334.96  *  295.01  *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *    0.01  *    0.25  *    0.03  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.00  *    1.44  *    0.03  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  307.94  * 5619.73  * 1230.45  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  134.03  *  253.68  *  318.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.              *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.14  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  740.31  * Flow Area (sq ft)      * 3929.18  * 8504.80  * 1537.60  *
* E.G. Slope (ft/ft)     *0.000151  * Area (sq ft)           * 4179.62  * 8504.80  * 5379.49  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2631.53  *49659.65  * 2108.82  *
* Top Width (ft)         * 2486.76  * Top Width (ft)         * 1305.36  *  326.24  *  855.17  *
* Vel Total (ft/s)       *    3.89  * Avg. Vel. (ft/s)       *    0.67  *    5.84  *    1.37  *
* Max Chl Dpth (ft)      *   38.85  * Hydr. Depth (ft)       *    3.26  *   26.07  *    5.21  *
* Conv. Total (cfs)      *4429371.0  * Conv. (cfs)            *214264.9  *4043401.0  *171704.8  *
* Length Wtd. (ft)       *  346.95  * Wetted Per. (ft)       * 1214.07  *  334.96  *  295.01  *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *    0.03  *    0.24  *    0.05  *
* Alpha                  *    2.06  * Stream Power (lb/ft s) *    0.02  *    1.40  *    0.07  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  795.54  * 6286.77  * 2181.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  250.09  *  256.56  *  455.94  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.              *   0.060  *   0.027  *   0.063  *
* W.S. Elev (ft)         *  760.89  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  741.59  * Flow Area (sq ft)      * 6041.69  * 9077.33  * 6513.29  *
* E.G. Slope (ft/ft)     *0.000126  * Area (sq ft)           * 6493.77  * 9077.33  * 6949.85  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4888.53  *50522.79  * 7588.68  *
* Top Width (ft)         * 2597.19  * Top Width (ft)         * 1328.72  *  326.24  *  942.23  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    0.81  *    5.57  *    1.17  *
* Max Chl Dpth (ft)      *   40.60  * Hydr. Depth (ft)       *    5.02  *   27.82  *    7.97  *
* Conv. Total (cfs)      *5620266.0  * Conv. (cfs)            *436108.8  *4507167.0  *676990.0  *
* Length Wtd. (ft)       *  330.95  * Wetted Per. (ft)       * 1217.58  *  334.96  *  827.24  *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *    0.04  *    0.21  *    0.06  *
* Alpha                  *    2.95  * Stream Power (lb/ft s) *    0.03  *    1.18  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1230.13  * 6703.74  * 3025.46  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  289.87  *  256.81  *  637.17  *
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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  764.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.060  *   0.027  *   0.059  *
* W.S. Elev (ft)         *  763.78  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  743.37  * Flow Area (sq ft)      * 9524.07  *10021.13  * 8979.90  *
* E.G. Slope (ft/ft)     *0.000105  * Area (sq ft)           *10383.63  *10021.13  *10002.04  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 9504.43  *54511.82  *11883.75  *
* Top Width (ft)         * 2825.11  * Top Width (ft)         * 1359.77  *  326.24  * 1139.11  *
* Vel Total (ft/s)       *    2.66  * Avg. Vel. (ft/s)       *    1.00  *    5.44  *    1.32  *
* Max Chl Dpth (ft)      *   43.49  * Hydr. Depth (ft)       *    7.91  *   30.72  *   10.11  *
* Conv. Total (cfs)      *7400348.0  * Conv. (cfs)           *926694.4  *5314973.0  *1158681.0  *
* Length Wtd. (ft)       *  313.86  * Wetted Per. (ft)       * 1223.36  *  334.96  *  898.45  *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *    0.05  *    0.20  *    0.07  *
* Alpha                  *    3.06  * Stream Power (lb/ft s) *    0.05  *    1.07  *    0.09  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 2106.61  * 7381.67  * 4895.89  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  343.46  *  257.78  *  861.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  753.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  753.18  * Reach Len. (ft)        *   95.24  *  361.45  *  259.38  *
* Crit W.S. (ft)         *  737.58  * Flow Area (sq ft)      *          * 6563.62  *  168.39  *
* E.G. Slope (ft/ft)     *0.000214  * Area (sq ft)           *          * 6563.62  * 1610.24  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38567.04  *  132.96  *
* Top Width (ft)         *  631.91  * Top Width (ft)         *          *  323.72  *  308.19  *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *          *    5.88  *    0.79  *
* Max Chl Dpth (ft)      *   32.89  * Hydr. Depth (ft)       *          *   20.28  *    1.76  *
* Conv. Total (cfs)      *2648557.0  * Conv. (cfs)           *          *2639457.0  *  9099.3  *
* Length Wtd. (ft)       *  361.27  * Wetted Per. (ft)       *          *  332.30  *   95.98  *
* Min Ch El (ft)         *  720.29  * Shear (lb/sq ft)       *          *    0.26  *    0.02  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *          *    1.55  *    0.02  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  105.17  * 4874.16  *  486.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   47.32  *  246.08  *  140.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.463

INPUT
Description: COE Riverstation=28443.33
Preliminary Model
             Riverstation=12430.84

This section has been modified between
             1184 and 1940 to match the COE '03 As-Builts of the I-70 Fill Area
             and Fill Area 6.
Station Elevation Data    num=     199
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0   801.94     .97   801.72    1.61   801.68    2.86   801.58   17.34     800
    21.9   798.81   24.43      798    28.4   796.45   29.84      796   39.12     794
   44.36    793.1   52.08      792    53.1   791.84   53.96   791.73   61.05   790.7
   66.74      790   67.88   789.77   78.02      788   78.18   787.71   79.07     786
   79.14   785.87   79.93   784.35   80.11      784   80.83   782.61   81.16     782
   81.78   780.81   82.22      780   83.15   778.51   83.42      778   89.31  776.98
   94.15      776  154.62      766  178.31      764  184.45   763.11  193.71     762
```

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  213.82     760  260.74     758  289.03     756   307.6     754  322.55     754
  385.34     752  494.93  750.09  496.26  750.09  498.66     750  562.69     750
  591.33  750.44  676.46  748.36  681.96  748.32  682.56  748.33  687.95  748.04
  688.09  748.04   689.5  748.02  689.84  748.02  690.03  748.03  690.34  748.04
  698.25  748.43     719   756.8    1280     758    1446     758    1917     756
    1941     754 1989.93     738 2014.56     736 2022.58  734.08 2022.93     734
 2036.78     730 2044.06     728 2068.54     726 2078.27     724  2093.5  720.18
  2115.5  720.18  2137.5  720.18 2152.68     724 2166.73     726 2170.42  727.38
 2176.85     730 2187.31  733.96 2187.42     734 2187.55  734.03 2196.95     736
 2218.39     738  2229.1     740 2247.31     746 2253.61     748 2273.52     754
 2279.69     754 2324.59  754.69 2415.68     754  2417.9  753.77 2418.69  753.74
 2424.36  753.24 2429.25  753.07 2432.94   752.8 2440.31  752.58 2442.08  752.46
  2447.9  752.29 2453.28     752 2458.08  750.97 2463.38     750 2468.75  749.42
 2470.67  749.35 2474.61  748.99 2478.01  748.85 2480.47  748.63 2488.79  748.14
 2493.53  747.71 2494.58  747.59 2519.63  744.41 2523.36     744 2529.08  742.46
 2530.47     742 2531.21   741.6 2534.05     740 2535.27  739.35 2537.66     738
 2539.41  737.07 2541.33     736 2548.64     732 2552.98     730 2554.78     730
 2563.89     734 2570.02  736.57 2573.59     738 2583.04  742.57 2593.73     748
    2598  749.47 2599.71     750 2605.32  751.34 2607.87     752  2610.7  752.51
 2629.92  755.62 2633.03     756 2633.17     756 2643.64  756.44 2774.66     764
 2796.21     766 2829.27     768 2841.12  769.89 2841.87     770 2847.84     772
 2852.21     774 2859.01     778 2862.51     780  2866.1     782  2871.1     784
 2886.23     784 2893.86     782 2910.41     772 2910.73   771.8 2916.99     768
 2920.97     766 2933.54  759.84 2933.94  759.65  2937.3     758 2941.73     756
 2953.45     752 2971.99     752 2979.37  754.38 2983.69     756 2990.49     758
 3043.52     760 3126.82     762 3205.35     762 3311.93     764  3409.8  764.55
 3418.91  764.53 3521.75     766 3547.71     766  3618.6     768 3676.14     770
 3676.91  770.43 3680.04     772 3688.43     776 3701.66     776 3710.53     772
 3715.02  770.52 3716.52     770 3722.97   768.2  3723.6     768  3732.5     766
  3738.1     766  3743.3     768 3748.77     770 3758.52     772  3786.4     776
 3800.84     776 3802.54  775.49  3805.6     776 3813.87     776 3816.55  777.52
 3817.37     778 3830.44     786 3833.76     788 3842.44  793.12 3847.39     796
 3947.65  796.68 4018.97     798 4020.93   799.1 4022.61     800

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .06    1941    .027 2273.52     .04  2417.9      .1 2629.92     .04
 2841.12     .15 2979.37     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1941 2273.52           121.07  255.13  354.74             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       0     562   775.8       F
     562     778     757       F
    2406    2882   760.5       F
    2882    3800     770       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     395     500     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  740.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  739.87  * Reach Len. (ft)        *  121.07  *  255.13  *  354.74  *
* Crit W.S. (ft)          *  730.01  * Flow Area (sq ft)      *          * 2701.22  *          *
* E.G. Slope (ft/ft)      *0.000309  * Area (sq ft)           *          * 2701.22  *  225.34  *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  287.33  * Top Width (ft)         *          *  244.18  *   43.16  *
* Vel Total (ft/s)        *    4.74  * Avg. Vel. (ft/s)       *          *    4.74  *          *
* Max Chl Dpth (ft)       *   19.69  * Hydr. Depth (ft)       *          *   11.06  *          *
* Conv. Total (cfs)       *728566.8  * Conv. (cfs)            *          *728566.8  *          *
* Length Wtd. (ft)        *  255.13  * Wetted Per. (ft)       *          *  248.97  *          *
* Min Ch El (ft)          *  720.18  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.99  *          *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)   *          * 2184.81  *    1.10  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *          *  185.43  *    0.32  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	744.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.027	
W.S. Elev (ft)	744.28	Reach Len. (ft)	121.07	255.13	354.74
Crit W.S. (ft)	732.53	Flow Area (sq ft)		3839.96	
E.G. Slope (ft/ft)	0.000283	Area (sq ft)		3839.96	457.92
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	337.01	Top Width (ft)		271.38	65.63
Vel Total (ft/s)	5.34	Avg. Vel. (ft/s)		5.34	
Max Chl Dpth (ft)	24.10	Hydr. Depth (ft)		14.15	
Conv. Total (cfs)	1217828.0	Conv. (cfs)		1217828.0	
Length Wtd. (ft)	255.13	Wetted Per. (ft)		277.58	
Min Ch El (ft)	720.18	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		1.31	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.51	3011.54	9.67
C & E Loss (ft)	0.01	Cum SA (acres)	2.36	209.04	9.42

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	748.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.027	
W.S. Elev (ft)	747.78	Reach Len. (ft)	121.07	255.13	354.74
Crit W.S. (ft)	734.33	Flow Area (sq ft)		4826.62	
E.G. Slope (ft/ft)	0.000256	Area (sq ft)		4826.62	748.25
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	393.45	Top Width (ft)		292.90	100.55
Vel Total (ft/s)	5.61	Avg. Vel. (ft/s)		5.61	
Max Chl Dpth (ft)	27.60	Hydr. Depth (ft)		16.48	
Conv. Total (cfs)	1692106.0	Conv. (cfs)		1692106.0	
Length Wtd. (ft)	255.13	Wetted Per. (ft)		300.20	
Min Ch El (ft)	720.18	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.45	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	15.75	3725.38	79.58
C & E Loss (ft)	0.01	Cum SA (acres)	9.30	226.11	41.96

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	751.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.027	
W.S. Elev (ft)	751.26	Reach Len. (ft)	121.07	255.13	354.74
Crit W.S. (ft)	736.34	Flow Area (sq ft)		5883.19	
E.G. Slope (ft/ft)	0.000237	Area (sq ft)	342.46	5883.19	1191.40
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	668.52	Top Width (ft)	205.26	315.03	148.23
Vel Total (ft/s)	5.86	Avg. Vel. (ft/s)		5.86	
Max Chl Dpth (ft)	31.08	Hydr. Depth (ft)		18.68	
Conv. Total (cfs)	2239546.0	Conv. (cfs)		2239546.0	
Length Wtd. (ft)	255.13	Wetted Per. (ft)		323.40	
Min Ch El (ft)	720.18	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.58	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	60.38	4444.35	291.64
C & E Loss (ft)	0.00	Cum SA (acres)	28.13	238.20	95.32

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	757.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.060	0.027	0.040
W.S. Elev (ft)	756.47	Reach Len. (ft)	121.07	255.13	354.74
Crit W.S. (ft)	738.94	Flow Area (sq ft)	61.77	7593.81	281.13
E.G. Slope (ft/ft)	0.000188	Area (sq ft)	1836.76	7593.81	2641.67

```
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   12.41  *45251.36  *  236.24  *
* Top Width (ft)         * 1214.21  * Top Width (ft)         *  466.37  *  332.52  *  415.32  *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)       *    0.20  *    5.96  *    0.84  *
* Max Chl Dpth (ft)      *   36.29  * Hydr. Depth (ft)       *    0.46  *   22.84  *    2.12  *
* Conv. Total (cfs)      *3321395.0  * Conv. (cfs)           *   905.6  *3303245.0  * 17245.0  *
* Length Wtd. (ft)       *  255.54  * Wetted Per. (ft)       *  135.60  *  341.73  *  132.49  *
* Min Ch El (ft)         *  720.18  * Shear (lb/sq ft)       *    0.01  *    0.26  *    0.02  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.00  *    1.55  *    0.02  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  304.95  * 5556.41  * 1212.82  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  132.16  *  250.95  *  315.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.56  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.01  * Reach Len. (ft)        *  121.07  *  255.13  *  354.74  *
* Crit W.S. (ft)         *  740.43  * Flow Area (sq ft)      * 3563.07  * 8438.58  *  617.70  *
* E.G. Slope (ft/ft)     *0.000170  * Area (sq ft)           * 4786.67  * 8438.58  * 3782.64  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2166.66  *51397.55  *  835.79  *
* Top Width (ft)         * 2428.44  * Top Width (ft)         * 1599.05  *  332.52  *  496.87  *
* Vel Total (ft/s)       *    4.31  * Avg. Vel. (ft/s)       *    0.61  *    6.09  *    1.35  *
* Max Chl Dpth (ft)      *   38.83  * Hydr. Depth (ft)       *    2.58  *   25.38  *    4.66  *
* Conv. Total (cfs)      *4168186.0  * Conv. (cfs)           *166011.6  *3938136.0  * 64039.2  *
* Length Wtd. (ft)       *  253.03  * Wetted Per. (ft)       * 1380.76  *  341.73  *  132.49  *
* Min Ch El (ft)         *  720.18  * Shear (lb/sq ft)       *    0.03  *    0.26  *    0.05  *
* Alpha                  *    1.89  * Stream Power (lb/ft s) *    0.02  *    1.60  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  785.74  * 6216.47  * 2154.59  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  246.92  *  253.82  *  451.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.23  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.060  *   0.027  *   0.080  *
* W.S. Elev (ft)         *  760.77  * Reach Len. (ft)        *  121.07  *  255.13  *  354.74  *
* Crit W.S. (ft)         *  741.71  * Flow Area (sq ft)      * 5978.09  * 9020.92  * 4249.92  *
* E.G. Slope (ft/ft)     *0.000147  * Area (sq ft)           * 7619.10  * 9020.92  * 4727.61  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4767.29  *53353.48  * 4879.23  *
* Top Width (ft)         * 2551.22  * Top Width (ft)         * 1629.88  *  332.52  *  588.82  *
* Vel Total (ft/s)       *    3.27  * Avg. Vel. (ft/s)       *    0.80  *    5.91  *    1.15  *
* Max Chl Dpth (ft)      *   40.59  * Hydr. Depth (ft)       *    4.34  *   27.13  *    9.55  *
* Conv. Total (cfs)      *5197214.0  * Conv. (cfs)           *393280.0  *4401420.0  *402513.9  *
* Length Wtd. (ft)       *  252.41  * Wetted Per. (ft)       * 1380.76  *  341.73  *  453.96  *
* Min Ch El (ft)         *  720.18  * Shear (lb/sq ft)       *    0.04  *    0.24  *    0.09  *
* Alpha                  *    2.78  * Stream Power (lb/ft s) *    0.03  *    1.43  *    0.10  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1214.70  * 6628.65  * 2990.69  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  286.63  *  254.07  *  632.62  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.08  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.060  *   0.027  *   0.074  *
* W.S. Elev (ft)         *  763.66  * Reach Len. (ft)        *  121.07  *  255.13  *  354.74  *
* Crit W.S. (ft)         *  743.51  * Flow Area (sq ft)      * 9972.42  * 9984.08  * 5611.82  *
* E.G. Slope (ft/ft)     *0.000126  * Area (sq ft)           *12379.71  * 9984.08  * 6835.73  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *10344.87  *58431.52  * 7123.61  *
* Top Width (ft)         * 2851.33  * Top Width (ft)         * 1655.36  *  332.52  *  863.45  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.04  *    5.85  *    1.27  *
* Max Chl Dpth (ft)      *   43.48  * Hydr. Depth (ft)       *    7.23  *   30.03  *   11.33  *
* Conv. Total (cfs)      *6770426.0  * Conv. (cfs)           *922782.6  *5212204.0  *635439.6  *
* Length Wtd. (ft)       *  246.48  * Wetted Per. (ft)       * 1380.76  *  341.73  *  504.25  *
* Min Ch El (ft)         *  720.18  * Shear (lb/sq ft)       *    0.06  *    0.23  *    0.09  *
```

```
* Alpha                  *    3.03  * Stream Power (lb/ft s) *    0.06  *    1.34  *    0.11  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 2081.73  * 7298.67  * 4845.76  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  340.16  *  255.04  *  855.28  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  753.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *    0.027  *          *
* W.S. Elev (ft)         *  753.08  * Reach Len. (ft)        *  121.07  *  255.13  *  354.74  *
* Crit W.S. (ft)         *  737.60  * Flow Area (sq ft)      *          * 6467.48  *          *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           *  749.86  * 6467.48  * 1510.89  *
* Q Total (cfs)          *38700.00  * Flow (cfs)              *          *38700.00  *          *
* Top Width (ft)         *  790.16  * Top Width (ft)          *  253.28  *  326.64  *  210.24  *
* Vel Total (ft/s)       *    5.98  * Avg. Vel. (ft/s)        *          *    5.98  *          *
* Max Chl Dpth (ft)      *   32.90  * Hydr. Depth (ft)        *          *   19.80  *          *
* Conv. Total (cfs)      *2558592.0  * Conv. (cfs)             *          *2558592.0  *          *
* Length Wtd. (ft)       *  255.13  * Wetted Per. (ft)        *          *  335.57  *          *
* Min Ch El (ft)         *  720.18  * Shear (lb/sq ft)        *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.65  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  104.35  * 4820.10  *  477.21  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   47.05  *  243.38  *  138.48  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.415

INPUT
Description: COE Riverstation=28698.46
Preliminary Model
             Riverstation=12175.70

This section has been modified between
             1224 and 2055 to match the COE '03 As-Builts of the I-70 Fill Area.
Station Elevation Data    num=     329
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
       0    802.1     .93     802    10.56     800    20.32     798    21.24   797.81
   21.73    797.7   22.46   797.54     23.3   797.36    27.38  796.48    27.92   796.38
   30.11      796   30.18     796    30.93   795.86    31.22   795.8    34.13   795.24
   36.24   794.86   38.21   794.48     40.8     794    42.04  793.73    42.16   793.71
   42.33   793.68   42.65   793.65    45.89   793.03       47  792.92    48.61   792.73
   51.07   792.41    52.1   792.24       54     792    54.49   791.8    54.72   791.69
   56.28   791.07   56.88   790.91    57.84   790.36       58  790.34    58.13   790.33
   58.46      790   59.46   788.95    60.22     788    60.83  787.33    61.87      786
   62.19   785.64   63.41   784.02    69.31     782    70.75  781.66    84.61   778.42
   85.95    778.1    86.4     778    91.74   776.72     94.7     776    96.51   775.54
  102.77      774  106.35   773.09   110.75     772   115.62  770.78   118.88      770
  131.98      768  132.52     768   138.59   767.23   143.28  766.71   150.18      766
  150.87   765.92  151.01   765.91   151.23   765.89    165.1  764.47   169.18      764
  172.05   763.65  172.92   763.59   180.46   762.92      186   762.4   190.38      762
   194.2   761.61  197.65   761.45   204.08   760.96   208.42  760.76   221.84      760
   221.9   759.99  226.89   759.53    228.3   759.48    232.9   759.1   235.56   759.02
     239   758.89   242.5   758.66   247.37   758.46   255.25  758.05   256.18      758
  262.12   757.52  263.92   757.46   268.44   757.13   279.73  756.59   288.42   756.06
  288.73   756.04  289.15   756.03   289.43      756   296.56  755.51   312.46   754.28
  314.33    754.2  318.61      754   319.53   753.95   347.97     752    363.2      752
  373.07   750.99  379.56   750.76   380.99   750.72   400.76  750.13   404.46      750
   524.6      750  575.26   748.53   581.26   748.53   582.45  748.48   585.41   748.47
  588.54   748.47  593.39    748.4   600.57   748.34   609.72  748.29   611.06   748.28
  617.42   748.26  618.33   748.26   619.05   748.25   624.99  748.25   629.03   748.27
  629.64   748.27  641.36    748.3    642.6   748.31   643.52  748.32   644.21   748.33
  645.75   748.41  652.49   748.41   653.41   748.28    656.9  748.14   660.17      748
     846      748     886      757     1403      758     1755     758     2033      756
 2066.08   754.01 2066.44      754  2070.72   752.83  2075.79  751.48  2086.96   748.46
```

2088.67	748	2089.59	747.7	2090.93	747.25	2094.68	746	2109.22	741.03
2114.02	739.38	2118	738	2144.77	736	2145.62	735.72	2151.12	734
2156.34	732.23	2158.88	731.36	2162.91	730	2165.31	729.29	2169.81	728
2180.42	727.3	2188.52	726.78	2200.06	726	2201.14	725.59	2204.87	724
2223.4	720.11	2245.4	720.11	2267.4	720.11	2285.83	724	2293.83	725.39
2297.49	726	2299.05	726.57	2303	728	2303.18	728.07	2308.33	730
2313.56	732	2314.49	732.35	2318.79	734	2335.47	736	2343.33	736.86
2353.43	738	2359.2	739.85	2359.66	740	2360.17	740.17	2365.56	742
2366.6	742.35	2377.38	746	2382.22	747.83	2382.68	748	2382.9	748.08
2388.65	750	2389.89	750.41	2394.62	752	2404.7	752.58	2430.69	754
2501.74	756	2510.71	756.4	2512.38	756.47	2546.53	758	2546.86	758
2554.54	758.3	2558.3	758.44	2566.86	758.78	2569.8	758.89	2571.54	758.96
2574.59	759.06	2599.39	760	2606.11	760.61	2620.71	762	2620.82	762
2630.64	762.97	2632.63	763.17	2634.05	763.31	2635.11	763.41	2640.96	764
2644.66	764.47	2653.01	765.51	2657.2	766	2668.42	767.94	2668.79	768
2669.59	768.47	2672.23	770	2672.72	770.29	2679.09	774	2681.73	775.55
2685.92	778	2686.19	778.16	2689.32	780	2712.66	780	2717.35	778
2718.91	777.06	2720.69	776	2722.32	775.06	2724.12	774	2726.42	772.68
2727.62	772	2728.49	771.52	2731.18	770	2733.95	768.45	2734.76	768
2739.18	766	2739.84	765.71	2743.76	764	2745.63	763.19	2748.35	762
2751.98	760.43	2752.97	760	2754.94	759.15	2757.63	758	2761.23	756.48
2762.36	756	2763.44	755.68	2767.44	754.48	2769.01	754	2772.74	752.89
2775.65	752	2788.46	752	2790.29	752.69	2792.55	753.53	2799.23	756
2809.52	757.42	2814.04	758	2852.98	759.13	2879.87	760	3011.88	762
3090	762	3095.8	762.29	3101.3	762.54	3118.79	763.37	3128.71	763.34
3135.44	763.28	3158.35	762	3160.77	762	3166.78	762.26	3168.85	762.29
3189.57	763.04	3197.45	763.29	3198.29	763.31	3206.23	763.28	3271.91	764
3351.97	764	3356.01	764.16	3356.38	764.17	3372.35	764.73	3379.47	764.96
3416.94	766	3430.99	766	3450.27	766.5	3458.57	766.73	3490.04	768
3503.13	768	3505.04	768.07	3523.93	768.78	3527.4	768.89	3535.99	769.22
3562.51	768.91	3563.07	768.93	3568.24	768	3572.39	766.36	3573.28	766
3582.78	766	3587.56	767.99	3587.61	768.01	3592.48	770	3595.44	770.76
3600.72	772	3612.14	773.53	3615.6	774	3621.01	774.69	3631.43	776
3653.64	776	3654.1	776.23	3657.62	778	3657.74	778.06	3661.35	780
3664.94	781.88	3665.16	782	3665.42	782.13	3669.1	784	3673.1	786
3674.17	786.52	3680.46	789.52	3681.48	790	3688.16	793.16	3689.95	794
3690.93	794.47	3694.15	796	3702.38	796.16	3790.08	797.38	3794.14	797.38
3850.03	797.86	3876.16	798	3880.05	799.33	3882.81	800		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2066.08	.027	2394.62	.04	2653.01	.15	2809.52	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2066.08	2394.62	135	182.16	240	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	978	775.8	F
2691	3610	770	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
162.68	256.13	780	386.36	478.28	780	688.2	766.35	780
3735	3865	810						

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	740.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.027	
W.S. Elev (ft)	739.81	Reach Len. (ft)	135.00	182.16	240.00
Crit W.S. (ft)	729.81	Flow Area (sq ft)		2776.00	
E.G. Slope (ft/ft)	0.000285	Area (sq ft)		2776.00	
Q Total (cfs)	12800.00	Flow (cfs)		12800.00	
Top Width (ft)	246.28	Top Width (ft)		246.28	
Vel Total (ft/s)	4.61	Avg. Vel. (ft/s)		4.61	
Max Chl Dpth (ft)	19.70	Hydr. Depth (ft)		11.27	
Conv. Total (cfs)	757728.7	Conv. (cfs)		757728.7	
Length Wtd. (ft)	182.16	Wetted Per. (ft)		251.32	
Min Ch El (ft)	720.11	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.91	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		2168.77	0.18
C & E Loss (ft)	0.00	Cum SA (acres)		183.99	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	744.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.027	
W.S. Elev (ft)	744.23	Reach Len. (ft)	135.00	182.16	240.00
Crit W.S. (ft)	732.27	Flow Area (sq ft)		3922.18	
E.G. Slope (ft/ft)	0.000266	Area (sq ft)		3922.18	
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	272.27	Top Width (ft)		272.27	
Vel Total (ft/s)	5.23	Avg. Vel. (ft/s)		5.23	
Max Chl Dpth (ft)	24.12	Hydr. Depth (ft)		14.41	
Conv. Total (cfs)	1257984.0	Conv. (cfs)		1257984.0	
Length Wtd. (ft)	182.16	Wetted Per. (ft)		278.78	
Min Ch El (ft)	720.11	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		1.22	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.51	2988.81	7.81
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	207.45	9.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	748.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.027	
W.S. Elev (ft)	747.73	Reach Len. (ft)	135.00	182.16	240.00
Crit W.S. (ft)	734.06	Flow Area (sq ft)		4911.64	
E.G. Slope (ft/ft)	0.000242	Area (sq ft)		4911.64	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	292.45	Top Width (ft)		292.45	
Vel Total (ft/s)	5.52	Avg. Vel. (ft/s)		5.52	
Max Chl Dpth (ft)	27.62	Hydr. Depth (ft)		16.79	
Conv. Total (cfs)	1742316.0	Conv. (cfs)		1742316.0	
Length Wtd. (ft)	182.16	Wetted Per. (ft)		300.14	
Min Ch El (ft)	720.11	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.36	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	15.75	3696.86	76.53
C & E Loss (ft)	0.01	Cum SA (acres)	9.30	224.40	41.55

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	751.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.027	
W.S. Elev (ft)	751.21	Reach Len. (ft)	135.00	182.16	240.00
Crit W.S. (ft)	736.03	Flow Area (sq ft)		5968.82	
E.G. Slope (ft/ft)	0.000227	Area (sq ft)	772.89	5968.82	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	634.72	Top Width (ft)	319.25	315.47	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	31.10	Hydr. Depth (ft)		18.92	
Conv. Total (cfs)	2290362.0	Conv. (cfs)		2290362.0	
Length Wtd. (ft)	182.16	Wetted Per. (ft)		324.20	
Min Ch El (ft)	720.11	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.51	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	58.83	4409.65	286.79
C & E Loss (ft)	0.01	Cum SA (acres)	27.40	236.36	94.72

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	756.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.060	0.027	0.040
W.S. Elev (ft)	756.43	Reach Len. (ft)	135.00	182.16	240.00
Crit W.S. (ft)	738.61	Flow Area (sq ft)	60.21	7668.85	227.29
E.G. Slope (ft/ft)	0.000179	Area (sq ft)	2811.92	7668.85	343.33

```
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   14.92  *45309.03  *  176.05  *
* Top Width (ft)         * 1010.70  * Top Width (ft)         *  524.27  *  328.54  *  157.88  *
* Vel Total (ft/s)       *    5.72  * Avg. Vel. (ft/s)       *    0.25  *    5.91  *    0.77  *
* Max Chl Dpth (ft)      *   36.32  * Hydr. Depth (ft)       *    0.65  *   23.34  *    1.94  *
* Conv. Total (cfs)      *3398299.0  * Conv. (cfs)           *  1114.0  *3384036.0  * 13149.0  *
* Length Wtd. (ft)       *  182.35  * Wetted Per. (ft)       *   93.24  *  337.77  *  116.96  *
* Min Ch El (ft)         *  720.11  * Shear (lb/sq ft)       *    0.01  *    0.25  *    0.02  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.00  *    1.50  *    0.02  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  298.49  * 5511.71  * 1200.66  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  130.78  *  249.01  *  312.88  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.51  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  758.92  * Reach Len. (ft)        *  135.00  *  182.16  *  240.00  *
* Crit W.S. (ft)         *  740.05  * Flow Area (sq ft)      * 1549.52  * 8485.14  *  588.43  *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           * 5592.31  * 8485.14  *  847.88  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  644.00  *53107.96  *  648.04  *
* Top Width (ft)         * 2234.43  * Top Width (ft)         * 1639.88  *  328.54  *  266.00  *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *    0.42  *    6.26  *    1.10  *
* Max Chl Dpth (ft)      *   38.81  * Hydr. Depth (ft)       *    1.42  *   25.83  *    3.35  *
* Conv. Total (cfs)      *4102886.0  * Conv. (cfs)           * 48571.1  *4005440.0  * 48875.6  *
* Length Wtd. (ft)       *  181.99  * Wetted Per. (ft)       * 1088.15  *  337.77  *  176.00  *
* Min Ch El (ft)         *  720.11  * Shear (lb/sq ft)       *    0.02  *    0.28  *    0.04  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *    0.01  *    1.73  *    0.04  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  771.31  * 6166.91  * 2135.74  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  242.42  *  251.89  *  448.80  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  760.53  * Reach Len. (ft)        *  135.00  *  182.16  *  240.00  *
* Crit W.S. (ft)         *  741.34  * Flow Area (sq ft)      * 3303.63  * 9014.79  *  904.58  *
* E.G. Slope (ft/ft)     *0.000180  * Area (sq ft)           * 8236.00  * 9014.79  * 1358.60  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2303.79  *59504.46  * 1191.75  *
* Top Width (ft)         * 2342.06  * Top Width (ft)         * 1639.88  *  328.54  *  373.64  *
* Vel Total (ft/s)       *    4.76  * Avg. Vel. (ft/s)       *    0.70  *    6.60  *    1.32  *
* Max Chl Dpth (ft)      *   40.42  * Hydr. Depth (ft)       *    3.04  *   27.44  *    4.30  *
* Conv. Total (cfs)      *4691035.0  * Conv. (cfs)           *171542.4  *4430754.0  * 88738.6  *
* Length Wtd. (ft)       *  180.95  * Wetted Per. (ft)       * 1088.15  *  337.77  *  210.79  *
* Min Ch El (ft)         *  720.11  * Shear (lb/sq ft)       *    0.03  *    0.30  *    0.05  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.02  *    1.98  *    0.06  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1192.67  * 6575.83  * 2965.91  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  282.09  *  252.14  *  628.70  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  764.02  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.060  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  763.41  * Reach Len. (ft)        *  135.00  *  182.16  *  240.00  *
* Crit W.S. (ft)         *  743.12  * Flow Area (sq ft)      * 6433.59  * 9959.86  * 1553.73  *
* E.G. Slope (ft/ft)     *0.000163  * Area (sq ft)           *12953.26  * 9959.86  * 2875.67  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6642.57  *66706.60  * 2550.84  *
* Top Width (ft)         * 2681.43  * Top Width (ft)         * 1639.88  *  328.54  *  713.01  *
* Vel Total (ft/s)       *    4.23  * Avg. Vel. (ft/s)       *    1.03  *    6.70  *    1.64  *
* Max Chl Dpth (ft)      *   43.30  * Hydr. Depth (ft)       *    5.91  *   30.32  *    6.46  *
* Conv. Total (cfs)      *5952693.0  * Conv. (cfs)           *520963.8  *5231672.0  *200057.4  *
* Length Wtd. (ft)       *  178.89  * Wetted Per. (ft)       * 1088.15  *  337.77  *  240.77  *
* Min Ch El (ft)         *  720.11  * Shear (lb/sq ft)       *    0.06  *    0.30  *    0.07  *
```

```
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    0.06  *    2.00  *    0.11  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 2046.52  * 7240.27  * 4806.22  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  335.58  *  253.11  *  848.87  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  753.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  753.03  * Reach Len. (ft)        *  135.00  *  182.16  *  240.00  *
* Crit W.S. (ft)         *  737.23  * Flow Area (sq ft)      *          * 6553.51  *    9.33  *
* E.G. Slope (ft/ft)     *0.000217  * Area (sq ft)           * 1396.79  * 6553.51  *   25.70  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38696.75  *    3.26  *
* Top Width (ft)         *  727.28  * Top Width (ft)         *  365.36  *  324.64  *   37.28  *
* Vel Total (ft/s)       *    5.90  * Avg. Vel. (ft/s)       *          *    5.90  *    0.35  *
* Max Chl Dpth (ft)      *   32.92  * Hydr. Depth (ft)       *          *   20.19  *    0.51  *
* Conv. Total (cfs)      *2625366.0  * Conv. (cfs)            *          *2625146.0  *   220.8  *
* Length Wtd. (ft)       *  182.16  * Wetted Per. (ft)       *          *  333.74  *   18.37  *
* Min Ch El (ft)         *  720.11  * Shear (lb/sq ft)       *          *    0.27  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.57  *    0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  101.36  * 4781.96  *  470.95  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   46.19  *  241.47  *  137.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 7.381

INPUT
Description: Expanded Section u/s of I-70

COE
             Riverstation=28880.62
Preliminary Model
             Riverstation=11993.55

This section has been modified between
             1777 and 2288 to match the COE '03 As-Builts of the I-70 Fill
             Area.
Reach lengths have been increased by 43.42, 109.5 and 65.49
             to account for the distance between the assumed and the actual
             location of the I-70 bridge face sections.
Station Elevation Data    num=     278
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  797.13     .36  797.11    1.85     797    3.01  796.94    3.31  796.92
    4.51  796.86    4.79  796.84    6.43  796.75    7.48  796.67      10  796.54
   10.77  796.48   14.14  796.31   14.68  796.27   18.43  796.08   18.58  796.07
    28.7  795.42    40.3  794.43   40.96  794.49   45.55  794.49   48.16   794.3
   54.76     794   63.31  793.46   64.95  793.39   72.01  792.98    74.5  792.87
   75.95  792.78   78.25  792.68    79.4  792.61   82.66  792.48   87.56  792.24
   87.85  792.22    90.6  792.09   90.71  792.09      95  791.84   95.24  791.83
   98.44  791.63   98.91  791.61   99.06   791.6   99.56  791.56  100.13  791.53
   101.4  791.44  102.21   791.4  104.29  791.26  105.48   791.2  107.62  791.05
  109.11  790.98  110.75  790.87  114.49  790.69  126.37  790.05  128.25  789.94
  128.43  789.93  132.28  789.67  132.87  789.65  135.95  789.44  137.85  789.35
  140.94  789.15  144.76  788.97  156.31  788.35  156.76  788.32  162.83     788
  165.09  787.84  165.39  787.83  168.28  787.64  169.07   787.6  171.83  787.42
  172.87  787.37   175.1  787.23  176.84  787.15  178.08  786.92  179.88  786.79
  181.58  786.89  197.41  786.04  198.06     786  198.88  785.92   206.2  785.49
  225.09  784.46  225.84  784.41  231.06  784.13  231.29  784.12  235.66     784
  236.97     784  239.78  783.93   240.1  783.93  240.22  783.92  240.36  783.92
  242.17  783.83  242.55  783.82  244.79   783.7  245.13  783.69  247.98  783.54
  248.54  783.53  251.88  783.36  252.64  783.34  277.35     782  277.73     782
  306.37     780  307.41  779.91  307.85  779.89   338.5     778  342.41  777.69
  343.01  777.66  346.49  777.41  347.49  777.37  369.66     776  372.85   775.7
```

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  373.56  775.66  396.61     774  396.85     774  401.11  773.58  423.66     772
  431.14     772  449.79  770.99  462.01     770  468.77     770   470.7  769.87
  471.19  769.86  474.98  769.63  483.82   769.3  503.15     768  514.24     768
  522.02  767.57  523.07  767.56  525.83  767.42  527.14  767.41  527.66  767.38
  536.56  767.11  550.26     766  563.41     766  575.24   765.5  581.17  765.38
   589.4  765.27  590.04  765.24  592.08  765.23  604.33     764  816.28     764
  828.67   765.2  855.56  765.31     856  765.32  862.97  765.31  868.14   765.3
  873.51  765.53  874.85  765.56   877.5  765.54  879.04  765.57   905.5  765.64
  906.85  765.66  913.84     766 1092.19     766 1099.73  767.02 1102.98  767.03
 1103.82  767.06 1108.06  767.07 1112.17  767.18  1116.2  767.19  1122.9   767.4
 1125.41  767.41 1126.85  767.45 1127.05  767.45 1127.22  767.46 1133.65  767.52
  1208.2  767.93 1211.82     768 1271.24     768 1274.65  768.21 1284.25  768.39
 1290.61     768 1303.85     766 1335.76  760.03 1335.91     760 1350.35     758
 1352.94     758    1439     757    2010   757.9    2454     756 2473.38     754
 2487.17     752 2493.82     750 2500.87     748 2524.92     740 2525.48  739.84
 2531.56     738 2564.64     734 2584.01     728 2605.27     726 2616.74     724
 2638.43  720.05 2660.43  720.05 2682.43  720.05 2704.11     724 2710.57     726
 2717.46     728 2723.53     730 2734.94  733.97 2746.14     736 2765.46     738
 2775.21     740  2802.5     748 2815.63     752 2819.63  752.27 2851.73     754
 2881.63     756 2899.27     758 2903.32  758.62 2923.76  761.28 2925.56  761.46
 2926.92  761.55 2928.57     762 2932.48  763.65 2933.36     764 2937.34  765.68
 2938.13     766 2942.16  767.72 2942.87     768 2965.41   777.9 2965.63     778
 2980.12     778 2980.86  777.67 3003.53     768 3017.01     762 3021.08     760
 3040.32     752 3054.28     752 3055.27  752.52 3057.75     754    3059   754.8
 3060.74     756 3064.16  757.99 3064.65  758.02 3120.73     760 3140.56     760
  3331.3  761.62 3423.25     762 3510.92     762  3643.3     764 3652.72     764
 3710.73  765.07 3729.63     766 3731.35     766 3743.43  767.01 3746.97  767.21
 3750.21  767.15 3819.28     768 3844.21     768 3849.75  764.15 3849.96     764
  3850.1  763.91 3852.91     762 3856.03     762 3876.73     768 3878.29  768.56
 3887.23  771.68 3888.02     772 3888.68  772.08 3902.41     774 3908.62  774.69
 3925.51  774.47 3927.93  774.47 3931.56     774 3934.47     774 3941.72     776
 3947.47     778 3955.05  781.57 3959.97     784 3963.93     786 3965.24  786.64
 3968.28     788 3972.42  789.57 3973.62     790 3978.77     792 3980.81  792.85
 3984.14     794 3984.84     794  4054.3     796  4054.5     796 4064.03  796.76
 4090.17     798 4090.49  798.11 4096.52  799.97

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .04 2473.38    .027 2815.63     .04 2923.76     .15 3064.65     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2473.38 2815.63           392.82  455.12  284.41             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1552   775.8       F
    2974    3900     770       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************************************
     190     327     800     423     570     790     790     868     785

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.08  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.            *          *   0.027  *          *
* W.S. Elev (ft)         *  739.76  * Reach Len. (ft)       *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  729.52  * Flow Area (sq ft)     *          * 2828.55  *          *
* E.G. Slope (ft/ft)     *0.000270  * Area (sq ft)          *          * 2828.55  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)            *          *12800.00  *          *
* Top Width (ft)         *  248.32  * Top Width (ft)        *          *  248.32  *          *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)      *          *    4.53  *          *
* Max Chl Dpth (ft)      *   19.71  * Hydr. Depth (ft)      *          *   11.39  *          *
* Conv. Total (cfs)      *778825.1  * Conv. (cfs)           *          *778825.1  *          *
* Length Wtd. (ft)       *  455.12  * Wetted Per. (ft)      *          *  252.75  *          *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)      *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.85  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)  *          * 2157.05  *    0.18  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *  182.96  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  744.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.19  * Reach Len. (ft)        *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  731.99  * Flow Area (sq ft)      *          * 3992.28  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 3992.28  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  277.17  * Top Width (ft)          *          *  277.17  *          *
* Vel Total (ft/s)       *    5.13  * Avg. Vel. (ft/s)        *          *    5.13  *          *
* Max Chl Dpth (ft)      *   24.14  * Hydr. Depth (ft)        *          *   14.40  *          *
* Conv. Total (cfs)      *1282928.0  * Conv. (cfs)            *          *1282928.0  *          *
* Length Wtd. (ft)       *  455.12  * Wetted Per. (ft)        *          *  282.94  *          *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)        *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.15  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *    1.51  * 2972.26  *    7.81  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    2.36  *  206.30  *    9.15  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  748.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  747.70  * Reach Len. (ft)        *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  733.81  * Flow Area (sq ft)      *          * 5004.32  *          *
* E.G. Slope (ft/ft)     *0.000234  * Area (sq ft)           *          * 5004.32  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  299.69  * Top Width (ft)          *          *  299.69  *          *
* Vel Total (ft/s)       *    5.42  * Avg. Vel. (ft/s)        *          *    5.42  *          *
* Max Chl Dpth (ft)      *   27.65  * Hydr. Depth (ft)        *          *   16.70  *          *
* Conv. Total (cfs)      *1772378.0  * Conv. (cfs)            *          *1772378.0  *          *
* Length Wtd. (ft)       *  455.12  * Wetted Per. (ft)        *          *  306.53  *          *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)        *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.29  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *   15.75  * 3676.13  *   76.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    9.30  *  223.16  *   41.55  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  751.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  751.18  * Reach Len. (ft)        *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  735.82  * Flow Area (sq ft)      *          * 6089.39  *          *
* E.G. Slope (ft/ft)     *0.000218  * Area (sq ft)           *          * 6089.39  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  323.05  * Top Width (ft)          *          *  323.05  *          *
* Vel Total (ft/s)       *    5.67  * Avg. Vel. (ft/s)        *          *    5.67  *          *
* Max Chl Dpth (ft)      *   31.13  * Hydr. Depth (ft)        *          *   18.85  *          *
* Conv. Total (cfs)      *2335837.0  * Conv. (cfs)            *          *2335837.0  *          *
* Length Wtd. (ft)       *  455.12  * Wetted Per. (ft)        *          *  330.92  *          *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.42  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *   57.63  * 4384.43  *  286.79  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *   26.90  *  235.02  *   94.72  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  756.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  756.42  * Reach Len. (ft)        *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  738.33  * Flow Area (sq ft)      *   47.77  * 7853.80  *  165.61  *
* E.G. Slope (ft/ft)     *0.000174  * Area (sq ft)           *   47.77  * 7853.80  *  267.12  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *   12.90  *45342.69  *  144.42  *
* Top Width (ft)         *  560.50  * Top Width (ft)          *  116.81  *  342.25  *  101.44  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)        *    0.27  *    5.77  *    0.87  *
* Max Chl Dpth (ft)      *   36.37  * Hydr. Depth (ft)        *    0.41  *   22.95  *    2.38  *
* Conv. Total (cfs)      *3447291.0  * Conv. (cfs)            *   977.1  *3435372.0  * 10941.6  *
```

```
* Length Wtd. (ft)       *  454.53  * Wetted Per. (ft)       *  116.91  *  350.50  *   69.82  *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)       *    0.00  *    0.24  *    0.03  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    0.00  *    1.41  *    0.02  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  294.05  * 5479.25  * 1198.98  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  129.79  *  247.61  *  312.16  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  758.91  * Reach Len. (ft)        *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  739.80  * Flow Area (sq ft)      * 1575.73  * 8707.74  *  366.01  *
* E.G. Slope (ft/ft)     *0.000168  * Area (sq ft)           * 1908.60  * 8707.74  *  570.57  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1084.55  *52867.38  *  448.07  *
* Top Width (ft)         * 1628.02  * Top Width (ft)         * 1129.61  *  342.25  *  156.15  *
* Vel Total (ft/s)       *    5.11  * Avg. Vel. (ft/s)       *    0.69  *    6.07  *    1.22  *
* Max Chl Dpth (ft)      *   38.86  * Hydr. Depth (ft)       *    1.71  *   25.44  *    4.07  *
* Conv. Total (cfs)      *4198497.0  * Conv. (cfs)            * 83703.8  *4080212.0  * 34581.2  *
* Length Wtd. (ft)       *  450.83  * Wetted Per. (ft)       *  921.49  *  350.50  *   90.24  *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)       *    0.02  *    0.26  *    0.04  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.01  *    1.58  *    0.05  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  759.69  * 6130.96  * 2131.83  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  238.13  *  250.49  *  447.64  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  760.53  * Reach Len. (ft)        *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  741.11  * Flow Area (sq ft)      * 3068.92  * 9262.39  *  521.85  *
* E.G. Slope (ft/ft)     *0.000170  * Area (sq ft)           * 3748.47  * 9262.39  *  897.26  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 3313.49  *58940.23  *  746.28  *
* Top Width (ft)         * 1768.22  * Top Width (ft)         * 1140.31  *  342.25  *  285.66  *
* Vel Total (ft/s)       *    4.90  * Avg. Vel. (ft/s)       *    1.08  *    6.36  *    1.43  *
* Max Chl Dpth (ft)      *   40.48  * Hydr. Depth (ft)       *    3.33  *   27.06  *    5.10  *
* Conv. Total (cfs)      *4834009.0  * Conv. (cfs)            *254245.0  *4522502.0  * 57262.0  *
* Length Wtd. (ft)       *  448.66  * Wetted Per. (ft)       *  921.49  *  350.50  *  102.79  *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)       *    0.04  *    0.28  *    0.05  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *    0.04  *    1.78  *    0.08  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1174.10  * 6537.62  * 2959.69  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  277.78  *  250.74  *  626.88  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  763.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  763.42  * Reach Len. (ft)        *  392.82  *  455.12  *  284.41  *
* Crit W.S. (ft)         *  742.89  * Flow Area (sq ft)      * 5729.03  *10250.49  *  843.28  *
* E.G. Slope (ft/ft)     *0.000150  * Area (sq ft)           * 7062.91  *10250.49  * 2405.10  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 8816.58  *65610.27  * 1473.14  *
* Top Width (ft)         * 2215.47  * Top Width (ft)         * 1155.74  *  342.25  *  717.48  *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)       *    1.54  *    6.40  *    1.75  *
* Max Chl Dpth (ft)      *   43.37  * Hydr. Depth (ft)       *    6.22  *   29.95  *    7.25  *
* Conv. Total (cfs)      *6194673.0  * Conv. (cfs)            *719576.3  *5354864.0  *120232.0  *
* Length Wtd. (ft)       *  444.58  * Wetted Per. (ft)       *  921.49  *  350.50  *  117.12  *
* Min Ch El (ft)         *  720.05  * Shear (lb/sq ft)       *    0.06  *    0.27  *    0.07  *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *    0.09  *    1.75  *    0.12  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 2015.50  * 7198.01  * 4791.67  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  331.25  *  251.70  *  844.92  *
**********************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	753.53	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.52	Wt. n-Val.		0.027	0.040	
W.S. Elev (ft)	753.01	Reach Len. (ft)	392.82	455.12	284.41	
Crit W.S. (ft)	736.88	Flow Area (sq ft)		6690.34	8.54	
E.G. Slope (ft/ft)	0.000211	Area (sq ft)		6690.34	24.76	
Q Total (cfs)	38700.00	Flow (cfs)		38697.17	2.83	
Top Width (ft)	371.28	Top Width (ft)		335.41	35.88	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	0.33	
Max Chl Dpth (ft)	32.96	Hydr. Depth (ft)		19.95	0.48	
Conv. Total (cfs)	2665150.0	Conv. (cfs)		2664955.0	194.9	
Length Wtd. (ft)	455.11	Wetted Per. (ft)		343.58	17.71	
Min Ch El (ft)	720.05	Shear (lb/sq ft)		0.26	0.01	
Alpha	1.00	Stream Power (lb/ft s)		1.48	0.00	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	99.20	4754.27	470.81	
C & E Loss (ft)	0.04	Cum SA (acres)	45.62	240.09	137.27	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 7.294

INPUT
Description: u/s Face I-70

COE Riverstation=29226.24
Preliminary Model
Riverstation=11647.92

This section has been modified between
1795 and 2119 to match the COE '03 As-Builts of the I-70 Fill
Area.
This section was cut beyond the influence of the roadway
embankment, but the face sections are being modeled as if they
were one foot from the bridge face. The remaining distance
between the cross sections is being added to the reach lengths of
the adjacent sections, so that the true length of the river is
modeled.
Station Elevation Data num= 364

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	799.95	3.16	799.55	16.21	799.33	18.43	799.18	19.61	799.03
21.81	798.97	23.55	798.73	25.26	798.67	27.3	798.35	28.08	798.33
30.17	798.04	30.67	798	32.23	797.94	60.85	797.69	64.38	797.32
69.4	797.25	70.11	797.14	71.25	797.12	72.44	796.99	73.4	796.98
74.73	796.84	75.81	796.81	76.77	796.65	78.26	796.27	78.79	796.24
81.4	796	87.49	796	89.04	795.69	89.15	795.68	94.52	795.46
95.39	795.28	97.4	794.76	99.52	794.59	99.91	794.44	100.47	794.35
109.45	793.71	109.8	793.66	112.12	793.5	113.56	793.29	115.78	793.1
117.26	792.85	118.57	792.72	120.18	792.42	120.66	792.36	130.09	790.58
132.58	790	134.65	789.63	134.85	789.57	136.21	789.34	136.85	789.18
138.13	788.96	140.99	788.24	141.35	788.17	141.96	788	144.02	787.5
144.55	787.34	146.07	786.98	148.75	786.17	149.04	786.09	149.31	786
150.92	785.59	151.14	785.52	153.37	784.94	154.85	784.5	155.55	784.32
156.51	784	160.22	783.02	161.98	782.46	162.52	782.32	163.51	782
167.7	780.81	169.79	780.04	169.91	780	174.13	778.78	176.34	778
177.44	778	182.08	776.69	182.84	776.54	185.1	776	186.59	775.58
191.45	774.34	191.95	774.23	192.16	774.19	194.81	773.51	195.18	773.38
199.18	772.34	199.38	772.3	202.99	771.4	204.18	771.14	204.93	770.95
205.8	770.78	208.03	770.13	208.16	770.1	208.47	770	208.68	770
209.86	769.82	209.96	769.8	211.57	769.79	211.72	769.77	214.58	769.71
214.81	769.68	215.15	769.66	224.08	769.56	240.42	769.76	262.69	769.47
359.72	769.03	379.92	769.34	402.92	769.29	403.15	769.28	433.71	769.33
436.53	769.12	439.04	768.67	441.43	768	441.89	767.89	442.19	767.8
454.94	764.26	462.43	762	467.54	762	476.14	760.62	508.64	761.56

```
  509.84  761.54  514.29  761.71  572.53     760  590.47     760  596.82  758.83
   598.7  758.77  600.43  758.63  601.93  758.75  604.02  758.78  614.83  759.87
  614.97   759.9  616.51  760.11  617.63  760.32  618.74   760.6  621.31  761.14
  623.95  761.89  624.07  761.92  624.34     762  628.34  762.89  633.78  764.26
  654.08  768.63  658.73  769.48  667.63  770.76  670.92   771.1  676.98  771.52
   677.7  771.55  679.94  771.78  680.21   771.8  686.22   772.4  690.04  772.59
  764.57  773.46  791.93  774.58  793.43   774.6  798.16   774.8  799.71  774.79
  800.72  774.74  804.83  774.88  805.71  774.81  806.48  774.84  808.37  774.76
  824.85  775.38  825.19  775.38  827.06  775.47   844.3  775.54  845.36  775.58
   850.3  775.59  851.83  775.65  854.93  775.63  855.63  775.66  862.68  775.67
  863.26  775.69  872.54  775.72  884.39   775.2  900.21     774  924.02  769.38
  930.71   768.4  933.13  768.13  933.39  768.11  941.54   767.3  953.56  766.47
  954.89  766.41  958.76  766.05  958.91  766.05  959.39     766  970.89  765.14
  972.21     765  973.98   764.9  975.06  764.79  979.35  764.54  1021.5   763.8
 1033.94  763.76 1034.36  763.77 1064.96  763.78 1082.73  764.23 1100.06     764
 1114.08     766 1120.78     766 1127.62   766.6 1129.77  766.72 1142.07     768
 1156.01     768 1193.16  769.95 1193.38  769.97 1193.91     770 1206.08  769.92
 1282.13     768    1318  764.85 1370.34  760.84 1383.54  760.08  1383.7  760.08
 1427.17  758.21 1430.07     758 1432.31  757.94 1432.56  757.91 1439.79  757.63
 1440.84  757.44 1445.05  757.23 1446.35  756.94 1448.03   756.7  1458.3     756
 1468.87  755.89 1469.46  755.84 1477.57  755.73 1478.94  755.59 1485.28  755.47
 1487.08  755.23 1490.68  755.14  1492.5  754.91  1494.8  754.84 1496.59  754.65
 1498.57  754.58 1505.91     754 1509.69  753.92 1510.07   753.9 1517.59  753.75
 1518.63   753.7 1525.99  753.55 1528.39   753.4 1533.77  753.28 1536.75  753.02
 1539.42  752.95  1541.8  752.69 1543.91  752.63 1546.71  752.31 1547.21   752.3
 1550.81  752.01 1558.67  751.68 1558.94  751.64 1562.36   751.5 1575.68  751.49
 1641.31  750.57 1643.94  750.32 1646.93  749.92 1647.12  749.91 1651.93  749.39
 1653.48  749.33 1655.56  749.13 1657.89  749.04 1659.47   748.9 1675.41     748
 1695.76     748 1696.51  748.03 1709.93  748.18 1719.25  748.08 1741.41  748.69
 1750.62  748.77 1790.41     750  1800.3     750  1819.7  751.98 1819.84  751.99
 1863.25     754 2093.69     754 2108.53  752.98 2127.43     752 2160.55  744.25
 2177.04     740 2190.72     738 2219.06     736 2224.16  734.72 2227.58     734
 2240.91     730 2248.25     728 2294.96     726 2297.35  725.09 2300.64     724
  2312.1  719.95  2334.1  719.95  2356.1  719.95 2367.52     724 2396.27     726
 2408.31     728 2416.43     730 2430.03     734 2456.75     736 2460.06   736.4
 2470.54  737.97 2470.71     738  2477.6     740 2500.34     748 2522.56  754.84
 2527.05     756 2582.38  757.38 2599.38     758 2620.84     760 2631.31     762
 2636.89  764.41 2663.99     776 2679.76     776 2696.28     770 2725.22     760
 2735.16     756 2741.26     754 2751.34     752  2765.2     752 2768.15  753.91
 2768.28     754 2771.33  755.95 2771.57  756.08 2775.65     758 2845.34   759.9
 2845.73  759.92 2848.69     760 2850.45  761.18 2940.52  761.18 3057.47  760.53
 3123.54     760  3148.4     762 3267.09     762 3345.61  764.52 3400.93     766
 3469.22  767.11 3504.98     768 3511.92     768 3524.17  763.75 3529.79     762
 3541.73     760 3554.77     760 3559.71     762 3575.73     768 3588.31     772
 3604.96     774 3644.33     774 3665.88     776 3677.23     778 3682.46     780
 3693.53     786 3699.83     788  3705.3  791.33 3706.59     792 3715.54     792
  3735.5  793.51 3740.52  793.67  3742.5     794 3742.99     794 3779.73  795.72
 3782.77     796 3783.79     796 3788.34  797.15  3792.7  797.38 3795.39  797.72
 3803.85  797.96    3804  797.97 3805.54     798 3806.39  798.11

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .04 2093.69    .027 2527.05     .04 2636.89     .15 2679.76     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2093.69 2527.05              101     101     101             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0    1618   775.8        F
    1618 1863.25     757        F
    2674    3600     770        F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0     100     810    1016    1148     780

CROSS SECTION OUTPUT  Profile #2-yr
***********************************************************************************************
* E.G. Elev (ft)          *  739.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.25  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  739.70  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  729.82  * Flow Area (sq ft)      *          * 3194.86  *          *
* E.G. Slope (ft/ft)      *0.000228  * Area (sq ft)           *          * 3194.86  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  297.46  * Top Width (ft)         *          *  297.46  *          *
```

```
* Vel Total (ft/s)       *    4.01  * Avg. Vel. (ft/s)       *          *    4.01  *          *
* Max Chl Dpth (ft)      *   19.75  * Hydr. Depth (ft)       *          *   10.74  *          *
* Conv. Total (cfs)      *847262.9  * Conv. (cfs)            *          *847262.9  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  302.03  *          *
* Min Ch El (ft)         *  719.95  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.60  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          * 2125.58  *    0.18  *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *  180.11  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)         *  744.16  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  731.98  * Flow Area (sq ft)      *          * 4592.28  *          *
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           *          * 4592.28  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  328.50  * Top Width (ft)         *          *  328.50  *          *
* Vel Total (ft/s)       *    4.46  * Avg. Vel. (ft/s)       *          *    4.46  *          *
* Max Chl Dpth (ft)      *   24.21  * Hydr. Depth (ft)       *          *   13.98  *          *
* Conv. Total (cfs)      *1449407.0  * Conv. (cfs)            *          *1449407.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  334.37  *          *
* Min Ch El (ft)         *  719.95  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.77  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.51  * 2927.41  *    7.81  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.36  *  203.14  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)         *  747.69  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  733.57  * Flow Area (sq ft)      *          * 5796.10  *          *
* E.G. Slope (ft/ft)     *0.000178  * Area (sq ft)           *          * 5796.10  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  353.58  * Top Width (ft)         *          *  353.58  *          *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)       *          *    4.68  *          *
* Max Chl Dpth (ft)      *   27.74  * Hydr. Depth (ft)       *          *   16.39  *          *
* Conv. Total (cfs)      *2032108.0  * Conv. (cfs)            *          *2032108.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  360.47  *          *
* Min Ch El (ft)         *  719.95  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.83  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   15.75  * 3619.71  *   76.53  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    9.30  *  219.75  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)         *  751.19  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.32  * Flow Area (sq ft)      *          * 7079.74  *          *
* E.G. Slope (ft/ft)     *0.000163  * Area (sq ft)           *  397.50  * 7079.74  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  594.45  * Top Width (ft)         *  214.66  *  379.79  *          *
* Vel Total (ft/s)       *    4.87  * Avg. Vel. (ft/s)       *          *    4.87  *          *
* Max Chl Dpth (ft)      *   31.24  * Hydr. Depth (ft)       *          *   18.64  *          *
* Conv. Total (cfs)      *2702265.0  * Conv. (cfs)            *          *2702265.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  387.61  *          *
* Min Ch El (ft)         *  719.95  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.91  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   55.84  * 4315.64  *  286.79  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   25.94  *  231.35  *   94.72  *
*****************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	756.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.040	0.027	0.040
W.S. Elev (ft)	756.45	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	737.61	Flow Area (sq ft)	565.42	9261.10	4.13
E.G. Slope (ft/ft)	0.000135	Area (sq ft)	2709.86	9261.10	125.20
Q Total (cfs)	45500.00	Flow (cfs)	444.46	45054.88	0.66
Top Width (ft)	1131.93	Top Width (ft)	642.05	433.36	56.52
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	0.79	4.86	0.16
Max Chl Dpth (ft)	36.50	Hydr. Depth (ft)	2.45	21.37	0.23
Conv. Total (cfs)	3911720.0	Conv. (cfs)	38211.0	3873452.0	57.0
Length Wtd. (ft)	1.00	Wetted Per. (ft)	230.44	442.03	18.20
Min Ch El (ft)	719.95	Shear (lb/sq ft)	0.02	0.18	0.00
Alpha	1.09	Stream Power (lb/ft s)	0.02	0.86	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	281.62	5389.85	1197.70
C & E Loss (ft)		Cum SA (acres)	126.37	243.56	311.65

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	759.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.040	0.027	0.040
W.S. Elev (ft)	759.01	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	738.99	Flow Area (sq ft)	3388.09	10370.95	156.67
E.G. Slope (ft/ft)	0.000111	Area (sq ft)	4401.89	10370.95	408.82
Q Total (cfs)	54400.00	Flow (cfs)	4917.43	49388.93	93.64
Top Width (ft)	1297.53	Top Width (ft)	695.76	433.36	168.42
Vel Total (ft/s)	3.91	Avg. Vel. (ft/s)	1.45	4.76	0.60
Max Chl Dpth (ft)	39.06	Hydr. Depth (ft)	7.12	23.93	1.88
Conv. Total (cfs)	5152217.0	Conv. (cfs)	465729.3	4677620.0	8868.2
Length Wtd. (ft)	1.00	Wetted Per. (ft)	475.98	442.03	83.29
Min Ch El (ft)	719.95	Shear (lb/sq ft)	0.05	0.16	0.01
Alpha	1.36	Stream Power (lb/ft s)	0.07	0.78	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)	731.24	6031.29	2128.64
C & E Loss (ft)		Cum SA (acres)	229.90	246.43	446.58

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	760.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.040	0.027	0.040
W.S. Elev (ft)	760.64	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	740.17	Flow Area (sq ft)	4159.49	11073.70	304.62
E.G. Slope (ft/ft)	0.000114	Area (sq ft)	5596.14	11073.70	777.22
Q Total (cfs)	63000.00	Flow (cfs)	7002.95	55738.37	258.69
Top Width (ft)	1556.80	Top Width (ft)	788.54	433.36	334.90
Vel Total (ft/s)	4.05	Avg. Vel. (ft/s)	1.68	5.03	0.85
Max Chl Dpth (ft)	40.69	Hydr. Depth (ft)	8.74	25.55	3.14
Conv. Total (cfs)	5897509.0	Conv. (cfs)	655554.6	5217738.0	24216.1
Length Wtd. (ft)	1.00	Wetted Per. (ft)	475.98	442.03	97.30
Min Ch El (ft)	719.95	Shear (lb/sq ft)	0.06	0.18	0.02
Alpha	1.38	Stream Power (lb/ft s)	0.10	0.90	0.02
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1131.96	6431.38	2954.23
C & E Loss (ft)	0.00	Cum SA (acres)	269.09	246.68	624.86

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	763.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.040	0.027	0.040
W.S. Elev (ft)	763.49	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	741.78	Flow Area (sq ft)	5519.20	12312.42	600.35

```
* E.G. Slope (ft/ft)     *0.000107  * Area (sq ft)           * 8124.75  *12312.42  * 2508.80  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *10851.63  *64326.86  *  721.51  *
* Top Width (ft)         * 2109.62  * Top Width (ft)         *  931.27  *  433.36  *  744.99  *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *    1.97  *    5.22  *    1.20  *
* Max Chl Dpth (ft)      *   43.54  * Hydr. Depth (ft)       *   11.60  *   28.41  *    5.57  *
* Conv. Total (cfs)      *7346538.0  * Conv. (cfs)            *1050354.0  *6226347.0  * 69836.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  475.98  *  442.03  *  108.34  *
* Min Ch El (ft)         *  719.95  * Shear (lb/sq ft)       *    0.08  *    0.19  *    0.04  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.15  *    0.97  *    0.04  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1947.02  * 7080.14  * 4775.63  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  321.84  *  247.65  *  840.15  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  753.40  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  753.02  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.24  * Flow Area (sq ft)      *          * 7795.83  *          *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           *  890.89  * 7795.83  *   17.54  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  734.53  * Top Width (ft)         *  305.28  *  408.68  *   20.57  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *          *    4.96  *          *
* Max Chl Dpth (ft)      *   33.07  * Hydr. Depth (ft)       *          *   19.08  *          *
* Conv. Total (cfs)      *3022591.0  * Conv. (cfs)            *          *3022591.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  416.90  *          *
* Min Ch El (ft)         *  719.95  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.95  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   95.18  * 4678.60  *  470.67  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   44.25  *  236.21  *  137.09  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 7.285

INPUT
Description: I-70 Bridge
COE River Station=29386.24
Preliminary Model River
             Station=11486

1st bridge doesn't have any specs...just an
             approximation of where it is.
Distance from Upstream XS =       1
Deck/Roadway Width        =      99
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=      63
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       1   793.5     700     150   791.5     700     300     788     700
   399.2  784.75     700   399.3  784.75  779.75   644.5  779.75  774.75
   644.6  779.75     700     750     780     700     900     777     700
    1050     774     700    1200   773.5     700    1350   773.5     700
    1500     774     700 1619.11  773.91     700 1619.12  773.91  768.54
 1677.99  775.03  769.66 1702.41  775.67   767.8 1721.51  776.36  770.99
 1782.47  777.67   772.3 1807.72  778.49  770.62 1832.72  779.35  773.98
 1889.75  781.25  775.88  1909.5  781.94  771.48 2094.42  788.97  778.51
 2130.42  790.22  775.18 2166.42  791.48  781.02 2331.42  797.26   786.8
 2367.42  798.52  783.48 2403.42  799.78  789.32 2584.81  805.57  795.11
  2605.1  806.28  799.49  2697.2  809.36  802.57 2716.99  809.99  799.95
 2735.99  810.88  804.09  2823.3  813.02  806.23  2846.3  813.82  803.78
  2870.3  814.74  807.95 2956.61  816.48  809.69 2975.61  817.18  807.14
 3015.61  817.98  811.19 3064.92  819.47  812.68 3104.92  820.06  810.02
 3144.92  820.64  813.85 3194.23  821.97  815.18 3234.23  822.46  812.42
 3274.23  822.79     816 3349.33  824.37  817.58 3369.25  824.62  814.58
```

3398.02	824.97	818.18	3484.8	825.5	818.71	3507.8	825.74	815.7
3530.8	826.42	819.63	3623.35	826.85	820.06	3646.35	826.99	816.95
3669.35	827.16	820.37	3737.9	827.4	820.61	3760.9	827.56	817.52
3783.9	827.67	819.63	3783.9	827.8	824.3	3849.91	828.1	824.6
3913.91	828.42	824.92	3983.91	828.77	825.27	4042.16	829.05	825.55

Upstream Bridge Cross Section Data
Station Elevation Data num= 364

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	799.95	3.16	799.55	16.21	799.33	18.43	799.18	19.61	799.03
21.81	798.97	23.55	798.73	25.26	798.67	27.3	798.35	28.08	798.33
30.17	798.04	30.67	798	32.23	797.94	60.85	797.69	64.38	797.32
69.4	797.25	70.11	797.14	71.25	797.12	72.44	796.99	73.4	796.98
74.73	796.84	75.81	796.81	76.77	796.65	78.26	796.27	78.79	796.24
81.4	796	87.49	796	89.04	795.69	89.15	795.68	94.52	795.46
95.39	795.28	97.4	794.76	99.52	794.59	99.91	794.44	100.47	794.35
109.45	793.71	109.8	793.66	112.12	793.5	113.56	793.29	115.78	793.1
117.26	792.85	118.57	792.72	120.18	792.42	120.66	792.36	130.09	790.58
132.58	790	134.65	789.63	134.85	789.57	136.21	789.34	136.85	789.18
138.13	788.96	140.99	788.24	141.35	788.17	141.96	788	144.02	787.5
144.55	787.34	146.07	786.98	148.75	786.17	149.04	786.09	149.31	786
150.92	785.59	151.14	785.52	153.37	784.94	154.85	784.5	155.55	784.32
156.51	784	160.22	783.02	161.98	782.46	162.52	782.32	163.51	782
167.7	780.81	169.79	780.04	169.91	780	174.13	778.78	176.34	778
177.44	778	182.08	776.69	182.84	776.54	185.1	776	186.59	775.58
191.45	774.34	191.95	774.23	192.16	774.19	194.81	773.51	195.18	773.38
199.18	772.34	199.38	772.3	202.99	771.4	204.18	771.14	204.93	770.95
205.8	770.78	208.03	770.13	208.16	770.1	208.47	770	208.68	770
209.86	769.82	209.96	769.8	211.57	769.79	211.72	769.77	214.58	769.71
214.81	769.68	215.15	769.66	224.08	769.56	240.42	769.76	262.69	769.47
359.72	769.03	379.92	769.34	402.92	769.29	403.15	769.28	433.71	769.33
436.53	769.12	439.04	768.67	441.43	768	441.89	767.89	442.19	767.8
454.94	764.26	462.43	762	467.54	762	476.14	760.62	508.64	761.56
509.84	761.54	514.29	761.71	572.53	760	590.47	760	596.82	758.83
598.7	758.77	600.43	758.63	601.93	758.75	604.02	758.78	614.83	759.87
614.97	759.9	616.51	760.11	617.63	760.32	618.74	760.6	621.31	761.14
623.95	761.89	624.07	761.92	624.34	762	628.34	762.89	633.78	764.26
654.08	768.63	658.73	769.48	667.63	770.76	670.92	771.1	676.98	771.52
677.7	771.55	679.94	771.78	680.21	771.8	686.22	772.4	690.04	772.59
764.57	773.46	791.93	774.58	793.43	774.6	798.16	774.8	799.71	774.79
800.72	774.74	804.83	774.88	805.71	774.81	806.48	774.84	808.37	774.76
824.85	775.38	825.19	775.38	827.06	775.47	844.3	775.54	845.36	775.58
850.3	775.59	851.83	775.65	854.93	775.63	855.63	775.66	862.68	775.67
863.26	775.69	872.54	775.72	884.39	775.2	900.21	774	924.02	769.38
930.71	768.4	933.13	768.13	933.39	768.11	941.54	767.3	953.56	766.47
954.89	766.41	958.76	766.05	958.91	766.05	959.39	766	970.89	765.14
972.21	765	973.98	764.9	975.06	764.79	979.35	764.54	1021.5	763.8
1033.94	763.76	1034.36	763.77	1064.96	763.78	1082.73	764.23	1100.06	764
1114.08	766	1120.78	766	1127.62	766.6	1129.77	766.72	1142.07	768
1156.01	768	1193.16	769.95	1193.38	769.97	1193.91	770	1206.08	769.92
1282.13	768	1318	764.85	1370.34	760.84	1383.54	760.08	1383.7	760.08
1427.17	758.21	1430.07	758	1432.31	757.94	1432.56	757.91	1439.79	757.63
1440.84	757.44	1445.05	757.23	1446.35	756.94	1448.03	756.7	1458.3	756
1468.87	755.89	1469.46	755.84	1477.57	755.73	1478.94	755.59	1485.28	755.47
1487.08	755.23	1490.68	755.14	1492.5	754.91	1494.8	754.84	1496.59	754.65
1498.57	754.58	1505.91	754	1509.69	753.92	1510.07	753.9	1517.59	753.75
1518.63	753.7	1525.99	753.55	1528.39	753.4	1533.77	753.28	1536.75	753.02
1539.42	752.95	1541.8	752.69	1543.91	752.63	1546.71	752.31	1547.21	752.3
1550.81	752.01	1558.67	751.68	1558.94	751.64	1562.36	751.5	1575.68	751.49
1641.31	750.57	1643.94	750.32	1646.93	749.92	1647.12	749.91	1651.93	749.39
1653.48	749.33	1655.56	749.13	1657.89	749.04	1659.47	748.9	1675.41	748
1695.76	748	1696.51	748.03	1709.93	748.18	1719.25	748.08	1741.41	748.69
1750.62	748.77	1790.41	750	1800.3	750	1819.7	751.98	1819.84	751.99
1863.25	754	2093.69	754	2108.53	752.98	2127.43	752	2160.55	744.25
2177.04	740	2190.72	738	2219.06	736	2224.16	734.72	2227.58	734
2240.91	730	2248.25	728	2294.96	726	2297.35	725.09	2300.64	724
2312.1	719.95	2334.1	719.95	2356.1	719.95	2367.52	724	2396.27	726
2408.31	728	2416.43	730	2430.03	734	2456.75	736	2460.06	736.4
2470.54	737.97	2470.71	738	2477.6	740	2500.34	748	2522.56	754.84
2527.05	756	2582.38	757.38	2599.38	758	2620.84	760	2631.31	762
2636.89	764.41	2663.99	776	2679.76	776	2696.28	770	2725.22	760
2735.16	756	2741.26	754	2751.34	752	2765.2	752	2768.15	753.91
2768.28	754	2771.33	755.95	2771.57	756.08	2775.65	758	2845.34	759.9
2845.73	759.92	2848.69	760	2850.45	761.18	2940.52	761.18	3057.47	760.53
3123.54	760	3148.4	762	3267.09	762	3345.61	764.52	3400.93	766

3469.22	767.11	3504.98	768	3511.92	768	3524.17	763.75	3529.79	762
3541.73	760	3554.77	760	3559.71	762	3575.73	768	3588.31	772
3604.96	774	3644.33	774	3665.88	776	3677.23	778	3682.46	780
3693.53	786	3699.83	788	3705.3	791.33	3706.59	792	3715.54	792
3735.5	793.51	3740.52	793.67	3742.5	794	3742.99	794	3779.73	795.72
3782.77	796	3783.79	796	3788.34	797.15	3792.7	797.38	3795.39	797.72
3803.85	797.96	3804	797.97	3805.54	798	3806.39	798.11		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	2093.69	.027	2527.05	.04	2636.89	.15	2679.76	.05

Bank Sta: Left Right Coeff Contr. Expan.
2093.69 2527.05 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	1618	775.8	F
1618	1863.25	757	F
2674	3600	770	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	100	810	1016	1148	780

Downstream Deck/Roadway Coordinates
num= 63

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
262	792	700	411	790	700	561	787	700
711	785	700	732.5	784.75	700	732.6	784.75	779.75
1045.4	779.75	774.75	1045.5	779.75	700	1161	776	700
1311	774	700	1461	773	700	1611	773.5	700
1761	773.5	700	1807.58	773.91	700	1807.59	773.91	768.54
1863.88	775.03	769.66	1890.88	775.67	767.8	1918.88	776.36	770.99
1970.19	777.67	772.3	1996.19	778.49	770.62	2024.19	779.35	773.98
2078.22	781.25	775.88	2097.97	781.94	771.48	2282.89	788.97	778.51
2318.89	790.22	775.18	2354.89	791.48	781.02	2519.89	797.26	786.8
2555.89	798.52	783.48	2591.89	799.78	789.32	2773.28	805.57	795.11
2793.57	806.28	799.49	2885.67	809.36	802.57	2905.46	809.99	799.95
2924.46	810.88	804.09	3011.77	813.02	806.23	3034.77	813.82	803.78
3058.77	814.74	807.95	3145.08	816.48	809.69	3164.08	817.18	807.14
3204.08	817.98	811.19	3253.39	819.47	812.68	3293.39	820.06	810.02
3333.39	820.64	813.85	3382.7	821.97	815.18	3422.7	822.46	812.42
3462.7	822.79	816	3537.8	824.37	817.58	3557.72	824.62	814.58
3581.72	824.97	818.18	3673.27	825.5	818.71	3696.27	825.74	815.7
3719.27	826.42	819.63	3811.82	826.85	820.06	3834.82	826.99	816.95
3857.82	827.16	820.37	3926.37	827.4	820.61	3949.37	827.56	817.52
3972.37	827.67	819.63	3972.37	827.8	824.3	4038.38	828.1	824.6
4102.38	828.42	824.92	4172.38	828.77	825.27	4230.63	829.05	825.55

Downstream Bridge Cross Section Data
Station Elevation Data num= 298

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
261	790.42	306.66	789.64	310.16	789.64	311.24	789.61	349.52	790
428.6	790	431.98	789.83	433.43	789.83	434.72	789.56	438.53	789.52
452.54	788.4	465.73	788	515.21	788	529.31	786.86	529.77	786.83
530.91	786.78	531.35	786.75	574.83	786	592.01	786	593.24	785.93
593.51	785.92	599.65	785.59	614.3	785	626.36	784.74	626.93	784.71
636.95	784.48	637.17	784.47	640.68	784.41	657.62	784	677.95	784
678.18	784.01	679.19	784	708	782.75	711.31	782.67	711.48	782.66
713.25	782.62	717.53	782	725.93	782	732.68	780	737.77	778.33
744.74	776.27	754.34	772.99	762.32	770	771.74	768	796.09	762
820.55	760	930.42	760	939.06	758.77	939.23	758.75	954.41	758
963.07	758	981.24	759.63	983.03	759.75	984.9	759.82	985.3	759.85
991.82	760	994.78	760.14	994.93	760.14	998.75	760.36	998.95	760.38
999.89	760.45	1000.24	760.46	1000.92	760.53	1001.49	760.61	1002.41	760.66
1005.08	760.67	1023.55	760.25	1023.97	760.22	1027.47	760.04	1027.57	760.04
1028.09	760	1032.87	759.73	1033.07	759.74	1072.86	759.49	1086.46	759.57
1088.46	759.64	1101	759.64	1101.93	759.72	1126.52	759.81	1127.13	759.85
1145.1	759.91	1145.36	759.93	1163.63	759.97	1164.48	760	1224.37	760.56
1242.06	760.44	1242.75	760.45	1248.13	760.43	1248.93	760.45	1261.46	760.61
1309.35	760.06	1309.55	760.05	1456.37	759.94	1504.08	758.27	1506.2	758.29
1507.37	758.12	1507.71	758.12	1510.54	758.01	1554.39	758	1557.24	757.5
1560.99	757.49	1561.15	757.47	1564.76	757.44	1565.12	757.42	1573.43	757.28

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 1576.53  757.15 1578.17  757.03 1580.45  756.95 1583.75  756.69 1587.36  756.58
 1588.51  756.51 1627.82  755.92 1627.95  755.93 1632.02  755.91 1632.22  755.92
 1634.33  755.98 1634.57     756 1637.11  756.12 1637.29  756.12 1640.42  756.26
 1644.35  756.26  1653.2     756 1654.57  755.92 1654.78  755.92 1661.33  755.58
  1663.3  755.57 1669.23  755.34 1703.63  754.64 1720.24     754 1732.75  752.89
 1734.55  752.79  1735.3  752.81 1736.08   752.8 1736.83  752.87  1737.7  752.88
 1738.52  752.97 1739.64     753 1740.41  753.09 1741.94  753.13 1742.91  753.22
 1743.26  753.24 1743.47  753.24 1743.89  753.23 1745.94  753.26 1748.14   753.2
 1750.49  753.21 1752.18  753.15 1754.51  753.15 1760.45  753.04 1761.15  753.04
 1762.11  753.01 1763.06  753.05 1764.03  753.01 1765.21  753.02 1769.79  752.79
 1779.64     752 1785.74  751.24 1787.82  751.02 1790.19   750.8 1791.78   750.7
 1793.04  750.56 1797.74  750.31 1798.48  750.23 1802.46     750 1803.76  749.79
 1804.05  749.75 1806.21  749.21 1807.92  748.93 1809.34  748.52 1813.39     748
 1843.04     748 1843.65  747.85 1846.84     748 1848.16  748.02 1848.27  748.03
 1853.17  748.13 1881.53  749.31 1894.49     750 1925.51     754 2080.03     754
 2083.15  753.89 2083.54  753.86 2083.73  753.86 2120.76     752 2169.38  740.06
 2169.53  740.03 2169.64     740 2179.01  738.04 2179.18     738 2199.33     736
 2223.31     734 2250.59     728 2263.28     726 2291.79     724  2312.1  719.85
  2334.1  719.85  2356.1  719.85 2376.36     724 2403.33  726.65 2414.83  727.99
 2440.85     734  2455.5     736 2480.99     738 2481.38  738.09 2481.64  738.16
 2522.32     748 2537.22     752 2537.66  752.06 2537.94  752.09 2545.23   753.1
 2550.56     754 2620.43     758 2668.18     760 2682.22     762 2683.52  762.06
 2701.42  762.39 2703.23  762.37 2703.61  762.38 2705.22  762.36  2710.7  762.82
 2713.09  763.15 2713.95  763.18    2719     764 2730.57     764 2732.71  763.92
 2732.93  763.92 2740.97  763.62 2744.05  763.42 2749.95  763.18 2758.72  762.41
 2760.46  762.32 2763.25     762 2778.73     762  2780.7  762.09 2809.03     764
 2809.14  764.08 2822.36     774 2822.49   774.1 2825.05     776 2836.06     776
 2850.78  769.37 2857.67  766.06 2857.89  765.95 2866.07     762  2869.9     760
 2875.16     758 2883.23     756 2891.14     754 2898.25  752.47 2900.46  752.22
 2902.37   752.1 2903.51  752.08 2903.74  752.12 2906.36  752.35 2907.94  752.66
  2910.7  753.05 2932.38  757.79 2932.75  757.86 2933.34     758 2953.98     760
 3267.67     760 3283.41     762 3286.15  762.09 3325.67  762.08 3329.26     762
 3402.29     762 3403.05  762.23 3406.65  763.73 3407.33     764 3442.42     766
 3606.29     766 3627.13     762  3638.1     762 3654.02     768 3656.08  768.65
 3660.01     770 3668.69     772 3693.95     774 3764.55     774 3789.23     776
 3792.56  777.07 3795.89     778  3799.1   778.8 3806.36  780.06 3823.64  782.23
 3836.24     784 3892.58  793.87 3909.79  796.96 3914.44  797.92 3914.76     798
 3917.78  798.93  3920.8  800.31 3923.98     802 3926.39  802.26  3927.1  802.26
 3927.57  802.28 3938.06  803.11 3946.47  803.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
     261     .04 2120.76    .027 2550.56     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
      2120.76 2550.56           .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
     261    1806   775.8       F
    1806 1925.51     757       F
    2832    3671     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************
     261     311     810    1195    1333     780

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  3

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
   399.3  779.75   462.7     760
Downstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
   732.6  779.75   804.2     760
```

```
Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
   593.2     760   644.5  774.75
Downstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
   971.4     760  1045.4  774.75

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
 1619.12  768.54 1704.74     740
Downstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
 1807.59  768.54 1893.21     740

Number of Piers =  18

Pier Data
Pier Station     Upstream= 1702.41    Downstream= 1890.88
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.25     739    4.25   767.8
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.25     739    4.25   767.8

Pier Data
Pier Station     Upstream= 1807.72    Downstream= 1996.19
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.25     738    4.25  770.62
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.25     738    4.25  770.62

Pier Data
Pier Station     Upstream=  1909.5    Downstream= 2097.97
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    5.25     746    5.25  771.48
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    5.25     746    5.25  771.48

Pier Data
Pier Station     Upstream= 2130.42    Downstream= 2318.89
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.61     718     5.5  775.18
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.61     718     5.5  775.18

Pier Data
Pier Station     Upstream= 2367.42    Downstream= 2555.89
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.78     718     5.5  783.48
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
```

```
    6.78     718     5.5  783.48

Pier Data
Pier Station     Upstream= 2584.81    Downstream= 2773.28
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    5.25   757.5    5.25  795.11
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    5.25   757.5    5.25  795.11

Pier Data
Pier Station     Upstream= 2716.99    Downstream= 2905.46
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     756    4.75  799.95
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     756    4.75  799.95

Pier Data
Pier Station     Upstream=  2846.3    Downstream= 3034.77
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     756    4.75  803.78
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     756    4.75  803.78

Pier Data
Pier Station     Upstream= 2975.61    Downstream= 3164.08
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     760    4.75  807.14
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     760    4.75  807.14

Pier Data
Pier Station     Upstream= 3104.92    Downstream= 3293.39
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     765    4.75  810.02
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     765    4.75  810.02

Pier Data
Pier Station     Upstream= 3234.23    Downstream=  3422.7
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     764    4.75  812.42
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.75     764    4.75  812.42

Pier Data
Pier Station     Upstream= 3369.25    Downstream= 3557.72
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5   759.5       5  814.58
Downstream     num=       2
    Width   Elev    Width   Elev
```

```
********************************
       5   759.5       5  814.58

Pier Data
Pier Station     Upstream=  3507.8    Downstream= 3696.27
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       5   762.5       5   815.7
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       5   762.5       5   815.7

Pier Data
Pier Station     Upstream= 3646.35    Downstream= 3834.82
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       5   772.5       5  816.95
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       5   772.5       5  816.95

Pier Data
Pier Station     Upstream=  3760.9    Downstream= 3949.37
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.33   789.3    3.33  817.52
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.33   789.3    3.33  817.52

Pier Data
Pier Station     Upstream= 3849.91    Downstream= 4038.38
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       5   800.7       5   824.6
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       5   800.7       5   824.6

Pier Data
Pier Station     Upstream= 3913.91    Downstream= 4102.38
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.25   803.5    3.25  824.92
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.25   803.5    3.25  824.92

Pier Data
Pier Station     Upstream= 3983.91    Downstream= 4172.38
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.25   804.6    3.25  825.27
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    3.25   804.6    3.25  825.27

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =     .95
Selected Low Flow Methods = Yarnell
```

```
High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =      .5
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     739.95  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     739.70  * E.G. Elev (ft)         *     739.96  *     739.92  *
* Q Total (cfs)          *   12800.00  * W.S. Elev (ft)         *     739.69  *     739.69  *
* Q Bridge (cfs)         *   12800.00  * Crit W.S. (ft)         *     730.03  *     729.36  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.74  *      19.84  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.14  *       3.81  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3088.91  *    3356.94  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   23723.07  *   25823.17  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      10.61  *      10.81  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *     327.45  *     353.36  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *   758944.4  *   828686.6  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     291.03  *     310.67  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.14  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.17  *       0.14  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.69  *       0.54  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     744.47  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     744.16  * E.G. Elev (ft)         *     744.48  *     744.43  *
* Q Total (cfs)          *   20500.00  * W.S. Elev (ft)         *     744.15  *     744.15  *
* Q Bridge (cfs)         *   20500.00  * Crit W.S. (ft)         *     732.22  *     731.60  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.20  *      24.30  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.60  *       4.25  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4457.73  *    4824.29  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   41771.29  *   45183.99  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      13.84  *      13.88  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *     368.72  *     400.14  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  1292278.0  *  1395970.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     322.18  *     347.56  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.60  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.19  *       0.16  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.87  *       0.69  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     748.03  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     747.69  * E.G. Elev (ft)         *     748.04  *     747.98  *
* Q Total (cfs)          *   27100.00  * W.S. Elev (ft)         *     747.68  *     747.68  *
* Q Bridge (cfs)         *   27100.00  * Crit W.S. (ft)         *     733.82  *     733.19  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.73  *      27.83  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.81  *       4.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5639.37  *    6102.47  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.19  *
```

```
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   60683.58  *   65472.21  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      16.24  *      16.20  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *     401.87  *     437.00  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  1805625.0  *  1947526.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     347.33  *     376.60  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.81  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.20  *       0.17  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.95  *       0.75  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     751.56  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     751.19  * E.G. Elev (ft)         *     751.57  *     751.51  *
* Q Total (cfs)          *   34500.00  * W.S. Elev (ft)         *     751.18  *     751.18  *
* Q Bridge (cfs)         *   34500.00  * Crit W.S. (ft)         *     735.66  *     734.91  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.23  *      31.33  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.00  *       4.62  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6900.52  *    7469.38  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   83922.57  *   90414.56  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      18.59  *      18.48  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *     434.05  *     472.33  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  2401087.0  *  2589858.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     503.29  *     443.82  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.00  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.20  *       0.18  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.02  *       0.81  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     756.82  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     756.45  * E.G. Elev (ft)         *     756.83  *     756.78  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     756.45  *     756.45  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     737.95  *     737.20  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.50  *      36.60  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.75  *       4.46  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9574.40  *   10204.41  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  128009.90  *  137795.30  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      14.41  *      15.79  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *     753.17  *     741.23  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  3427464.0  *  3857765.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     902.18  *     763.82  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.75  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.14  *       0.12  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.66  *       0.53  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     759.34  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     759.01  * E.G. Elev (ft)         *     759.36  *     759.36  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     759.01  *     759.01  *
* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     739.32  *     738.61  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.06  *      39.16  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.15  *       4.34  *
```

```
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   13115.80  *   12523.62  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *       0.12  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  163649.30  *  169981.70  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      14.08  *      16.00  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *    1095.94  *     937.95  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *  4409301.0  *  4714288.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *    1016.58  *     883.22  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.34  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.11  *       0.11  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.47  *       0.48  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     760.99  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     760.64  * E.G. Elev (ft)         *     760.99  *     760.97  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     760.60  *     760.56  *
* Q Bridge (cfs)         *   63000.00  * Crit W.S. (ft)         *     740.50  *     739.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.65  *      40.71  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.31  *       4.57  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   14616.52  *   13771.95  *
* Weir Submerg           *             * Froude # Chl           *       0.61  *       0.82  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  187404.40  *  192322.60  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      15.38  *      16.90  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *    1136.81  *     989.44  *
* Delta EG (ft)          *       0.03  * Conv. Total (cfs)      *  4984002.0  *  5254645.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *    1214.37  *    1364.76  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *       4.57  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.13  *       0.12  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.55  *       0.57  *
*****************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     763.86  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     763.49  * E.G. Elev (ft)         *     763.86  *     763.84  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     763.45  *     763.39  *
* Q Bridge (cfs)         *   75900.00  * Crit W.S. (ft)         *     742.10  *     741.33  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.50  *      43.54  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.37  *       4.69  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   17359.21  *   16182.47  *
* Weir Submerg           *             * Froude # Chl           *       0.37  *       0.42  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  235194.40  *  237170.90  *
* Min El Weir Flow (ft)  *     773.92  * Hydr Depth (ft)        *      17.90  *      17.65  *
* Min El Prs (ft)        *     824.40  * W.P. Total (ft)        *    1196.86  *    1129.29  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *  6102930.0  *  6314238.0  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *    1729.79  *    1658.89  *
* BR Open Area (sq ft)   *   86623.04  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *       4.69  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.14  *       0.13  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.61  *       0.61  *
*****************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	753.40	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	753.02	E.G. Elev (ft)	753.41	753.35
Q Total (cfs)	38700.00	W.S. Elev (ft)	753.01	753.01
Q Bridge (cfs)	38700.00	Crit W.S. (ft)	736.61	735.84
Q Weir (cfs)		Max Chl Dpth (ft)	33.06	33.16
Weir Sta Lft (ft)		Vel Total (ft/s)	5.10	4.70
Weir Sta Rgt (ft)		Flow Area (sq ft)	7595.52	8232.42
Weir Submerg		Froude # Chl	0.21	0.19
Weir Max Depth (ft)		Specif Force (cu ft)	97954.91	105488.90
Min El Weir Flow (ft)	773.92	Hydr Depth (ft)	19.16	18.79
Min El Prs (ft)	824.40	W.P. Total (ft)	466.18	510.19
Delta EG (ft)	0.06	Conv. Total (cfs)	2686544.0	2965962.0
Delta WS (ft)	0.01	Top Width (ft)	584.71	507.37
BR Open Area (sq ft)	86623.04	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.10	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.21	0.17
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.08	0.81

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 7.275

INPUT
Description: d/s Face I-70

COE Riverstation=29546.24
Preliminary Model
Riverstation=11327.93

Reach lengths have been increased by
43.42, 109.5 and 65.49 to account for the distance between the
assumed and the actual location of the I-70 bridge face sections.
Station Elevation Data num= 298

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
261	790.42	306.66	789.64	310.16	789.64	311.24	789.61	349.52	790
428.6	790	431.98	789.83	433.43	789.83	434.72	789.56	438.53	789.52
452.54	788.4	465.73	788	515.21	788	529.31	786.86	529.77	786.83
530.91	786.78	531.35	786.75	574.83	786	592.01	786	593.24	785.93
593.51	785.92	599.65	785.59	614.3	785	626.36	784.74	626.93	784.71
636.95	784.48	637.17	784.47	640.68	784.41	657.62	784	677.95	784
678.18	784.01	679.19	784	708	782.75	711.31	782.67	711.48	782.66
713.25	782.62	717.53	782	725.93	782	732.68	780	737.77	778.33
744.74	776.27	754.34	772.99	762.32	770	771.74	768	796.09	762
820.55	760	930.42	760	939.06	758.77	939.23	758.75	954.41	758
963.07	758	981.24	759.63	983.03	759.75	984.9	759.82	985.3	759.85
991.82	760	994.78	760.14	994.93	760.14	998.75	760.36	998.95	760.38
999.89	760.45	1000.24	760.46	1000.92	760.53	1001.49	760.61	1002.41	760.66
1005.08	760.67	1023.55	760.25	1023.97	760.22	1027.47	760.04	1027.57	760.04
1028.09	760	1032.87	759.73	1033.07	759.74	1072.86	759.49	1086.46	759.57
1088.46	759.64	1101	759.64	1101.93	759.72	1126.52	759.81	1127.13	759.85
1145.1	759.91	1145.36	759.93	1163.63	759.97	1164.48	760	1224.37	760.56
1242.06	760.44	1242.75	760.45	1248.13	760.43	1248.93	760.45	1261.46	760.61
1309.35	760.06	1309.55	760.05	1456.37	759.94	1504.08	758.27	1506.2	758.29
1507.37	758.12	1507.71	758.12	1510.54	758.01	1554.39	758	1557.24	757.5
1560.99	757.49	1561.15	757.47	1564.76	757.44	1565.12	757.42	1573.43	757.28
1576.53	757.15	1578.17	757.03	1580.45	756.95	1583.75	756.69	1587.36	756.58
1588.51	756.51	1627.82	755.92	1627.95	755.93	1632.02	755.91	1632.22	755.92
1634.33	755.98	1634.57	756	1637.11	756.12	1637.29	756.12	1640.42	756.26
1644.35	756.26	1653.2	756	1654.57	755.92	1654.78	755.92	1661.33	755.58
1663.3	755.57	1669.23	755.34	1703.63	754.64	1720.24	754	1732.75	752.89
1734.55	752.79	1735.3	752.81	1736.08	752.8	1736.83	752.87	1737.7	752.88
1738.52	752.97	1739.64	753	1740.41	753.09	1741.94	753.13	1742.91	753.22
1743.26	753.24	1743.47	753.24	1743.89	753.23	1745.94	753.26	1748.14	753.2
1750.49	753.21	1752.18	753.15	1754.51	753.15	1760.45	753.04	1761.15	753.04
1762.11	753.01	1763.06	753.05	1764.03	753.01	1765.21	753.02	1769.79	752.79

```
 1779.64     752 1785.74  751.24 1787.82  751.02 1790.19   750.8 1791.78   750.7
 1793.04  750.56 1797.74  750.31 1798.48  750.23 1802.46     750 1803.76  749.79
 1804.05  749.75 1806.21  749.21 1807.92  748.93 1809.34  748.52 1813.39     748
 1843.04     748 1843.65  747.85 1846.84     748 1848.16  748.02 1848.27  748.03
 1853.17  748.13 1881.53  749.31 1894.49     750 1925.51     754 2080.03     754
 2083.15  753.89 2083.54  753.86 2083.73  753.86 2120.76     752 2169.38  740.06
 2169.53  740.03 2169.64     740 2179.01  738.04 2179.18     738 2199.33     736
 2223.31     734 2250.59     728 2263.28     726 2291.79     724  2312.1  719.85
  2334.1  719.85  2356.1  719.85 2376.36     724 2403.33  726.65 2414.83  727.99
 2440.85     734  2455.5     736 2480.99     738 2481.38  738.09 2481.64  738.16
 2522.32     748 2537.22     752 2537.66  752.06 2537.94  752.09 2545.23   753.1
 2550.56     754 2620.43     758 2668.18     760 2682.22     762 2683.52  762.06
 2701.42  762.39 2703.23  762.37 2703.61  762.38 2705.22  762.36  2710.7  762.82
 2713.09  763.15 2713.95  763.18    2719     764 2730.57     764 2732.71  763.92
 2732.93  763.92 2740.97  763.62 2744.05  763.42 2749.95  763.18 2758.72  762.41
 2760.46  762.32 2763.25     762 2778.73     762  2780.7  762.09 2809.03     764
 2809.14  764.08 2822.36     774 2822.49   774.1 2825.05     776 2836.06     776
 2850.78  769.37 2857.67  766.06 2857.89  765.95 2866.07     762  2869.9     760
 2875.16     758 2883.23     756 2891.14     754 2898.25  752.47 2900.46  752.22
 2902.37   752.1 2903.51  752.08 2903.74  752.12 2906.36  752.35 2907.94  752.66
  2910.7  753.05 2932.38  757.79 2932.75  757.86 2933.34     758 2953.98     760
 3267.67     760 3283.41     762 3286.15  762.09 3325.67  762.08 3329.26     762
 3402.29     762 3403.05  762.23 3406.65  763.73 3407.33     764 3442.42     766
 3606.29     766 3627.13     762  3638.1     762 3654.02     768 3656.08  768.65
 3660.01     770 3668.69     772 3693.95     774 3764.55     774 3789.23     776
 3792.56  777.07 3795.89     778  3799.1   778.8 3806.36  780.06 3823.64  782.23
 3836.24     784 3892.58  793.87 3909.79  796.96 3914.44  797.92 3914.76     798
 3917.78  798.93  3920.8  800.31 3923.98     802 3926.39  802.26  3927.1  802.26
 3927.57  802.28 3938.06  803.11 3946.47  803.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
     261     .04 2120.76    .027 2550.56     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2120.76 2550.56           201.34  756.34 1098.23             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
     261    1806   775.8       F
    1806 1925.51     757       F
    2832    3671     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
     261     311     810    1195    1333     780

CROSS SECTION OUTPUT  Profile #2-yr
**************************************************************************************************
* E.G. Elev (ft)         *  739.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  739.69  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  729.04  * Flow Area (sq ft)      *          * 3483.55  *          *
* E.G. Slope (ft/ft)     *0.000185  * Area (sq ft)           *          * 3483.55  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  316.85  * Top Width (ft)          *          *  316.85  *          *
* Vel Total (ft/s)       *    3.67  * Avg. Vel. (ft/s)        *          *    3.67  *          *
* Max Chl Dpth (ft)      *   19.84  * Hydr. Depth (ft)        *          *   10.99  *          *
* Conv. Total (cfs)      *941205.8  * Conv. (cfs)             *          *941205.8  *          *
* Length Wtd. (ft)       *  756.34  * Wetted Per. (ft)        *          *  320.24  *          *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)        *          *    0.13  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.46  *          *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)    *          * 2118.11  *    0.18  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *  179.41  *    0.15  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**************************************************************************************************
* E.G. Elev (ft)         *  744.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.15  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  731.24  * Flow Area (sq ft)      *          * 4978.30  *          *
* E.G. Slope (ft/ft)     *0.000167  * Area (sq ft)           *          * 4978.30  *          *
```

```
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  353.66  * Top Width (ft)          *          *  353.66  *          *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)        *          *    4.12  *          *
* Max Chl Dpth (ft)      *   24.30  * Hydr. Depth (ft)        *          *   14.08  *          *
* Conv. Total (cfs)      *1583985.0  * Conv. (cfs)             *          *1583985.0  *          *
* Length Wtd. (ft)       *  756.34  * Wetted Per. (ft)        *          *  358.12  *          *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)        *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.60  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)    *    1.51  * 2916.65  *    7.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    2.36  *  202.36  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)         *  747.68  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  732.82  * Flow Area (sq ft)      *          * 6277.90  *          *
* E.G. Slope (ft/ft)     *0.000150  * Area (sq ft)           *          * 6277.90  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  382.63  * Top Width (ft)          *          *  382.63  *          *
* Vel Total (ft/s)       *    4.32  * Avg. Vel. (ft/s)        *          *    4.32  *          *
* Max Chl Dpth (ft)      *   27.83  * Hydr. Depth (ft)        *          *   16.41  *          *
* Conv. Total (cfs)      *2210471.0  * Conv. (cfs)             *          *2210471.0  *          *
* Length Wtd. (ft)       *  756.34  * Wetted Per. (ft)        *          *  387.93  *          *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)        *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.66  *          *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)    *   15.75  * 3606.09  *   76.53  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    9.30  *  218.91  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)         *  751.18  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  734.47  * Flow Area (sq ft)      *          * 7665.81  *          *
* E.G. Slope (ft/ft)     *0.000138  * Area (sq ft)           *  256.49  * 7665.81  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  527.39  * Top Width (ft)          *  117.33  *  410.06  *          *
* Vel Total (ft/s)       *    4.50  * Avg. Vel. (ft/s)        *          *    4.50  *          *
* Max Chl Dpth (ft)      *   31.33  * Hydr. Depth (ft)        *          *   18.69  *          *
* Conv. Total (cfs)      *2942138.0  * Conv. (cfs)             *          *2942138.0  *          *
* Length Wtd. (ft)       *  756.34  * Wetted Per. (ft)        *          *  416.24  *          *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)        *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.71  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)    *   55.43  * 4298.97  *  286.79  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *   25.74  *  230.45  *   94.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.              *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  756.45  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  736.74  * Flow Area (sq ft)      *  517.41  * 9903.01  *   52.24  *
* E.G. Slope (ft/ft)     *0.000107  * Area (sq ft)           * 1827.85  * 9903.01  *  163.67  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *  379.92  *45101.77  *   18.31  *
* Top Width (ft)         * 1045.30  * Top Width (ft)          *  527.97  *  429.80  *   87.52  *
* Vel Total (ft/s)       *    4.34  * Avg. Vel. (ft/s)        *    0.73  *    4.55  *    0.35  *
* Max Chl Dpth (ft)      *   36.60  * Hydr. Depth (ft)        *    2.65  *   23.04  *    1.22  *
* Conv. Total (cfs)      *4407363.0  * Conv. (cfs)             * 36801.2  *4368789.0  *  1773.6  *
* Length Wtd. (ft)       *  754.09  * Wetted Per. (ft)        *  195.30  *  436.34  *   42.79  *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)        *    0.02  *    0.15  *    0.01  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    0.01  *    0.69  *    0.00  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)    *  278.52  * 5368.17  * 1197.40  *
```

```
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  125.56  *  242.58  *  311.49  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  759.01  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  738.25  * Flow Area (sq ft)      * 2162.72  *11003.85  *  222.21  *
* E.G. Slope (ft/ft)     *0.000097  * Area (sq ft)           * 3333.66  *11003.85  *  478.82  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2864.00  *51420.34  *  115.67  *
* Top Width (ft)         * 1269.57  * Top Width (ft)         *  674.64  *  429.80  *  165.14  *
* Vel Total (ft/s)       *    4.06  * Avg. Vel. (ft/s)       *    1.32  *    4.67  *    0.52  *
* Max Chl Dpth (ft)      *   39.16  * Hydr. Depth (ft)       *    6.87  *   25.60  *    2.37  *
* Conv. Total (cfs)      *5509608.0  * Conv. (cfs)           *290064.3  *5207829.0  * 11714.7  *
* Length Wtd. (ft)       *  741.48  * Wetted Per. (ft)       *  315.25  *  436.34  *   94.05  *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)       *    0.04  *    0.15  *    0.01  *
* Alpha                  *    1.26  * Stream Power (lb/ft s) *    0.06  *    0.72  *    0.01  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  726.03  * 6007.10  * 2127.69  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  229.03  *  245.45  *  446.21  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  760.59  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  739.38  * Flow Area (sq ft)      * 2661.41  *11684.80  *  398.02  *
* E.G. Slope (ft/ft)     *0.000104  * Area (sq ft)           * 4737.60  *11684.80  *  968.70  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4170.59  *58564.63  *  264.78  *
* Top Width (ft)         * 2117.40  * Top Width (ft)         * 1162.27  *  429.80  *  525.33  *
* Vel Total (ft/s)       *    4.27  * Avg. Vel. (ft/s)       *    1.57  *    5.01  *    0.67  *
* Max Chl Dpth (ft)      *   40.74  * Hydr. Depth (ft)       *    8.46  *   27.19  *    3.27  *
* Conv. Total (cfs)      *6191889.0  * Conv. (cfs)           *409902.4  *5755963.0  * 26023.6  *
* Length Wtd. (ft)       *  736.57  * Wetted Per. (ft)       *  315.25  *  436.34  *  121.97  *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)       *    0.05  *    0.17  *    0.02  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    0.09  *    0.87  *    0.01  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1125.28  * 6405.65  * 2952.35  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  268.01  *  245.70  *  623.91  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  763.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  763.42  * Reach Len. (ft)        *  201.34  *  756.34  * 1098.23  *
* Crit W.S. (ft)         *  740.93  * Flow Area (sq ft)      * 3553.26  *12902.61  *  847.04  *
* E.G. Slope (ft/ft)     *0.000102  * Area (sq ft)           * 8091.56  *12902.61  * 2784.71  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6694.85  *68508.79  *  696.36  *
* Top Width (ft)         * 2408.65  * Top Width (ft)         * 1192.45  *  429.80  *  786.40  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *    1.88  *    5.31  *    0.82  *
* Max Chl Dpth (ft)      *   43.57  * Hydr. Depth (ft)       *   11.29  *   30.02  *    3.83  *
* Conv. Total (cfs)      *7522704.0  * Conv. (cfs)           *663549.2  *6790136.0  * 69019.1  *
* Length Wtd. (ft)       *  728.77  * Wetted Per. (ft)       *  315.25  *  436.34  *  221.89  *
* Min Ch El (ft)         *  719.85  * Shear (lb/sq ft)       *    0.07  *    0.19  *    0.02  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *    0.13  *    1.00  *    0.02  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1936.93  * 7051.62  * 4769.83  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  320.58  *  246.67  *  838.45  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	753.34	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.33	Wt. n-Val.	0.040	0.027		
W.S. Elev (ft)	753.01	Reach Len. (ft)	201.34	756.34	1098.23	
Crit W.S. (ft)	735.38	Flow Area (sq ft)	10.17	8429.58		
E.G. Slope (ft/ft)	0.000132	Area (sq ft)	511.64	8429.58	8.30	
Q Total (cfs)	38700.00	Flow (cfs)	2.75	38697.25		
Top Width (ft)	619.60	Top Width (ft)	181.09	423.83	14.69	
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)	0.27	4.59		
Max Chl Dpth (ft)	33.16	Hydr. Depth (ft)	0.51	19.89		
Conv. Total (cfs)	3371595.0	Conv. (cfs)	239.6	3371355.0		
Length Wtd. (ft)	756.32	Wetted Per. (ft)	20.15	430.28		
Min Ch El (ft)	719.85	Shear (lb/sq ft)	0.00	0.16		
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.74		
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	94.33	4660.25	470.65	
C & E Loss (ft)	0.02	Cum SA (acres)	43.96	235.26	137.05	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 7.132

INPUT
Description: Expanded section between I-70 and 40 Hwy.

COE
Riverstation=30193.08
Preliminary Model
Riverstation=10681.08

Reach lengths have been increased by
46.32, 23.05 and 14.06 to account for the distance between the assumed and the actual location of the I-70 & HWY 40 bridge face sections.

Station Elevation Data num= 202

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	791.37	.33	791.37	4.38	791.17	6.45	791.14	8.64	791.02
11.81	790.98	13.2	790.9	14.37	790.89	15.35	790.83	18.79	790.78
19.48	790.74	26.16	790	53.81	790	55.84	789.92	55.98	789.91
56.21	789.91	61.93	789.69	63.11	789.67	69.17	789.4	71.7	789.36
74.09	789.23	77.1	789.19	80.68	789	83.5	788.95	84.59	788.95
86.59	789.01	95.3	788	109.96	788	132.06	784	145.08	782
173.87	778	180.77	778	199.91	782	208.39	784	223.31	784
247.71	782	258.65	780	289.54	772.01	305.18	768	337.65	760
350.6	755.77	351.01	755.65	354.23	754.65	354.78	754.52	355.45	754.33
356.83	754.11	356.96	754.08	357.66	754	361.98	754	367.03	753.34
371.49	752.99	379.05	752	381.1	751.69	390.49	750	399.95	748.59
403.42	748	419.93	746	443.4	744	447.25	744	455.22	743.62
462.56	743.61	468.48	743.68	476.17	744	496.12	744	528.62	747.83
529.87	748	558.46	754	584.46	760	588.18	760.42	590.27	760.57
594.86	761.03	597.93	761.22	599.67	761.39	609.87	762	631.02	762
644.48	760	661.1	758	663.15	758	673.58	758.47	673.71	758.47
688.88	759.44	695.35	760	757.59	760	775.23	759.39	778.21	759.39
784.76	759.19	788.43	759.22	799.34	758.95	804.69	759.05	810.01	758.98
811.14	759	816.15	758.94	847.16	760	993.74	760	1104.47	758.72
1207.24	758	1299.25	758	1326.22	757.56	1372.91	757.28	1379.6	757.42
1380.46	757.41	1405.66	757.91	1405.88	757.91	1432.3	757.95	1448.77	757.6
1491.71	756	1555.05	752	1566.21	750	1586.96	748	1613.81	746
1641.56	738	1655.77	736	1674.02	734	1685.92	730	1692.23	728
1704.22	726	1728.07	724	1746.6	719.67	1768.6	719.67	1790.6	719.67
1809.06	724	1821.69	726	1831.55	728	1837.63	730	1849.18	734
1866.51	736	1878.79	738	1886.46	740	1912.2	748	1926.5	752
1943.39	754	1956.45	756	1963.47	758	2058.61	760	2154.81	761.2
2155.12	761.21	2258.12	762	2402.23	762	2407.94	762.3	2415.85	762.13
2416.62	762.13	2440.99	762	2444.58	762.06	2450.45	762.17	2450.57	762.17
2450.75	762.18	2518	764	2554.14	764.62	2588.72	764.85	2598.59	764.76

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 2616.45  764.08 2616.81  764.09  2618.1     764  2646.8     764 2649.77  764.08
 2663.67   763.9 2669.96  763.97 2670.55     764  2688.8  765.43 2692.41  765.78
 2694.07     766  2739.4     766  2761.5  766.52 2772.52     766 2813.19     766
 2825.45     770 2837.47     770 2847.87     766 2848.01  765.95 2858.25  762.02
  2858.4  761.96  2863.5     760 2871.23     760 2871.44  760.06 2877.77     762
 3016.26     764 3063.97     766 3106.88     768 3151.82     768 3156.61     770
 3164.49     772 3199.13     772 3206.85     770  3221.7     770 3231.59  770.41
 3231.93  770.43 3243.44     772 3248.95   773.2 3252.89     774 3260.01     776
 3266.59     778 3272.04     780 3281.08     786 3283.23  787.38 3284.24     788
 3284.74  788.29 3294.32  793.87  3294.5  793.97 3301.89     798    3336  799.77
 3339.22     800 3344.68  800.17

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .05 1491.71    .027 1963.47     .06 2877.77     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1491.71 1963.47          151.45  423.58 651.085             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1266   775.8       F
    2834    3250     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     325     600     760     935    1070     780

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  739.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  739.41  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  729.29  * Flow Area (sq ft)      *          * 2846.45  *          *
* E.G. Slope (ft/ft)     *0.000263  * Area (sq ft)           *          * 2846.45  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  247.53  * Top Width (ft)         *          *  247.53  *          *
* Vel Total (ft/s)       *    4.50  * Avg. Vel. (ft/s)       *          *    4.50  *          *
* Max Chl Dpth (ft)      *   19.74  * Hydr. Depth (ft)       *          *   11.50  *          *
* Conv. Total (cfs)      *788614.8  * Conv. (cfs)            *          *788614.8  *          *
* Length Wtd. (ft)       *  423.58  * Wetted Per. (ft)       *          *  252.01  *          *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.84  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *          * 2063.15  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  174.51  *    0.15  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  744.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  743.84  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  731.71  * Flow Area (sq ft)      *          * 4009.25  *          *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           *          * 4009.25  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  277.50  * Top Width (ft)         *          *  277.50  *          *
* Vel Total (ft/s)       *    5.11  * Avg. Vel. (ft/s)       *          *    5.11  *          *
* Max Chl Dpth (ft)      *   24.17  * Hydr. Depth (ft)       *          *   14.45  *          *
* Conv. Total (cfs)      *1291084.0  * Conv. (cfs)            *          *1291084.0  *          *
* Length Wtd. (ft)       *  423.58  * Wetted Per. (ft)       *          *  283.25  *          *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.14  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *    1.51  * 2838.62  *    7.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  196.88  *    9.15  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  747.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.027  *          *
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* W.S. Elev (ft)         *  747.36  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  733.45  * Flow Area (sq ft)      *          * 5037.31  *          *
* E.G. Slope (ft/ft)     *0.000243  * Area (sq ft)           *          * 5037.31  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  314.58  * Top Width (ft)         *          *  314.58  *          *
* Vel Total (ft/s)       *    5.38  * Avg. Vel. (ft/s)       *          *    5.38  *          *
* Max Chl Dpth (ft)      *   27.69  * Hydr. Depth (ft)       *          *   16.01  *          *
* Conv. Total (cfs)      *1736806.0  * Conv. (cfs)            *          *1736806.0  *          *
* Length Wtd. (ft)       *  423.58  * Wetted Per. (ft)       *          *  321.23  *          *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.28  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   15.75  * 3507.86  *   76.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  212.85  *   41.55  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  751.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  750.87  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  735.52  * Flow Area (sq ft)      *          * 6230.79  *          *
* E.G. Slope (ft/ft)     *0.000233  * Area (sq ft)           *          * 6230.79  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  361.09  * Top Width (ft)         *          *  361.09  *          *
* Vel Total (ft/s)       *    5.54  * Avg. Vel. (ft/s)       *          *    5.54  *          *
* Max Chl Dpth (ft)      *   31.20  * Hydr. Depth (ft)       *          *   17.26  *          *
* Conv. Total (cfs)      *2259271.0  * Conv. (cfs)            *          *2259271.0  *          *
* Length Wtd. (ft)       *  423.58  * Wetted Per. (ft)       *          *  368.43  *          *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.36  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   54.84  * 4178.33  *  286.79  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   25.46  *  223.76  *   94.72  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  756.64  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.050  *   0.027  *          *
* W.S. Elev (ft)         *  756.19  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  737.89  * Flow Area (sq ft)      *    0.47  * 8408.57  *          *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           *    0.47  * 8408.57  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    0.04  *45499.96  *          *
* Top Width (ft)         *  470.43  * Top Width (ft)         *    5.04  *  465.40  *          *
* Vel Total (ft/s)       *    5.41  * Avg. Vel. (ft/s)       *    0.09  *    5.41  *          *
* Max Chl Dpth (ft)      *   36.52  * Hydr. Depth (ft)       *    0.09  *   18.07  *          *
* Conv. Total (cfs)      *3150238.0  * Conv. (cfs)            *     2.9  *3150235.0  *          *
* Length Wtd. (ft)       *  423.58  * Wetted Per. (ft)       *    5.04  *  473.41  *          *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *    0.00  *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.25  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  274.29  * 5209.19  * 1195.34  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  124.33  *  234.81  *  310.39  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.21  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.050  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  758.72  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  739.35  * Flow Area (sq ft)      *  265.34  * 9596.00  *   12.22  *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           *  353.28  * 9596.00  *   12.22  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  122.54  *54275.33  *    2.13  *
* Top Width (ft)         *  915.08  * Top Width (ft)         *  409.22  *  471.76  *   34.10  *
* Vel Total (ft/s)       *    5.51  * Avg. Vel. (ft/s)       *    0.46  *    5.66  *    0.17  *
* Max Chl Dpth (ft)      *   39.05  * Hydr. Depth (ft)       *    1.18  *   20.34  *    0.36  *
* Conv. Total (cfs)      *3898839.0  * Conv. (cfs)            *  8782.2  *3889904.0  *   152.7  *
* Length Wtd. (ft)       *  423.28  * Wetted Per. (ft)       *  225.75  *  480.03  *   34.11  *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *    0.01  *    0.24  *    0.00  *
```

```
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.01  *    1.37  *    0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  717.51  * 5828.27  * 2121.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  226.53  *  237.63  *  443.70  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.050  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  760.27  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  740.68  * Flow Area (sq ft)      *  616.04  *10329.00  *  123.82  *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           * 1253.61  *10329.00  *  126.13  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  507.66  *62447.07  *   45.26  *
* Top Width (ft)         * 1562.28  * Top Width (ft)         *  964.36  *  471.76  *  126.17  *
* Vel Total (ft/s)       *    5.69  * Avg. Vel. (ft/s)       *    0.82  *    6.05  *    0.37  *
* Max Chl Dpth (ft)      *   40.60  * Hydr. Depth (ft)       *    2.73  *   21.89  *    1.06  *
* Conv. Total (cfs)      *4436576.0  * Conv. (cfs)           * 35750.6  *4397638.0  *  3187.2  *
* Length Wtd. (ft)       *  422.58  * Wetted Per. (ft)       *  225.75  *  480.03  *  116.86  *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *    0.03  *    0.27  *    0.01  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *    0.03  *    1.64  *    0.00  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1111.43  * 6214.53  * 2938.55  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  263.10  *  237.88  *  615.69  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  763.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.050  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  763.10  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  742.45  * Flow Area (sq ft)      * 1255.13  *11664.79  * 1008.70  *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           * 4089.85  *11664.79  * 1101.01  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1603.32  *73765.47  *  531.21  *
* Top Width (ft)         * 2123.42  * Top Width (ft)         * 1031.65  *  471.76  *  620.01  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)       *    1.28  *    6.32  *    0.53  *
* Max Chl Dpth (ft)      *   43.43  * Hydr. Depth (ft)       *    5.56  *   24.73  *    1.93  *
* Conv. Total (cfs)      *5541645.0  * Conv. (cfs)           *117062.6  *5385798.0  * 38784.9  *
* Length Wtd. (ft)       *  421.61  * Wetted Per. (ft)       *  225.75  *  480.03  *  521.41  *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *    0.07  *    0.28  *    0.02  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.08  *    1.80  *    0.01  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1908.78  * 6838.34  * 4720.85  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  315.44  *  238.85  *  820.72  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  753.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.71  * Reach Len. (ft)        *  151.45  *  423.58  *  651.09  *
* Crit W.S. (ft)         *  736.50  * Flow Area (sq ft)      *          * 6913.71  *          *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           *          * 6913.71  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  388.61  * Top Width (ft)         *          *  388.61  *          *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)       *          *    5.60  *          *
* Max Chl Dpth (ft)      *   33.04  * Hydr. Depth (ft)       *          *   17.79  *          *
* Conv. Total (cfs)      *2559526.0  * Conv. (cfs)           *          *2559526.0  *          *
* Length Wtd. (ft)       *  423.58  * Wetted Per. (ft)       *          *  396.26  *          *
* Min Ch El (ft)         *  719.67  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.39  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   93.15  * 4527.05  *  470.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   43.54  *  228.21  *  136.87  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 7.052

INPUT
Description: u/s Face 40 Hwy.

COE Riverstation=30593.61
Preliminary Model
Riverstation=10280.55

This section was cut beyond the influence
of the roadway embankment, but the face sections are being modeled
as if they were one foot from the bridge face. The remaining
distance between the cross sections is being added to the reach
lengths of the adjacent sections, so that the true length of the
river is modeled.

Station Elevation Data num= 381

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	786.04	.53	786	9.01	786	11.87	785.79	12.56	785.78
16.36	785.55	17.68	785.54	35.53	784	67.44	784	67.67	783.98
70.93	783.85	71.21	783.85	71.55	783.84	75.11	783.67	75.99	783.65
79.22	783.48	80.81	783.44	82.56	783.35	103.43	782.03	103.54	782.03
103.96	782	121.76	780.05	122.29	780	152.2	780	180.51	778
182.25	777.76	183.72	777.61	190.98	776.75	199.73	776	229.92	770
230.15	769.95	235.37	769	267.89	764.11	268.18	764.08	268.75	764
272.33	763.54	276.49	763.08	287.63	762.11	287.92	762.09	288.1	762.07
305.48	760.79	319.23	760.07	320.44	760.02	320.87	760.01	321.3	760.01
321.47	760	325.1	759.89	325.26	759.89	329.43	759.76	340.46	759.45
340.7	759.45	342.44	759.4	343.04	759.4	344.32	759.37	360.95	759.22
362.78	759.28	372.71	760	379.72	760.65	380.85	760.74	391.65	761.9
406.7	763.87	410.92	764.53	418.04	765.71	420.62	766	428.33	766.04
430.57	766	431.02	765.98	435.85	765.98	443.02	766.07	448.07	766.14
449.85	766	477.06	766	510.88	760	541.64	754	546.63	753.23
547.52	753.14	551.12	752.6	552.31	752.63	553.47	752.47	555.62	752.55
556.53	752.45	559.25	752.55	560.39	752.45	568.21	752.39	598.23	753.39
598.85	753.42	599.15	753.43	605.08	754	613.61	754	627.61	755.01
638.23	755.96	638.37	755.97	656.74	758	682.29	760	945.21	760
1017.42	760.27	1043.24	760.27	1043.88	760.29	1053.25	760.26	1053.71	760.28
1063.79	760.28	1064.02	760.29	1073.95	760.31	1074.46	760.32	1214.93	760.82
1244.98	761.07	1248.41	761.03	1257.39	761.09	1260.64	761.05	1262.06	761.07
1272.09	760.7	1273.02	760.72	1277.43	760.35	1278.43	760.39	1281.88	760
1289.4	758.61	1291.56	758.25	1292.69	758	1295.03	757.25	1299.44	756
1310.07	752.35	1310.9	752.08	1311.13	752	1313.95	751.08	1314.8	750.76
1315.66	750.47	1316.19	750.28	1316.86	750	1338.35	748	1362.98	746.57
1376.7	746	1377.17	746	1384.92	744.94	1389.35	744	1408.15	738.18
1408.71	738	1421.9	736	1440.4	734	1452.21	730	1458.05	728
1464.8	726.15	1465.29	726	1496.23	724	1507	719.57	1529	719.57
1551	719.57	1561.74	724	1583.78	726	1592.75	728	1599.14	730
1610.98	734	1621.18	736	1644.62	738	1648	738.79	1653.57	740
1659.34	742	1659.71	742.11	1660.06	742.19	1663.24	743.05	1664.36	743.33
1668.14	743.84	1668.39	743.89	1668.57	743.92	1679.17	744.96	1679.83	745.06
1681.5	745.21	1682.36	745.34	1684.85	745.54	1685.57	745.65	1689.58	745.96
1689.98	746	1693.65	746.45	1694.24	746.49	1695.12	746.57	1696.09	746.68
1702.44	747.44	1703.85	747.64	1707.61	748	1711.17	749.12	1713.54	750
1713.89	750.12	1714.18	750.23	1718.07	752	1718.94	752.43	1721.78	754
1728.85	758	1728.99	758.03	1733.02	758.67	1734.5	758.67	1737.84	759.03
1740.33	759.02	1759.72	759.53	1764.34	759.75	1773.48	760	1776.06	760.17
1776.68	760.17	1783.16	760.48	1784.95	760.47	1789.65	760.64	1791.76	760.63
1795.88	760.76	1799.12	760.75	1803.78	760.89	1804.96	760.88	1814.38	761.03
1816.48	761.09	1928.68	761.86	1929.63	761.88	1938.09	761.88	1938.71	761.89
1954.23	761.84	1954.78	761.85	2000	761.9	2000.88	761.92	2024.47	762
2033.91	762.17	2034.93	762.17	2046.22	762.38	2077.12	762.73	2141.65	762.9
2167.53	762.11	2168.21	762.11	2170.38	762	2234.55	762	2269.76	761.84
2287.51	761.6	2320.3	761.6	2320.85	761.58	2336.04	761.58	2336.97	761.56
2344.6	761.56	2345.81	761.53	2355.35	761.53	2379.98	760.08	2381.12	760.06
2381.52	760.04	2382.4	760.01	2382.56	760	2394.44	760	2400.45	760.2
2403.03	760.24	2410.32	760.29	2411.41	760.28	2415.71	760.34	2425.7	760.38
2429.83	760.3	2430.75	760.3	2435.94	760.15	2436.4	760.16	2436.95	760.16
2443.83	760	2444.41	760	2444.67	759.99	2495.26	759.96	2499.02	760
2499.71	760.02	2504.47	760.24	2505.95	760	2532.3	760	2557.63	759.45
2585.18	759.43	2595.53	758	2656.96	758	2750.34	759.95	2750.55	759.95

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 2772.33  760.51 2807.44  760.86 2807.81  760.87 2808.01  760.88 2808.95  760.91
 2809.05  760.91 2810.41  760.93 2815.41  760.85 2817.67  760.89 2822.36  760.88
 2843.05  761.25 2849.85  761.32 2852.57   761.3 2853.11  761.31 2860.43  761.24
 2863.49  761.16 2892.33     761 2895.35  760.93 2896.42  760.93 2916.61  760.46
 2977.95  761.03 2990.37  760.98  2996.1  760.99 2998.39   761.1 3000.78  761.09
 3002.85  761.14 3004.39  761.33 3006.29  761.34 3007.09  761.47 3009.98  761.43
 3010.49  761.51 3011.74   761.5    3012  761.53 3012.13  761.55 3019.15     762
 3019.96     762 3020.81  762.16 3021.15  762.15 3024.62  762.76  3031.1  763.06
 3041.18     764 3041.52  764.05 3041.64  764.05  3047.8  764.66 3049.77  764.61
 3067.85  765.69 3133.66  764.43 3158.44     764 3187.66     764  3265.5     766
 3282.66     768 3286.83  769.78 3287.37     770 3288.36     770 3317.16  771.59
 3318.14  771.59 3320.57     772 3322.45  772.91 3324.93     774  3330.1     776
  3341.3     780 3358.41     782 3360.57     782 3372.97  783.08 3374.68  783.46
 3375.21  783.49 3375.96  783.57 3378.08     784 3378.91     784  3391.6  785.46
  3399.7  786.13 3414.24  787.44 3418.34     788 3424.53     788 3426.27  788.12
 3426.46  788.14 3427.77  788.26 3428.49  788.36 3429.68  788.58 3430.52   788.7
 3436.67  789.94 3436.93     790 3449.98     792 3450.67  792.08 3463.04     794
 3470.77     794 3473.07  794.12  3490.5     796 3502.46     796 3510.66  796.86
 3516.15  796.95 3542.65     798 3546.25  798.55 3551.64  798.63    3562  799.34
 3573.67  799.44 3575.22  799.53 3585.82   799.6 3604.06     800 3606.33     800
 3608.15   800.3 3609.54  800.31 3614.06  800.77 3615.68  800.91 3617.85  801.03
 3628.77  801.08 3638.22  801.38 3654.32  801.42 3657.24  801.51  3671.8     800
 3739.22     800 3789.75     798 3802.32     798 3809.74  799.78 3810.61     800
 3810.81  800.09

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .05 1262.06    .027 1737.84     .06 3133.66     .04  3341.3     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1262.06 1737.84               50      50      50              .1       .3
Ineffective Flow     num=        6
   Sta L   Sta R    Elev  Permanent
       0    1018   775.8       F
    1018    1281   763.5       F
    1761    2045   763.5       F
    2045    2750     767       F
    2750    3013   789.1       F
    3469    3500     798       F
Blocked Obstructions     num=        6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************************************
     250     425     765     500     700     760     788     940     780
    2322    2482     780    3420    3475     815    3690    3735     815

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)          *  739.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  739.25  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  729.59  * Flow Area (sq ft)      *          * 2702.66  *          *
* E.G. Slope (ft/ft)      *0.000311  * Area (sq ft)           *          * 2702.66  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  245.44  * Top Width (ft)         *          *  245.44  *          *
* Vel Total (ft/s)        *    4.74  * Avg. Vel. (ft/s)       *          *    4.74  *          *
* Max Chl Dpth (ft)       *   19.68  * Hydr. Depth (ft)       *          *   11.01  *          *
* Conv. Total (cfs)       *725920.3  * Conv. (cfs)            *          *725920.3  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)       *          *  250.66  *          *
* Min Ch El (ft)          *  719.57  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.99  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *          * 2036.17  *    0.18  *
* C & E Loss (ft)         *          * Cum SA (acres)         *          *  172.11  *    0.15  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)          *  744.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  743.69  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  732.05  * Flow Area (sq ft)      *          * 3858.27  *          *
* E.G. Slope (ft/ft)      *0.000286  * Area (sq ft)           *          * 3858.27  *          *
* Q Total (cfs)           *20500.00  * Flow (cfs)             *          *20500.00  *          *
```

```
* Top Width (ft)         *  276.66  * Top Width (ft)         *          *  276.66  *          *
* Vel Total (ft/s)       *    5.31  * Avg. Vel. (ft/s)       *          *    5.31  *          *
* Max Chl Dpth (ft)      *   24.12  * Hydr. Depth (ft)       *          *   13.95  *          *
* Conv. Total (cfs)      *1211322.0  * Conv. (cfs)            *          *1211322.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  283.17  *          *
* Min Ch El (ft)         *  719.57  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.29  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.51  * 2800.37  *    7.81  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.36  *  194.19  *    9.15  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**************************************************************************************************
* E.G. Elev (ft)         *  747.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  747.23  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  733.86  * Flow Area (sq ft)      *          * 4943.62  *          *
* E.G. Slope (ft/ft)     *0.000297  * Area (sq ft)           *          * 4943.62  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  348.99  * Top Width (ft)         *          *  348.99  *          *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *          *    5.48  *          *
* Max Chl Dpth (ft)      *   27.66  * Hydr. Depth (ft)       *          *   14.17  *          *
* Conv. Total (cfs)      *1572007.0  * Conv. (cfs)            *          *1572007.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  355.94  *          *
* Min Ch El (ft)         *  719.57  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.41  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   15.75  * 3459.33  *   76.53  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    9.30  *  209.63  *   41.55  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**************************************************************************************************
* E.G. Elev (ft)         *  751.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  750.77  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.88  * Flow Area (sq ft)      *          * 6294.96  *          *
* E.G. Slope (ft/ft)     *0.000258  * Area (sq ft)           *          * 6294.96  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  400.60  * Top Width (ft)         *          *  400.60  *          *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *          *    5.48  *          *
* Max Chl Dpth (ft)      *   31.20  * Hydr. Depth (ft)       *          *   15.71  *          *
* Conv. Total (cfs)      *2145877.0  * Conv. (cfs)            *          *2145877.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  408.34  *          *
* Min Ch El (ft)         *  719.57  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.36  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   54.84  * 4117.43  *  286.79  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   25.46  *  220.05  *   94.72  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**************************************************************************************************
* E.G. Elev (ft)         *  756.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  756.11  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  738.33  * Flow Area (sq ft)      *          * 8504.76  *          *
* E.G. Slope (ft/ft)     *0.000180  * Area (sq ft)           *          * 8504.76  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  426.47  * Top Width (ft)         *          *  426.47  *          *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *          *    5.35  *          *
* Max Chl Dpth (ft)      *   36.54  * Hydr. Depth (ft)       *          *   19.94  *          *
* Conv. Total (cfs)      *3389460.0  * Conv. (cfs)            *          *3389460.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  436.42  *          *
* Min Ch El (ft)         *  719.57  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.17  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  274.29  * 5126.96  * 1195.34  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  124.32  *  230.47  *  310.39  *
**************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	759.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.027	
W.S. Elev (ft)	758.63	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	739.82	Flow Area (sq ft)		9597.70	
E.G. Slope (ft/ft)	0.000182	Area (sq ft)		9597.70	50.00
Q Total (cfs)	54400.00	Flow (cfs)		54400.00	
Top Width (ft)	539.88	Top Width (ft)		443.52	96.36
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	39.06	Hydr. Depth (ft)		21.64	
Conv. Total (cfs)	4036279.0	Conv. (cfs)		4036279.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		454.35	
Min Ch El (ft)	719.57	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		1.36	
Frctn Loss (ft)		Cum Volume (acre-ft)	716.89	5734.94	2121.03
C & E Loss (ft)		Cum SA (acres)	225.82	233.18	442.73

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	760.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.		0.027	0.060
W.S. Elev (ft)	760.16	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	741.09	Flow Area (sq ft)		10289.94	20.86
E.G. Slope (ft/ft)	0.000201	Area (sq ft)	50.13	10289.95	324.53
Q Total (cfs)	63000.00	Flow (cfs)		62993.18	6.82
Top Width (ft)	1097.59	Top Width (ft)	327.25	457.42	312.93
Vel Total (ft/s)	6.11	Avg. Vel. (ft/s)		6.12	0.33
Max Chl Dpth (ft)	40.59	Hydr. Depth (ft)		22.52	0.90
Conv. Total (cfs)	4446074.0	Conv. (cfs)		4445593.0	481.6
Length Wtd. (ft)	1.00	Wetted Per. (ft)		467.83	23.17
Min Ch El (ft)	719.57	Shear (lb/sq ft)		0.28	0.01
Alpha	1.00	Stream Power (lb/ft s)		1.69	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1109.16	6114.28	2935.18
C & E Loss (ft)	0.02	Cum SA (acres)	260.85	233.36	612.41

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	763.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.027	0.060
W.S. Elev (ft)	762.95	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	742.91	Flow Area (sq ft)		11563.04	96.36
E.G. Slope (ft/ft)	0.000197	Area (sq ft)	1640.67	11606.04	2314.27
Q Total (cfs)	75900.00	Flow (cfs)		74795.51	72.85
Top Width (ft)	2222.51	Top Width (ft)	615.82	475.78	1130.91
Vel Total (ft/s)	6.42	Avg. Vel. (ft/s)		6.47	0.76
Max Chl Dpth (ft)	43.38	Hydr. Depth (ft)		25.31	2.48
Conv. Total (cfs)	5404860.0	Conv. (cfs)		5399601.0	5259.0
Length Wtd. (ft)	1.00	Wetted Per. (ft)		467.83	39.00
Min Ch El (ft)	719.57	Shear (lb/sq ft)		0.30	0.03
Alpha	1.01	Stream Power (lb/ft s)		1.97	0.02
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1898.82	6725.19	4695.32
C & E Loss (ft)	0.04	Cum SA (acres)	312.58	234.24	807.63

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	753.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.027	
W.S. Elev (ft)	752.62	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	736.94	Flow Area (sq ft)		7044.98	
E.G. Slope (ft/ft)	0.000231	Area (sq ft)		7044.98	
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	410.01	Top Width (ft)		410.01	
Vel Total (ft/s)	5.49	Avg. Vel. (ft/s)		5.49	
Max Chl Dpth (ft)	33.05	Hydr. Depth (ft)		17.18	
Conv. Total (cfs)	2546763.0	Conv. (cfs)		2546763.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		418.47	
Min Ch El (ft)	719.57	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		1.33	
Frctn Loss (ft)		Cum Volume (acre-ft)	93.15	4459.18	470.54
C & E Loss (ft)		Cum SA (acres)	43.54	224.33	136.87

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 7.047

INPUT
Description: HWY 40 Bridge
COE River Station=30641.66
Preliminary Model River
Station=10230

Do not have specs on 2nd bridge opening at this
time. Location is correct, but there is most likely a pier and
depth is a guess
Distance from Upstream XS = 1
Deck/Roadway Width = 48
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 37

Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord
1	786.5	700	150	780	700	300		774	700	
450	768.5	700	600	762.5	700	750		760	700	
900	760	700	1050	762	700	1200		763	700	
1304.62	763.2	700	1304.63	763.2	759.4	1353.21		763.2	759.43	
1400.71	763.2	759.43	1448.21	763.2	759.43	1496.63		763.2	759.43	
1496.63	763.2	757.73	1637.42	763.2	757.73	1637.42		763.2	759.43	
1685.84	763.2	759.43	1734.42	763.2	759.43	1735		763.5	700	
1885	764	700	2035	764	700	2185		764	700	
2335	764.5	700	2485	765	700	2635		767	700	
2785	774	700	2935	782	700	3014.3		789.5	700	
3014.4	789.5	786.5	3452.5	806	803	3452.6		806	700	
3605	809	700	3703	815.6	700	3703.1		815.6	812.6	
3810.6	820	817								

Upstream Bridge Cross Section Data
Station Elevation Data num= 381

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	786.04	.53	786	9.01	786	11.87	785.79	12.56	785.78
16.36	785.55	17.68	785.54	35.53	784	67.44	784	67.67	783.98
70.93	783.85	71.21	783.85	71.55	783.84	75.11	783.67	75.99	783.65
79.22	783.48	80.81	783.44	82.56	783.35	103.43	782.03	103.54	782.03
103.96	782	121.76	780.05	122.29	780	152.2	780	180.51	778
182.25	777.76	183.72	777.61	190.98	776.75	199.73	776	229.92	770
230.15	769.95	235.37	769	267.89	764.11	268.18	764.08	268.75	764
272.33	763.54	276.49	763.08	287.63	762.11	287.92	762.09	288.1	762.07
305.48	760.79	319.23	760.07	320.44	760.02	320.87	760.01	321.3	760.01
321.47	760	325.1	759.89	325.26	759.89	329.43	759.76	340.46	759.45
340.7	759.45	342.44	759.4	343.04	759.4	344.32	759.37	360.95	759.22
362.78	759.28	372.71	760	379.72	760.65	380.85	760.74	391.65	761.9
406.7	763.87	410.92	764.53	418.04	765.71	420.62	766	428.33	766.04

```
  430.57     766  431.02  765.98  435.85  765.98  443.02  766.07  448.07  766.14
  449.85     766  477.06     766  510.88     760  541.64     754  546.63  753.23
  547.52  753.14  551.12   752.6  552.31  752.63  553.47  752.47  555.62  752.55
  556.53  752.45  559.25  752.55  560.39  752.45  568.21  752.39  598.23  753.39
  598.85  753.42  599.15  753.43  605.08     754  613.61     754  627.61  755.01
  638.23  755.96  638.37  755.97  656.74     758  682.29     760  945.21     760
 1017.42  760.27 1043.24  760.27 1043.88  760.29 1053.25  760.26 1053.71  760.28
 1063.79  760.28 1064.02  760.29 1073.95  760.31 1074.46  760.32 1214.93  760.82
 1244.98  761.07 1248.41  761.03 1257.39  761.09 1260.64  761.05 1262.06  761.07
 1272.09   760.7 1273.02  760.72 1277.43  760.35 1278.43  760.39 1281.88     760
  1289.4  758.61 1291.56  758.25 1292.69     758 1295.03  757.25 1299.44     756
 1310.07  752.35  1310.9  752.08 1311.13     752 1313.95  751.08  1314.8  750.76
 1315.66  750.47 1316.19  750.28 1316.86     750 1338.35     748 1362.98  746.57
  1376.7     746 1377.17     746 1384.92  744.94 1389.35     744 1408.15  738.18
 1408.71     738  1421.9     736  1440.4     734 1452.21     730 1458.05     728
  1464.8  726.15 1465.29     726 1496.23     724    1507  719.57    1529  719.57
    1551  719.57 1561.74     724 1583.78     726 1592.75     728 1599.14     730
 1610.98     734 1621.18     736 1644.62     738    1648  738.79 1653.57     740
 1659.34     742 1659.71  742.11 1660.06  742.19 1663.24  743.05 1664.36  743.33
 1668.14  743.84 1668.39  743.89 1668.57  743.92 1679.17  744.96 1679.83  745.06
  1681.5  745.21 1682.36  745.34 1684.85  745.54 1685.57  745.65 1689.58  745.96
 1689.98     746 1693.65  746.45 1694.24  746.49 1695.12  746.57 1696.09  746.68
 1702.44  747.44 1703.85  747.64 1707.61     748 1711.17  749.12 1713.54     750
 1713.89  750.12 1714.18  750.23 1718.07     752 1718.94  752.43 1721.78     754
 1728.85     758 1728.99  758.03 1733.02  758.67  1734.5  758.67 1737.84  759.03
 1740.33  759.02 1759.72  759.53 1764.34  759.75 1773.48     760 1776.06  760.17
 1776.68  760.17 1783.16  760.48 1784.95  760.47 1789.65  760.64 1791.76  760.63
 1795.88  760.76 1799.12  760.75 1803.78  760.89 1804.96  760.88 1814.38  761.03
 1816.48  761.09 1928.68  761.86 1929.63  761.88 1938.09  761.88 1938.71  761.89
 1954.23  761.84 1954.78  761.85    2000   761.9 2000.88  761.92 2024.47     762
 2033.91  762.17 2034.93  762.17 2046.22  762.38 2077.12  762.73 2141.65   762.9
 2167.53  762.11 2168.21  762.11 2170.38     762 2234.55     762 2269.76  761.84
 2287.51   761.6  2320.3   761.6 2320.85  761.58 2336.04  761.58 2336.97  761.56
  2344.6  761.56 2345.81  761.53 2355.35  761.53 2379.98  760.08 2381.12  760.06
 2381.52  760.04  2382.4  760.01 2382.56     760 2394.44     760 2400.45   760.2
 2403.03  760.24 2410.32  760.29 2411.41  760.28 2415.71  760.34  2425.7  760.38
 2429.83   760.3 2430.75   760.3 2435.94  760.15  2436.4  760.16 2436.95  760.16
 2443.83     760 2444.41     760 2444.67  759.99 2495.26  759.96 2499.02     760
 2499.71  760.02 2504.47  760.24 2505.95     760  2532.3     760 2557.63  759.45
 2585.18  759.43 2595.53     758 2656.96     758 2750.34  759.95 2750.55  759.95
 2772.33  760.51 2807.44  760.86 2807.81  760.87 2808.01  760.88 2808.95  760.91
 2809.05  760.91 2810.41  760.93 2815.41  760.85 2817.67  760.89 2822.36  760.88
 2843.05  761.25 2849.85  761.32 2852.57   761.3 2853.11  761.31 2860.43  761.24
 2863.49  761.16 2892.33     761 2895.35  760.93 2896.42  760.93 2916.61  760.46
 2977.95  761.03 2990.37  760.98  2996.1  760.99 2998.39   761.1 3000.78  761.09
 3002.85  761.14 3004.39  761.33 3006.29  761.34 3007.09  761.47 3009.98  761.43
 3010.49  761.51 3011.74   761.5    3012  761.53 3012.13  761.55 3019.15     762
 3019.96     762 3020.81  762.16 3021.15  762.15 3024.62  762.76  3031.1  763.06
 3041.18     764 3041.52  764.05 3041.64  764.05  3047.8  764.66 3049.77  764.61
 3067.85  765.69 3133.66  764.43 3158.44     764 3187.66     764  3265.5     766
 3282.66     768 3286.83  769.78 3287.37     770 3288.36     770 3317.16  771.59
 3318.14  771.59 3320.57     772 3322.45  772.91 3324.93     774  3330.1     776
  3341.3     780 3358.41     782 3360.57     782 3372.97  783.08 3374.68  783.46
 3375.21  783.49 3375.96  783.57 3378.08     784 3378.91     784  3391.6  785.46
  3399.7  786.13 3414.24  787.44 3418.34     788 3424.53     788 3426.27  788.12
 3426.46  788.14 3427.77  788.26 3428.49  788.36 3429.68  788.58 3430.52   788.7
 3436.67  789.94 3436.93     790 3449.98     792 3450.67  792.08 3463.04     794
 3470.77     794 3473.07  794.12  3490.5     796 3502.46     796 3510.66  796.86
 3516.15  796.95 3542.65     798 3546.25  798.55 3551.64  798.63    3562  799.34
 3573.67  799.44 3575.22  799.53 3585.82   799.6 3604.06     800 3606.33     800
 3608.15   800.3 3609.54  800.31 3614.06  800.77 3615.68  800.91 3617.85  801.03
 3628.77  801.08 3638.22  801.38 3654.32  801.42 3657.24  801.51  3671.8     800
 3739.22     800 3789.75     798 3802.32     798 3809.74  799.78 3810.61     800
 3810.81  800.09

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05 1262.06    .027 1737.84     .06 3133.66     .04  3341.3     .07

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1262.06 1737.84             .1       .3
Ineffective Flow     num=       6
   Sta L   Sta R    Elev  Permanent
       0    1018   775.8        F
    1018    1281   763.5        F
```

1761	2045	763.5	F
2045	2750	767	F
2750	3013	789.1	F
3469	3500	798	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
250	425	765	500	700	760	788	940	780
2322	2482	780	3420	3475	815	3690	3735	815

Downstream Deck/Roadway Coordinates
num= 42

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1	798.5	700	150	797	700	300	795.5	700
450	794	700	600	789	700	679.15	786.5	700
828.15	781.5	700	978.15	776	700	1128.15	771	700
1278.15	766	700	1428.15	761	700	1578.15	760	700
1728.15	762	700	1878.15	763	700	1954.04	763.2	700
1954.05	763.2	759.4	1954.05	763.2	759.43	2002.63	763.2	759.43
2050.13	763.2	759.43	2097.63	763.2	759.43	2146.04	763.2	759.43
2146.05	763.2	757.73	2286.84	763.2	757.73	2286.84	763.2	759.43
2335.26	763.2	759.43	2383.89	763.2	759.43	2383.9	763.2	700
2384	763.5	700	2534	764	700	2684	764	700
2834	764.5	700	2984	765	700	3134	767	700
3284	774	700	3434	782	700	3770.5	789.5	700
3770.6	789.5	786.5	4198.9	806	803	4199	806	700
4450	815.6	700	4450.1	815.6	812.6	4559.3	820	817

Downstream Bridge Cross Section Data
Station Elevation Data num= 396

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780.27	1.09	780.05	1.22	780.04	1.37	780	14.66	780
21.62	778.18	22.41	778.01	22.51	778	33.86	778	41.15	776.24
41.9	776.18	42.6	776	52.18	776	59.6	774.11	60.01	774.08
60.46	774	69.41	774	75.68	772.21	77.29	772	88.44	772
96.68	770.01	103.82	770	111.05	768.4	111.71	768.34	112.2	768.23
112.65	768.19	114.16	768	128.26	768	136.08	766.42	136.95	766.38
138.5	766.05	138.6	766.05	138.9	766	152.8	766	159.67	764.39
159.83	764.38	161.03	764.23	161.19	764.19	162.18	764	283.8	764
289.08	762.09	289.24	762.09	289.36	762.08	289.78	762	328.19	762
339.76	760.24	341.07	760.24	343.74	760	362.88	760	369.75	760.29
370.38	760.27	373.89	760.41	375.17	760.38	379.32	760.53	381.15	760.5
385.78	760.65	387.72	760.62	392.05	760.75	408.01	760.91	417.22	760.56
417.66	760.51	420.1	760.51	421.14	760.43	436.11	760.12	436.24	760.11
487.93	760.01	488.26	760	498.78	759.99	499.21	759.96	530.13	759.85
530.38	759.84	583.86	760.1	609.77	759.73	645.46	760.18	645.63	760.19
708.72	760.21	723.76	759.94	723.97	759.93	762.65	759.86	794.13	760.11
798.93	759.87	799.2	759.87	801.5	759.74	805.37	759.77	805.84	759.79
853.18	760.03	862.13	759.93	914.25	760.15	917.36	760.08	917.49	760.07
921.79	759.94	928.93	759.75	939.46	759.91	939.62	759.92	950.98	760.18
962.62	760.06	968.44	760.34	1022.34	759.94	1042.07	760.24	1043.03	760.2
1056.02	760.09	1056.24	760.08	1068.78	759.89	1082.21	759.51	1099.45	759.58
1129.46	760.12	1131.96	760.21	1148.46	760.18	1154.67	760.1	1154.84	760.09
1168.1	759.91	1168.28	759.9	1175.87	759.96	1181.25	760.11	1251.44	759.41
1324.26	759.92	1324.46	759.93	1351.52	760.3	1357.55	760.3	1362.5	760.26
1362.64	760.24	1365.32	760.22	1365.72	760.19	1369.88	760.08	1370	760.07
1381.84	759.39	1389.86	759.44	1404.97	759.97	1413.27	760.03	1413.6	760
1425.71	760	1429.48	759.63	1431.9	759.55	1437.86	759.01	1438.02	758.99
1442.14	758.91	1443.59	758.8	1497.91	758.2	1526.28	758.16	1527.36	758.2
1532.68	758.21	1533.65	758.26	1542.02	758.36	1542.16	758.35	1543.47	758.4
1549.27	758.36	1551.07	758.43	1557.58	758.39	1558.02	758.41	1558.74	758.48
1561.33	758.86	1565.71	758.82	1566.49	758.95	1567.24	759	1575.37	759.07
1590.72	759.65	1623.62	759.4	1631.33	759.49	1639.9	759.82	1662.37	759.05
1665.9	759.2	1669.08	759.15	1670.09	759.23	1676.18	759.45	1676.94	759.51
1677.26	759.52	1682.41	760	1695.64	760.21	1695.77	760.22	1706.09	760.39
1706.3	760.4	1723.84	760.72	1728.33	760.88	1774.15	760.62	1779.42	760.39
1780.95	760.38	1786.02	760.11	1787.32	760.17	1788.2	760	1789.65	760
1793.55	759.52	1797.07	759.61	1797.95	759.6	1802.36	759.75	1802.88	759.73
1806.99	759.9	1807.24	759.88	1809.57	760	1810.92	760	1816.56	758.12
1816.87	758	1824.72	756	1827.38	756	1838.36	755.43	1847.81	755.23
1851.61	754.98	1858	754.93	1863	754.37	1864.28	754.36	1866.53	754
1900.61	753.74	1902.49	753.65	1919.69	753.64	1922.4	753.43	1929.99	753.42
1934.94	752.86	1938.91	752.83	1943.87	752	1958.72	751.22	1960.01	751.2
1966.73	750.07	1966.93	750.05	1967.16	750	2002.66	748	2032.57	746

```
 2036.86  745.46  2045.1     744 2065.45     738 2095.93     734 2124.45     726
 2150.58  724.01 2163.71  719.54 2185.71  719.54 2207.71  719.54 2220.83     724
 2241.86     726 2249.86     728    2256     730 2267.18     734 2281.19     736
 2303.01     738  2312.2     740 2319.13  741.92 2319.39     742 2331.03     744
 2355.58     746 2356.41     746 2364.02     748 2368.28  750.72 2375.24  754.72
 2381.68     758  2382.9  758.53 2386.26  759.72 2387.16     760 2389.38  760.36
 2390.37  760.44 2405.11     762 2431.85  762.04 2432.81     762 2466.28  762.12
 2508.58     764 2616.97  764.08  2647.1     766 2703.38     766 2715.47   766.4
 2722.38   766.4 2731.84     766 2954.21     766 3012.63  764.29 3041.89  764.26
 3051.75     764 3087.94     764 3099.64  764.34 3134.05  764.39 3162.93  765.42
 3169.89  765.03 3170.58  765.05 3172.23  764.94 3173.57  764.98 3176.91  764.72
 3178.23  764.76 3184.02  764.23  3184.8  764.23 3186.63     764 3190.39  763.08
 3195.84     762 3196.68   761.8 3202.03   760.8 3208.72  759.82 3209.19   759.7
 3224.54  756.08 3225.02     756 3268.18  756.11 3268.37  756.12 3357.42  756.87
 3378.62  756.52 3445.03  754.84 3502.27  754.05 3502.43  754.04 3575.73     754
 3593.34  754.16 3607.22     754 3611.67  754.43  3617.6  754.72 3633.89   755.1
 3635.47  755.26  3639.4  755.33 3641.25  755.54 3646.36   755.6 3647.79  755.75
  3653.4  755.79 3654.15  755.86 3664.75  755.96 3664.89  755.97 3673.93  756.15
 3674.42  756.14  3681.1  756.54 3682.52  756.53 3684.91  756.67 3712.33  757.38
 3726.89  757.43  3734.9  757.26 3737.08   757.1 3739.99  757.17 3742.18  756.99
 3744.43  757.04 3746.94  756.83 3749.08  756.86 3752.23  756.67 3800.36  755.97
 3801.06     756 3821.43     756 3827.38     758 3840.38  761.91 3840.64     762
 3846.95     764 3849.57     764 3908.62     764 3918.44     762 3923.32     762
 3960.42     764  4000.6     764 4003.03  764.49 4012.58     766 4023.57     768
  4062.4     770 4068.17  772.18 4080.08  776.37 4084.99     778  4107.9     780
 4137.62  781.21 4175.22     782 4182.18     782 4184.17  782.25  4184.3  782.26
 4184.43  782.28 4185.36  782.35 4185.88  782.46 4189.06  783.32 4194.63  783.45
 4196.35  783.69 4196.53   783.7 4206.73  783.83 4207.53  783.89 4217.33     784
 4231.57  784.89  4234.5  785.24 4242.66  785.44 4244.09  785.59 4251.43  785.72
 4252.14  785.77 4285.97     786 4290.54  786.18 4291.18  786.18 4298.19  786.64
 4302.86  786.64 4308.84  786.98 4314.81  786.98 4319.48  787.21 4334.09  787.43
 4346.01     788 4354.38  788.84 4358.91  788.94 4364.62  789.37 4373.23  789.61
 4382.14     790 4387.08  790.47  4389.1  790.52 4396.39  791.23 4424.23     792
 4431.41   792.6 4435.86  792.72 4441.68  793.19  4446.9  793.28  4456.9     794
 4461.63     794 4462.78  794.34 4477.59     796 4481.93     796 4483.11  794.18
 4483.25     794 4486.98     794 4488.57     796 4541.96     796 4551.22     798
  4559.3  800.04

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05 1929.99    .027 2405.11     .06 3849.57     .04 4080.08     .07

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1929.99 2405.11             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0    1675   775.8       F
    1675    1925   763.5       F
    2396    2640   764.5       F
    2640    4243     767       F
    4243    4300     798       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
       0    1500     760    1500    1610     780    3015    3155     780
    4170    4235     815    4430    4480     815

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  3

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
  3014.4   786.5  3066.2     760
Downstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
```

```
  3770.6   786.5  3824.5     760

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*******************************
  3320.4     772  3452.5     803
Downstream     num=       2
     Sta    Elev     Sta    Elev
*******************************
  4067.5     772  4198.9     803

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*******************************
  3703.1   812.6  3743.2     790
Downstream     num=       2
     Sta    Elev     Sta    Elev
*******************************
  4450.1   812.6  4476.9     790

Number of Piers =  7

Pier Data
Pier Station     Upstream= 1353.21    Downstream= 2002.63
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  735.07    2.83  754.29    2.94   754.3    2.94  759.43
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  735.07    2.83  754.29    2.94   754.3    2.94  759.43

Pier Data
Pier Station     Upstream= 1400.71    Downstream= 2050.13
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  735.07    2.83  754.29    2.94   754.3    2.94  759.43
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  735.07    2.83  754.29    2.94   754.3    2.94  759.43

Pier Data
Pier Station     Upstream= 1448.21    Downstream= 2097.63
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  727.07    2.83  754.29    2.94   754.3    2.94  759.43
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  727.07    2.83  754.29    2.94   754.3    2.94  759.43

Pier Data
Pier Station     Upstream= 1496.63    Downstream= 2146.05
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    8.04     698     4.5  754.15     5.5  754.16     5.5  759.43
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    8.04     698     4.5  754.15     5.5  754.16     5.5  759.43

Pier Data
Pier Station     Upstream= 1637.42    Downstream= 2286.84
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       8     698     4.5  753.97     5.5  753.98     5.5  759.43
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
```

```
*****************************************************************
       8     698     4.5  753.97     5.5  753.98     5.5  759.43

Pier Data
Pier Station     Upstream= 1685.84    Downstream= 2335.26
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  727.07    2.83  754.29    2.94   754.3    2.94  759.43
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  727.07    2.83  754.29    2.94   754.3    2.94  759.43

Pier Data
Pier Station     Upstream= 1734.42    Downstream= 2383.84
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  727.07    2.83  754.29    2.94   754.3    2.94  759.43
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    2.83  727.07    2.83  754.29    2.94   754.3    2.94  759.43

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =      .5
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =  759.43

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. US. (ft)          *     739.60  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     739.25  * E.G. Elev (ft)         *     739.58  *     739.45  *
* Q Total (cfs)          *   12800.00  * W.S. Elev (ft)         *     739.19  *     739.06  *
* Q Bridge (cfs)         *   12800.00  * Crit W.S. (ft)         *     729.80  *     729.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      19.62  *      19.52  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.99  *       5.01  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2564.12  *    2553.21  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   21071.23  *   21019.45  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *      11.09  *      10.99  *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *     285.94  *     281.37  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *   609090.1  *   611304.5  *
* Delta WS (ft)          *       0.16  * Top Width (ft)         *     231.30  *     232.28  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.01  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.25  *       0.25  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.23  *       1.25  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. US. (ft)          *     744.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     743.69  * E.G. Elev (ft)         *     744.10  *     743.96  *
```

```
* Q Total (cfs)          *   20500.00  * W.S. Elev (ft)         *     743.61  *     743.47  *
* Q Bridge (cfs)         *   20500.00  * Crit W.S. (ft)         *     732.28  *     732.20  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.04  *      23.93  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.63  *       5.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3644.16  *    3652.13  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   36331.71  *   36254.30  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *      14.02  *      13.78  *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *     347.85  *     343.07  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *   960213.8  *   972631.3  *
* Delta WS (ft)          *       0.17  * Top Width (ft)         *     259.86  *     265.09  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.63  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.30  *       0.30  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.68  *       1.66  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     747.69  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     747.23  * E.G. Elev (ft)         *     747.67  *     747.51  *
* Q Total (cfs)          *   27100.00  * W.S. Elev (ft)         *     747.14  *     746.99  *
* Q Bridge (cfs)         *   27100.00  * Crit W.S. (ft)         *     734.19  *     734.05  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.57  *      27.45  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.81  *       5.80  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4661.55  *    4675.58  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   52239.05  *   52128.50  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *      14.26  *      14.43  *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *     446.30  *     435.46  *
* Delta EG (ft)          *       0.19  * Conv. Total (cfs)      *  1225839.0  *  1252349.0  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *     326.96  *     323.99  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.81  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.32  *       0.31  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.85  *       1.82  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     751.24  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.77  * E.G. Elev (ft)         *     751.21  *     751.05  *
* Q Total (cfs)          *   34500.00  * W.S. Elev (ft)         *     750.68  *     750.52  *
* Q Bridge (cfs)         *   34500.00  * Crit W.S. (ft)         *     736.31  *     736.18  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.11  *      30.98  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.81  *       5.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5933.42  *    5931.72  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   72290.13  *   72162.78  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *      15.64  *      15.48  *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *     541.50  *     535.59  *
* Delta EG (ft)          *       0.19  * Conv. Total (cfs)      *  1610921.0  *  1621983.0  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *     379.41  *     383.17  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.82  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.31  *       0.31  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.82  *       1.82  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
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```
* E.G. US. (ft)          *     756.56  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     756.11  * E.G. Elev (ft)         *     756.53  *     756.36  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     756.03  *     755.86  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     738.69  *     738.62  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.46  *      36.32  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.67  *       5.65  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8024.71  *    8046.91  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  111344.20  *  111209.50  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *      20.16  *      20.08  *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *     632.44  *     627.37  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *  2402529.0  *  2426591.0  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *     397.98  *     400.67  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.67  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.28  *       0.28  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.61  *       1.59  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     759.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     758.63  * E.G. Elev (ft)         *     759.10  *     758.91  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     758.53  *     758.34  *
* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     740.20  *     740.14  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.96  *      38.80  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.10  *       6.07  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8915.57  *    8963.90  *
* Weir Submerg           *             * Froude # Chl           *       1.16  *       0.98  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  134849.20  *  134641.50  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *      33.09  *      33.17  *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *     805.95  *     799.35  *
* Delta EG (ft)          *       0.22  * Conv. Total (cfs)      *  2435991.0  *  2471544.0  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *     269.43  *     274.32  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.10  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.34  *       0.34  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       2.10  *       2.06  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     760.75  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     760.16  * E.G. Elev (ft)         *     760.73  *     760.68  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     760.00  *     759.96  *
* Q Bridge (cfs)         *   63000.00  * Crit W.S. (ft)         *     741.51  *     741.47  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.43  *      40.42  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.88  *       6.80  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9159.33  *    9258.01  *
* Weir Submerg           *             * Froude # Chl           *       0.79  *       0.71  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  151360.50  *  152562.60  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *    1087.54  *    1082.50  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *  2086612.0  *  2130794.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *             *       9.44  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       6.88  * C & E Loss (ft)        *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.48  *       0.47  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.30  *       3.18  *
*********************************************************************************************

Warning: The pressure flow/weir calculations did not converge within the given number of iterations.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
```

```
Note:    The water surface computed by the sluice gate equation (during pressure only calculations) is
         below the physical low chord of the bridge.
Note:    The downstream water surface is below the minimum elevation for pressure flow.  The sluice
         gate equations were used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     763.62  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     762.95  * E.G. Elev (ft)         *     763.58  *     763.51  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     762.54  *     762.50  *
* Q Bridge (cfs)         *   74868.36  * Crit W.S. (ft)         *     743.39  *     743.33  *
* Q Weir (cfs)           *    1031.64  * Max Chl Dpth (ft)      *      42.97  *      42.96  *
* Weir Sta Lft (ft)      *    1018.00  * Vel Total (ft/s)       *       8.17  *       8.09  *
* Weir Sta Rgt (ft)      *    1770.50  * Flow Area (sq ft)      *    9159.35  *    9258.01  *
* Weir Submerg           *       0.20  * Froude # Chl           *       0.65  *       0.62  *
* Weir Max Depth (ft)    *       2.05  * Specif Force (cu ft)   *  180240.70  *  181512.90  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *  329093.90  *            *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *    1089.25  *    1082.50  *
* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *  2086613.0  *  2130794.0  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *       0.03  *      39.39  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *       0.06  *       0.00  *
* BR Open Vel (ft/s)     *       8.17  * C & E Loss (ft)        *       0.01  *       0.11  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.69  *       0.68  *
* Br Sel Method          *Energy/Weir  * Power Total (lb/ft s)  *       5.68  *       5.48  *
*********************************************************************************************

Warning: The pressure flow/weir calculations did not converge within the given number of iterations.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The water surface computed by the sluice gate equation (during pressure only calculations) is
         below the physical low chord of the bridge.
Note:    The downstream water surface is below the minimum elevation for pressure flow.  The sluice
         gate equations were used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Notes(60):  This is an inside cross section of a perched bridge that has energy, low flow inside
         of the bridge and weir flow over the embankment.  The reported hydraulics are based on the
         flow and area inside of the bridge.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Notes(60):  This is an inside cross section of a perched bridge that has energy, low flow inside
         of the bridge and weir flow over the embankment.  The reported hydraulics are based on the
         flow and area inside of the bridge.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     753.09  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     752.62  * E.G. Elev (ft)         *     753.06  *     752.90  *
* Q Total (cfs)          *   38700.00  * W.S. Elev (ft)         *     752.54  *     752.37  *
* Q Bridge (cfs)         *   38700.00  * Crit W.S. (ft)         *     737.35  *     737.16  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.97  *      32.83  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.82  *       5.81  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6644.61  *    6655.95  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   84697.36  *   84555.91  *
* Min El Weir Flow (ft)  *     763.16  * Hydr Depth (ft)        *      17.08  *      16.78  *
* Min El Prs (ft)        *     759.43  * W.P. Total (ft)        *     573.88  *     572.40  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *  1871548.0  *  1880103.0  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *     389.09  *     396.57  *
* BR Open Area (sq ft)   *   19636.69  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.82  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.31  *       0.31  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       1.80  *       1.79  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 7.042

INPUT
Description: d/s Face 40 Hwy.

COE Riverstation=30689.71
Preliminary Model
Riverstation=10184.45

Reach lengths have been increased by
46.32, 23.05 and 14.06 to account for the distance between the
assumed and the actual location of the HWY 40 bridge face sections.
Station Elevation Data num= 396

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780.27	1.09	780.05	1.22	780.04	1.37	780	14.66	780
21.62	778.18	22.41	778.01	22.51	778	33.86	778	41.15	776.24
41.9	776.18	42.6	776	52.18	776	59.6	774.11	60.01	774.08
60.46	774	69.41	774	75.68	772.21	77.29	772	88.44	772
96.68	770.01	103.82	770	111.05	768.4	111.71	768.34	112.2	768.23
112.65	768.19	114.16	768	128.26	768	136.08	766.42	136.95	766.38
138.5	766.05	138.6	766.05	138.9	766	152.8	766	159.67	764.39
159.83	764.38	161.03	764.23	161.19	764.19	162.18	764	283.8	764
289.08	762.09	289.24	762.09	289.36	762.08	289.78	762	328.19	762
339.76	760.24	341.07	760.24	343.74	760	362.88	760	369.75	760.29
370.38	760.27	373.89	760.41	375.17	760.38	379.32	760.53	381.15	760.5
385.78	760.65	387.72	760.62	392.05	760.75	408.01	760.91	417.22	760.56
417.66	760.51	420.1	760.51	421.14	760.43	436.11	760.12	436.24	760.11
487.93	760.01	488.26	760	498.78	759.99	499.21	759.96	530.13	759.85
530.38	759.84	583.86	760.1	609.77	759.73	645.46	760.18	645.63	760.19
708.72	760.21	723.76	759.94	723.97	759.93	762.65	759.86	794.13	760.11
798.93	759.87	799.2	759.87	801.5	759.74	805.37	759.77	805.84	759.79
853.18	760.03	862.13	759.93	914.25	760.15	917.36	760.08	917.49	760.07
921.79	759.94	928.93	759.75	939.46	759.91	939.62	759.92	950.98	760.18
962.62	760.06	968.44	760.34	1022.34	759.94	1042.07	760.24	1043.03	760.2
1056.02	760.09	1056.24	760.08	1068.78	759.89	1082.21	759.51	1099.45	759.58
1129.46	760.12	1131.96	760.21	1148.46	760.18	1154.67	760.1	1154.84	760.09
1168.1	759.91	1168.28	759.9	1175.87	759.96	1181.25	760.11	1251.44	759.41
1324.26	759.92	1324.46	759.93	1351.52	760.3	1357.55	760.3	1362.5	760.26
1362.64	760.24	1365.32	760.22	1365.72	760.19	1369.88	760.08	1370	760.07
1381.84	759.39	1389.86	759.44	1404.97	759.97	1413.27	760.03	1413.6	760
1425.71	760	1429.48	759.63	1431.9	759.55	1437.86	759.01	1438.02	758.99
1442.14	758.91	1443.59	758.8	1497.91	758.2	1526.28	758.16	1527.36	758.2
1532.68	758.21	1533.65	758.26	1542.02	758.36	1542.16	758.35	1543.47	758.4
1549.27	758.36	1551.07	758.43	1557.58	758.39	1558.02	758.41	1558.74	758.48
1561.33	758.86	1565.71	758.82	1566.49	758.95	1567.24	759	1575.37	759.07
1590.72	759.65	1623.62	759.4	1631.33	759.49	1639.9	759.82	1662.37	759.05
1665.9	759.2	1669.08	759.15	1670.09	759.23	1676.18	759.45	1676.94	759.51
1677.26	759.52	1682.41	760	1695.64	760.21	1695.77	760.22	1706.09	760.39
1706.3	760.4	1723.84	760.72	1728.33	760.88	1774.15	760.62	1779.42	760.39
1780.95	760.38	1786.02	760.11	1787.32	760.17	1788.2	760	1789.65	760
1793.55	759.52	1797.07	759.61	1797.95	759.6	1802.36	759.75	1802.88	759.73
1806.99	759.9	1807.24	759.88	1809.57	760	1810.92	760	1816.56	758.12
1816.87	758	1824.72	756	1827.38	756	1838.36	755.43	1847.81	755.23
1851.61	754.98	1858	754.93	1863	754.37	1864.28	754.36	1866.53	754
1900.61	753.74	1902.49	753.65	1919.69	753.64	1922.4	753.43	1929.99	753.42
1934.94	752.86	1938.91	752.83	1943.87	752	1958.72	751.22	1960.01	751.2
1966.73	750.07	1966.93	750.05	1967.16	750	2002.66	748	2032.57	746
2036.86	745.46	2045.1	744	2065.45	738	2095.93	734	2124.45	726
2150.58	724.01	2163.71	719.54	2185.71	719.54	2207.71	719.54	2220.83	724
2241.86	726	2249.86	728	2256	730	2267.18	734	2281.19	736
2303.01	738	2312.2	740	2319.13	741.92	2319.39	742	2331.03	744
2355.58	746	2356.41	746	2364.02	748	2368.28	750.72	2375.24	754.72
2381.68	758	2382.9	758.53	2386.26	759.72	2387.16	760	2389.38	760.36
2390.37	760.44	2405.11	762	2431.85	762.04	2432.81	762	2466.28	762.12
2508.58	764	2616.97	764.08	2647.1	766	2703.38	766	2715.47	766.4
2722.38	766.4	2731.84	766	2954.21	766	3012.63	764.29	3041.89	764.26
3051.75	764	3087.94	764	3099.64	764.34	3134.05	764.39	3162.93	765.42

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 3169.89  765.03 3170.58  765.05 3172.23  764.94 3173.57  764.98 3176.91  764.72
 3178.23  764.76 3184.02  764.23  3184.8  764.23 3186.63     764 3190.39  763.08
 3195.84     762 3196.68   761.8 3202.03   760.8 3208.72  759.82 3209.19   759.7
 3224.54  756.08 3225.02     756 3268.18  756.11 3268.37  756.12 3357.42  756.87
 3378.62  756.52 3445.03  754.84 3502.27  754.05 3502.43  754.04 3575.73     754
 3593.34  754.16 3607.22     754 3611.67  754.43  3617.6  754.72 3633.89   755.1
 3635.47  755.26  3639.4  755.33 3641.25  755.54 3646.36   755.6 3647.79  755.75
  3653.4  755.79 3654.15  755.86 3664.75  755.96 3664.89  755.97 3673.93  756.15
 3674.42  756.14  3681.1  756.54 3682.52  756.53 3684.91  756.67 3712.33  757.38
 3726.89  757.43  3734.9  757.26 3737.08   757.1 3739.99  757.17 3742.18  756.99
 3744.43  757.04 3746.94  756.83 3749.08  756.86 3752.23  756.67 3800.36  755.97
 3801.06     756 3821.43     756 3827.38     758 3840.38  761.91 3840.64     762
 3846.95     764 3849.57     764 3908.62     764 3918.44     762 3923.32     762
 3960.42     764  4000.6     764 4003.03  764.49 4012.58     766 4023.57     768
  4062.4     770 4068.17  772.18 4080.08  776.37 4084.99     778  4107.9     780
 4137.62  781.21 4175.22     782 4182.18     782 4184.17  782.25  4184.3  782.26
 4184.43  782.28 4185.36  782.35 4185.88  782.46 4189.06  783.32 4194.63  783.45
 4196.35  783.69 4196.53   783.7 4206.73  783.83 4207.53  783.89 4217.33     784
 4231.57  784.89  4234.5  785.24 4242.66  785.44 4244.09  785.59 4251.43  785.72
 4252.14  785.77 4285.97     786 4290.54  786.18 4291.18  786.18 4298.19  786.64
 4302.86  786.64 4308.84  786.98 4314.81  786.98 4319.48  787.21 4334.09  787.43
 4346.01     788 4354.38  788.84 4358.91  788.94 4364.62  789.37 4373.23  789.61
 4382.14     790 4387.08  790.47  4389.1  790.52 4396.39  791.23 4424.23     792
 4431.41   792.6 4435.86  792.72 4441.68  793.19  4446.9  793.28  4456.9     794
 4461.63     794 4462.78  794.34 4477.59     796 4481.93     796 4483.11  794.18
 4483.25     794 4486.98     794 4488.57     796 4541.96     796 4551.22     798
  4559.3  800.04

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05 1929.99    .027 2405.11     .06 3849.57     .04 4080.08     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1929.99 2405.11           254.66     307 139.975             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0    1675   775.8       F
    1675    1925   763.5       F
    2396    2640   764.5       F
    2640    4243     767       F
    4243    4300     798       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
       0    1500     760    1500    1610     780    3015    3155     780
    4170    4235     815    4430    4480     815

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  739.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  739.09  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  729.51  * Flow Area (sq ft)      *          * 2678.56  *          *
* E.G. Slope (ft/ft)     *0.000321  * Area (sq ft)           *          * 2678.56  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  246.28  * Top Width (ft)          *          *  246.28  *          *
* Vel Total (ft/s)       *    4.78  * Avg. Vel. (ft/s)        *          *    4.78  *          *
* Max Chl Dpth (ft)      *   19.55  * Hydr. Depth (ft)        *          *   10.88  *          *
* Conv. Total (cfs)      *714419.9  * Conv. (cfs)              *          *714419.9  *          *
* Length Wtd. (ft)       *  307.00  * Wetted Per. (ft)        *          *  251.05  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)        *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.02  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)    *          * 2033.23  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  171.85  *    0.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  743.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  743.52  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  732.01  * Flow Area (sq ft)      *          * 3843.86  *          *
```

```
* E.G. Slope (ft/ft)     *0.000296  * Area (sq ft)           *          * 3843.86  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  281.51  * Top Width (ft)         *          *  281.51  *          *
* Vel Total (ft/s)       *    5.33  * Avg. Vel. (ft/s)       *          *    5.33  *          *
* Max Chl Dpth (ft)      *   23.98  * Hydr. Depth (ft)       *          *   13.65  *          *
* Conv. Total (cfs)      *1191869.0  * Conv. (cfs)            *          *1191869.0  *          *
* Length Wtd. (ft)       *  307.00  * Wetted Per. (ft)       *          *  287.42  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.32  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.51  * 2796.18  *    7.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  193.89  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  747.04  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  733.80  * Flow Area (sq ft)      *          * 4934.60  *          *
* E.G. Slope (ft/ft)     *0.000292  * Area (sq ft)           *          * 4934.60  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  343.33  * Top Width (ft)         *          *  343.33  *          *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *          *    5.49  *          *
* Max Chl Dpth (ft)      *   27.50  * Hydr. Depth (ft)       *          *   14.37  *          *
* Conv. Total (cfs)      *1585623.0  * Conv. (cfs)            *          *1585623.0  *          *
* Length Wtd. (ft)       *  307.00  * Wetted Per. (ft)       *          *  349.76  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.41  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   15.75  * 3453.97  *   76.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  209.25  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  750.58  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  735.83  * Flow Area (sq ft)      *          * 6266.15  *          *
* E.G. Slope (ft/ft)     *0.000265  * Area (sq ft)           *          * 6266.15  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  404.33  * Top Width (ft)         *          *  404.33  *          *
* Vel Total (ft/s)       *    5.51  * Avg. Vel. (ft/s)       *          *    5.51  *          *
* Max Chl Dpth (ft)      *   31.04  * Hydr. Depth (ft)       *          *   15.50  *          *
* Conv. Total (cfs)      *2117649.0  * Conv. (cfs)            *          *2117649.0  *          *
* Length Wtd. (ft)       *  307.00  * Wetted Per. (ft)       *          *  411.78  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.39  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   54.84  * 4110.61  *  286.79  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.46  *  219.61  *   94.72  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.050  *   0.027  *          *
* W.S. Elev (ft)         *  755.92  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  738.32  * Flow Area (sq ft)      *   12.46  * 8584.04  *          *
* E.G. Slope (ft/ft)     *0.000186  * Area (sq ft)           *  167.98  * 8584.04  *  344.77  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    9.28  *45490.72  *          *
* Top Width (ft)         *  806.84  * Top Width (ft)         *  101.07  *  447.61  *  258.17  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *    0.74  *    5.30  *          *
* Max Chl Dpth (ft)      *   36.38  * Hydr. Depth (ft)       *    2.50  *   19.18  *          *
* Conv. Total (cfs)      *3340644.0  * Conv. (cfs)            *  681.4  *3339962.0  *          *
* Length Wtd. (ft)       *  306.99  * Wetted Per. (ft)       *    4.99  *  456.63  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)       *    0.03  *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.02  *    1.15  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  274.29  * 5117.72  * 1195.34  *
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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  124.32  *  230.01  *  310.39  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.050  *   0.027  *          *
* W.S. Elev (ft)         *  758.42  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  739.80  * Flow Area (sq ft)      *   24.95  * 9710.49  *          *
* E.G. Slope (ft/ft)     *0.000179  * Area (sq ft)           *  442.60  * 9710.49  * 1668.89  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   28.97  *54371.03  *          *
* Top Width (ft)         * 1181.18  * Top Width (ft)         *  114.34  *  452.66  *  614.18  *
* Vel Total (ft/s)       *    5.59  * Avg. Vel. (ft/s)       *    1.16  *    5.60  *          *
* Max Chl Dpth (ft)      *   38.88  * Hydr. Depth (ft)       *    5.00  *   21.45  *          *
* Conv. Total (cfs)      *4070663.0  * Conv. (cfs)            *  2167.7  *4068495.0  *          *
* Length Wtd. (ft)       *  306.98  * Wetted Per. (ft)       *    4.99  *  462.27  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)       *    0.06  *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.06  *    1.31  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  716.89  * 5724.67  * 2121.01  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  225.82  *  232.86  *  442.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.050  *   0.027  *          *
* W.S. Elev (ft)         *  760.07  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  741.08  * Flow Area (sq ft)      *   33.19  *10461.65  *          *
* E.G. Slope (ft/ft)     *0.000190  * Area (sq ft)           *  741.16  *10461.65  * 2693.32  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *   48.02  *62951.97  *          *
* Top Width (ft)         * 2107.10  * Top Width (ft)         * 1022.19  *  457.63  *  627.29  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *    1.45  *    6.02  *          *
* Max Chl Dpth (ft)      *   40.53  * Hydr. Depth (ft)       *    6.65  *   22.86  *          *
* Conv. Total (cfs)      *4575467.0  * Conv. (cfs)            *  3487.8  *4571979.0  *          *
* Length Wtd. (ft)       *  306.92  * Wetted Per. (ft)       *    4.99  *  467.51  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)       *    0.08  *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.11  *    1.59  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1109.16  * 6103.68  * 2935.14  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  260.84  *  233.35  *  612.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.050  *   0.027  *          *
* W.S. Elev (ft)         *  762.75  * Reach Len. (ft)        *  254.66  *  307.00  *  139.98  *
* Crit W.S. (ft)         *  742.90  * Flow Area (sq ft)      *   46.56  *11705.99  *          *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)           * 4646.67  *11717.24  * 4465.73  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   85.33  *75814.67  *          *
* Top Width (ft)         * 2756.81  * Top Width (ft)         * 1532.74  *  475.12  *  748.95  *
* Vel Total (ft/s)       *    6.46  * Avg. Vel. (ft/s)       *    1.83  *    6.48  *          *
* Max Chl Dpth (ft)      *   43.21  * Hydr. Depth (ft)       *    9.33  *   25.12  *          *
* Conv. Total (cfs)      *5454527.0  * Conv. (cfs)            *  6131.9  *5448395.0  *          *
* Length Wtd. (ft)       *  306.68  * Wetted Per. (ft)       *    4.99  *  475.95  *          *
* Min Ch El (ft)         *  719.54  * Shear (lb/sq ft)       *    0.11  *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.21  *    1.93  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1898.75  * 6714.57  * 4695.21  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  312.56  *  234.23  *  807.59  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	752.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.027	
W.S. Elev (ft)	752.42	Reach Len. (ft)	254.66	307.00	139.98
Crit W.S. (ft)	736.89	Flow Area (sq ft)		7036.62	
E.G. Slope (ft/ft)	0.000246	Area (sq ft)		7036.62	
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	429.91	Top Width (ft)		429.91	
Vel Total (ft/s)	5.50	Avg. Vel. (ft/s)		5.50	
Max Chl Dpth (ft)	32.88	Hydr. Depth (ft)		16.37	
Conv. Total (cfs)	2465708.0	Conv. (cfs)		2465708.0	
Length Wtd. (ft)	307.00	Wetted Per. (ft)		437.97	
Min Ch El (ft)	719.54	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.36	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	93.15	4451.54	470.54
C & E Loss (ft)	0.01	Cum SA (acres)	43.54	223.87	136.87

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 6.984

INPUT
Description: Expanded Section d/s of 40 Hwy.

COE
Riverstation=30973.66
Preliminary Model Riverstation=9900.501
Station Elevation Data num= 268

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	790	9.95	788.35	10.45	788.28	12.16	788	18.85	786.78
20.34	786.49	23.02	786	48.69	781.58	58.3	780	58.55	780
59.57	779.81	60.69	779.62	62.78	779.21	70.17	778	70.36	777.97
93.18	774	99.82	773.16	102.37	772.93	108.95	772.2	110.58	772
115.19	771.37	127.54	770	127.72	770	132	769.44	148.01	768
152.51	768	177.28	766	179.76	766	202.18	764	225.53	764
225.98	763.92	226.09	763.92	228.94	763.47	238.95	762	340.79	762
370.24	760.58	380.21	760.58	383.35	760.55	402.52	760.56	404.3	760.53
407.9	760.54	417.19	760.46	445.84	760.59	477.28	760.58	479.02	760.56
499.55	760.59	548.08	760	883.27	760	900.63	759.84	1003.38	758
1135.62	758	1143.92	756.23	1145.05	756	1175.76	754	1180.68	752.69
1183.15	752	1194.47	748	1215.65	740.12	1215.98	740	1225.58	738
1259.98	734	1263.59	732.84	1266.07	732	1271.76	730	1277.94	728
1283.68	726.54	1285.66	726	1311.43	724	1325.3	719.46	1347.3	719.46
1369.3	719.46	1383.09	724	1396.68	726	1423.27	734	1429.6	735.19
1434.67	736	1461.45	738	1468.27	740	1491.32	748	1491.75	748.16
1502.48	752	1518.59	754	1541.61	756	1543.63	756.64	1548.16	758
1554.22	760	1554.48	760.07	1558.39	761.09	1562.13	762	1595.61	763.98
1595.89	764	1679.15	766	1735.25	766.87	1739.01	766.85	1745.38	766.95
1790.6	766.87	1793.78	766.84	1842.66	766	2020.03	766	2070.69	767.21
2090.58	767.22	2092.3	767.21	2099.69	766	2108.49	766	2111.13	767.16
2120.16	767.18	2187.62	766	2296.69	766	2307.97	764	2315.84	762
2319.23	761.19	2324.63	760	2332.86	760	2343.28	759.46	2346.55	759.47
2353.42	759.55	2354.17	759.54	2357.66	759.53	2357.98	759.52	2358.12	759.52
2364.34	759.47	2366.65	759.42	2370.96	759.46	2383.64	759.32	2397.61	759.38
2400.06	759.42	2402.76	759.39	2406.33	759.45	2407.86	759.43	2412.63	759.51
2414.7	759.47	2420.23	759.57	2422.41	759.52	2422.68	759.51	2428.42	759.61
2428.76	759.6	2429.55	759.59	2435.4	759.68	2436.52	759.66	2441.79	759.72
2442.99	759.7	2447.1	759.7	2448.31	759.67	2451.3	759.63	2452.41	759.57
2453.36	759.49	2454.21	759.39	2454.87	759.3	2455.31	759.25	2455.6	759.2
2455.95	759.16	2457.7	759.07	2458.15	759.01	2459.14	758.94	2459.8	758.87
2460.82	758.78	2461.47	758.71	2462.91	758.59	2463.5	758.52	2467.95	758.13
2468.16	758.1	2469.27	758	2476.61	756.85	2480.95	756	2493.31	756
2686.45	756	2703.2	755.11	2797.93	755.09	2828.57	754.83	2884.9	754
2893.43	753.79	2895.27	753.76	2907.94	753.46	2912.79	753.39	2937.03	752.86
2946.96	752.75	2951.16	752.67	2965.36	752.52	2997.34	752.15	3003.87	752.13
3004.47	752.12	3004.99	752.12	3012.21	752.04	3095.66	753.7	3141.04	754
3178.83	754	3186.23	755.55	3188.3	756	3197.77	759.25	3205.88	762
3210.81	762.98	3220.47	763	3220.77	762.99	3225.18	762	3233.69	760

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 3241.89     758 3245.54     758 3247.05   758.6 3250.36     760 3251.74  760.73
 3254.28     762  3258.6  763.39 3259.53  763.45 3263.75  763.58 3264.63  763.53
 3272.34     762 3294.73     762 3323.94     764 3330.79     764 3341.43  763.22
 3362.31  763.83 3362.89     764 3369.17     766 3376.24  767.74 3377.22     768
 3431.08     770 3436.65   771.9 3436.97     772 3437.77   772.2  3443.6     774
 3448.44  774.93 3463.78  777.14 3470.08     778 3475.02  778.13 3475.59  778.14
 3488.21   778.4 3492.56  778.46  3511.3  778.48 3516.08  778.41 3517.68  778.43
 3522.26  778.36 3524.29  778.39 3524.74  778.39 3528.35  778.36 3528.62  778.36
 3529.02  778.37 3529.87  778.38 3534.16  778.39  3542.7  778.45 3546.11  778.51
 3555.96  778.57 3561.23  778.65 3598.66  778.97 3602.04  778.97 3604.35  778.95
 3609.05  778.95 3630.77  778.75 3637.79  778.76 3641.07  778.79  3657.4  779.24
 3678.37  780.04 3678.77  780.05 3727.92     782 3764.71     784 3771.78  784.59
 3775.29  784.98 3783.77     786 3784.36  786.09 3794.52     788  3795.7  788.33
 3799.32  789.45 3813.14     794 3818.05  795.52  3819.8     796 3901.19     798
 3903.22  798.34 3912.53     800  3914.1     800

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .075 1135.62    .027 1562.13     .06 2493.31    .075 3247.05     .04
 3448.44     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1135.62 1562.13           271.04   347.7   201.4              .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
    3694    3865     798       F
    1829    3694     767       F
       0     850     764       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
     422     230     780    3225    3255     760    3530    3590     790
    3773    3857     800

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  739.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.39  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  738.95  * Reach Len. (ft)        *  271.04  *  347.70  *  201.40  *
* Crit W.S. (ft)          *  729.56  * Flow Area (sq ft)      *          * 2557.51  *          *
* E.G. Slope (ft/ft)      *0.000369  * Area (sq ft)           *          * 2557.51  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  243.66  * Top Width (ft)         *          *  243.66  *          *
* Vel Total (ft/s)        *    5.00  * Avg. Vel. (ft/s)       *          *    5.00  *          *
* Max Chl Dpth (ft)       *   19.49  * Hydr. Depth (ft)       *          *   10.50  *          *
* Conv. Total (cfs)       *666027.9  * Conv. (cfs)            *          *666027.9  *          *
* Length Wtd. (ft)        *  347.70  * Wetted Per. (ft)       *          *  248.46  *          *
* Min Ch El (ft)          *  719.46  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.19  *          *
* Frctn Loss (ft)         *    0.11  * Cum Volume (acre-ft)   *          * 2014.78  *    0.18  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *          *  170.12  *    0.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  743.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.48  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  743.39  * Reach Len. (ft)        *  271.04  *  347.70  *  201.40  *
* Crit W.S. (ft)          *  732.14  * Flow Area (sq ft)      *          * 3705.22  *          *
* E.G. Slope (ft/ft)      *0.000319  * Area (sq ft)           *          * 3705.22  *          *
* Q Total (cfs)           *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)          *  271.17  * Top Width (ft)         *          *  271.17  *          *
* Vel Total (ft/s)        *    5.53  * Avg. Vel. (ft/s)       *          *    5.53  *          *
* Max Chl Dpth (ft)       *   23.93  * Hydr. Depth (ft)       *          *   13.66  *          *
* Conv. Total (cfs)       *1147909.0  * Conv. (cfs)            *          *1147909.0  *          *
* Length Wtd. (ft)        *  347.70  * Wetted Per. (ft)       *          *  277.41  *          *
* Min Ch El (ft)          *  719.46  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.47  *          *
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)   *    1.51  * 2769.58  *    7.81  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *    2.36  *  191.94  *    9.15  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	747.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.027	
W.S. Elev (ft)	746.90	Reach Len. (ft)	271.04	347.70	201.40
Crit W.S. (ft)	734.04	Flow Area (sq ft)		4690.57	
E.G. Slope (ft/ft)	0.000280	Area (sq ft)		4690.57	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	290.70	Top Width (ft)		290.70	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	27.44	Hydr. Depth (ft)		16.14	
Conv. Total (cfs)	1620700.0	Conv. (cfs)		1620700.0	
Length Wtd. (ft)	347.70	Wetted Per. (ft)		298.17	
Min Ch El (ft)	719.46	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.59	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	15.75	3420.05	76.53
C & E Loss (ft)	0.02	Cum SA (acres)	9.30	207.02	41.55

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	750.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.027	
W.S. Elev (ft)	750.40	Reach Len. (ft)	271.04	347.70	201.40
Crit W.S. (ft)	736.18	Flow Area (sq ft)		5742.71	
E.G. Slope (ft/ft)	0.000253	Area (sq ft)		5742.71	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	310.32	Top Width (ft)		310.32	
Vel Total (ft/s)	6.01	Avg. Vel. (ft/s)		6.01	
Max Chl Dpth (ft)	30.94	Hydr. Depth (ft)		18.51	
Conv. Total (cfs)	2170892.0	Conv. (cfs)		2170892.0	
Length Wtd. (ft)	347.70	Wetted Per. (ft)		318.99	
Min Ch El (ft)	719.46	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.71	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	54.84	4068.29	286.79
C & E Loss (ft)	0.01	Cum SA (acres)	25.46	217.10	94.72

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	756.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.027	
W.S. Elev (ft)	755.71	Reach Len. (ft)	271.04	347.70	201.40
Crit W.S. (ft)	738.64	Flow Area (sq ft)		7535.81	
E.G. Slope (ft/ft)	0.000239	Area (sq ft)		7535.81	917.89
Q Total (cfs)	45500.00	Flow (cfs)		45500.00	
Top Width (ft)	883.95	Top Width (ft)		388.84	495.12
Vel Total (ft/s)	6.04	Avg. Vel. (ft/s)		6.04	
Max Chl Dpth (ft)	36.25	Hydr. Depth (ft)		19.38	
Conv. Total (cfs)	2943287.0	Conv. (cfs)		2943287.0	
Length Wtd. (ft)	347.68	Wetted Per. (ft)		398.59	
Min Ch El (ft)	719.46	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.70	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	273.80	5060.92	1193.31
C & E Loss (ft)	0.01	Cum SA (acres)	124.03	227.06	309.18

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	758.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.075	0.027	
W.S. Elev (ft)	758.20	Reach Len. (ft)	271.04	347.70	201.40
Crit W.S. (ft)	740.15	Flow Area (sq ft)	27.78	8540.95	

```
* E.G. Slope (ft/ft)     *0.000244  * Area (sq ft)           *   27.78  * 8540.95  * 2639.10  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *    2.88  *54397.12  *          *
* Top Width (ft)         * 1284.22  * Top Width (ft)         *  143.49  *  413.15  *  727.58  *
* Vel Total (ft/s)       *    6.35  * Avg. Vel. (ft/s)       *    0.10  *    6.37  *          *
* Max Chl Dpth (ft)      *   38.74  * Hydr. Depth (ft)       *    0.19  *   20.67  *          *
* Conv. Total (cfs)      *3483006.0  * Conv. (cfs)            *   184.2  *3482822.0  *          *
* Length Wtd. (ft)       *  347.28  * Wetted Per. (ft)       *  143.49  *  423.46  *          *
* Min Ch El (ft)         *  719.46  * Shear (lb/sq ft)       *    0.00  *    0.31  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    1.96  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  715.51  * 5660.35  * 2114.09  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  225.06  *  229.81  *  440.56  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.075  *   0.027  *          *
* W.S. Elev (ft)         *  759.83  * Reach Len. (ft)        *  271.04  *  347.70  *  201.40  *
* Crit W.S. (ft)         *  741.38  * Flow Area (sq ft)      *  335.97  * 9218.61  *          *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *  335.97  * 9218.61  * 3881.37  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  135.52  *62864.48  *          *
* Top Width (ft)         * 1516.02  * Top Width (ft)         *  234.54  *  418.09  *  863.38  *
* Vel Total (ft/s)       *    6.59  * Avg. Vel. (ft/s)       *    0.40  *    6.82  *          *
* Max Chl Dpth (ft)      *   40.37  * Hydr. Depth (ft)       *    1.43  *   22.05  *          *
* Conv. Total (cfs)      *3931851.0  * Conv. (cfs)            *  8457.8  *3923393.0  *          *
* Length Wtd. (ft)       *  346.77  * Wetted Per. (ft)       *  234.56  *  428.67  *          *
* Min Ch El (ft)         *  719.46  * Shear (lb/sq ft)       *    0.02  *    0.34  *          *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.01  *    2.35  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1106.01  * 6034.33  * 2924.58  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  257.16  *  230.26  *  610.00  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  763.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.81  * Wt. n-Val.             *   0.075  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  762.51  * Reach Len. (ft)        *  271.04  *  347.70  *  201.40  *
* Crit W.S. (ft)         *  743.18  * Flow Area (sq ft)      * 1094.74  *10352.88  *    2.23  *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           * 2303.55  *10352.88  * 6328.51  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  848.71  *75050.94  *    0.36  *
* Top Width (ft)         * 2295.46  * Top Width (ft)         *  900.17  *  426.51  *  968.79  *
* Vel Total (ft/s)       *    6.63  * Avg. Vel. (ft/s)       *    0.78  *    7.25  *    0.16  *
* Max Chl Dpth (ft)      *   43.05  * Hydr. Depth (ft)       *    3.83  *   24.27  *    0.26  *
* Conv. Total (cfs)      *4750353.0  * Conv. (cfs)            * 53118.1  *4697213.0  *    22.3  *
* Length Wtd. (ft)       *  345.63  * Wetted Per. (ft)       *  285.64  *  437.36  *    8.70  *
* Min Ch El (ft)         *  719.46  * Shear (lb/sq ft)       *    0.06  *    0.38  *    0.00  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.05  *    2.73  *    0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1878.43  * 6636.79  * 4677.87  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  305.44  *  231.05  *  804.83  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  752.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.23  * Reach Len. (ft)        *  271.04  *  347.70  *  201.40  *
* Crit W.S. (ft)         *  737.33  * Flow Area (sq ft)      *          * 6319.60  *          *
* E.G. Slope (ft/ft)     *0.000243  * Area (sq ft)           *          * 6319.60  *    2.84  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  352.70  * Top Width (ft)         *          *  321.96  *   30.75  *
* Vel Total (ft/s)       *    6.12  * Avg. Vel. (ft/s)       *          *    6.12  *          *
* Max Chl Dpth (ft)      *   32.77  * Hydr. Depth (ft)       *          *   19.63  *          *
* Conv. Total (cfs)      *2483287.0  * Conv. (cfs)            *          *2483287.0  *          *
* Length Wtd. (ft)       *  347.70  * Wetted Per. (ft)       *          *  331.23  *          *
```

```
* Min Ch El (ft)         *  719.46  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.77  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   93.15  * 4404.47  *  470.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   43.54  *  221.23  *  136.82  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.918

INPUT
Description: COE Riverstation=31321.36
Preliminary Model Riverstation=9552.804
Station Elevation Data    num=     256
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  800.01    1.47  799.29    3.52  798.33    8.37     796    8.94  795.73
    9.64  795.41   12.57     794   14.64  793.03   16.74     792   19.96  790.58
   21.34     790   23.55  788.87   25.73     788   34.02     784   35.43  783.28
   37.87     782   40.05  780.66    41.1     780   44.37     778   48.26     776
    48.8  775.77   52.84     774   60.83     772   62.54  771.59    76.1     768
  102.31     766  106.16  765.86  106.34  765.86  108.67  765.78  108.89  765.78
  203.58     764  252.46     764  265.83  763.75  313.89  763.05  349.99     762
  361.81  761.44  393.05     760   420.4     758  423.49   757.7  433.97   756.8
   435.8  756.67  444.41     756  454.75  754.76  459.96  754.19     462     754
  473.66  752.29  478.45  751.62  478.69  751.59  481.48  751.24  482.73  751.16
  484.65  750.97  486.78  750.84   488.2  750.73  491.44  750.52  492.37  750.47
  498.92  750.05  499.88     750  500.45  749.96  501.37  749.94  502.58  749.94
  510.08  750.07  510.26  750.08  510.49  750.08   527.7  750.36  537.79  750.56
  544.62  750.74  550.88  750.99  553.62  751.15  557.84  751.35  560.13  751.49
  571.83  752.16  572.27  752.19  597.38  753.83  599.78     754  601.95  754.03
   602.2  754.04  616.87  754.38  624.48  754.58  627.09  754.68  631.42   754.8
  660.72     756  660.94     756  675.96  756.22  677.27  756.22  692.12  756.38
  786.15     756  866.06     754  877.01  750.08  877.22     750  877.44  749.92
  882.67  748.12  883.03     748  904.59     740   911.3     738  920.28     736
  938.84     734  948.89     732  953.97     730  959.89     728  969.59     726
  980.54     724 1002.87  719.37 1024.87  719.37 1046.87  719.37 1069.19     724
 1085.73     726  1096.9     728 1105.04     730 1120.69     734 1139.27     736
 1152.48     738 1159.28     740 1168.65  743.48  1175.3     746 1177.56  746.83
 1180.86     748 1185.42  749.54 1186.84     750 1193.12  751.28 1196.48     752
 1230.54     756 1237.66  757.67 1239.02     758 1245.87     760 1250.47  761.19
 1260.97     764 1453.29     764 1462.34  763.81 1465.36  763.82 1471.88     764
 1538.41     764 1566.58  764.41  1587.4  764.36 1588.43  764.35 1595.74  764.34
 1605.96  764.48  1621.1  764.45  1621.7  764.46 1623.17  764.46 1628.28  764.54
 1628.96  764.56 1629.51  764.56 1631.15  764.61 1665.37  764.97 1686.48  764.83
 1688.92  764.77  1693.7  764.77 1696.88   764.7 1735.47  764.39 1774.57  764.34
 1776.52  764.35 1838.01  764.28 1875.61     764 1906.26     760 1906.52  759.97
 1906.84  759.92 1921.26     758  1923.2   757.9 1923.52  757.88 1934.24  757.29
 1935.32  757.24  1940.3  757.05 1943.39  756.88 1947.41  756.73 1959.89     756
 2031.64     756 2086.07     756  2112.4   756.5 2121.49  756.56 2140.21  756.58
 2165.75  756.74 2171.63  756.72 2236.22     756 2250.38     756 2252.19  756.07
 2253.45  756.13 2313.89  756.46  2373.7     756 2497.18  756.02 2497.86  756.03
 2708.74     756  2709.8  756.01 2814.66  755.16 2861.94  754.37 2962.86     754
  3053.1     754 3143.12     752 3177.96     752 3192.15  753.91 3192.89     754
 3201.46     756 3217.02     762 3229.07     762 3244.43     758 3251.95     758
 3256.21  759.08 3259.99     760 3282.29     760 3302.66     760  3303.6  760.12
 3319.08     762 3373.96     762 3377.81  763.46 3384.39     766 3389.73  767.69
 3390.64     768 3443.22     768 3451.77     770 3470.73  770.54 3538.22   772.2
 3595.59  773.22  3599.7  773.27 3617.59  773.68 3619.62  773.71 3631.28     774
 3698.25  776.13  3699.2  776.15 3758.45     778 3761.21  778.24 3783.84  779.96
 3784.52     780 3785.09   780.4 3787.27     782 3789.51  782.92 3790.61  783.34
  3792.1     784 3796.27  785.32 3797.93     786 3799.47  786.78 3804.15   789.1
 3805.91     790 3813.54     794 3814.77  794.66 3817.32     796 3820.13  796.88
 3824.35     798 3887.39     798 3891.81  796.38  3892.7     796 3894.27   795.2
 3898.78  793.04 3905.76     790 3906.73  789.57 3910.37     788 3911.96  787.62
 3914.32  787.28 3918.56  786.53 3923.71     786 3925.73   785.9 3928.36     786
 3946.01     786 3947.01   786.1 3985.36     790 3987.56  790.43 3997.08     792
 3998.17  792.48

Manning's n Values        num=       7
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .085  361.81     .04  866.06    .027 1260.97     .06 2031.64    .075
 3282.29     .04 3470.73    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        866.06 1260.97            455.7   417.2   180.2             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     622     764       F
     622     693     757       F
    1670    3400     767       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
    1425    1535     780    2295    2445     780    3720    3810     800

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  739.21  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  738.88  * Reach Len. (ft)        *  455.70  *  417.20  *  180.20  *
* Crit W.S. (ft)         *  728.98  * Flow Area (sq ft)      *          * 2789.86  *          *
* E.G. Slope (ft/ft)     *0.000281  * Area (sq ft)           *          * 2789.86  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  247.12  * Top Width (ft)         *          *  247.12  *          *
* Vel Total (ft/s)       *    4.59  * Avg. Vel. (ft/s)       *          *    4.59  *          *
* Max Chl Dpth (ft)      *   19.51  * Hydr. Depth (ft)       *          *   11.29  *          *
* Conv. Total (cfs)      *764183.8  * Conv. (cfs)            *          *764183.8  *          *
* Length Wtd. (ft)       *  417.20  * Wetted Per. (ft)       *          *  251.25  *          *
* Min Ch El (ft)         *  719.37  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.89  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *          * 1993.44  *    0.18  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *  168.16  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  743.33  * Reach Len. (ft)        *  455.70  *  417.20  *  180.20  *
* Crit W.S. (ft)         *  731.46  * Flow Area (sq ft)      *          * 3948.38  *          *
* E.G. Slope (ft/ft)     *0.000259  * Area (sq ft)           *          * 3948.38  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  272.62  * Top Width (ft)         *          *  272.62  *          *
* Vel Total (ft/s)       *    5.19  * Avg. Vel. (ft/s)       *          *    5.19  *          *
* Max Chl Dpth (ft)      *   23.96  * Hydr. Depth (ft)       *          *   14.48  *          *
* Conv. Total (cfs)      *1273571.0  * Conv. (cfs)            *          *1273571.0  *          *
* Length Wtd. (ft)       *  417.20  * Wetted Per. (ft)       *          *  278.27  *          *
* Min Ch El (ft)         *  719.37  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.19  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.51  * 2739.03  *    7.81  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.36  *  189.77  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.31  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.84  * Reach Len. (ft)        *  455.70  *  417.20  *  180.20  *
* Crit W.S. (ft)         *  733.29  * Flow Area (sq ft)      *          * 4939.45  *          *
* E.G. Slope (ft/ft)     *0.000236  * Area (sq ft)           *          * 4939.45  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  291.45  * Top Width (ft)         *          *  291.45  *          *
* Vel Total (ft/s)       *    5.49  * Avg. Vel. (ft/s)       *          *    5.49  *          *
* Max Chl Dpth (ft)      *   27.47  * Hydr. Depth (ft)       *          *   16.95  *          *
* Conv. Total (cfs)      *1765770.0  * Conv. (cfs)            *          *1765770.0  *          *
* Length Wtd. (ft)       *  417.20  * Wetted Per. (ft)       *          *  298.36  *          *
* Min Ch El (ft)         *  719.37  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.34  *          *
```

```
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   15.75  * 3381.61  *   76.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    9.30  *  204.70  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  750.35  * Reach Len. (ft)        *  455.70  *  417.20  *  180.20  *
* Crit W.S. (ft)         *  735.31  * Flow Area (sq ft)      *          * 5996.13  *          *
* E.G. Slope (ft/ft)     *0.000220  * Area (sq ft)           *    6.97  * 5996.13  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  344.98  * Top Width (ft)         *   32.70  *  312.29  *          *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *          *    5.75  *          *
* Max Chl Dpth (ft)      *   30.98  * Hydr. Depth (ft)       *          *   19.20  *          *
* Conv. Total (cfs)      *2326233.0  * Conv. (cfs)            *          *2326233.0  *          *
* Length Wtd. (ft)       *  417.20  * Wetted Per. (ft)       *          *  320.36  *          *
* Min Ch El (ft)         *  719.37  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.48  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   54.81  * 4021.44  *  286.79  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   25.36  *  214.61  *   94.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  755.66  * Reach Len. (ft)        *  455.70  *  417.20  *  180.20  *
* Crit W.S. (ft)         *  737.61  * Flow Area (sq ft)      *   55.27  * 7784.41  *          *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)           *  700.31  * 7784.41  *  770.37  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   25.32  *45474.68  *          *
* Top Width (ft)         * 1080.79  * Top Width (ft)         *  271.74  *  361.61  *  447.44  *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)       *    0.46  *    5.84  *          *
* Max Chl Dpth (ft)      *   36.29  * Hydr. Depth (ft)       *    0.83  *   21.53  *          *
* Conv. Total (cfs)      *3262572.0  * Conv. (cfs)            *  1815.2  *3260756.0  *          *
* Length Wtd. (ft)       *  417.22  * Wetted Per. (ft)       *   66.48  *  370.71  *          *
* Min Ch El (ft)         *  719.37  * Shear (lb/sq ft)       *    0.01  *    0.25  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    1.49  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  271.62  * 4999.78  * 1189.40  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  123.18  *  224.07  *  307.00  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  758.16  * Reach Len. (ft)        *  455.70  *  417.20  *  180.20  *
* Crit W.S. (ft)         *  739.09  * Flow Area (sq ft)      *  611.89  * 8702.11  *          *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           * 1709.34  * 8702.11  * 3251.60  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  587.36  *53812.64  *          *
* Top Width (ft)         * 1966.96  * Top Width (ft)         *  447.78  *  373.49  * 1145.69  *
* Vel Total (ft/s)       *    5.84  * Avg. Vel. (ft/s)       *    0.96  *    6.18  *          *
* Max Chl Dpth (ft)      *   38.79  * Hydr. Depth (ft)       *    2.51  *   23.30  *          *
* Conv. Total (cfs)      *3884703.0  * Conv. (cfs)            * 41943.4  *3842760.0  *          *
* Length Wtd. (ft)       *  417.53  * Wetted Per. (ft)       *  244.12  *  382.86  *          *
* Min Ch El (ft)         *  719.37  * Shear (lb/sq ft)       *    0.03  *    0.28  *          *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    0.03  *    1.72  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  710.11  * 5591.53  * 2100.47  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  223.22  *  226.67  *  436.23  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	760.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.040	0.027	
W.S. Elev (ft)	759.79	Reach Len. (ft)	455.70	417.20	180.20
Crit W.S. (ft)	740.36	Flow Area (sq ft)	1011.17	9317.72	
E.G. Slope (ft/ft)	0.000209	Area (sq ft)	2460.21	9317.72	5149.91
Q Total (cfs)	63000.00	Flow (cfs)	1399.88	61600.13	
Top Width (ft)	2024.32	Top Width (ft)	470.16	379.10	1175.07
Vel Total (ft/s)	6.10	Avg. Vel. (ft/s)	1.38	6.61	
Max Chl Dpth (ft)	40.42	Hydr. Depth (ft)	4.14	24.58	
Conv. Total (cfs)	4360101.0	Conv. (cfs)	96882.5	4263219.0	
Length Wtd. (ft)	417.83	Wetted Per. (ft)	244.12	388.70	
Min Ch El (ft)	719.37	Shear (lb/sq ft)	0.05	0.31	
Alpha	1.15	Stream Power (lb/ft s)	0.07	2.07	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	1097.31	5960.35	2903.70
C & E Loss (ft)	0.04	Cum SA (acres)	254.97	227.08	605.29

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	763.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.040	0.027	
W.S. Elev (ft)	762.48	Reach Len. (ft)	455.70	417.20	180.20
Crit W.S. (ft)	742.14	Flow Area (sq ft)	1668.35	10352.17	
E.G. Slope (ft/ft)	0.000212	Area (sq ft)	3801.75	10352.17	8529.44
Q Total (cfs)	75900.00	Flow (cfs)	3248.65	72651.35	
Top Width (ft)	2259.97	Top Width (ft)	532.71	389.25	1338.01
Vel Total (ft/s)	6.31	Avg. Vel. (ft/s)	1.95	7.02	
Max Chl Dpth (ft)	43.11	Hydr. Depth (ft)	6.84	26.60	
Conv. Total (cfs)	5214593.0	Conv. (cfs)	223193.5	4991400.0	
Length Wtd. (ft)	418.38	Wetted Per. (ft)	244.12	399.20	
Min Ch El (ft)	719.37	Shear (lb/sq ft)	0.09	0.34	
Alpha	1.19	Stream Power (lb/ft s)	0.18	2.41	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	1859.44	6554.16	4643.52
C & E Loss (ft)	0.04	Cum SA (acres)	300.99	227.79	799.50

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	752.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.027	
W.S. Elev (ft)	752.18	Reach Len. (ft)	455.70	417.20	180.20
Crit W.S. (ft)	736.29	Flow Area (sq ft)		6580.39	
E.G. Slope (ft/ft)	0.000216	Area (sq ft)	138.32	6580.39	7.03
Q Total (cfs)	38700.00	Flow (cfs)		38700.00	
Top Width (ft)	468.64	Top Width (ft)	97.63	326.84	44.17
Vel Total (ft/s)	5.88	Avg. Vel. (ft/s)		5.88	
Max Chl Dpth (ft)	32.81	Hydr. Depth (ft)		20.13	
Conv. Total (cfs)	2634257.0	Conv. (cfs)		2634257.0	
Length Wtd. (ft)	417.20	Wetted Per. (ft)		335.42	
Min Ch El (ft)	719.37	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.55	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	92.72	4352.99	470.52
C & E Loss (ft)	0.04	Cum SA (acres)	43.23	218.64	136.64

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 6.839

INPUT

Description: COE Riverstation=31738.56
Preliminary Model Riverstation=9135.609
Station Elevation Data num= 286

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	790	3.51	788.53	4.71	788	5.63	786.37	5.84	786
5.97	785.74	6.83	784	7.41	782.84	8.09	782	9.52	782
11.24	780.55	11.61	780.54	12.01	780.26	12.2	780.26	12.92	780.1
12.98	780.1	13.87	780.08	14.66	780.11	14.73	780.12	15.49	780.1
15.54	780.1	16.02	780	16.35	779.93	17.2	779.55	17.5	779.35
18.13	778.91	19.22	778.14	19.3	778.07	19.4	778	20.56	777.2
21.06	776.82	22.21	776	22.34	775.92	23.34	775.13	23.61	774.94
24	774.64	24.31	774.38	24.77	774	24.95	773.9	25.88	773.4
26.35	772.97	26.94	772.57	27.61	772	28.57	771.56	30.81	770
30.94	769.93	31.56	769.49	33.36	768.26	33.64	768	36.02	766.64
37.08	766	39.72	764.61	40.91	764	42.18	763.34	44.74	762
46.78	760.95	48.6	760	50.58	759.7	61	758.07	61.38	758
61.65	757.94	70.84	756	75.8	755.75	84.12	755.31	87.07	755.32
114.1	754.6	116.25	754.58	118.19	754.57	120.1	754.55	126.57	754.58
128.85	754.57	150.26	754.6	157.15	754.58	160.19	754.56	177.29	754.51
180.32	754.48	183.09	754.46	191.75	754.44	207.98	754.48	214.49	754.46
216.76	754.48	226.17	754.45	228.59	754.48	233.98	754.46	236.41	754.49
243.7	754.47	247.93	754.53	256.21	754.52	258.47	754.55	261.5	754.6
269.5	754.62	273.35	754.68	285.35	754.79	296.84	754.92	301.92	754.97
313.07	755.03	317.22	755.06	323.81	755.06	327.34	755.1	332.76	755.09
336.07	755.13	339.39	755.16	347.83	755.05	374.22	754.63	386.87	754.23
387.91	754.22	393.98	754	411.03	752.12	412.14	752	413.13	751.85
421.65	750.58	425.5	750	426.01	749.79	430.66	748	433.96	746.9
442.52	744.07	442.74	744	443.19	743.85	448.87	742	457.34	739.26
461.27	738	477.77	736	495.83	734	500.67	732.04	500.78	732
501.38	731.76	505.8	730	507.3	729.43	510.93	728	538.02	726
575.72	724	594.6	719.25	616.6	719.25	638.6	719.25	657.46	724
659.64	724.3	672.19	726	680.57	727.31	685.13	728	686.72	728.44
692.43	730	695.98	731.18	698.38	732	704.33	734	717.02	735.11
726.96	736	731.3	736.74	738.54	738	744.8	740	745.6	740.31
750.23	742	750.71	742.17	755.82	744	757.84	744.73	761.39	746
764.03	746.95	767.05	748	778.77	751.72	779.64	752	803.92	754
823.01	756	827.88	757.47	829.62	758	834.62	759.51	836.25	760
841.66	762	846.68	763.81	847.18	764	890	765	1623	765
1644	758	1652.66	756	1701.3	756	1884.05	756	1886.69	756.02
1889.44	756	2210.35	756	2262.25	755.91	2265.59	755.9	2294.33	756
2451.88	756	2462.13	755.88	2462.76	755.87	2480.2	755.89	2481.46	755.87
2481.93	755.86	2498.4	755.8	2499.19	755.79	2500.76	755.78	2514.86	755.66
2550.78	755.49	2556.55	755.48	2561.9	755.44	2568.33	755.42	2575.91	755.35
2582.52	755.32	2590.83	755.23	2605.34	755.04	2610.97	755	2616.39	754.92
2620.4	754.88	2625.63	754.8	2627.87	754.77	2671.32	754.3	2673.84	754.3
2676.21	754.31	2679.82	754.36	2715.07	755.29	2829.86	756	2836.96	756
2955.16	754.3	2955.45	754.3	2965.46	754	2979.14	754	3063.54	752.77
3082.7	752.53	3085.79	752.51	3123.5	753.16	3128.59	753.74	3130.78	754
3137.17	755.02	3143.06	756	3148.62	757.23	3152.13	758	3158.07	759.37
3160.65	760	3171.83	760	3174.64	759.42	3181.32	758	3193.29	758
3204.18	760	3208.07	760.62	3210.32	760.72	3213.39	760.72	3217.91	760.08
3218.41	760.09	3218.42	760	3219.37	759.86	3232.3	758	3234.35	758
3240.71	758.99	3246.95	760	3271.94	761.89	3273.43	762	3278.93	762
3311.77	760	3315.37	760	3316.16	760.36	3319.81	762	3324.23	764
3327.78	765.6	3328.27	765.83	3328.65	766	3380.31	767.97	3381.06	768
3384.28	768.09	3448.86	770	3449.74	770	3598.22	772	3641.24	773.24
3671.04	774	3703.47	775.85	3706.25	776	3712.73	778	3713.18	778.34
3715.39	780	3718.06	782	3720.75	784	3723.04	785.69	3723.45	786
3723.93	786.35	3726.22	788	3729.04	790	3729.62	790.4	3731.93	792
3733.8	793.24	3734.93	794	3735.74	794.53	3738	796	3739.22	796.79
3741.1	798	3746.87	799.19	3750.63	800	3760.19	800.32	3764.9	800.47
3787.74	801.08								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	393.98	.027	847.18	.05	1701.3	.075	3204.18	.04
3384.28	.075								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
393.98	847.18	527.21	344.26	158.02	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	296	764	F
1623	3350	767	F

```
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1300    1410     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  739.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  738.83  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  728.84  * Flow Area (sq ft)      *          * 3191.21  *          *
* E.G. Slope (ft/ft)     *0.000214  * Area (sq ft)           *          * 3191.21  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  282.47  * Top Width (ft)          *          *  282.47  *          *
* Vel Total (ft/s)       *    4.01  * Avg. Vel. (ft/s)        *          *    4.01  *          *
* Max Chl Dpth (ft)      *   19.58  * Hydr. Depth (ft)        *          *   11.30  *          *
* Conv. Total (cfs)      *875152.7  * Conv. (cfs)             *          *875152.7  *          *
* Length Wtd. (ft)       *  344.26  * Wetted Per. (ft)        *          *  286.89  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)        *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.60  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *          * 1964.80  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  165.63  *    0.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  743.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  743.30  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  730.92  * Flow Area (sq ft)      *          * 4514.25  *          *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *          * 4514.25  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  309.01  * Top Width (ft)          *          *  309.01  *          *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)        *          *    4.54  *          *
* Max Chl Dpth (ft)      *   24.05  * Hydr. Depth (ft)        *          *   14.61  *          *
* Conv. Total (cfs)      *1466102.0  * Conv. (cfs)            *          *1466102.0  *          *
* Length Wtd. (ft)       *  344.26  * Wetted Per. (ft)        *          *  314.90  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)        *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.79  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *    1.51  * 2698.50  *    7.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    2.36  *  186.98  *    9.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  747.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.83  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  732.45  * Flow Area (sq ft)      *          * 5641.46  *          *
* E.G. Slope (ft/ft)     *0.000178  * Area (sq ft)           *          * 5641.46  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  329.55  * Top Width (ft)          *          *  329.55  *          *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)        *          *    4.80  *          *
* Max Chl Dpth (ft)      *   27.58  * Hydr. Depth (ft)        *          *   17.12  *          *
* Conv. Total (cfs)      *2033262.0  * Conv. (cfs)            *          *2033262.0  *          *
* Length Wtd. (ft)       *  344.26  * Wetted Per. (ft)        *          *  336.62  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)        *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.89  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *   15.75  * 3330.94  *   76.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    9.30  *  201.72  *   41.55  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)         *  750.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  750.35  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
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* Crit W.S. (ft)         *  734.02  * Flow Area (sq ft)      *          * 6836.98  *          *
* E.G. Slope (ft/ft)     *0.000166  * Area (sq ft)           *          * 6836.98  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  351.30  * Top Width (ft)         *          *  351.30  *          *
* Vel Total (ft/s)       *    5.05  * Avg. Vel. (ft/s)       *          *    5.05  *          *
* Max Chl Dpth (ft)      *   31.10  * Hydr. Depth (ft)       *          *   19.46  *          *
* Conv. Total (cfs)      *2680770.0  * Conv. (cfs)            *          *2680770.0  *          *
* Length Wtd. (ft)       *  344.26  * Wetted Per. (ft)       *          *  359.52  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.99  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   54.78  * 3959.99  *  286.79  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   25.19  *  211.43  *   94.72  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.              *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  755.68  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  736.45  * Flow Area (sq ft)      *   81.44  * 8908.61  *          *
* E.G. Slope (ft/ft)     *0.000153  * Area (sq ft)           *  307.16  * 8908.61  *  641.82  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   33.12  *45466.88  *          *
* Top Width (ft)         * 1290.09  * Top Width (ft)         *  316.84  *  425.97  *  547.28  *
* Vel Total (ft/s)       *    5.06  * Avg. Vel. (ft/s)       *    0.41  *    5.10  *          *
* Max Chl Dpth (ft)      *   36.43  * Hydr. Depth (ft)       *    0.83  *   20.91  *          *
* Conv. Total (cfs)      *3673447.0  * Conv. (cfs)            *  2673.9  *3670773.0  *          *
* Length Wtd. (ft)       *  344.76  * Wetted Per. (ft)       *   98.00  *  434.85  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)       *    0.01  *    0.20  *          *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.00  *    1.00  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  266.35  * 4919.84  * 1186.48  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  120.10  *  220.30  *  304.94  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.              *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  758.18  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  737.95  * Flow Area (sq ft)      *  326.26  * 9988.00  *          *
* E.G. Slope (ft/ft)     *0.000153  * Area (sq ft)           * 1124.82  * 9988.00  * 4113.00  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  334.27  *54065.73  *          *
* Top Width (ft)         * 2297.54  * Top Width (ft)         *  333.67  *  436.23  * 1527.64  *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)       *    1.02  *    5.41  *          *
* Max Chl Dpth (ft)      *   38.93  * Hydr. Depth (ft)       *    3.33  *   22.90  *          *
* Conv. Total (cfs)      *4397866.0  * Conv. (cfs)            * 27023.2  *4370843.0  *          *
* Length Wtd. (ft)       *  345.97  * Wetted Per. (ft)       *   98.00  *  445.45  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)       *    0.03  *    0.21  *          *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.03  *    1.16  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  695.28  * 5502.03  * 2085.24  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  219.14  *  222.79  *  430.70  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.              *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  759.81  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  739.13  * Flow Area (sq ft)      *  486.62  *10706.39  *          *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           * 1679.49  *10706.39  * 6654.47  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  673.91  *62326.09  *          *
* Top Width (ft)         * 2363.71  * Top Width (ft)         *  344.16  *  441.65  * 1577.90  *
* Vel Total (ft/s)       *    5.63  * Avg. Vel. (ft/s)       *    1.38  *    5.82  *          *
* Max Chl Dpth (ft)      *   40.56  * Hydr. Depth (ft)       *    4.97  *   24.24  *          *
* Conv. Total (cfs)      *4918709.0  * Conv. (cfs)            * 52615.4  *4866094.0  *          *
* Length Wtd. (ft)       *  346.89  * Wetted Per. (ft)       *   98.00  *  451.11  *          *
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* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)       *    0.05  *    0.24  *          *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.07  *    1.42  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1075.65  * 5864.46  * 2879.28  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  250.71  *  223.15  *  599.60  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  763.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.              *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  762.50  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  740.77  * Flow Area (sq ft)      *  749.81  *11902.81  *          *
* E.G. Slope (ft/ft)     *0.000168  * Area (sq ft)           * 2613.14  *11902.81  *11081.42  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1403.92  *74496.08  *          *
* Top Width (ft)         * 2489.69  * Top Width (ft)         *  350.20  *  449.07  * 1690.42  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *    1.87  *    6.26  *          *
* Max Chl Dpth (ft)      *   43.25  * Hydr. Depth (ft)       *    7.65  *   26.51  *          *
* Conv. Total (cfs)      *5847186.0  * Conv. (cfs)            *108155.5  *5739031.0  *          *
* Length Wtd. (ft)       *  348.41  * Wetted Per. (ft)       *   98.00  *  459.00  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)       *    0.08  *    0.27  *          *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.15  *    1.71  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1825.88  * 6447.58  * 4602.96  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  296.37  *  223.78  *  793.23  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  752.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)         *  752.19  * Reach Len. (ft)        *  527.21  *  344.26  *  158.02  *
* Crit W.S. (ft)         *  735.06  * Flow Area (sq ft)      *          * 7497.97  *          *
* E.G. Slope (ft/ft)     *0.000165  * Area (sq ft)           *          * 7497.97  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  371.46  * Top Width (ft)         *          *  371.46  *          *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)       *          *    5.16  *          *
* Max Chl Dpth (ft)      *   32.94  * Hydr. Depth (ft)       *          *   20.18  *          *
* Conv. Total (cfs)      *3012691.0  * Conv. (cfs)            *          *3012691.0  *          *
* Length Wtd. (ft)       *  344.26  * Wetted Per. (ft)       *          *  380.08  *          *
* Min Ch El (ft)         *  719.25  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.05  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   92.00  * 4285.57  *  470.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.72  *  215.29  *  136.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.774

INPUT
Description: COE Riverstation=32082.82
Preliminary Model Riverstation=8791.352
Station Elevation Data    num=     308
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  799.11     .15  799.11    5.67  799.21    6.83  799.21    7.29  799.05
   13.89     798   66.91     798   70.53  796.54   74.07   795.1   76.75     794
   78.64  793.22   81.62     792   85.87  790.38   86.84     790   87.41  789.78
   88.41  789.42   92.46     788   94.94  787.24   99.09     786   99.59  785.73
  100.14  785.58  101.41  785.22  103.89   784.4  105.32  784.11  105.75     784
  105.91     784  106.02  783.95  106.09  783.92  106.31  783.81  106.58  783.63
  108.07  782.78  108.83  782.31  109.37     782  111.65  780.65  112.77     780
  115.01  778.76  116.33     778  119.97  776.01  120.03  775.98  122.56  774.46
  123.24     774  125.19  772.64  126.06     772   127.2  771.15  128.76     770
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131.48	768	133.17	766.8	134.3	766	137.26	764.17	137.51	764
141.09	762.27	141.6	762.03	141.72	761.97	142.12	761.79	146.08	760
146.39	759.8	149.44	758	152.57	756.71	153.97	756.14	154.33	756
171.31	754.78	184.4	754	185.26	753.91	189.13	753.45	189.41	753.48
199.46	752.84	200.19	752.83	217.68	753.12	219.38	753.09	223.39	753.03
224.76	753.02	227.58	752.98	230.73	752.91	232.82	752.9	236.93	752.78
238.86	752.77	243.99	752.61	245.49	752.61	246.83	752.6	252.22	752.44
253.21	752.44	254.31	752.43	259.25	752.32	260.23	752.32	262.32	752.2
265.65	752	270.91	752	274.08	751.09	276.78	750	280.84	748.1
281.05	748	281.93	747.59	285.32	746	287.78	744.87	289.66	744
294.41	742.25	295.06	742	299.69	740.44	300.97	740	305.36	738.51
306.85	738	317.98	736.62	323.05	736	340.12	734	345.38	732.34
346.45	732	351.34	730.46	352.79	730	358.79	728	359.42	727.78
361.56	727.06	364.73	726	384.88	724.65	387.16	724.5	388.94	724.39
390.47	724.29	398.83	724.14	399.56	724.1	403.3	724	422.18	724
423.57	723.85	423.95	723.78	425.31	723.55	431.88	722.89	434.6	722
439.5	719.16	461.5	719.16	483.5	719.16	488.38	722	491.02	723.43
492.03	724	517.1	726	536.74	728	541.78	729.36	544.12	730
549.7	732	555.32	734	574.38	736	586.5	737.68	588.85	738
592.14	738.95	595.72	740	599.24	741.26	601.33	742	603.39	742.74
606.92	744	612.48	745.97	612.55	746	612.62	746.02	615.79	747.11
618.46	748	622.37	749.35	624.15	750	628.79	751.51	630.32	752
631.87	752.19	647.28	754	671.89	756	676.96	757.79	677.55	758
678.38	758.29	683.44	760	685.87	760.91	692.22	763.27	694.24	764
697.99	765.34	699.81	766	701.18	766.49	705.43	768	824.15	768
825.75	767.95	829.61	767.86	829.86	767.86	839.81	767.76	850.58	767.58
876.68	767.05	923.19	766	1480	766	1510	756	1516.77	755.92
1525.85	755.87	1528.73	755.85	2039.85	756	2069.58	755.68	2073.76	755.64
2112.83	755.44	2113.01	755.44	2117.42	755.45	2239.21	755.93	2297.74	755.92
2464.8	754	2465.05	754	2473.94	753.82	2477.41	753.77	2494.44	753.83
2502.22	754	2598.34	755.13	2601.89	755.15	2607.88	755.3	2609.27	755.33
2616.77	755.39	2619.42	755.48	2624.85	755.63	2636.62	755.9	2638.56	755.95
2643.58	756	2657.55	756	2879.86	754.29	2881.58	754.29	2944.97	754
2970.96	754	3030.33	752.88	3052.54	752.54	3082.85	752	3099.07	752
3108.3	753.68	3120.76	756	3129.57	757.7	3131.15	758	3181.67	758
3216.02	758	3233.26	760	3298.73	762	3302.74	763.32	3304.85	764
3309.36	765.51	3310.88	766	3364.94	766	3394.81	767.67	3401.25	768
3436.92	769.91	3438.25	770	3449.22	770	3509.19	770.42	3517.6	770.43
3524.12	770.46	3560.64	770.85	3568.87	770.96	3574.92	771.01	3636.29	772
3645.24	772	3668.64	773.9	3669.74	774	3670.14	774.08	3677.03	776
3677.35	776.24	3679.67	778	3679.94	778.19	3682.52	780	3683.55	780.72
3687.22	783.3	3688.21	784	3691.06	786	3691.96	786.64	3693.91	788
3696.75	790	3697.67	790.65	3699.6	792	3702.41	793.78	3702.79	794
3709.31	794.74	3712.13	795.01	3714.66	795.23	3721.52	795.39	3723.79	795.53
3725.41	795.61	3726.72	795.65	3735.93	795.79	3745.87	795.92	3746.14	795.93
3748.73	796	3751.76	796	3754.94	796.05	3755	796.05	3776	796.18
3776.28	796.18	3784.99	796.07	3785.16	796.06	3796.5	796.04	3796.66	796.04
3796.85	796.03	3808.85	796.06	3809.27	796.06	3819.87	796.09	3820.47	796.08
3828.2	796.08	3829.79	796.1	3834.61	796.09	3837.42	796.07	3837.66	796.08
3839.16	796.07	3845.52	796.07	3850.13	796.08	3850.27	796.08	3856.73	796.12
3864.53	796.2	3865.67	796.2	3866.1	796.21	3874.19	796.29	3875.03	796.3
3876.24	796.32	3882.94	796.4	3884.69	796.43	3889.41	796.64	3893.53	796.71
3897.21	797	3903.3	797.52	3904.13	797.55				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	171.31	.04	270.91	.027	705.43	.04	1516.77	.075
3181.67	.04	3364.94	.075						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
270.91	705.43	444.6	362.11	237.39	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1480	3400	767	F

CROSS SECTION OUTPUT Profile #2-yr

* E.G. Elev (ft)	* 739.01	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.24	* Wt. n-Val.	*	* 0.027	* *
* W.S. Elev (ft)	* 738.76	* Reach Len. (ft)	* 444.60	* 362.11	* 237.39 *
* Crit W.S. (ft)	* 728.77	* Flow Area (sq ft)	*	* 3238.32	* *
* E.G. Slope (ft/ft)	*0.000209	* Area (sq ft)	*	* 3238.32	* *
* Q Total (cfs)	*12800.00	* Flow (cfs)	*	*12800.00	* *
* Top Width (ft)	* 286.89	* Top Width (ft)	*	* 286.89	* *
* Vel Total (ft/s)	* 3.95	* Avg. Vel. (ft/s)	*	* 3.95	* *

```
* Max Chl Dpth (ft)      *   19.60  * Hydr. Depth (ft)       *          *   11.29  *          *
* Conv. Total (cfs)      *885633.6  * Conv. (cfs)            *          *885633.6  *          *
* Length Wtd. (ft)       *  362.11  * Wetted Per. (ft)       *          *  292.32  *          *
* Min Ch El (ft)         *  719.16  * Shear (lb/sq ft)       *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.57  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *          * 1939.39  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  163.38  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  743.24  * Reach Len. (ft)        *  444.60  *  362.11  *  237.39  *
* Crit W.S. (ft)         *  730.83  * Flow Area (sq ft)      *          * 4583.84  *          *
* E.G. Slope (ft/ft)     *0.000190  * Area (sq ft)           *          * 4583.84  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  313.09  * Top Width (ft)         *          *  313.09  *          *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *          *    4.47  *          *
* Max Chl Dpth (ft)      *   24.08  * Hydr. Depth (ft)       *          *   14.64  *          *
* Conv. Total (cfs)      *1487850.0  * Conv. (cfs)            *          *1487850.0  *          *
* Length Wtd. (ft)       *  362.11  * Wetted Per. (ft)       *          *  320.02  *          *
* Min Ch El (ft)         *  719.16  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.76  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    1.51  * 2662.55  *    7.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  184.53  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.78  * Reach Len. (ft)        *  444.60  *  362.11  *  237.39  *
* Crit W.S. (ft)         *  732.36  * Flow Area (sq ft)      *          * 5723.81  *          *
* E.G. Slope (ft/ft)     *0.000171  * Area (sq ft)           *          * 5723.81  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  331.18  * Top Width (ft)         *          *  331.18  *          *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)       *          *    4.73  *          *
* Max Chl Dpth (ft)      *   27.62  * Hydr. Depth (ft)       *          *   17.28  *          *
* Conv. Total (cfs)      *2071300.0  * Conv. (cfs)            *          *2071300.0  *          *
* Length Wtd. (ft)       *  362.11  * Wetted Per. (ft)       *          *  339.47  *          *
* Min Ch El (ft)         *  719.16  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.85  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   15.75  * 3286.03  *   76.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  199.11  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  750.30  * Reach Len. (ft)        *  444.60  *  362.11  *  237.39  *
* Crit W.S. (ft)         *  733.89  * Flow Area (sq ft)      *          * 6921.54  *          *
* E.G. Slope (ft/ft)     *0.000158  * Area (sq ft)           *          * 6921.54  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34500.00  *          *
* Top Width (ft)         *  349.05  * Top Width (ft)         *          *  349.05  *          *
* Vel Total (ft/s)       *    4.98  * Avg. Vel. (ft/s)       *          *    4.98  *          *
* Max Chl Dpth (ft)      *   31.14  * Hydr. Depth (ft)       *          *   19.83  *          *
* Conv. Total (cfs)      *2740402.0  * Conv. (cfs)            *          *2740402.0  *          *
* Length Wtd. (ft)       *  362.11  * Wetted Per. (ft)       *          *  358.70  *          *
* Min Ch El (ft)         *  719.16  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.95  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   54.78  * 3905.62  *  286.79  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   25.19  *  208.67  *   94.72  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	756.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.040	0.027	
W.S. Elev (ft)	755.63	Reach Len. (ft)	444.60	362.11	237.39
Crit W.S. (ft)	736.20	Flow Area (sq ft)	265.27	8888.21	
E.G. Slope (ft/ft)	0.000140	Area (sq ft)	265.27	8888.21	948.29
Q Total (cfs)	45500.00	Flow (cfs)	217.44	45282.56	
Top Width (ft)	1310.82	Top Width (ft)	111.44	396.44	802.94
Vel Total (ft/s)	4.97	Avg. Vel. (ft/s)	0.82	5.09	
Max Chl Dpth (ft)	36.47	Hydr. Depth (ft)	2.38	22.42	
Conv. Total (cfs)	3841204.0	Conv. (cfs)	18356.8	3822847.0	
Length Wtd. (ft)	362.31	Wetted Per. (ft)	111.57	406.82	
Min Ch El (ft)	719.16	Shear (lb/sq ft)	0.02	0.19	
Alpha	1.05	Stream Power (lb/ft s)	0.02	0.98	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	262.89	4849.51	1183.60
C & E Loss (ft)	0.00	Cum SA (acres)	117.51	217.05	302.49

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	758.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.042	0.027	
W.S. Elev (ft)	758.13	Reach Len. (ft)	444.60	362.11	237.39
Crit W.S. (ft)	737.74	Flow Area (sq ft)	560.86	9894.64	
E.G. Slope (ft/ft)	0.000143	Area (sq ft)	560.86	9894.64	4785.63
Q Total (cfs)	54400.00	Flow (cfs)	681.76	53718.25	
Top Width (ft)	2242.18	Top Width (ft)	121.68	407.00	1713.49
Vel Total (ft/s)	5.20	Avg. Vel. (ft/s)	1.22	5.43	
Max Chl Dpth (ft)	38.97	Hydr. Depth (ft)	4.61	24.31	
Conv. Total (cfs)	4547993.0	Conv. (cfs)	56996.7	4490996.0	
Length Wtd. (ft)	362.65	Wetted Per. (ft)	122.26	417.77	
Min Ch El (ft)	719.16	Shear (lb/sq ft)	0.04	0.21	
Alpha	1.08	Stream Power (lb/ft s)	0.05	1.15	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	685.08	5423.46	2069.10
C & E Loss (ft)	0.00	Cum SA (acres)	216.38	219.46	424.82

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	760.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.042	0.027	
W.S. Elev (ft)	759.76	Reach Len. (ft)	444.60	362.11	237.39
Crit W.S. (ft)	738.94	Flow Area (sq ft)	761.37	10561.66	
E.G. Slope (ft/ft)	0.000155	Area (sq ft)	761.37	10561.66	7592.80
Q Total (cfs)	63000.00	Flow (cfs)	1134.61	61865.39	
Top Width (ft)	2268.68	Top Width (ft)	124.45	411.81	1732.43
Vel Total (ft/s)	5.56	Avg. Vel. (ft/s)	1.49	5.86	
Max Chl Dpth (ft)	40.60	Hydr. Depth (ft)	6.12	25.65	
Conv. Total (cfs)	5057788.0	Conv. (cfs)	91089.4	4966699.0	
Length Wtd. (ft)	363.02	Wetted Per. (ft)	125.46	422.84	
Min Ch El (ft)	719.16	Shear (lb/sq ft)	0.06	0.24	
Alpha	1.09	Stream Power (lb/ft s)	0.09	1.42	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	1060.88	5780.42	2853.44
C & E Loss (ft)	0.00	Cum SA (acres)	247.87	219.78	593.59

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	763.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.043	0.027	
W.S. Elev (ft)	762.43	Reach Len. (ft)	444.60	362.11	237.39

```
* Crit W.S. (ft)         *  740.58  * Flow Area (sq ft)      * 1102.12  *11674.13  *          *
* E.G. Slope (ft/ft)     *0.000162  * Area (sq ft)           * 1102.12  *11674.13  *12341.95  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2043.34  *73856.66  *          *
* Top Width (ft)         * 2358.57  * Top Width (ft)         *  130.16  *  419.06  * 1809.35  *
* Vel Total (ft/s)       *    5.94  * Avg. Vel. (ft/s)       *    1.85  *    6.33  *          *
* Max Chl Dpth (ft)      *   43.27  * Hydr. Depth (ft)       *    8.47  *   27.86  *          *
* Conv. Total (cfs)      *5958837.0  * Conv. (cfs)            *160421.0  *5798416.0  *          *
* Length Wtd. (ft)       *  363.73  * Wetted Per. (ft)       *  131.77  *  430.57  *          *
* Min Ch El (ft)         *  719.16  * Shear (lb/sq ft)       *    0.08  *    0.27  *          *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    0.16  *    1.74  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1803.40  * 6354.42  * 4560.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  293.46  *  220.35  *  786.88  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  752.54  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  752.14  * Reach Len. (ft)        *  444.60  *  362.11  *  237.39  *
* Crit W.S. (ft)         *  734.84  * Flow Area (sq ft)      *    0.87  * 7571.47  *          *
* E.G. Slope (ft/ft)     *0.000155  * Area (sq ft)           *    0.87  * 7571.47  *    2.79  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *    0.10  *38699.90  *          *
* Top Width (ft)         *  392.69  * Top Width (ft)         *    7.53  *  360.52  *   24.63  *
* Vel Total (ft/s)       *    5.11  * Avg. Vel. (ft/s)       *    0.11  *    5.11  *          *
* Max Chl Dpth (ft)      *   32.98  * Hydr. Depth (ft)       *    0.12  *   21.00  *          *
* Conv. Total (cfs)      *3113343.0  * Conv. (cfs)            *     7.7  *3113335.0  *          *
* Length Wtd. (ft)       *  362.11  * Wetted Per. (ft)       *    7.54  *  370.73  *          *
* Min Ch El (ft)         *  719.16  * Shear (lb/sq ft)       *    0.00  *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.01  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   91.99  * 4226.02  *  470.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.68  *  212.40  *  136.51  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.705

INPUT
Description: COE Riverstation=32444.93
Preliminary Model Riverstation=8429.240
Station Elevation Data    num=     322
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  799.55    7.71  798.09    8.22     798   18.63     796   22.39  795.26
   38.73     792   39.47  791.88   51.29     790   63.96  788.32    64.7  788.23
    65.1  788.18   66.39     788   79.06  786.08   79.62     786   81.74  785.48
   87.87     784   90.17  783.39   92.51  782.78   94.83  782.17    95.6     782
   97.57  781.45  100.72  780.51  101.81  780.19  102.41     780  106.07   778.2
  106.41     778  106.66  777.84  109.81     776  115.02  774.76  118.41     774
  120.34  773.59  128.19     772  130.03  771.52  134.62  770.54  137.11     770
  139.21  768.73  140.41     768  140.82  767.77   143.6     766  146.66  764.06
  146.78     764  146.93   763.9  148.78   762.8  149.44  762.48  150.81  762.34
  152.14  762.38  153.17  762.25   154.2  762.11  154.92     762  155.28  761.93
  156.35  761.92  156.67     762  157.68  762.28  158.67  762.72  159.44  763.12
  159.96  763.44  161.01     764  161.46  764.22  161.58  764.29  161.81  764.41
  163.04  765.12  163.63  765.45  164.47     766  165.16     766  165.48   766.2
  166.39  766.39  167.28  766.55   168.1  766.68  174.65  766.28  174.73  766.27
  174.93  766.24  176.45     766  180.27  765.57  180.99  765.52  182.36  765.42
  184.51  765.22  189.37  764.75  195.19     764  196.51     764  197.44  763.65
  202.08     762  202.32  761.92  205.71   760.7  207.69     760  209.13     760
  214.08  758.85  214.33  758.82  218.51     758  268.27     758  308.56  757.14
  324.89  756.72  328.39  756.64   330.4   756.6  331.93  756.56  334.11  756.51
   337.1  756.42   352.2     756  352.76  755.77  357.12     754  357.46  753.86
  365.41   750.6  366.89     750  367.97  749.56  373.42  747.33  376.18  746.21
  376.68     746  380.52  744.43  381.58     744  386.92     742  392.85  740.03
  392.94     740  398.93     738  407.25  736.93   414.6     736  418.89  735.51
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  433.29     734  435.47  733.06  437.89     732  440.84  730.73  442.64     730
  447.79  728.41  449.14     728  450.13  727.71  451.12  727.43  456.05     726
  460.96  725.74  474.59  725.21  496.32  724.29  505.46     724  523.96  722.66
  530.53     722  535.01  719.05  557.01  719.05  579.01  719.05  583.58     722
  585.33  722.75  587.91     724  613.87     726     627  727.71  629.45     728
  638.67  730.73  644.69  732.57  649.15     734  676.81     736  681.28  737.27
  683.83     738   689.8  739.77  690.58     740  697.28     742  697.99  742.22
   703.6     744  705.94   744.8  709.43     746   714.2  747.61  715.32     748
  717.45  748.71  721.29     750  727.39     752  752.59     754  770.18     756
  778.24     758  785.53     760  786.66   760.4  791.12     762  791.77  762.23
  796.45  763.91  796.71     764  796.77  764.02  797.25   764.2  801.82  765.82
  802.31     766  810.03  766.94  810.21  766.93  810.48   766.9  812.25   767.1
  822.88  767.56  877.48  767.37  881.83  767.33  940.89  766.93  984.21  766.54
    1024     766 1076.47     766    1417     766    1450     755 1589.08  754.72
 1596.51  754.72 1599.42  754.69  1599.6   754.7 1602.52   754.7 1837.07  755.14
 1840.43  755.13 1843.86  755.13 1854.66  755.16 1933.42  755.83 1986.06     756
 2133.07     756 2186.43  755.73 2292.03  754.91 2294.83  754.91 2295.26   754.9
 2296.74  754.89 2334.75  754.45 2337.19  754.43 2337.89  754.43 2338.35  754.42
 2341.06   754.4 2341.46   754.4 2377.96  754.27 2379.02  754.28 2379.27  754.28
 2379.77  754.29 2385.44  754.35  2386.9  754.35 2393.31  754.42 2416.03  754.61
 2480.49  754.51 2539.71   754.7 2607.94  755.56 2610.01  755.57 2615.99  755.57
 2738.48  755.27 2761.76  755.29 2774.65   755.2 2850.13  755.07 2939.37  754.64
  2941.6  754.56 2957.26  754.03 2957.54  754.03 2958.12     754 3039.65  752.92
 3043.08  752.88 3048.21  752.81 3050.19  752.79 3051.88  752.78 3053.27  752.76
 3054.33  752.75 3061.62  752.73 3062.24  752.73  3062.7  752.72  3063.4  752.72
 3082.09  752.77 3095.99  752.88 3147.23   752.6 3182.96  752.02 3186.65     752
 3193.44     752 3216.46     756  3222.6  757.09 3227.84     758 3259.38     758
 3270.49     760 3282.37     760 3287.38  759.03  3292.8     758 3301.86     758
 3308.59  758.87 3317.75     760 3334.09  760.23 3340.92  760.27 3348.75  760.28
 3368.03     760 3378.19     760 3378.47  760.15 3382.87  762.55 3385.54     764
 3400.68  765.77 3402.74     766 3445.73     766 3450.25  766.25 3481.44   767.9
 3483.28     768 3634.19     770 3711.11     772 3747.56  773.71 3753.52     774
  3755.6  775.27  3756.8     776 3757.39  776.35 3760.11     778 3763.46     780
 3765.41  781.11 3767.04     782 3771.43  783.17 3774.16     784 3775.52     784
  3786.7  784.66 3791.23  784.76 3794.25  784.75 3798.67  784.82 3802.29  784.85
 3805.57  784.84 3808.58  784.85 3817.94  784.98 3820.23  785.04 3822.32  785.06
 3831.07  785.08 3833.46  785.11 3833.73  785.11 3836.35  785.12 3838.61  785.12
 3839.88  785.15 3841.91  785.17 3847.82  785.22 3850.48  785.27 3853.55   785.3
 3857.91  785.36  3866.5  785.45 3868.82  785.47 3877.44     786 3888.79     786
 3896.97   787.7 3898.57     788 3905.87     790 3908.06  790.62 3912.61     792
 3913.86  792.45 3917.91     794 3921.46  795.62  3922.3     796  3923.9  796.73
  3929.1  799.11 3929.77  799.42

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .14  202.08     .04   352.2    .027  822.88     .04  3222.6     .04
 3400.68    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         352.2  822.88           258.58  223.16   233.1             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1417    3500     767        F

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  738.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.24  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  738.69  * Reach Len. (ft)        *  258.58  *  223.16  *  233.10  *
* Crit W.S. (ft)          *  728.67  * Flow Area (sq ft)      *          * 3275.81  *          *
* E.G. Slope (ft/ft)      *0.000203  * Area (sq ft)           *          * 3275.81  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)          *  289.32  * Top Width (ft)          *          *  289.32  *          *
* Vel Total (ft/s)        *    3.91  * Avg. Vel. (ft/s)        *          *    3.91  *          *
* Max Chl Dpth (ft)       *   19.64  * Hydr. Depth (ft)        *          *   11.32  *          *
* Conv. Total (cfs)       *897449.1  * Conv. (cfs)             *          *897449.1  *          *
* Length Wtd. (ft)        *  223.16  * Wetted Per. (ft)        *          *  294.94  *          *
* Min Ch El (ft)          *  719.05  * Shear (lb/sq ft)        *          *    0.14  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.55  *          *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)    *          * 1912.31  *    0.18  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *          *  160.98  *    0.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	743.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.027	
W.S. Elev (ft)	743.18	Reach Len. (ft)	258.58	223.16	233.10
Crit W.S. (ft)	730.72	Flow Area (sq ft)		4637.79	
E.G. Slope (ft/ft)	0.000186	Area (sq ft)		4637.79	
Q Total (cfs)	20500.00	Flow (cfs)		20500.00	
Top Width (ft)	317.25	Top Width (ft)		317.25	
Vel Total (ft/s)	4.42	Avg. Vel. (ft/s)		4.42	
Max Chl Dpth (ft)	24.13	Hydr. Depth (ft)		14.62	
Conv. Total (cfs)	1503830.0	Conv. (cfs)		1503830.0	
Length Wtd. (ft)	223.16	Wetted Per. (ft)		324.28	
Min Ch El (ft)	719.05	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		0.73	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	1.51	2624.22	7.81
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	181.91	9.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	747.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.027	
W.S. Elev (ft)	746.73	Reach Len. (ft)	258.58	223.16	233.10
Crit W.S. (ft)	732.23	Flow Area (sq ft)		5797.38	
E.G. Slope (ft/ft)	0.000168	Area (sq ft)		5797.38	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	336.67	Top Width (ft)		336.67	
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)		4.67	
Max Chl Dpth (ft)	27.68	Hydr. Depth (ft)		17.22	
Conv. Total (cfs)	2093300.0	Conv. (cfs)		2093300.0	
Length Wtd. (ft)	223.16	Wetted Per. (ft)		344.97	
Min Ch El (ft)	719.05	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.82	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	15.75	3238.15	76.53
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	196.33	41.55

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	750.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.027	
W.S. Elev (ft)	750.25	Reach Len. (ft)	258.58	223.16	233.10
Crit W.S. (ft)	733.74	Flow Area (sq ft)		7018.67	
E.G. Slope (ft/ft)	0.000155	Area (sq ft)		7018.67	
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	355.80	Top Width (ft)		355.80	
Vel Total (ft/s)	4.92	Avg. Vel. (ft/s)		4.92	
Max Chl Dpth (ft)	31.20	Hydr. Depth (ft)		19.73	
Conv. Total (cfs)	2770585.0	Conv. (cfs)		2770585.0	
Length Wtd. (ft)	223.16	Wetted Per. (ft)		365.37	
Min Ch El (ft)	719.05	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.91	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	54.78	3847.68	286.79
C & E Loss (ft)	0.00	Cum SA (acres)	25.19	205.74	94.72

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	755.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.027	
W.S. Elev (ft)	755.59	Reach Len. (ft)	258.58	223.16	233.10
Crit W.S. (ft)	736.16	Flow Area (sq ft)		9050.66	
E.G. Slope (ft/ft)	0.000141	Area (sq ft)		9050.66	1431.04
Q Total (cfs)	45500.00	Flow (cfs)		45500.00	
Top Width (ft)	1878.91	Top Width (ft)		413.32	1465.59

```
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)       *          *    5.03  *          *
* Max Chl Dpth (ft)      *   36.54  * Hydr. Depth (ft)       *          *   21.90  *          *
* Conv. Total (cfs)      *3830517.0  * Conv. (cfs)            *          *3830517.0  *          *
* Length Wtd. (ft)       *  223.16  * Wetted Per. (ft)       *          *  424.39  *          *
* Min Ch El (ft)         *  719.05  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.94  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  261.53  * 4774.95  * 1177.12  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  116.94  *  213.68  *  296.31  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  758.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  758.08  * Reach Len. (ft)        *  258.58  *  223.16  *  233.10  *
* Crit W.S. (ft)         *  737.57  * Flow Area (sq ft)      *   89.37  *10099.25  *          *
* E.G. Slope (ft/ft)     *0.000146  * Area (sq ft)           *   89.37  *10099.25  * 5760.54  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   30.58  *54369.43  *          *
* Top Width (ft)         * 2389.48  * Top Width (ft)         *  134.08  *  426.32  * 1829.08  *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)       *    0.34  *    5.38  *          *
* Max Chl Dpth (ft)      *   39.03  * Hydr. Depth (ft)       *    0.67  *   23.69  *          *
* Conv. Total (cfs)      *4506926.0  * Conv. (cfs)            *  2533.1  *4504393.0  *          *
* Length Wtd. (ft)       *  223.17  * Wetted Per. (ft)       *  134.11  *  437.74  *          *
* Min Ch El (ft)         *  719.05  * Shear (lb/sq ft)       *    0.01  *    0.21  *          *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.00  *    1.13  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  681.76  * 5340.36  * 2040.36  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  215.08  *  216.00  *  415.17  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  759.70  * Reach Len. (ft)        *  258.58  *  223.16  *  233.10  *
* Crit W.S. (ft)         *  738.71  * Flow Area (sq ft)      *  313.63  *10796.38  *          *
* E.G. Slope (ft/ft)     *0.000158  * Area (sq ft)           *  313.63  *10796.38  * 8759.42  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  248.61  *62751.39  *          *
* Top Width (ft)         * 2438.34  * Top Width (ft)         *  141.78  *  432.24  * 1864.33  *
* Vel Total (ft/s)       *    5.67  * Avg. Vel. (ft/s)       *    0.79  *    5.81  *          *
* Max Chl Dpth (ft)      *   40.65  * Hydr. Depth (ft)       *    2.21  *   24.98  *          *
* Conv. Total (cfs)      *5007682.0  * Conv. (cfs)            * 19761.2  *4987921.0  *          *
* Length Wtd. (ft)       *  223.34  * Wetted Per. (ft)       *  141.98  *  443.88  *          *
* Min Ch El (ft)         *  719.05  * Shear (lb/sq ft)       *    0.02  *    0.24  *          *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.02  *    1.40  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1055.40  * 5691.65  * 2808.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  246.52  *  216.27  *  583.79  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  762.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  762.38  * Reach Len. (ft)        *  258.58  *  223.16  *  233.10  *
* Crit W.S. (ft)         *  740.40  * Flow Area (sq ft)      *  709.35  *11964.18  *          *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           *  709.35  *11964.18  *13944.03  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  944.89  *74955.11  *          *
* Top Width (ft)         * 2553.18  * Top Width (ft)         *  158.52  *  439.98  * 1954.69  *
* Vel Total (ft/s)       *    5.99  * Avg. Vel. (ft/s)       *    1.33  *    6.26  *          *
* Max Chl Dpth (ft)      *   43.33  * Hydr. Depth (ft)       *    4.47  *   27.19  *          *
* Conv. Total (cfs)      *5921129.0  * Conv. (cfs)            * 73712.8  *5847416.0  *          *
* Length Wtd. (ft)       *  223.78  * Wetted Per. (ft)       *  159.27  *  452.07  *          *
* Min Ch El (ft)         *  719.05  * Shear (lb/sq ft)       *    0.05  *    0.27  *          *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.06  *    1.70  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1794.16  * 6256.17  * 4488.84  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  291.99  *  216.78  *  776.63  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  752.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.09  * Reach Len. (ft)        *  258.58  *  223.16  *  233.10  *
* Crit W.S. (ft)         *  734.73  * Flow Area (sq ft)      *          * 7681.13  *          *
* E.G. Slope (ft/ft)     *0.000151  * Area (sq ft)           *          * 7681.13  *    1.07  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  382.00  * Top Width (ft)         *          *  366.74  *   15.26  *
* Vel Total (ft/s)       *    5.04  * Avg. Vel. (ft/s)       *          *    5.04  *          *
* Max Chl Dpth (ft)      *   33.04  * Hydr. Depth (ft)       *          *   20.94  *          *
* Conv. Total (cfs)      *3153696.0  * Conv. (cfs)            *          *3153696.0  *          *
* Length Wtd. (ft)       *  223.16  * Wetted Per. (ft)       *          *  376.95  *          *
* Min Ch El (ft)         *  719.05  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.97  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   91.99  * 4162.63  *  470.49  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.64  *  209.38  *  136.40  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.663

INPUT
Description: COE Riverstation=32668.09
Preliminary Model
             Riverstation=8206.08

FEMA Section K
Station Elevation Data    num=     164
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  799.34    8.28     798   18.87     796   38.19  793.66   51.44     792
   80.33     788    83.4     788   98.63     784   102.4  782.28  103.03     782
  117.28     776   130.5  770.56   131.8     770  134.84  768.75  136.78     768
  146.74  764.36  147.77     764  153.85     762  169.37     758  177.06     758
  182.79     760  206.23     760  210.42  758.88  210.54  758.87  210.67  758.88
  211.31  758.91  212.72  758.62  213.38  758.53  213.62  758.55  236.38  758.01
  236.53     758  422.71     758  423.43  757.98  423.58  757.98  423.82  757.97
  489.32     756  498.92     754  528.67     744  528.91  743.93  535.28     742
  549.24     738   577.8     734  588.59     730  594.33     728  600.45     726
  605.34  724.58  607.22     724  669.49     722  673.94  718.99  695.94  718.99
  717.94  718.99  722.38     722  723.08   722.3  727.83     724  751.82     726
  771.18     728   787.8  733.94  787.96     734  801.09     736  822.38     738
  842.27     744  860.13     750  860.33  750.06  866.09     752  895.43  754.98
  908.05     756  915.47     758   915.6  758.04  922.28     760  928.55     762
  938.36  763.91  938.86     764  951.38     764  974.92  763.47  981.91  763.71
  982.15  763.71  989.81     764  992.28  764.19  992.46   764.2   997.2  764.57
  997.64  764.59  998.42   764.6 1001.69  764.84  1003.7  764.85 1005.88  764.99
 1009.67  765.01 1014.18  765.27 1019.95  765.27 1021.68  765.35 1027.67  765.34
 1032.49  765.53 1038.17  765.51 1040.38  765.58 1045.14  765.54 1047.16  765.59
 1051.27  765.54    1469     766    1505     754 1554.05     754 1688.09     754
 1740.85  753.82 2026.48     754 2062.04  754.37 2270.98  755.16 2273.99  755.14
 2371.74   755.5 2496.11   755.2 2769.99  755.44 2910.09  754.49 2966.25  754.51
 2983.02     754 3164.16  753.02 3306.31     752 3354.64     750 3363.67     750
 3392.58     756 3399.75     758 3403.83     758  3417.6     758 3425.89  756.07
 3426.17     756 3426.37  755.96 3426.78     756 3448.03     756 3458.66     758
 3516.35     758 3516.47  758.06 3520.81     760 3525.08     762  3531.9     764
 3591.96     764 3647.22     766  3753.4  767.98 3753.68  767.99 3753.85  767.99
 3845.66     770 3848.08  770.11 3848.56  770.12 3861.43  770.72 3863.42  770.75
 3885.95  771.82 3899.64  771.85 3906.66  771.97 3927.25     772 3942.53  773.64
 3945.33     774 3947.17   774.3 3960.78     776 3964.17     778 3964.98  778.49
  3967.4     780 3967.78  780.23 3970.06  781.65 3976.95     786  3982.4  789.52
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 3983.16     790 3985.61  791.61 3986.19     792 3989.12     794 3989.51  794.28
 3992.04     796 3992.72  796.49 3994.92     798 3997.93     798

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .14  213.62     .04  489.32    .027  938.86     .04 1554.05    .075
 3403.83     .04 3591.96    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        489.32  938.86           551.27  501.74  308.18              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
    1469    3750     767       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  738.64  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  728.27  * Flow Area (sq ft)      *          * 3215.12  *          *
* E.G. Slope (ft/ft)     *0.000205  * Area (sq ft)           *          * 3215.12  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  277.48  * Top Width (ft)         *          *  277.48  *          *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *          *    3.98  *          *
* Max Chl Dpth (ft)      *   19.65  * Hydr. Depth (ft)       *          *   11.59  *          *
* Conv. Total (cfs)      *893539.4  * Conv. (cfs)            *          *893539.4  *          *
* Length Wtd. (ft)       *  501.74  * Wetted Per. (ft)       *          *  283.31  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.58  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *          * 1895.69  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  159.53  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  743.12  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  730.37  * Flow Area (sq ft)      *          * 4527.71  *          *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)           *          * 4527.71  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  307.78  * Top Width (ft)         *          *  307.78  *          *
* Vel Total (ft/s)       *    4.53  * Avg. Vel. (ft/s)       *          *    4.53  *          *
* Max Chl Dpth (ft)      *   24.13  * Hydr. Depth (ft)       *          *   14.71  *          *
* Conv. Total (cfs)      *1473324.0  * Conv. (cfs)            *          *1473324.0  *          *
* Length Wtd. (ft)       *  501.74  * Wetted Per. (ft)       *          *  314.92  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.79  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    1.51  * 2600.75  *    7.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  180.30  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.67  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  731.93  * Flow Area (sq ft)      *          * 5658.65  *          *
* E.G. Slope (ft/ft)     *0.000177  * Area (sq ft)           *          * 5658.65  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  329.49  * Top Width (ft)         *          *  329.49  *          *
* Vel Total (ft/s)       *    4.79  * Avg. Vel. (ft/s)       *          *    4.79  *          *
* Max Chl Dpth (ft)      *   27.68  * Hydr. Depth (ft)       *          *   17.17  *          *
* Conv. Total (cfs)      *2039023.0  * Conv. (cfs)            *          *2039023.0  *          *
* Length Wtd. (ft)       *  501.74  * Wetted Per. (ft)       *          *  337.75  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.88  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   15.75  * 3208.80  *   76.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  194.63  *   41.55  *
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*****************************************************************************************
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  750.20  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  733.47  * Flow Area (sq ft)      *          * 6858.55  *          *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           *          * 6858.55  *    2.36  *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *          *
* Top Width (ft)         *  365.29  * Top Width (ft)          *          *  350.51  *   14.78  *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)        *          *    5.03  *          *
* Max Chl Dpth (ft)      *   31.21  * Hydr. Depth (ft)        *          *   19.57  *          *
* Conv. Total (cfs)      *2692820.0  * Conv. (cfs)            *          *2692820.0  *          *
* Length Wtd. (ft)       *  501.74  * Wetted Per. (ft)        *          *  359.93  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)        *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.98  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   54.78  * 3812.13  *  286.78  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   25.19  *  203.93  *   94.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  755.53  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  735.75  * Flow Area (sq ft)      *          * 8859.01  *          *
* E.G. Slope (ft/ft)     *0.000150  * Area (sq ft)           *          * 8859.01  * 2445.32  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         * 2300.67  * Top Width (ft)          *          *  410.73  * 1889.94  *
* Vel Total (ft/s)       *    5.14  * Avg. Vel. (ft/s)        *          *    5.14  *          *
* Max Chl Dpth (ft)      *   36.54  * Hydr. Depth (ft)        *          *   21.57  *          *
* Conv. Total (cfs)      *3713726.0  * Conv. (cfs)            *          *3713726.0  *          *
* Length Wtd. (ft)       *  501.74  * Wetted Per. (ft)        *          *  421.40  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)        *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.01  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *  261.53  * 4729.07  * 1166.74  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  116.94  *  211.57  *  287.33  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.040  *   0.027  *          *
* W.S. Elev (ft)         *  758.02  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  737.46  * Flow Area (sq ft)      *   72.36  * 9906.60  *          *
* E.G. Slope (ft/ft)     *0.000155  * Area (sq ft)           *   72.36  * 9906.60  * 7235.00  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *   14.46  *54385.54  *          *
* Top Width (ft)         * 2710.99  * Top Width (ft)          *  261.31  *  426.22  * 2023.46  *
* Vel Total (ft/s)       *    5.45  * Avg. Vel. (ft/s)        *    0.20  *    5.49  *          *
* Max Chl Dpth (ft)      *   39.03  * Hydr. Depth (ft)        *    0.28  *   23.24  *          *
* Conv. Total (cfs)      *4366673.0  * Conv. (cfs)            *  1160.8  *4365512.0  *          *
* Length Wtd. (ft)       *  501.80  * Wetted Per. (ft)        *  261.34  *  437.23  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)        *    0.00  *    0.22  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s)  *    0.00  *    1.21  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *  681.28  * 5289.11  * 2005.59  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  213.90  *  213.81  *  404.86  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
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* E.G. Elev (ft)         *  760.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.041  *   0.027  *          *
* W.S. Elev (ft)         *  759.65  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  738.76  * Flow Area (sq ft)      *  539.73  *10603.10  *          *
* E.G. Slope (ft/ft)     *0.000167  * Area (sq ft)           *  539.73  *10603.10  *10527.17  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  377.28  *62622.72  *          *
* Top Width (ft)         * 2764.27  * Top Width (ft)         *  300.56  *  431.75  * 2031.96  *
* Vel Total (ft/s)       *    5.65  * Avg. Vel. (ft/s)       *    0.70  *    5.91  *          *
* Max Chl Dpth (ft)      *   40.66  * Hydr. Depth (ft)       *    1.80  *   24.56  *          *
* Conv. Total (cfs)      *4875647.0  * Conv. (cfs)            * 29198.1  *4846449.0  *          *
* Length Wtd. (ft)       *  502.20  * Wetted Per. (ft)       *  301.22  *  442.99  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)       *    0.02  *    0.25  *          *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.01  *    1.47  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1052.86  * 5636.83  * 2757.28  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  245.20  *  214.06  *  573.37  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  762.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.043  *   0.027  *          *
* W.S. Elev (ft)         *  762.34  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  740.46  * Flow Area (sq ft)      * 1423.84  *11777.51  *          *
* E.G. Slope (ft/ft)     *0.000170  * Area (sq ft)           * 1423.84  *11777.51  *16017.88  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1716.86  *74183.14  *          *
* Top Width (ft)         * 2823.73  * Top Width (ft)         *  336.50  *  440.97  * 2046.25  *
* Vel Total (ft/s)       *    5.75  * Avg. Vel. (ft/s)       *    1.21  *    6.30  *          *
* Max Chl Dpth (ft)      *   43.35  * Hydr. Depth (ft)       *    4.23  *   26.71  *          *
* Conv. Total (cfs)      *5823437.0  * Conv. (cfs)            *131726.5  *5691711.0  *          *
* Length Wtd. (ft)       *  503.25  * Wetted Per. (ft)       *  337.62  *  452.60  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)       *    0.04  *    0.28  *          *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.05  *    1.74  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1787.82  * 6195.35  * 4408.68  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  290.52  *  214.52  *  765.92  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  752.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  752.03  * Reach Len. (ft)        *  551.27  *  501.74  *  308.18  *
* Crit W.S. (ft)         *  734.35  * Flow Area (sq ft)      *          * 7512.33  *          *
* E.G. Slope (ft/ft)     *0.000159  * Area (sq ft)           *          * 7512.33  *   78.45  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  433.69  * Top Width (ft)         *          *  361.67  *   72.02  *
* Vel Total (ft/s)       *    5.15  * Avg. Vel. (ft/s)       *          *    5.15  *          *
* Max Chl Dpth (ft)      *   33.04  * Hydr. Depth (ft)       *          *   20.77  *          *
* Conv. Total (cfs)      *3067660.0  * Conv. (cfs)            *          *3067660.0  *          *
* Length Wtd. (ft)       *  501.74  * Wetted Per. (ft)       *          *  371.68  *          *
* Min Ch El (ft)         *  718.99  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.03  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   91.99  * 4123.71  *  470.27  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.64  *  207.51  *  136.17  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.568

INPUT
Description: COE Riverstation=33169.83
Preliminary Model Riverstation=7704.336
```

Station Elevation Data num= 334

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	790	9.78	788.41	12.12	788	15.6	787.35	22.71	786
29.9	784	36.18	782.76	40.07	782	43.25	781.37	49.82	780
54.94	778.86	58.98	778	62.26	777.33	68.39	776	75.99	774.06
76.26	774	83.94	772	87.44	770.83	90.01	770	94	768.18
95.31	767.59	98.76	766	101.26	764.65	102.56	764	105.33	762.42
106.05	762	108.98	760.36	109.63	760	109.76	759.93	113.45	758
114.78	757.36	117.27	756	119.46	754.41	120.16	754	132.11	754
133.45	754.21	134.41	754.35	139.08	755.06	144.32	755.82	145.51	756
146.65	756.16	149.17	756.45	149.56	756.39	154.45	756.17	163.88	756.4
167.7	756.48	169.25	756.53	175.92	756.7	177.28	756.74	193.38	757.16
194.48	757.19	195.71	757.22	199.66	757.33	203.13	757.4	205.51	757.47
205.76	757.47	206.05	757.48	206.68	757.5	209.66	757.54	212.21	757.61
216.92	757.65	218.23	757.69	235.26	758	255.3	758	306.37	758.43
310.09	758.41	311.33	758.41	312.21	758.4	317.97	758.4	324.37	758.35
324.79	758.34	351.18	758	357.95	758	646.42	756.2	652.43	756.14
669.19	756	676.14	755.82	743.58	754	744.07	753.8	744.8	753.51
748.55	752	751.96	750.62	753.52	750	754.73	749.51	758.49	748
761.98	746.59	763.47	746	767.94	744.21	768.47	744	769.31	743.71
774.19	742	780.1	740.08	780.35	740	780.61	739.95	790.05	738
806.51	736	810.05	735.39	817.77	734	823.02	732	828.3	730
831.35	729.02	834.5	728	839.45	726.49	841.01	726	887.28	724
911.91	722	917.71	718.83	939.71	718.83	961.71	718.83	967.5	722
974.91	723.23	979.7	724	986.49	724.57	1004.1	726	1004.93	726.25
1010.63	728	1014.49	729.21	1017.05	730	1021.37	731.37	1026.06	732.85
1029.76	734	1051.26	736	1064.96	738	1076.49	741.61	1077.73	742
1082.54	743.64	1083.59	744	1083.83	744.09	1091.16	747.06	1093.49	748
1098.48	750	1099.22	750.1	1113.45	752	1118	752.47	1133.08	754
1212	765	1521	766	1557	754	1623.6	754	1656.29	754
1675.24	754.15	1678.04	754.14	1680.55	754.12	1688.14	754.03	1688.9	754.03
1691.45	754.02	1695.41	754.02	1708.19	754.03	1708.79	754.02	1715.6	754.02
1718.08	754	1753.61	754	1756.26	753.99	1779.92	753.97	1788.43	754
2061.73	754	2068.58	754.12	2087.13	754.18	2088.25	754.19	2089.2	754.19
2105.45	754.24	2106.24	754.24	2117.42	754.27	2119.38	754.27	2126.66	754.3
2128.69	754.3	2133.64	754.33	2138.57	754.33	2142.96	754.38	2146.17	754.38
2150.08	754.43	2152.26	754.43	2155.33	754.48	2159.11	754.48	2161.16	754.51
2183.36	754.52	2294.04	755.6	2331.09	755.6	2373.27	755.78	2399.83	755.79
2401.64	755.78	2406.89	755.79	2436.24	755.79	2525.41	755.37	2628.36	755.39
2735.52	754.1	2737.23	754.09	2756.63	754	2873.24	754	2903.49	753.9
2956.09	753.9	2962.01	753.89	2971.27	754	3006.48	754	3102.65	752.21
3106.92	752.06	3107.77	752.06	3109.07	752	3125.19	752	3134.67	752.59
3137.92	752.77	3142.26	753.02	3148.62	753.4	3154.4	753.76	3157.78	754
3162.59	754.15	3163.19	754.14	3219.69	755.7	3221.28	755.7	3228.18	755.69
3230.7	755.69	3231.21	755.7	3231.97	755.7	3233.95	755.72	3281.95	756
3285.44	756.61	3293.07	758	3298.44	758	3306.98	757.08	3317.18	756
3322.56	755.3	3323.77	755.29	3344.52	754	3344.69	754	3348.96	753.92
3355.56	753.52	3363.43	753.16	3376.63	752.52	3377.71	752.48	3378.84	752.43
3380.63	752.44	3385.45	752.3	3387.06	752.29	3412.89	752	3426.77	752
3438.5	751.2	3449.65	750.38	3452.09	750.21	3454.93	750	3466.85	748.8
3474.25	748	3495.93	748	3496.74	748.19	3503.61	750	3504.46	750.37
3508.3	752	3512.07	753.58	3513.05	754	3513.68	754.18	3519.59	756
3529.64	756	3540.58	756	3543.98	754.25	3544.45	754	3548.05	752
3548.56	751.7	3551.52	750	3557.21	750	3558.81	750.86	3564.67	754
3568.96	756	3576.84	757.87	3577.1	757.93	3577.41	758	3577.59	758.01
3579.04	758	3633.58	758	3637.77	759.19	3640.65	760	3647.4	761.45
3650.14	762	3713	762	3715.34	762.3	3735.13	762.85	3747.11	763.31
3758.82	764	3769.02	764	3790	764.29	3806.6	764.49	3809.06	764.51
3813.4	764.47	3815.35	764.49	3825.32	764.82	3839.94	764.91	3843.75	764.95
3846.69	764.97	3958.22	766	3966.36	766	3971.13	766.51	3979.28	768
3979.75	768.18	3984.77	770	3988.39	771.3	3990.26	772	3993.81	773.63
3994.67	774	3997.66	775.53	3998.38	775.9	3998.96	776.19	4000.07	776.71
4007.24	780	4011.86	781.79	4012.44	782	4024.44	782	4062.26	781.46
4062.5	781.46	4070.3	781.39	4070.91	781.39	4074.95	781.33	4077.84	781.33
4082.43	781.38	4084.67	781.41	4085.52	781.42	4086.42	781.44	4110.17	781.9
4115	782	4115.27	782.28	4116.28	783.27	4117.02	784	4117.88	784.98
4118.78	786	4119.12	786.39	4120.54	788	4121.85	789.48	4122.3	790
4122.67	790.42	4124.05	792	4125.67	793.86	4125.79	794	4125.91	794.15
4127.46	796	4130.47	799.71	4130.7	800	4134.07	801.1		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	175.92	.04	743.58	.027	1133.08	.04	1623.6	.075
3529.64	.06								

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        743.58 1133.08           195.86  418.79  244.26              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1521    4000     767       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0     275     758

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.78  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  738.53  * Reach Len. (ft)        *  195.86  *  418.79  *  244.26  *
* Crit W.S. (ft)         *  728.40  * Flow Area (sq ft)      *          * 3189.37  *          *
* E.G. Slope (ft/ft)     *0.000212  * Area (sq ft)           *          * 3189.37  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  279.16  * Top Width (ft)         *          *  279.16  *          *
* Vel Total (ft/s)       *    4.01  * Avg. Vel. (ft/s)       *          *    4.01  *          *
* Max Chl Dpth (ft)      *   19.70  * Hydr. Depth (ft)       *          *   11.42  *          *
* Conv. Total (cfs)      *879425.6  * Conv. (cfs)            *          *879425.6  *          *
* Length Wtd. (ft)       *  418.79  * Wetted Per. (ft)       *          *  284.39  *          *
* Min Ch El (ft)         *  718.83  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.60  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *          * 1858.80  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  156.32  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  743.02  * Reach Len. (ft)        *  195.86  *  418.79  *  244.26  *
* Crit W.S. (ft)         *  730.47  * Flow Area (sq ft)      *          * 4516.73  *          *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *          * 4516.73  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  309.46  * Top Width (ft)         *          *  309.46  *          *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *          *    4.54  *          *
* Max Chl Dpth (ft)      *   24.19  * Hydr. Depth (ft)       *          *   14.60  *          *
* Conv. Total (cfs)      *1463937.0  * Conv. (cfs)            *          *1463937.0  *          *
* Length Wtd. (ft)       *  418.79  * Wetted Per. (ft)       *          *  316.03  *          *
* Min Ch El (ft)         *  718.83  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.79  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *    1.51  * 2548.66  *    7.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  176.75  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.94  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.58  * Reach Len. (ft)        *  195.86  *  418.79  *  244.26  *
* Crit W.S. (ft)         *  732.02  * Flow Area (sq ft)      *          * 5651.39  *          *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           *          * 5651.39  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  327.97  * Top Width (ft)         *          *  327.97  *          *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)       *          *    4.80  *          *
* Max Chl Dpth (ft)      *   27.75  * Hydr. Depth (ft)       *          *   17.23  *          *
* Conv. Total (cfs)      *2042285.0  * Conv. (cfs)            *          *2042285.0  *          *
* Length Wtd. (ft)       *  418.79  * Wetted Per. (ft)       *          *  335.86  *          *
* Min Ch El (ft)         *  718.83  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.89  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   15.75  * 3143.66  *   76.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  190.84  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	750.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.027	
W.S. Elev (ft)	750.11	Reach Len. (ft)	195.86	418.79	244.26
Crit W.S. (ft)	733.60	Flow Area (sq ft)		6841.65	
E.G. Slope (ft/ft)	0.000163	Area (sq ft)		6841.65	76.44
Q Total (cfs)	34500.00	Flow (cfs)		34500.00	
Top Width (ft)	402.68	Top Width (ft)		346.09	56.59
Vel Total (ft/s)	5.04	Avg. Vel. (ft/s)		5.04	
Max Chl Dpth (ft)	31.28	Hydr. Depth (ft)		19.77	
Conv. Total (cfs)	2704803.0	Conv. (cfs)		2704803.0	
Length Wtd. (ft)	418.79	Wetted Per. (ft)		355.34	
Min Ch El (ft)	718.83	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.99	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	54.78	3733.23	286.51
C & E Loss (ft)	0.00	Cum SA (acres)	25.19	199.92	94.42

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	755.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.040	0.027	0.040
W.S. Elev (ft)	755.46	Reach Len. (ft)	195.86	418.79	244.26
Crit W.S. (ft)	735.92	Flow Area (sq ft)	39.46	8834.84	7.64
E.G. Slope (ft/ft)	0.000141	Area (sq ft)	39.46	8834.84	2675.96
Q Total (cfs)	45500.00	Flow (cfs)	14.11	45483.18	2.71
Top Width (ft)	2108.26	Top Width (ft)	54.08	389.50	1664.68
Vel Total (ft/s)	5.12	Avg. Vel. (ft/s)	0.36	5.15	0.36
Max Chl Dpth (ft)	36.63	Hydr. Depth (ft)	0.73	22.68	0.73
Conv. Total (cfs)	3830714.0	Conv. (cfs)	1187.7	3829298.0	228.6
Length Wtd. (ft)	418.52	Wetted Per. (ft)	54.10	399.73	10.57
Min Ch El (ft)	718.83	Shear (lb/sq ft)	0.01	0.19	0.01
Alpha	1.01	Stream Power (lb/ft s)	0.00	1.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	261.28	4627.17	1148.63
C & E Loss (ft)	0.00	Cum SA (acres)	116.60	206.96	274.76

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	758.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.040	0.027	0.040
W.S. Elev (ft)	757.95	Reach Len. (ft)	195.86	418.79	244.26
Crit W.S. (ft)	737.51	Flow Area (sq ft)	505.24	9803.34	55.85
E.G. Slope (ft/ft)	0.000141	Area (sq ft)	505.24	9803.34	7610.49
Q Total (cfs)	54400.00	Flow (cfs)	270.97	54090.51	38.52
Top Width (ft)	2820.60	Top Width (ft)	376.95	389.50	2054.15
Vel Total (ft/s)	5.25	Avg. Vel. (ft/s)	0.54	5.52	0.69
Max Chl Dpth (ft)	39.12	Hydr. Depth (ft)	1.34	25.17	1.97
Conv. Total (cfs)	4580248.0	Conv. (cfs)	22814.5	4554191.0	3242.9
Length Wtd. (ft)	416.65	Wetted Per. (ft)	376.99	399.73	28.58
Min Ch El (ft)	718.83	Shear (lb/sq ft)	0.01	0.22	0.02
Alpha	1.10	Stream Power (lb/ft s)	0.01	1.19	0.01
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	677.63	5175.60	1953.07
C & E Loss (ft)	0.00	Cum SA (acres)	209.86	209.12	390.44

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	760.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.041	0.027	0.040
W.S. Elev (ft)	759.57	Reach Len. (ft)	195.86	418.79	244.26
Crit W.S. (ft)	738.80	Flow Area (sq ft)	1495.42	10436.32	111.33

```
* E.G. Slope (ft/ft)     *0.000149  * Area (sq ft)           * 1495.42  *10436.32  *11064.85  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1169.60  *61731.05  *   99.35  *
* Top Width (ft)         * 3161.44  * Top Width (ft)         *  633.13  *  389.50  * 2138.81  *
* Vel Total (ft/s)       *    5.23  * Avg. Vel. (ft/s)       *    0.78  *    5.92  *    0.89  *
* Max Chl Dpth (ft)      *   40.74  * Hydr. Depth (ft)       *    2.36  *   26.79  *    2.79  *
* Conv. Total (cfs)      *5158667.0  * Conv. (cfs)            * 95770.8  *5054761.0  *  8135.4  *
* Length Wtd. (ft)       *  412.48  * Wetted Per. (ft)       *  633.56  *  399.73  *   40.36  *
* Min Ch El (ft)         *  718.83  * Shear (lb/sq ft)       *    0.02  *    0.24  *    0.03  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.02  *    1.44  *    0.02  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1039.99  * 5515.66  * 2680.90  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  239.29  *  209.33  *  558.61  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  762.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.042  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  762.28  * Reach Len. (ft)        *  195.86  *  418.79  *  244.26  *
* Crit W.S. (ft)         *  740.49  * Flow Area (sq ft)      * 3219.17  *11492.64  *  246.11  *
* E.G. Slope (ft/ft)     *0.000145  * Area (sq ft)           * 3219.17  *11492.64  *16936.61  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4022.19  *71595.24  *  282.57  *
* Top Width (ft)         * 3270.00  * Top Width (ft)         *  638.02  *  389.50  * 2242.48  *
* Vel Total (ft/s)       *    5.07  * Avg. Vel. (ft/s)       *    1.25  *    6.23  *    1.15  *
* Max Chl Dpth (ft)      *   43.45  * Hydr. Depth (ft)       *    5.05  *   29.51  *    4.14  *
* Conv. Total (cfs)      *6292817.0  * Conv. (cfs)            *333477.3  *5935913.0  * 23427.3  *
* Length Wtd. (ft)       *  403.25  * Wetted Per. (ft)       *  639.14  *  399.73  *   60.00  *
* Min Ch El (ft)         *  718.83  * Shear (lb/sq ft)       *    0.05  *    0.26  *    0.04  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.06  *    1.63  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1758.44  * 6061.34  * 4292.10  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  284.35  *  209.74  *  750.75  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  752.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  751.95  * Reach Len. (ft)        *  195.86  *  418.79  *  244.26  *
* Crit W.S. (ft)         *  734.48  * Flow Area (sq ft)      *          * 7494.66  *          *
* E.G. Slope (ft/ft)     *0.000162  * Area (sq ft)           *          * 7494.66  *  213.97  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38700.00  *          *
* Top Width (ft)         *  457.86  * Top Width (ft)         *          *  364.42  *   93.43  *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)       *          *    5.16  *          *
* Max Chl Dpth (ft)      *   33.12  * Hydr. Depth (ft)       *          *   20.57  *          *
* Conv. Total (cfs)      *3042192.0  * Conv. (cfs)            *          *3042192.0  *          *
* Length Wtd. (ft)       *  418.78  * Wetted Per. (ft)       *          *  374.15  *          *
* Min Ch El (ft)         *  718.83  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.04  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   91.99  * 4037.28  *  469.24  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.64  *  203.33  *  135.58  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.489

INPUT
Description: COE Riverstation=33588.62
Preliminary Model
              Riverstation=7285.546

FEMA Section J
Station Elevation Data    num=     275
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	770.01	1.02	769.27	1.37	768.94	2.56	768	5.55	768
6.33	767.04	7.53	767.01	7.75	767.03	7.93	767.02	10.78	766.68
16.04	766	32.41	766	33.28	765.79	36.94	766	40.21	766.26
40.54	766.22	43.69	766.41	44.38	766.35	47.35	766.44	48.56	766.36
51.69	766.36	55.19	766.26	63.76	765.77	64.04	765.74	64.49	765.71
71.49	765.09	73.61	764.93	78.74	764.3	83.42	763.63	84.57	763.56
88.64	763.07	89.84	762.98	96.58	762.21	96.97	762.17	98.28	762
107.56	762	117.52	764	118.12	764.11	119.27	764.25	119.83	764.28
120.56	764.29	120.8	764.3	121.93	764.28	122.17	764.28	124.03	764.15
129.46	763.53	130.42	763.44	132.35	763.19	133.41	763.02	135.83	762.8
136.82	762.64	142.16	762.07	142.72	762	148.86	761.44	149.15	761.42
164.9	760	175.43	760	179.7	758.78	189.05	758	209.17	758
209.81	757.8	218.05	757.73	218.28	757.72	218.48	757.72	218.71	757.7
219.06	757.66	222.64	757.52	224.87	757.23	227.73	756.97	235.38	756
252.38	756	257.36	754.98	259.54	754.7	261.73	754.57	266.18	754.01
279.06	754	294.27	752	335.42	752	340.05	750.71	340.58	750.7
341.36	750.66	341.69	750.6	343.54	750.63	344.05	750.54	344.63	750.46
345.28	750.4	347.86	750.43	348.74	750.39	353.58	750.36	365.56	750
391.66	750	399.14	748.16	399.82	748.14	401.32	748	448.65	748
456.41	746.32	457.58	746.38	458.98	746.38	465.2	746.67	468.36	746.75
470.83	746.66	472.67	746.42	473.34	746.36	475.58	746	515.48	746
520.9	744.55	523.29	744.36	529.17	744.15	529.61	744.1	532.08	744
726.51	744	729.98	743.7	732.92	743.69	752.37	742	859.93	742
926.43	740.95	984.17	740.55	1027.88	740	1033.55	740	1040.8	741.56
1042.62	742	1042.85	742.36	1043.96	744	1045.22	746	1046.22	747.53
1046.53	748	1047.97	750	1049.02	750	1050.42	748	1051.44	746.57
1051.84	746	1054.73	742	1073.77	742	1086	742	1090.8	743.1
1093.58	744	1121.24	754	1124.94	754.67	1132.27	755.86	1132.89	755.97
1133.14	756	1140.01	756.12	1140.5	756.12	1148.3	756.26	1149.31	756.25
1156.16	756.36	1288.3	757.14	1552.27	756.54	1608.25	756	1726.09	756
1804.08	754	1810.66	752	1821.57	748.1	1821.86	748	1822.07	747.92
1833.33	744	1839.4	742	1852.45	738	1883.85	734	1890.57	732
1891.53	731.67	1902.32	728.18	1902.85	728	1903.5	727.8	1909.13	726
1986.5	724	1987.14	723.35	1988.51	722	1997.45	718.7	2019.45	718.7
2041.45	718.7	2050.38	722	2062.44	724	2078.16	726	2089.42	730
2089.95	730.18	2095.04	732	2103.52	734	2122.6	736	2137.5	739.82
2145.82	742	2152.65	744	2168.78	750	2183.35	752	2204.65	754
2209.93	756	2215.25	758	2283	765	2778	766	2799	759
2956.6	759	2971	763.8	4004	763.9	4079.95	762.95	4112.74	756
4143.41	756	4145	756.41	4152.19	758	4157.51	758	4161.17	757.24
4166.41	756	4170.91	754	4177.12	750	4178.88	749.06	4181.18	748
4185.09	747.01	4189.7	746.36	4190.69	746.17	4192.16	746	4194.65	745.42
4197.91	744.98	4200.02	744.55	4205.19	744	4302.34	744	4331.18	745.14
4331.76	745.17	4336.01	745.27	4336.68	745.31	4339.34	745.36	4342.33	745.53
4345.61	745.53	4346.44	745.5	4348.82	745.77	4349.15	745.76	4350.74	746
4413.56	748	4442.29	750	4453.16	752	4463.93	753.02	4472.41	754
4486.1	756	4493.86	756	4506.67	756	4512.66	754	4519.81	752
4527.06	752	4533.04	754	4539.79	756	4546.36	757.5	4548.7	758
4607.46	758	4616.77	760	4634.23	762	4645.88	762	4671.59	760.45
4681.55	760.39	4683.36	760.59	4685.29	760.51	4690.71	761.29	4692.98	761.56
4695.48	762	4704.56	763.8	4705.45	764	4736.07	764	4736.54	764.01
4853.44	765.62	4870.72	766	4882.42	768	4882.73	768.1	4902.12	774
4903.04	774.29	4908.72	776	4909.51	776.26	4928.25	782.2	4934.29	784
4942.2	784	4943.27	783.21	4948.71	778.87	4952.23	776	4993.6	776
5061.12	780	5064.85	782	5079.44	784	5091.38	786	5093.05	787.15

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	1073.77	.04	1804.08	.027	2168.78	.04	4157.51	.075
4493.86	.05								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1804.08	2168.78	177.88	170.17	454	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
2778	4900	767	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	1023	764	1023	1250	757	4100	4600	753

CROSS SECTION OUTPUT Profile #2-yr

```
* E.G. Elev (ft)         *  738.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  738.45  * Reach Len. (ft)        *  177.88  *  170.17  *  454.00  *
* Crit W.S. (ft)         *  728.37  * Flow Area (sq ft)      *          * 3233.81  *          *
* E.G. Slope (ft/ft)     *0.000205  * Area (sq ft)           *          * 3233.81  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  281.15  * Top Width (ft)          *          *  281.15  *          *
* Vel Total (ft/s)       *    3.96  * Avg. Vel. (ft/s)        *          *    3.96  *          *
* Max Chl Dpth (ft)      *   19.75  * Hydr. Depth (ft)        *          *   11.50  *          *
* Conv. Total (cfs)      *895077.1  * Conv. (cfs)             *          *895077.1  *          *
* Length Wtd. (ft)       *  170.17  * Wetted Per. (ft)        *          *  286.71  *          *
* Min Ch El (ft)         *  718.70  * Shear (lb/sq ft)        *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.57  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)    *          * 1827.93  *    0.18  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *  153.63  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  742.95  * Reach Len. (ft)        *  177.88  *  170.17  *  454.00  *
* Crit W.S. (ft)         *  730.45  * Flow Area (sq ft)      *          * 4570.93  *          *
* E.G. Slope (ft/ft)     *0.000191  * Area (sq ft)           *          * 4570.93  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  312.53  * Top Width (ft)          *          *  312.53  *          *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)        *          *    4.48  *          *
* Max Chl Dpth (ft)      *   24.25  * Hydr. Depth (ft)        *          *   14.63  *          *
* Conv. Total (cfs)      *1482917.0  * Conv. (cfs)            *          *1482917.0  *          *
* Length Wtd. (ft)       *  170.17  * Wetted Per. (ft)        *          *  319.36  *          *
* Min Ch El (ft)         *  718.70  * Shear (lb/sq ft)        *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.77  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)    *    1.51  * 2504.97  *    7.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    2.36  *  173.76  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.51  * Reach Len. (ft)        *  177.88  *  170.17  *  454.00  *
* Crit W.S. (ft)         *  731.97  * Flow Area (sq ft)      *          * 5723.60  *          *
* E.G. Slope (ft/ft)     *0.000172  * Area (sq ft)           *          * 5723.60  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27100.00  *          *
* Top Width (ft)         *  333.29  * Top Width (ft)          *          *  333.29  *          *
* Vel Total (ft/s)       *    4.73  * Avg. Vel. (ft/s)        *          *    4.73  *          *
* Max Chl Dpth (ft)      *   27.81  * Hydr. Depth (ft)        *          *   17.17  *          *
* Conv. Total (cfs)      *2063640.0  * Conv. (cfs)            *          *2063640.0  *          *
* Length Wtd. (ft)       *  170.17  * Wetted Per. (ft)        *          *  341.33  *          *
* Min Ch El (ft)         *  718.70  * Shear (lb/sq ft)        *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.85  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *   15.75  * 3088.98  *   76.53  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    9.30  *  187.66  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  750.05  * Reach Len. (ft)        *  177.88  *  170.17  *  454.00  *
* Crit W.S. (ft)         *  733.54  * Flow Area (sq ft)      *          * 6938.69  *    0.01  *
* E.G. Slope (ft/ft)     *0.000159  * Area (sq ft)           *          * 6938.69  *    0.01  *
* Q Total (cfs)          *34500.00  * Flow (cfs)              *          *34500.00  *    0.00  *
* Top Width (ft)         *  353.07  * Top Width (ft)          *          *  352.68  *    0.40  *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)        *          *    4.97  *    0.04  *
* Max Chl Dpth (ft)      *   31.35  * Hydr. Depth (ft)        *          *   19.67  *    0.03  *
* Conv. Total (cfs)      *2735257.0  * Conv. (cfs)            *          *2735257.0  *     0.0  *
```

```
* Length Wtd. (ft)       *  170.17  * Wetted Per. (ft)       *           *  361.95  *    0.40  *
* Min Ch El (ft)         *  718.70  * Shear (lb/sq ft)       *           *    0.19  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    0.95  *    0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   54.78  * 3666.99  *  286.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.19  *  196.56  *   94.26  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**************************************************************************************************
* E.G. Elev (ft)         *  755.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  755.41  * Reach Len. (ft)        *  177.88  *  170.17  *  454.00  *
* Crit W.S. (ft)         *  735.81  * Flow Area (sq ft)      *   38.61  * 8866.15  *  118.10  *
* E.G. Slope (ft/ft)     *0.000127  * Area (sq ft)           *   38.61  * 8866.15  *  899.84  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   12.80  *45385.45  *  101.75  *
* Top Width (ft)         *  802.80  * Top Width (ft)         *   54.87  *  364.70  *  383.23  *
* Vel Total (ft/s)       *    5.04  * Avg. Vel. (ft/s)       *    0.33  *    5.12  *    0.86  *
* Max Chl Dpth (ft)      *   36.71  * Hydr. Depth (ft)       *    0.70  *   24.31  *    2.98  *
* Conv. Total (cfs)      *4032466.0  * Conv. (cfs)           *  1134.3  *4022314.0  *  9018.0  *
* Length Wtd. (ft)       *  170.49  * Wetted Per. (ft)       *   54.89  *  374.60  *   40.07  *
* Min Ch El (ft)         *  718.70  * Shear (lb/sq ft)       *    0.01  *    0.19  *    0.02  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.00  *    0.96  *    0.02  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  261.11  * 4542.08  * 1138.60  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  116.35  *  203.34  *  269.02  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**************************************************************************************************
* E.G. Elev (ft)         *  758.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.041  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  757.90  * Reach Len. (ft)        *  177.88  *  170.17  *  454.00  *
* Crit W.S. (ft)         *  737.21  * Flow Area (sq ft)      * 1056.31  * 9774.10  *  224.86  *
* E.G. Slope (ft/ft)     *0.000128  * Area (sq ft)           * 1056.31  * 9774.10  * 2011.23  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  533.18  *53598.69  *  268.13  *
* Top Width (ft)         * 1630.12  * Top Width (ft)         *  781.08  *  364.70  *  484.34  *
* Vel Total (ft/s)       *    4.92  * Avg. Vel. (ft/s)       *    0.50  *    5.48  *    1.19  *
* Max Chl Dpth (ft)      *   39.20  * Hydr. Depth (ft)       *    1.35  *   26.80  *    4.87  *
* Conv. Total (cfs)      *4802746.0  * Conv. (cfs)           * 47071.9  *4732002.0  * 23671.9  *
* Length Wtd. (ft)       *  170.93  * Wetted Per. (ft)       *  782.09  *  374.60  *   47.14  *
* Min Ch El (ft)         *  718.70  * Shear (lb/sq ft)       *    0.01  *    0.21  *    0.04  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.01  *    1.15  *    0.05  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  674.12  * 5081.49  * 1926.10  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  207.26  *  205.49  *  383.32  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**************************************************************************************************
* E.G. Elev (ft)         *  760.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.041  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.53  * Reach Len. (ft)        *  177.88  *  170.17  *  454.00  *
* Crit W.S. (ft)         *  738.56  * Flow Area (sq ft)      * 2330.38  *10368.98  *  311.95  *
* E.G. Slope (ft/ft)     *0.000135  * Area (sq ft)           * 2330.38  *10368.98  * 3008.93  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2009.46  *60596.93  *  393.61  *
* Top Width (ft)         * 1886.28  * Top Width (ft)         *  781.08  *  364.70  *  740.50  *
* Vel Total (ft/s)       *    4.84  * Avg. Vel. (ft/s)       *    0.86  *    5.84  *    1.26  *
* Max Chl Dpth (ft)      *   40.83  * Hydr. Depth (ft)       *    2.98  *   28.43  *    5.09  *
* Conv. Total (cfs)      *5428761.0  * Conv. (cfs)           *173156.8  *5221686.0  * 33918.0  *
* Length Wtd. (ft)       *  171.29  * Wetted Per. (ft)       *  783.72  *  374.60  *   62.30  *
* Min Ch El (ft)         *  718.70  * Shear (lb/sq ft)       *    0.02  *    0.23  *    0.04  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.02  *    1.36  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1031.39  * 5415.65  * 2641.44  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  236.12  *  205.70  *  550.54  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	762.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.042	0.027	0.040
W.S. Elev (ft)	762.25	Reach Len. (ft)	177.88	170.17	454.00
Crit W.S. (ft)	740.25	Flow Area (sq ft)	4459.66	11363.18	514.90
E.G. Slope (ft/ft)	0.000130	Area (sq ft)	4459.66	11363.18	5195.47
Q Total (cfs)	75900.00	Flow (cfs)	5789.47	69406.19	704.34
Top Width (ft)	2024.07	Top Width (ft)	781.08	364.70	878.29
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)	1.30	6.11	1.37
Max Chl Dpth (ft)	43.55	Hydr. Depth (ft)	5.71	31.16	5.88
Conv. Total (cfs)	6651619.0	Conv. (cfs)	507369.5	6082523.0	61725.9
Length Wtd. (ft)	172.18	Wetted Per. (ft)	786.45	374.60	88.82
Min Ch El (ft)	718.70	Shear (lb/sq ft)	0.05	0.25	0.05
Alpha	1.59	Stream Power (lb/ft s)	0.06	1.51	0.06
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1741.18	5951.47	4230.05
C & E Loss (ft)	0.02	Cum SA (acres)	281.16	206.11	742.00

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	752.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	751.89	Reach Len. (ft)	177.88	170.17	454.00
Crit W.S. (ft)	734.42	Flow Area (sq ft)		7592.28	13.07
E.G. Slope (ft/ft)	0.000151	Area (sq ft)		7592.28	13.07
Q Total (cfs)	38700.00	Flow (cfs)		38694.28	5.72
Top Width (ft)	371.62	Top Width (ft)		357.82	13.80
Vel Total (ft/s)	5.09	Avg. Vel. (ft/s)		5.10	0.44
Max Chl Dpth (ft)	33.19	Hydr. Depth (ft)		21.22	0.95
Conv. Total (cfs)	3146881.0	Conv. (cfs)		3146416.0	465.3
Length Wtd. (ft)	170.19	Wetted Per. (ft)		367.41	13.93
Min Ch El (ft)	718.70	Shear (lb/sq ft)		0.20	0.01
Alpha	1.00	Stream Power (lb/ft s)		0.99	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	91.99	3964.76	468.60
C & E Loss (ft)	0.01	Cum SA (acres)	42.64	199.86	135.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 6.457

INPUT
Description: COE Riverstation=33758.79
Preliminary Model Riverstation=7115.372
Station Elevation Data num= 238

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780	9.89	778	15.19	777.4	25.15	776	37.98	772
42.24	770.1	42.44	770	42.55	769.92	48.18	766	51.04	764
65.33	754.04	71.15	750	71.74	749.44	73.2	748	74.99	745.95
76.65	744	78.56	744	78.9	744.36	80.48	746	83.93	749.67
84.23	750	86.08	750	87.62	748	87.79	747.77	88.61	746.72
89.16	746	91.79	742.66	92.32	742	94.85	740	141.79	740
145	741.3	146.94	742	153.89	743.16	159.67	744	242.76	744
247.03	743.83	247.47	743.84	253.51	743.86	253.76	743.87	280.91	743.92
281.02	743.93	301.83	743.91	302.17	743.92	314.49	743.92	314.76	743.91
352.53	743.86	352.95	743.87	416.03	743.8	416.86	743.79	459.71	743.72
460.67	743.73	471.18	743.71	472.21	743.72	481.27	743.7	493.52	743.69
494.62	743.71	540.41	743.74	553.31	744	607.69	744	625.86	742.01
627.06	742.08	629.78	742.28	629.91	742.28	633.64	742.55	633.9	742.55
637.31	742.78	638.25	742.78	640.93	742.92	644.46	743.01	646.95	742.99
648.68	743.04	654.16	742.99	656.43	743.08	660.11	743.04	662.48	743.14
666.11	743.11	668.19	743.2	676.27	743.17	678.15	743.24	687.6	743.22

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  689.32  743.29  691.84  743.28  710.94   743.6  757.14  743.64  772.18  743.37
  773.12  743.38  773.93  743.35  780.48  743.41  781.05  743.39  783.37     744
  803.33     744   807.4  743.23  813.65  743.15  814.85  743.16  817.93  743.09
  819.17  743.11  828.47  743.01  832.62  743.06  861.51  743.05  873.08  742.84
  887.22  742.98  890.69  743.15  894.17  743.04   899.4  743.49  904.08  743.92
  904.39  743.92  904.91     744  917.44  747.88   917.8     748  928.19     748
  933.73  746.09  933.92  746.03  934.33  745.88  949.09  740.91  958.16     738
  968.09     736   989.4     734   995.1  732.38 1010.87  728.16 1011.43     728
  1012.7  727.66 1020.11     726  1022.1     726 1081.46     724  1081.7  723.72
 1083.07     722 1088.23  718.65 1110.23  718.65 1132.23  718.65 1137.44     722
 1152.68     724 1164.62     726  1191.3     734  1208.7     736 1220.08     738
  1236.4     742 1243.65     744 1260.63     750 1271.81     752 1287.11     754
 1287.83  754.12 1300.15     756    1379     765    1634   766.2    1922   767.4
    2344   769.1    2538   769.1    2706   768.2    2865   766.6    3025     765
    3130   764.2 3140.05     762 3173.71     756 3200.66   750.4 3202.66     750
 3206.79  749.73 3210.78  749.61 3228.57  748.74 3237.88  748.62 3243.33  748.41
 3249.32     748 3288.67     748 3327.35     746 3336.32  744.38  3338.1     744
  3362.9     744 3363.52  744.25 3368.17  746.22 3381.02     752 3387.37  753.97
  3443.6     756 3493.46     756 3493.86  755.91 3494.98  755.59 3500.81     754
 3517.04     754 3522.95     756 3546.48     756 3548.98   755.5 3555.81     754
 3577.55     754 3589.99     756 3664.58     758  3683.5     760 3695.81     760
  3703.6     758 3703.89  757.89 3709.68     756 3711.06  755.64 3716.21     754
 3721.79  752.88 3725.87  752.22 3727.95  752.13 3728.68  752.14 3735.21     754
 3740.69     756 3746.36     758 3753.25  759.82 3754.01     760 3763.45     762
  3827.6     762 3839.01  763.87 3839.46  763.95  3839.8     764 3847.44     766
 3866.53  773.83 3866.93     774 3872.35     774 3880.28  769.63 3883.17     768
 3899.79  767.36 3984.45  766.92 4043.85  767.57  4107.7     768 4215.28     768
 4271.47  769.91 4278.17     770 4278.96     770 4280.49  770.03  4280.6  770.04
 4288.42  770.33 4289.34  770.35 4293.89   770.6 4297.14  770.65 4301.98   770.9
 4304.35  770.92  4333.5     772 4336.88  772.17 4339.06  772.18 4349.59  772.53
 4418.14     774  4498.7     774 4506.61     780 4507.52  780.71 4511.82     784
 4512.82  784.78 4516.88     788 4519.35     790

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  928.19    .027 1300.15     .04 3200.66    .075 3517.04     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        928.19 1300.15            332.5  390.72  369.88              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2344    3850     767       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
       0     928     757    3150    3450     753    4270    4430     790

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  738.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  738.35  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  728.81  * Flow Area (sq ft)      *          * 2931.54  *          *
* E.G. Slope (ft/ft)     *0.000263  * Area (sq ft)           *          * 2931.54  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  264.43  * Top Width (ft)          *          *  264.43  *          *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)        *          *    4.37  *          *
* Max Chl Dpth (ft)      *   19.70  * Hydr. Depth (ft)        *          *   11.09  *          *
* Conv. Total (cfs)      *789937.5  * Conv. (cfs)             *          *789937.5  *          *
* Length Wtd. (ft)       *  390.72  * Wetted Per. (ft)        *          *  270.58  *          *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)        *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    0.78  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)     *          * 1815.88  *    0.18  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)           *          *  152.56  *    0.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  743.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  742.85  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  731.08  * Flow Area (sq ft)      *          * 4192.94  *          *
```

```
* E.G. Slope (ft/ft)     *0.000238  * Area (sq ft)           *          * 4192.94  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  296.13  * Top Width (ft)         *          *  296.13  *          *
* Vel Total (ft/s)       *    4.89  * Avg. Vel. (ft/s)       *          *    4.89  *          *
* Max Chl Dpth (ft)      *   24.20  * Hydr. Depth (ft)       *          *   14.16  *          *
* Conv. Total (cfs)      *1328450.0  * Conv. (cfs)            *          *1328450.0  *          *
* Length Wtd. (ft)       *  390.72  * Wetted Per. (ft)       *          *  303.55  *          *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.00  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    1.51  * 2487.85  *    7.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  172.57  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.42  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  732.70  * Flow Area (sq ft)      *          * 5289.51  *          *
* E.G. Slope (ft/ft)     *0.000211  * Area (sq ft)           *          * 5289.51  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  317.70  * Top Width (ft)         *          *  317.70  *          *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *          *    5.12  *          *
* Max Chl Dpth (ft)      *   27.76  * Hydr. Depth (ft)       *          *   16.65  *          *
* Conv. Total (cfs)      *1864662.0  * Conv. (cfs)            *          *1864662.0  *          *
* Length Wtd. (ft)       *  390.72  * Wetted Per. (ft)       *          *  326.28  *          *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.10  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   15.75  * 3067.47  *   76.53  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.30  *  186.39  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.150  *   0.027  *          *
* W.S. Elev (ft)         *  749.96  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  734.43  * Flow Area (sq ft)      *    0.37  * 6445.51  *          *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           *    0.37  * 6445.51  *          *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *    0.02  *34499.98  *          *
* Top Width (ft)         *  332.51  * Top Width (ft)         *    0.19  *  332.32  *          *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *    0.04  *    5.35  *          *
* Max Chl Dpth (ft)      *   31.31  * Hydr. Depth (ft)       *    1.96  *   19.40  *          *
* Conv. Total (cfs)      *2513243.0  * Conv. (cfs)            *     1.1  *2513242.0  *          *
* Length Wtd. (ft)       *  390.72  * Wetted Per. (ft)       *    2.15  *  341.77  *          *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)       *    0.00  *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.19  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   54.78  * 3640.84  *  286.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.19  *  195.22  *   94.26  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.150  *   0.027  *          *
* W.S. Elev (ft)         *  755.32  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  736.76  * Flow Area (sq ft)      *    1.39  * 8316.81  *          *
* E.G. Slope (ft/ft)     *0.000160  * Area (sq ft)           *    1.39  * 8316.81  *  614.01  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    0.06  *45499.94  *          *
* Top Width (ft)         *  703.06  * Top Width (ft)         *    0.19  *  367.49  *  335.37  *
* Vel Total (ft/s)       *    5.47  * Avg. Vel. (ft/s)       *    0.04  *    5.47  *          *
* Max Chl Dpth (ft)      *   36.67  * Hydr. Depth (ft)       *    7.32  *   22.63  *          *
* Conv. Total (cfs)      *3597959.0  * Conv. (cfs)            *     4.5  *3597955.0  *          *
* Length Wtd. (ft)       *  390.72  * Wetted Per. (ft)       *    7.51  *  377.36  *          *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)       *    0.00  *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.20  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  261.03  * 4508.52  * 1130.71  *
```

```
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  116.24  *  201.91  *  265.27  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  758.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.150  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  757.79  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  738.21  * Flow Area (sq ft)      *  685.51  * 9234.00  *   14.01  *
* E.G. Slope (ft/ft)     *0.000163  * Area (sq ft)           *  685.51  * 9234.00  * 1747.55  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   73.63  *54320.22  *    6.15  *
* Top Width (ft)         * 1790.42  * Top Width (ft)         *  868.24  *  371.96  *  550.22  *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *    0.11  *    5.88  *    0.44  *
* Max Chl Dpth (ft)      *   39.14  * Hydr. Depth (ft)       *    0.79  *   24.83  *    0.89  *
* Conv. Total (cfs)      *4255664.0  * Conv. (cfs)            *  5760.2  *4249423.0  *   480.8  *
* Length Wtd. (ft)       *  390.64  * Wetted Per. (ft)       *  877.49  *  381.88  *   15.77  *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)       *    0.01  *    0.25  *    0.01  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *    0.00  *    1.45  *    0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  670.56  * 5044.36  * 1906.51  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  203.89  *  204.05  *  377.93  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.150  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.38  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  739.44  * Flow Area (sq ft)      * 2067.90  * 9825.45  *   49.99  *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           * 2067.90  * 9825.45  * 2670.41  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  479.98  *62485.25  *   34.77  *
* Top Width (ft)         * 1848.28  * Top Width (ft)         *  870.52  *  371.96  *  605.80  *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)       *    0.23  *    6.36  *    0.70  *
* Max Chl Dpth (ft)      *   40.73  * Hydr. Depth (ft)       *    2.38  *   26.42  *    1.69  *
* Conv. Total (cfs)      *4751496.0  * Conv. (cfs)            * 36200.1  *4712674.0  *  2622.5  *
* Length Wtd. (ft)       *  390.26  * Wetted Per. (ft)       *  880.27  *  381.88  *   29.79  *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)       *    0.03  *    0.28  *    0.02  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.01  *    1.80  *    0.01  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1022.40  * 5376.20  * 2611.85  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  232.74  *  204.26  *  543.52  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  762.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.150  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  762.03  * Reach Len. (ft)        *  332.50  *  390.72  *  369.88  *
* Crit W.S. (ft)         *  741.19  * Flow Area (sq ft)      * 4382.66  *10812.36  *  159.36  *
* E.G. Slope (ft/ft)     *0.000179  * Area (sq ft)           * 4382.66  *10812.36  * 4390.24  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1689.74  *74045.45  *  164.81  *
* Top Width (ft)         * 1987.01  * Top Width (ft)         *  874.33  *  371.96  *  740.73  *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *    0.39  *    6.85  *    1.03  *
* Max Chl Dpth (ft)      *   43.38  * Hydr. Depth (ft)       *    5.01  *   29.07  *    3.02  *
* Conv. Total (cfs)      *5666184.0  * Conv. (cfs)            *126144.6  *5527736.0  * 12303.4  *
* Length Wtd. (ft)       *  389.34  * Wetted Per. (ft)       *  884.91  *  381.88  *   53.19  *
* Min Ch El (ft)         *  718.65  * Shear (lb/sq ft)       *    0.06  *    0.32  *    0.03  *
* Alpha                  *    1.87  * Stream Power (lb/ft s) *    0.02  *    2.17  *    0.03  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   * 1723.13  * 5908.15  * 4180.10  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  277.78  *  204.68  *  733.56  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	752.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.150	0.027	
W.S. Elev (ft)	751.80	Reach Len. (ft)	332.50	390.72	369.88
Crit W.S. (ft)	735.42	Flow Area (sq ft)	0.72	7066.01	
E.G. Slope (ft/ft)	0.000182	Area (sq ft)	0.72	7066.01	
Q Total (cfs)	38700.00	Flow (cfs)	0.03	38699.97	
Top Width (ft)	342.68	Top Width (ft)	0.19	342.49	
Vel Total (ft/s)	5.48	Avg. Vel. (ft/s)	0.04	5.48	
Max Chl Dpth (ft)	33.15	Hydr. Depth (ft)	3.80	20.63	
Conv. Total (cfs)	2871703.0	Conv. (cfs)	2.3	2871701.0	
Length Wtd. (ft)	390.72	Wetted Per. (ft)	3.99	352.11	
Min Ch El (ft)	718.65	Shear (lb/sq ft)	0.00	0.23	
Alpha	1.00	Stream Power (lb/ft s)	0.00	1.25	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	91.99	3936.13	468.53
C & E Loss (ft)	0.01	Cum SA (acres)	42.64	198.49	135.21

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 6.383

INPUT
Description: COE Riverstation=34149.51
Preliminary Model Riverstation=6724.658
Station Elevation Data num= 141

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780	14.14	775.81	14.29	775.76	14.59	775.68	14.92	775.58
19.98	774	22.12	772.47	22.91	772	24.64	770.46	25.14	770
26.57	768.72	29.56	766	30.3	765.34	31.74	764	32.07	763.7
33.9	762	34.17	761.74	36.03	760	37.57	758.52	38.12	758
41.2	756	44.32	754.43	45.15	754	45.39	753.87	45.76	753.7
49.21	752	53.41	750	56.69	748.36	57.43	748	78.77	744.13
79.54	744	101.84	742	105.86	740.19	106.34	740	230.59	740
230.79	740.37	231.23	741.27	231.6	742	231.85	742.44	232.69	744
236.64	744.62	243.62	746	410.69	745.9	411.86	745.89	494.92	744
785.44	744	793.58	743.42	794.95	743.37	801.94	742.92	803.09	742.86
804.8	742.83	805.39	742.8	832.48	742	900.84	742	906.66	743.91
907.34	744.12	919.38	748	931.58	748	942.48	744	948.68	742
961.93	738	973.92	736	995.52	734	1007.33	730	1017.34	727.64
1023.74	726	1053.84	724	1056.91	723.29	1061.51	722	1067.41	718.53
1089.41	718.53	1111.41	718.53	1117.3	722	1139.79	724	1168.18	732
1181.97	734	1197.71	736	1205.18	738	1224.21	744	1242.47	750
1249.67	752	1264.39	754	1347	765	1658	766.2	2326	767.5
2525	767.1	2655	766.6	2739	765.9	2842	765	3070	762.9
3089.9	760	3120.12	755.28	3129.1	754	3138.83	752	3147.54	750
3173.48	744	3190.99	742	3281.84	742	3347.82	744	3408.28	744
3423.09	750.72	3425.69	752	3427.72	752.89	3430.68	754	3442.17	754.71
3463.96	756	3467.82	756	3480.14	754	3498.95	754	3515.67	756
3583.55	756	3588.88	758	3619.75	758	3624.78	756	3627.08	756
3641.08	759.97	3688.76	762	3709.62	762	3711.97	761.83	3713.84	761.79
3719.89	761.49	3738.76	761.38	3757.46	762	3776.71	764.44	3792.9	765.04
3793.92	765.01	3830.65	766	3900.98	766	3904.91	765.53	3906.77	765.45
3921.88	764.62	3945.34	764	3957.39	764	3957.6	764.03	3966.97	765.63
3969.33	766	3990.45	772	3993.09	772.57	4003.47	775.17	4006.46	776
4018.64	780								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.15	931.58	.027	1264.39	.04	3147.54	.075	3442.17	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
931.58	1264.39	357.1	362.55	321.78	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
2326	4018.64	767	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

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**************************************************
       0     931     757    3050    3500     753

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.53  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  738.17  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  728.84  * Flow Area (sq ft)      *          * 2668.85  *          *
* E.G. Slope (ft/ft)     *0.000323  * Area (sq ft)           *          * 2668.85  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  244.34  * Top Width (ft)         *          *  244.34  *          *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)       *          *    4.80  *          *
* Max Chl Dpth (ft)      *   19.64  * Hydr. Depth (ft)       *          *   10.92  *          *
* Conv. Total (cfs)      *712606.5  * Conv. (cfs)            *          *712606.5  *          *
* Length Wtd. (ft)       *  362.55  * Wetted Per. (ft)       *          *  249.74  *          *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.03  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *          * 1790.77  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  150.28  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.11  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  742.66  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  731.32  * Flow Area (sq ft)      *          * 3832.56  *          *
* E.G. Slope (ft/ft)     *0.000289  * Area (sq ft)           *          * 3832.56  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  273.35  * Top Width (ft)         *          *  273.35  *          *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *          *    5.35  *          *
* Max Chl Dpth (ft)      *   24.13  * Hydr. Depth (ft)       *          *   14.02  *          *
* Conv. Total (cfs)      *1206616.0  * Conv. (cfs)            *          *1206616.0  *          *
* Length Wtd. (ft)       *  362.55  * Wetted Per. (ft)       *          *  280.10  *          *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.32  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    1.51  * 2451.86  *    7.81  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  170.02  *    9.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.72  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  746.24  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  733.16  * Flow Area (sq ft)      *          * 4848.88  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 4848.88  *          *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *27100.00  *          *
* Top Width (ft)         *  294.65  * Top Width (ft)         *          *  294.65  *          *
* Vel Total (ft/s)       *    5.59  * Avg. Vel. (ft/s)       *          *    5.59  *          *
* Max Chl Dpth (ft)      *   27.71  * Hydr. Depth (ft)       *          *   16.46  *          *
* Conv. Total (cfs)      *1696208.0  * Conv. (cfs)            *          *1696208.0  *          *
* Length Wtd. (ft)       *  362.55  * Wetted Per. (ft)       *          *  302.57  *          *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.43  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   15.75  * 3022.00  *   76.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  183.65  *   41.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.31  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.150  *   0.027  *          *
* W.S. Elev (ft)         *  749.79  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  735.14  * Flow Area (sq ft)      *    1.04  * 5926.40  *          *
* E.G. Slope (ft/ft)     *0.000227  * Area (sq ft)           *    1.04  * 5926.40  *          *
```

```
* Q Total (cfs)          *34500.00  * Flow (cfs)              *    0.09  *34499.91  *          *
* Top Width (ft)         *  310.82  * Top Width (ft)          *    0.58  *  310.24  *          *
* Vel Total (ft/s)       *    5.82  * Avg. Vel. (ft/s)        *    0.09  *    5.82  *          *
* Max Chl Dpth (ft)      *   31.26  * Hydr. Depth (ft)        *    1.79  *   19.10  *          *
* Conv. Total (cfs)      *2287580.0  * Conv. (cfs)            *     5.9  *2287574.0  *          *
* Length Wtd. (ft)       *  362.55  * Wetted Per. (ft)        *    2.37  *  319.05  *          *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)        *    0.01  *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.54  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   54.77  * 3585.36  *  286.29  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   25.19  *  192.34  *   94.26  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.              *   0.150  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  755.16  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  737.40  * Flow Area (sq ft)      *    4.15  * 7658.08  *    5.05  *
* E.G. Slope (ft/ft)     *0.000185  * Area (sq ft)           *    4.15  * 7658.08  *  699.78  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *    0.37  *45497.87  *    1.76  *
* Top Width (ft)         *  706.54  * Top Width (ft)          *    0.58  *  332.81  *  373.15  *
* Vel Total (ft/s)       *    5.93  * Avg. Vel. (ft/s)        *    0.09  *    5.94  *    0.35  *
* Max Chl Dpth (ft)      *   36.63  * Hydr. Depth (ft)        *    7.16  *   23.01  *    0.58  *
* Conv. Total (cfs)      *3347982.0  * Conv. (cfs)            *    27.2  *3347825.0  *   129.6  *
* Length Wtd. (ft)       *  362.52  * Wetted Per. (ft)        *    7.74  *  342.06  *    8.78  *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)        *    0.01  *    0.26  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.53  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *  261.01  * 4436.87  * 1125.13  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  116.24  *  198.77  *  262.26  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.              *   0.150  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  757.61  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  738.87  * Flow Area (sq ft)      *  549.07  * 8473.45  *   48.92  *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           *  549.07  * 8473.45  * 1839.93  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *   53.54  *54309.75  *   36.70  *
* Top Width (ft)         * 1747.43  * Top Width (ft)          *  892.86  *  332.81  *  521.76  *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)        *    0.10  *    6.41  *    0.75  *
* Max Chl Dpth (ft)      *   39.08  * Hydr. Depth (ft)        *    0.61  *   25.46  *    1.80  *
* Conv. Total (cfs)      *3969335.0  * Conv. (cfs)            *  3906.7  *3962750.0  *  2678.0  *
* Length Wtd. (ft)       *  362.45  * Wetted Per. (ft)        *  902.04  *  342.06  *   27.35  *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)        *    0.01  *    0.29  *    0.02  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    0.00  *    1.86  *    0.02  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *  665.85  * 4964.95  * 1891.28  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  197.17  *  200.89  *  373.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.              *   0.150  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  740.15  * Flow Area (sq ft)      * 1947.24  * 8994.03  *  100.51  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           * 1947.24  * 8994.03  * 2716.41  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *  458.84  *62441.36  *   99.79  *
* Top Width (ft)         * 1809.44  * Top Width (ft)          *  894.69  *  332.81  *  581.94  *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)        *    0.24  *    6.94  *    0.99  *
* Max Chl Dpth (ft)      *   40.64  * Hydr. Depth (ft)        *    2.18  *   27.02  *    2.59  *
* Conv. Total (cfs)      *4415928.0  * Conv. (cfs)            * 32162.1  *4376771.0  *  6994.8  *
* Length Wtd. (ft)       *  362.36  * Wetted Per. (ft)        *  904.46  *  342.06  *   39.20  *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)        *    0.03  *    0.33  *    0.03  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.01  *    2.32  *    0.03  *
```

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* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1007.08  * 5291.80  * 2588.97  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  226.01  *  201.10  *  538.48  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  762.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *   0.150  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  761.81  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  741.96  * Flow Area (sq ft)      * 4306.88  * 9870.42  *  228.86  *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           * 4306.88  * 9870.42  * 4354.50  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1740.31  *73856.86  *  302.83  *
* Top Width (ft)         * 1934.23  * Top Width (ft)         *  897.48  *  332.81  *  703.94  *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)       *    0.40  *    7.48  *    1.32  *
* Max Chl Dpth (ft)      *   43.28  * Hydr. Depth (ft)       *    4.80  *   29.66  *    3.90  *
* Conv. Total (cfs)      *5251783.0  * Conv. (cfs)            *120418.1  *5110411.0  * 20953.8  *
* Length Wtd. (ft)       *  362.14  * Wetted Per. (ft)       *  908.29  *  342.06  *   59.15  *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)       *    0.06  *    0.38  *    0.05  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    0.02  *    2.82  *    0.07  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1689.96  * 5815.39  * 4142.97  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  271.02  *  201.51  *  727.43  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  752.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.150  *   0.027  *          *
* W.S. Elev (ft)         *  751.63  * Reach Len. (ft)        *  357.10  *  362.55  *  321.78  *
* Crit W.S. (ft)         *  736.12  * Flow Area (sq ft)      *    2.10  * 6503.05  *          *
* E.G. Slope (ft/ft)     *0.000216  * Area (sq ft)           *    2.10  * 6503.05  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *    0.19  *38699.80  *          *
* Top Width (ft)         *  317.33  * Top Width (ft)         *    0.58  *  316.75  *          *
* Vel Total (ft/s)       *    5.95  * Avg. Vel. (ft/s)       *    0.09  *    5.95  *          *
* Max Chl Dpth (ft)      *   33.10  * Hydr. Depth (ft)       *    3.63  *   20.53  *          *
* Conv. Total (cfs)      *2633399.0  * Conv. (cfs)            *    13.1  *2633386.0  *          *
* Length Wtd. (ft)       *  362.55  * Wetted Per. (ft)       *    4.21  *  325.81  *          *
* Min Ch El (ft)         *  718.53  * Shear (lb/sq ft)       *    0.01  *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.60  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   91.98  * 3875.27  *  468.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.64  *  195.53  *  135.21  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.314

INPUT
Description: COE Riverstation=34512.06
Preliminary Model Riverstation=6362.108
Station Elevation Data    num=     149
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0     780    4.61  778.62    5.53  778.33    8.32  777.53   11.26  776.62
   13.41     776   13.58  775.97   20.88  774.42      37  771.51      38   771.3
   42.87  770.16   43.27  770.08   50.47     768   56.79     766   57.03  765.79
   57.92  765.06   58.49  764.76   58.88  764.51      59  764.45   64.17     762
   66.51  760.99    69.4     760   70.86  759.66   71.83  759.32   73.46  758.84
   75.56     758   78.03  757.08   78.51  756.74   79.49  756.28   80.12     756
   82.08     756   87.36  755.45   94.17  754.95  101.03     754  105.77     754
  107.32  753.53  107.98  753.53  122.54     752  141.33     752  154.55     748
   166.2     744  186.68     742  187.01     742  189.84  740.59   191.1     740
  394.95     740  398.22     742  399.59  742.86  400.85  743.72  401.06  743.86
  401.26     744  411.78     744  417.37  743.66  419.77  743.55  424.83  743.21
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   441.3  742.24  444.68     742  559.59  742.14   599.2     742  779.48     742
   781.8  741.23  789.17     740  789.93     740  797.12  740.13  816.93  741.22
  826.79     742  839.35     746  844.71  747.53  846.51     748  849.16     748
   858.3     746  890.03     736  916.72     734  926.29     732  931.41     730
  938.63     728  946.59     726  954.55  724.72  961.47     724     976  722.72
  982.32     722  984.88  718.38 1006.88  718.38 1028.88  718.38 1031.43     722
 1062.79     724 1090.61  731.97 1090.73     732 1105.54     734 1125.74     736
 1148.98  744.12 1170.16     752 1221.86     754 1232.92     756 1248.76     758
 1279.93     760    1311     765    2291   766.2    2496   765.5    2596   765.2
    2608   765.1    2623     765    2917   762.3 2959.02     756  2995.7     754
 3024.98     752  3059.5     748 3079.76     744 3092.48     742 3230.88     742
 3233.77  743.07 3239.98  745.15 3244.27  746.53 3248.48     748 3249.31   748.3
 3253.66     750 3267.96  751.84 3268.99     752 3305.24  753.17  3338.1  753.98
  3338.3  753.98 3338.41  753.99 3338.99     754 3357.13     754 3495.62     756
  3560.1     756 3582.92     758 3612.29     758 3627.76  758.55 3668.18  758.96
 3672.01  758.61 3673.81  758.72 3679.06     758 3682.62     758 3702.72     760
 3756.41     760  3790.2  760.62 3804.47  763.28 3810.42  763.84 3832.82     764
 3871.55     764 3902.91     766 3909.31  767.96 3909.46     768 3910.37  769.51
 3913.08  773.96 3914.26  775.96 3915.43  777.99 3916.61     780

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  849.16    .027 1170.16     .06 3024.98    .075 3357.13     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         849.16 1170.16             650  637.65     630              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2291 3916.61     767       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0     849     757    2950    3350     753

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  738.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  738.05  * Reach Len. (ft)        *  650.00  *  637.65  *  630.00  *
* Crit W.S. (ft)          *  728.66  * Flow Area (sq ft)      *          * 2687.13  *          *
* E.G. Slope (ft/ft)      *0.000325  * Area (sq ft)           *          * 2687.13  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  248.11  * Top Width (ft)          *          *  248.11  *          *
* Vel Total (ft/s)        *    4.76  * Avg. Vel. (ft/s)       *          *    4.76  *          *
* Max Chl Dpth (ft)       *   19.67  * Hydr. Depth (ft)        *          *   10.83  *          *
* Conv. Total (cfs)       *710141.1  * Conv. (cfs)             *          *710141.1  *          *
* Length Wtd. (ft)        *  637.65  * Wetted Per. (ft)        *          *  255.36  *          *
* Min Ch El (ft)          *  718.38  * Shear (lb/sq ft)        *          *    0.21  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.02  *          *
* Frctn Loss (ft)         *    0.21  * Cum Volume (acre-ft)    *          * 1768.48  *    0.18  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *          *  148.23  *    0.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  743.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  742.56  * Reach Len. (ft)        *  650.00  *  637.65  *  630.00  *
* Crit W.S. (ft)          *  731.13  * Flow Area (sq ft)      *          * 3867.57  *          *
* E.G. Slope (ft/ft)      *0.000285  * Area (sq ft)           *          * 3867.57  *          *
* Q Total (cfs)           *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)          *  275.33  * Top Width (ft)          *          *  275.33  *          *
* Vel Total (ft/s)        *    5.30  * Avg. Vel. (ft/s)       *          *    5.30  *          *
* Max Chl Dpth (ft)       *   24.18  * Hydr. Depth (ft)        *          *   14.05  *          *
* Conv. Total (cfs)       *1213694.0  * Conv. (cfs)             *          *1213694.0  *          *
* Length Wtd. (ft)        *  637.65  * Wetted Per. (ft)        *          *  284.04  *          *
* Min Ch El (ft)          *  718.38  * Shear (lb/sq ft)        *          *    0.24  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.29  *          *
* Frctn Loss (ft)         *    0.18  * Cum Volume (acre-ft)    *    1.51  * 2419.82  *    7.81  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    2.36  *  167.73  *    9.15  *
*********************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	746.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.027	
W.S. Elev (ft)	746.15	Reach Len. (ft)	650.00	637.65	630.00
Crit W.S. (ft)	733.06	Flow Area (sq ft)		4894.17	
E.G. Slope (ft/ft)	0.000252	Area (sq ft)		4894.17	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	296.85	Top Width (ft)		296.85	
Vel Total (ft/s)	5.54	Avg. Vel. (ft/s)		5.54	
Max Chl Dpth (ft)	27.77	Hydr. Depth (ft)		16.49	
Conv. Total (cfs)	1707092.0	Conv. (cfs)		1707092.0	
Length Wtd. (ft)	637.64	Wetted Per. (ft)		306.73	
Min Ch El (ft)	718.38	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.39	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	15.75	2981.46	76.53
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	181.18	41.55

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	750.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.150	0.027	
W.S. Elev (ft)	749.71	Reach Len. (ft)	650.00	637.65	630.00
Crit W.S. (ft)	735.17	Flow Area (sq ft)	0.27	5990.21	
E.G. Slope (ft/ft)	0.000225	Area (sq ft)	0.27	5990.21	
Q Total (cfs)	34500.00	Flow (cfs)	0.01	34499.99	
Top Width (ft)	315.01	Top Width (ft)	0.16	314.85	
Vel Total (ft/s)	5.76	Avg. Vel. (ft/s)	0.04	5.76	
Max Chl Dpth (ft)	31.33	Hydr. Depth (ft)	1.71	19.03	
Conv. Total (cfs)	2297544.0	Conv. (cfs)	0.8	2297543.0	
Length Wtd. (ft)	637.41	Wetted Per. (ft)	1.87	325.58	
Min Ch El (ft)	718.38	Shear (lb/sq ft)	0.00	0.26	
Alpha	1.00	Stream Power (lb/ft s)	0.00	1.49	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	54.77	3535.77	286.29
C & E Loss (ft)	0.02	Cum SA (acres)	25.19	189.74	94.26

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	755.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.150	0.027	0.060
W.S. Elev (ft)	755.10	Reach Len. (ft)	650.00	637.65	630.00
Crit W.S. (ft)	737.31	Flow Area (sq ft)	1.14	7712.72	112.00
E.G. Slope (ft/ft)	0.000173	Area (sq ft)	1.14	7712.72	878.97
Q Total (cfs)	45500.00	Flow (cfs)	0.04	45443.34	56.62
Top Width (ft)	836.85	Top Width (ft)	0.16	321.00	515.69
Vel Total (ft/s)	5.81	Avg. Vel. (ft/s)	0.04	5.89	0.51
Max Chl Dpth (ft)	36.72	Hydr. Depth (ft)	7.10	24.03	1.94
Conv. Total (cfs)	3459182.0	Conv. (cfs)	3.3	3454874.0	4304.7
Length Wtd. (ft)	636.97	Wetted Per. (ft)	7.26	332.14	57.93
Min Ch El (ft)	718.38	Shear (lb/sq ft)	0.00	0.25	0.02
Alpha	1.03	Stream Power (lb/ft s)	0.00	1.48	0.01
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	260.98	4372.91	1119.30
C & E Loss (ft)	0.07	Cum SA (acres)	116.24	196.04	258.98

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	758.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.150	0.027	0.060
W.S. Elev (ft)	757.55	Reach Len. (ft)	650.00	637.65	630.00
Crit W.S. (ft)	738.70	Flow Area (sq ft)	425.66	8498.62	272.93

```
* E.G. Slope (ft/ft)     *0.000178  * Area (sq ft)           *  425.66  * 8498.62  * 2439.94  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   37.50  *54149.95  *  212.56  *
* Top Width (ft)         * 1797.52  * Top Width (ft)         *  772.39  *  321.00  *  704.13  *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *    0.09  *    6.37  *    0.78  *
* Max Chl Dpth (ft)      *   39.17  * Hydr. Depth (ft)       *    0.55  *   26.48  *    3.64  *
* Conv. Total (cfs)      *4080076.0  * Conv. (cfs)            *  2812.2  *4061322.0  * 15942.3  *
* Length Wtd. (ft)       *  636.83  * Wetted Per. (ft)       *  781.50  *  332.14  *   75.35  *
* Min Ch El (ft)         *  718.38  * Shear (lb/sq ft)       *    0.01  *    0.28  *    0.04  *
* Alpha                  *    1.16  * Stream Power (lb/ft s) *    0.00  *    1.81  *    0.03  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  661.85  * 4894.32  * 1875.47  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  190.34  *  198.17  *  368.85  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.150  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  759.11  * Reach Len. (ft)        *  650.00  *  637.65  *  630.00  *
* Crit W.S. (ft)         *  739.99  * Flow Area (sq ft)      * 1631.07  * 8998.26  *  404.01  *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)           * 1631.07  * 8998.26  * 3640.72  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  366.44  *62270.55  *  363.01  *
* Top Width (ft)         * 1948.88  * Top Width (ft)         *  776.60  *  321.00  *  851.28  *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)       *    0.22  *    6.92  *    0.90  *
* Max Chl Dpth (ft)      *   40.73  * Hydr. Depth (ft)       *    2.10  *   28.03  *    4.22  *
* Conv. Total (cfs)      *4519348.0  * Conv. (cfs)            * 26287.2  *4467020.0  * 26040.6  *
* Length Wtd. (ft)       *  636.79  * Wetted Per. (ft)       *  786.00  *  332.14  *   96.22  *
* Min Ch El (ft)         *  718.38  * Shear (lb/sq ft)       *    0.03  *    0.33  *    0.05  *
* Alpha                  *    1.45  * Stream Power (lb/ft s) *    0.01  *    2.27  *    0.05  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  992.41  * 5216.93  * 2565.49  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *  219.16  *  198.38  *  533.19  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  762.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.150  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  761.73  * Reach Len. (ft)        *  650.00  *  637.65  *  630.00  *
* Crit W.S. (ft)         *  741.75  * Flow Area (sq ft)      * 3682.41  * 9841.61  *  695.52  *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           * 3682.41  * 9841.61  * 6104.06  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1440.85  *73674.38  *  784.76  *
* Top Width (ft)         * 2101.31  * Top Width (ft)         *  784.37  *  321.00  *  995.94  *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)       *    0.39  *    7.49  *    1.13  *
* Max Chl Dpth (ft)      *   43.35  * Hydr. Depth (ft)       *    4.69  *   30.66  *    5.77  *
* Conv. Total (cfs)      *5343049.0  * Conv. (cfs)            *101430.2  *5186374.0  * 55244.1  *
* Length Wtd. (ft)       *  636.79  * Wetted Per. (ft)       *  794.21  *  332.14  *  121.09  *
* Min Ch El (ft)         *  718.38  * Shear (lb/sq ft)       *    0.06  *    0.37  *    0.07  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.02  *    2.79  *    0.08  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   * 1657.21  * 5733.36  * 4104.34  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  264.13  *  198.79  *  721.15  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  752.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.150  *   0.027  *          *
* W.S. Elev (ft)         *  751.56  * Reach Len. (ft)        *  650.00  *  637.65  *  630.00  *
* Crit W.S. (ft)         *  736.16  * Flow Area (sq ft)      *    0.57  * 6575.62  *          *
* E.G. Slope (ft/ft)     *0.000212  * Area (sq ft)           *    0.57  * 6575.62  *          *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *    0.02  *38699.98  *          *
* Top Width (ft)         *  319.97  * Top Width (ft)         *    0.16  *  319.81  *          *
* Vel Total (ft/s)       *    5.88  * Avg. Vel. (ft/s)       *    0.04  *    5.89  *          *
* Max Chl Dpth (ft)      *   33.18  * Hydr. Depth (ft)       *    3.56  *   20.56  *          *
* Conv. Total (cfs)      *2655146.0  * Conv. (cfs)            *     1.6  *2655144.0  *          *
* Length Wtd. (ft)       *  637.25  * Wetted Per. (ft)       *    3.72  *  330.87  *          *
```

```
* Min Ch El (ft)          *  718.38  * Shear (lb/sq ft)       *    0.00  *    0.26  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.55  *          *
* Frctn Loss (ft)         *    0.12  * Cum Volume (acre-ft)   *   91.96  * 3820.84  *  468.53  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   42.63  *  192.88  *  135.21  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 6.193

INPUT
Description: COE Riverstation=35149.71
Preliminary Model
             Riverstation=5724.46

FEMA Section I
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     790   16.34     788   55.44     786    94.5     782  164.94     776
   193.9     774  235.15     772  253.95     770  260.16  768.76  272.26     766
  286.33     764  304.51     764  431.31  762.69  434.47  762.62  467.01     762
  534.85     762  539.47  761.76   562.7     760   638.3   757.7  709.31  755.32
  744.91     754  745.09     754  746.94  753.81  760.65     752  777.89     746
  783.91     744  803.66     738   819.8     736  840.41     734  844.45  732.99
  848.08     732  860.96     728  868.12     726  886.26     724  911.25     722
   919.4  718.08   941.4  718.08   963.4  718.08  971.54     722  985.85     724
 1013.06     732 1026.05     734  1045.5     736 1059.12     740  1066.2     742
 1097.92     744 1140.08  745.41 1435.57  746.69 1474.11  746.99 1662.35     748
  1789.1  748.19 1840.59  748.57 1852.43  748.47 1995.52     750 2073.24     752
  2383.8     752 2482.55  753.06 2598.87  753.56 2739.19  753.07 2808.09     754
 2963.11     754 2963.96  753.98 3019.86  753.31 3216.28     752 3296.02     752
    3303     754 3373.62     754 3375.54  754.05 3438.76     756 3569.62     758
  3572.2     758 3702.35     760 3718.82     762 3725.52     764 3748.48     774
 3754.37     776 3769.61     778 3779.47  778.82 3787.89  779.19

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .05  760.65    .027  1066.2     .04 1474.11     .15 2739.19     .04
 3375.54     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         760.65  1066.2           413.41  305.64  196.48             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     371     764       F
    1913 3787.89     767       F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  738.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.36  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  737.84  * Reach Len. (ft)        *  413.41  *  305.64  *  196.48  *
* Crit W.S. (ft)          *  728.32  * Flow Area (sq ft)      *          * 2653.68  *          *
* E.G. Slope (ft/ft)      *0.000333  * Area (sq ft)           *          * 2653.68  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  246.76  * Top Width (ft)         *          *  246.76  *          *
* Vel Total (ft/s)        *    4.82  * Avg. Vel. (ft/s)       *          *    4.82  *          *
* Max Chl Dpth (ft)       *   19.76  * Hydr. Depth (ft)       *          *   10.75  *          *
* Conv. Total (cfs)       *701833.1  * Conv. (cfs)            *          *701833.1  *          *
* Length Wtd. (ft)        *  305.64  * Wetted Per. (ft)       *          *  251.89  *          *
* Min Ch El (ft)          *  718.08  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.06  *          *
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)   *          * 1729.39  *    0.18  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *          *  144.61  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	742.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	742.38	Reach Len. (ft)	413.41	305.64	196.48
Crit W.S. (ft)	730.85	Flow Area (sq ft)		3847.00	1.12
E.G. Slope (ft/ft)	0.000289	Area (sq ft)		3847.00	1.12
Q Total (cfs)	20500.00	Flow (cfs)		20499.77	0.23
Top Width (ft)	282.92	Top Width (ft)		276.95	5.97
Vel Total (ft/s)	5.33	Avg. Vel. (ft/s)		5.33	0.21
Max Chl Dpth (ft)	24.30	Hydr. Depth (ft)		13.89	0.19
Conv. Total (cfs)	1204974.0	Conv. (cfs)		1204960.0	13.7
Length Wtd. (ft)	305.64	Wetted Per. (ft)		283.33	5.98
Min Ch El (ft)	718.08	Shear (lb/sq ft)		0.25	0.00
Alpha	1.00	Stream Power (lb/ft s)		1.31	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	1.51	2363.35	7.80
C & E Loss (ft)	0.00	Cum SA (acres)	2.36	163.69	9.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	746.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	746.00	Reach Len. (ft)	413.41	305.64	196.48
Crit W.S. (ft)	732.72	Flow Area (sq ft)		4870.66	189.27
E.G. Slope (ft/ft)	0.000242	Area (sq ft)		4870.66	189.27
Q Total (cfs)	27100.00	Flow (cfs)		26997.85	102.15
Top Width (ft)	497.65	Top Width (ft)		288.30	209.35
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.54	0.54
Max Chl Dpth (ft)	27.92	Hydr. Depth (ft)		16.89	0.90
Conv. Total (cfs)	1743643.0	Conv. (cfs)		1737071.0	6572.3
Length Wtd. (ft)	305.07	Wetted Per. (ft)		295.25	209.44
Min Ch El (ft)	718.08	Shear (lb/sq ft)		0.25	0.01
Alpha	1.07	Stream Power (lb/ft s)		1.38	0.01
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	15.75	2909.99	75.16
C & E Loss (ft)	0.00	Cum SA (acres)	9.30	176.90	40.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	750.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.027	0.047
W.S. Elev (ft)	749.64	Reach Len. (ft)	413.41	305.64	196.48
Crit W.S. (ft)	734.74	Flow Area (sq ft)		5940.02	2316.31
E.G. Slope (ft/ft)	0.000188	Area (sq ft)		5940.02	2329.07
Q Total (cfs)	34500.00	Flow (cfs)		32360.53	2139.47
Top Width (ft)	1194.41	Top Width (ft)		298.77	895.64
Vel Total (ft/s)	4.18	Avg. Vel. (ft/s)		5.45	0.92
Max Chl Dpth (ft)	31.56	Hydr. Depth (ft)		19.88	2.74
Conv. Total (cfs)	2515466.0	Conv. (cfs)		2359473.0	155993.5
Length Wtd. (ft)	297.42	Wetted Per. (ft)		306.33	846.90
Min Ch El (ft)	718.08	Shear (lb/sq ft)		0.23	0.03
Alpha	1.60	Stream Power (lb/ft s)		1.24	0.03
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	54.76	3448.45	269.45
C & E Loss (ft)	0.01	Cum SA (acres)	25.18	185.24	87.78

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	755.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.050	0.027	0.057
W.S. Elev (ft)	755.17	Reach Len. (ft)	413.41	305.64	196.48
Crit W.S. (ft)	737.13	Flow Area (sq ft)	52.13	7622.17	7000.38
E.G. Slope (ft/ft)	0.000113	Area (sq ft)	52.13	7622.17	10758.77
Q Total (cfs)	45500.00	Flow (cfs)	17.55	37464.41	8018.05
Top Width (ft)	2698.58	Top Width (ft)	47.33	305.55	2345.70
Vel Total (ft/s)	3.10	Avg. Vel. (ft/s)	0.34	4.92	1.15

```
* Max Chl Dpth (ft)      *   37.09  * Hydr. Depth (ft)       *    1.10  *   24.95  *    8.27  *
* Conv. Total (cfs)      *4275466.0  * Conv. (cfs)            *  1648.7  *3520391.0  *753426.1  *
* Length Wtd. (ft)       *  284.74  * Wetted Per. (ft)       *   47.48  *  313.51  *  846.90  *
* Min Ch El (ft)         *  718.08  * Shear (lb/sq ft)       *    0.01  *    0.17  *    0.06  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    0.00  *    0.84  *    0.07  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  260.59  * 4260.67  * 1035.15  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  115.88  *  191.46  *  238.29  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  758.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.              *   0.050  *   0.027  *   0.059  *
* W.S. Elev (ft)         *  757.68  * Reach Len. (ft)        *  413.41  *  305.64  *  196.48  *
* Crit W.S. (ft)         *  738.65  * Flow Area (sq ft)      *  263.73  * 8388.73  * 9124.82  *
* E.G. Slope (ft/ft)     *0.000106  * Area (sq ft)           *  263.73  * 8388.73  *16792.24  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  135.07  *42560.54  *11704.39  *
* Top Width (ft)         * 2909.80  * Top Width (ft)         *  121.76  *  305.55  * 2482.49  *
* Vel Total (ft/s)       *    3.06  * Avg. Vel. (ft/s)       *    0.51  *    5.07  *    1.28  *
* Max Chl Dpth (ft)      *   39.60  * Hydr. Depth (ft)       *    2.17  *   27.45  *   10.78  *
* Conv. Total (cfs)      *5278924.0  * Conv. (cfs)            * 13107.1  *4130034.0  *1135783.0  *
* Length Wtd. (ft)       *  281.23  * Wetted Per. (ft)       *  121.95  *  313.51  *  846.90  *
* Min Ch El (ft)         *  718.08  * Shear (lb/sq ft)       *    0.01  *    0.18  *    0.07  *
* Alpha                  *    2.19  * Stream Power (lb/ft s) *    0.01  *    0.90  *    0.09  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  656.71  * 4770.72  * 1736.39  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  183.67  *  193.58  *  345.81  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.              *   0.050  *   0.027  *   0.059  *
* W.S. Elev (ft)         *  759.28  * Reach Len. (ft)        *  413.41  *  305.64  *  196.48  *
* Crit W.S. (ft)         *  739.93  * Flow Area (sq ft)      *  501.34  * 8879.04  *10483.66  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           *  501.34  * 8879.04  *20863.10  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  316.88  *47809.34  *14873.78  *
* Top Width (ft)         * 3069.61  * Top Width (ft)         *  174.44  *  305.55  * 2589.61  *
* Vel Total (ft/s)       *    3.17  * Avg. Vel. (ft/s)       *    0.63  *    5.38  *    1.42  *
* Max Chl Dpth (ft)      *   41.20  * Hydr. Depth (ft)       *    2.87  *   29.06  *   12.38  *
* Conv. Total (cfs)      *5982705.0  * Conv. (cfs)            * 30091.7  *4540146.0  *1412467.0  *
* Length Wtd. (ft)       *  279.73  * Wetted Per. (ft)       *  174.66  *  313.51  *  846.90  *
* Min Ch El (ft)         *  718.08  * Shear (lb/sq ft)       *    0.02  *    0.20  *    0.09  *
* Alpha                  *    2.23  * Stream Power (lb/ft s) *    0.01  *    1.06  *    0.12  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  976.50  * 5086.08  * 2388.30  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  212.06  *  193.79  *  508.30  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  762.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.              *   0.050  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  761.97  * Reach Len. (ft)        *  413.41  *  305.64  *  196.48  *
* Crit W.S. (ft)         *  741.68  * Flow Area (sq ft)      * 1051.13  * 9700.74  *12760.94  *
* E.G. Slope (ft/ft)     *0.000109  * Area (sq ft)           * 1051.13  * 9700.74  *27951.83  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  908.78  *54874.62  *20116.60  *
* Top Width (ft)         * 3183.26  * Top Width (ft)         *  225.30  *  305.55  * 2652.41  *
* Vel Total (ft/s)       *    3.23  * Avg. Vel. (ft/s)       *    0.86  *    5.66  *    1.58  *
* Max Chl Dpth (ft)      *   43.89  * Hydr. Depth (ft)       *    4.67  *   31.75  *   15.07  *
* Conv. Total (cfs)      *7277889.0  * Conv. (cfs)            * 87141.4  *5261810.0  *1928937.0  *
* Length Wtd. (ft)       *  278.05  * Wetted Per. (ft)       *  225.60  *  313.51  *  846.90  *
* Min Ch El (ft)         *  718.08  * Shear (lb/sq ft)       *    0.03  *    0.21  *    0.10  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.03  *    1.19  *    0.16  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1621.90  * 5590.33  * 3858.07  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  256.59  *  194.21  *  694.77  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	751.94	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.39	Wt. n-Val.		0.027	0.052	
W.S. Elev (ft)	751.54	Reach Len. (ft)	413.41	305.64	196.48	
Crit W.S. (ft)	735.81	Flow Area (sq ft)		6513.10	3925.87	
E.G. Slope (ft/ft)	0.000162	Area (sq ft)		6513.10	4135.53	
Q Total (cfs)	38700.00	Flow (cfs)		34631.79	4068.21	
Top Width (ft)	1293.42	Top Width (ft)		304.23	989.19	
Vel Total (ft/s)	3.71	Avg. Vel. (ft/s)		5.32	1.04	
Max Chl Dpth (ft)	33.46	Hydr. Depth (ft)		21.41	4.64	
Conv. Total (cfs)	3036004.0	Conv. (cfs)		2716854.0	319150.2	
Length Wtd. (ft)	292.42	Wetted Per. (ft)		312.12	846.90	
Min Ch El (ft)	718.08	Shear (lb/sq ft)		0.21	0.05	
Alpha	1.85	Stream Power (lb/ft s)		1.13	0.05	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	91.96	3725.04	438.63	
C & E Loss (ft)	0.01	Cum SA (acres)	42.63	188.32	128.05	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 6.135

INPUT
Description: COE Riverstation=35455.35
Preliminary Model Riverstation=5418.809
Station Elevation Data num= 213

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780	7.04	778	15.58	776	25.27	774	53.38	772
66.68	772	159.76	770	200.73	770	206.49	769.93	344.14	768.01
344.35	768.01	425.57	766	426.26	766	452.55	764	475.44	760
493.29	756	587.07	756	598.65	755.35	617.85	754	760.87	752
799.2	752	805.98	750.1	806.32	750	806.63	749.88	811.99	748
816.6	746	821.55	744	822.48	743.78	828.99	742	838.63	740.11
839.15	740	849.7	738	875.99	734	882.96	732	894.12	728
902.75	726	916.36	724	935.16	722	947.67	720	960.27	717.93
963.8	717.93	979.5	720	1010.91	722	1024.48	724	1031.12	726
1042.43	729.77	1043.17	730	1046.94	731.33	1048.96	732	1064.12	734
1081.37	736	1101.77	742	1116.3	744	1265.99	745.15	1351.03	745.04
1485.46	746	1517.7	745.95	1519.66	745.97	1635.47	746.04	1655.9	746.31
1929.87	750	1932.13	750.12	1933.43	750.16	1958.21	751.21	1965.53	751.21
1971.36	751.41	1978.68	751.33	2002.63	752	2355.01	752	2423.31	752.34
2557.54	753.3	2693.5	754	2748.49	754.77	2821.52	754	2931.11	753.81
3006.36	753.35	3158.11	752	3229.21	750	3233.11	750	3256.86	752
3262.43	754	3376.03	754	3407.55	755.56	3422.81	755.79	3425.43	755.9
3440.41	755.96	3442.47	756	3511.53	756	3555.51	758	3656.85	758
3685.56	762	3695.03	764	3707.83	768	3708.37	768.18	3714.05	770
3715.37	770.38	3722.25	772	3748.63	774	3763.51	775.48	3784.95	778
3839.57	780	3880.84	782	3896.9	784	3897.02	784.07	3918.79	797.97
3919.06	798.14	3921.93	800	3922.69	800.51	3931.06	806	3946.81	806
3955.82	804	3959.76	802	3963.06	800.63	3965.23	800	3967.41	799.61
3970.14	800	3974.37	800	3976.09	801.35	3976.98	802	3978.86	803.53
3979.45	804	3983.07	807.02	3984.17	808	4011.8	808	4015.29	807.83
4016.43	807.73	4025.07	807.21	4031.86	806.5	4034.05	806.33	4036.59	806
4037.47	804.36	4038.24	802.9	4038.74	802	4039.87	800	4041.02	798
4041.39	797.35	4045.7	790	4046.08	789.36	4046.88	788	4047.58	786.83
4049	784.43	4049.26	784	4050.43	782.03	4104.51	780.81	4137.07	780.43
4151.06	780.93	4152.82	780.82	4153.48	780.89	4155.77	780.77	4156.48	780.85
4157.41	780.93	4160.18	780.83	4161.11	780.91	4164.71	780.85	4172.35	781.41
4174.68	781.43	4180.5	782	4181.56	782.32	4189.59	784.67	4193.74	786
4254.13	786	4262.29	782	4266.43	780	4297.36	779.13	4312.4	778.89
4340.92	778.74	4345.32	778.83	4350.23	778.78	4361.93	778.93	4376.19	779.35
4378.85	779.46	4387.17	779.25	4388.77	779.01	4392.14	778.41	4394.09	778
4408.25	774	4413.45	772	4421.86	766	4425.2	763.69	4430.74	760
4439.91	754.08	4440.94	753.73	4446.2	752.13	4446.65	752	4447.34	751.76
4452.1	750	4455.01	748.4	4455.7	748.06	4455.84	748	4456.63	748
4469.36	750	4498.64	752	4516.91	754	4531.61	757.93	4532.15	758.08
4539.4	760	4590.16	760	4593.06	759.93	4598.25	760	4617.31	760

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 4645.21  760.89 4653.18  760.85 4681.11     760 4692.65     760 4693.22  760.08
 4708.02     762 4767.54     766    4805     768 4837.92     770 4858.52     772
 4862.22  773.94 4862.35     774 4873.72     780

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .04   799.2    .027  1116.3     .04 1635.47     .15 2423.31     .04
 3376.03    .075  4539.4     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         799.2  1116.3           388.7  389.29  520.26             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     469     764       F
    2041 4873.72     767       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    3975    4075     800

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  738.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.72  * Reach Len. (ft)        *  388.70  *  389.29  *  520.26  *
* Crit W.S. (ft)         *  728.49  * Flow Area (sq ft)      *          * 2605.12  *          *
* E.G. Slope (ft/ft)     *0.000331  * Area (sq ft)           *          * 2605.12  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  235.66  * Top Width (ft)         *          *  235.66  *          *
* Vel Total (ft/s)       *    4.91  * Avg. Vel. (ft/s)       *          *    4.91  *          *
* Max Chl Dpth (ft)      *   19.79  * Hydr. Depth (ft)       *          *   11.05  *          *
* Conv. Total (cfs)      *703157.8  * Conv. (cfs)            *          *703157.8  *          *
* Length Wtd. (ft)       *  389.29  * Wetted Per. (ft)       *          *  239.85  *          *
* Min Ch El (ft)         *  717.93  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.10  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *          * 1710.94  *    0.18  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *          *  142.92  *    0.15  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  742.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  742.26  * Reach Len. (ft)        *  388.70  *  389.29  *  520.26  *
* Crit W.S. (ft)         *  730.92  * Flow Area (sq ft)      *          * 3767.25  *          *
* E.G. Slope (ft/ft)     *0.000307  * Area (sq ft)           *          * 3767.25  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)         *  275.67  * Top Width (ft)         *          *  275.67  *          *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *          *    5.44  *          *
* Max Chl Dpth (ft)      *   24.33  * Hydr. Depth (ft)       *          *   13.67  *          *
* Conv. Total (cfs)      *1170236.0  * Conv. (cfs)            *          *1170236.0  *          *
* Length Wtd. (ft)       *  389.29  * Wetted Per. (ft)       *          *  280.93  *          *
* Min Ch El (ft)         *  717.93  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.40  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    1.51  * 2336.64  *    7.80  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.36  *  161.75  *    9.09  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  746.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  745.92  * Reach Len. (ft)        *  388.70  *  389.29  *  520.26  *
* Crit W.S. (ft)         *  732.76  * Flow Area (sq ft)      *          * 4831.64  *  324.59  *
* E.G. Slope (ft/ft)     *0.000258  * Area (sq ft)           *          * 4831.64  *  324.59  *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *26918.37  *  181.63  *
* Top Width (ft)         *  657.01  * Top Width (ft)         *          *  299.49  *  357.52  *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *          *    5.57  *    0.56  *
* Max Chl Dpth (ft)      *   27.99  * Hydr. Depth (ft)       *          *   16.13  *    0.91  *
```

```
* Conv. Total (cfs)      *1686787.0  * Conv. (cfs)            *          *1675481.0  * 11305.5  *
* Length Wtd. (ft)       *  390.57  * Wetted Per. (ft)        *          *  305.47  *  357.53  *
* Min Ch El (ft)         *  717.93  * Shear (lb/sq ft)        *          *    0.25  *    0.01  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *          *    1.42  *    0.01  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   15.75  * 2875.95  *   74.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    9.30  *  174.84  *   38.75  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**************************************************************************************************
* E.G. Elev (ft)         *  750.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.              *          *   0.027  *   0.043  *
* W.S. Elev (ft)         *  749.61  * Reach Len. (ft)        *  388.70  *  389.29  *  520.26  *
* Crit W.S. (ft)         *  734.71  * Flow Area (sq ft)      *          * 5954.30  * 2704.03  *
* E.G. Slope (ft/ft)     *0.000183  * Area (sq ft)           *          * 5954.30  * 2716.06  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *31443.72  * 3056.28  *
* Top Width (ft)         * 1107.61  * Top Width (ft)         *          *  308.90  *  798.71  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *          *    5.28  *    1.13  *
* Max Chl Dpth (ft)      *   31.68  * Hydr. Depth (ft)       *          *   19.28  *    3.45  *
* Conv. Total (cfs)      *2548133.0  * Conv. (cfs)            *          *2322400.0  *225733.3  *
* Length Wtd. (ft)       *  399.43  * Wetted Per. (ft)        *          *  315.59  *  784.67  *
* Min Ch El (ft)         *  717.93  * Shear (lb/sq ft)        *          *    0.22  *    0.04  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *          *    1.14  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *   54.76  * 3406.72  *  258.07  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   25.18  *  183.11  *   83.96  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**************************************************************************************************
* E.G. Elev (ft)         *  755.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.              *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  755.18  * Reach Len. (ft)        *  388.70  *  389.29  *  520.26  *
* Crit W.S. (ft)         *  737.07  * Flow Area (sq ft)      *  442.73  * 7708.96  * 7640.96  *
* E.G. Slope (ft/ft)     *0.000102  * Area (sq ft)           *  442.73  * 7708.96  *10993.29  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  284.50  *35511.30  * 9704.20  *
* Top Width (ft)         * 2881.75  * Top Width (ft)         *  198.07  *  317.10  * 2366.58  *
* Vel Total (ft/s)       *    2.88  * Avg. Vel. (ft/s)       *    0.64  *    4.61  *    1.27  *
* Max Chl Dpth (ft)      *   37.25  * Hydr. Depth (ft)       *    2.24  *   24.31  *    8.26  *
* Conv. Total (cfs)      *4495631.0  * Conv. (cfs)            * 28110.3  *3508697.0  *958823.9  *
* Length Wtd. (ft)       *  414.40  * Wetted Per. (ft)        *  198.13  *  324.13  *  924.77  *
* Min Ch El (ft)         *  717.93  * Shear (lb/sq ft)        *    0.01  *    0.15  *    0.05  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.01  *    0.70  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)    *  258.24  * 4206.88  *  986.09  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  114.72  *  189.27  *  227.66  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**************************************************************************************************
* E.G. Elev (ft)         *  757.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.              *   0.040  *   0.027  *   0.051  *
* W.S. Elev (ft)         *  757.70  * Reach Len. (ft)        *  388.70  *  389.29  *  520.26  *
* Crit W.S. (ft)         *  738.63  * Flow Area (sq ft)      * 1137.03  * 8508.35  * 9972.07  *
* E.G. Slope (ft/ft)     *0.000092  * Area (sq ft)           * 1137.03  * 8508.35  *17208.70  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  957.43  *39734.59  *13707.98  *
* Top Width (ft)         * 3159.55  * Top Width (ft)         *  313.48  *  317.10  * 2528.97  *
* Vel Total (ft/s)       *    2.77  * Avg. Vel. (ft/s)       *    0.84  *    4.67  *    1.37  *
* Max Chl Dpth (ft)      *   39.77  * Hydr. Depth (ft)       *    3.63  *   26.83  *   10.78  *
* Conv. Total (cfs)      *5662287.0  * Conv. (cfs)            * 99655.4  *4135821.0  *1426810.0  *
* Length Wtd. (ft)       *  419.68  * Wetted Per. (ft)        *  313.75  *  324.13  *  924.77  *
* Min Ch El (ft)         *  717.93  * Shear (lb/sq ft)        *    0.02  *    0.15  *    0.06  *
* Alpha                  *    2.14  * Stream Power (lb/ft s) *    0.02  *    0.71  *    0.09  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)    *  650.06  * 4711.44  * 1659.71  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *  181.61  *  191.40  *  334.50  *
**************************************************************************************************
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	759.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.040	0.027	0.052
W.S. Elev (ft)	759.31	Reach Len. (ft)	388.70	389.29	520.26
Crit W.S. (ft)	739.98	Flow Area (sq ft)	1649.04	9020.38	11465.22
E.G. Slope (ft/ft)	0.000094	Area (sq ft)	1649.04	9020.38	21448.07
Q Total (cfs)	63000.00	Flow (cfs)	1765.49	44143.09	17091.41
Top Width (ft)	3292.74	Top Width (ft)	320.69	317.10	2654.96
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)	1.07	4.89	1.49
Max Chl Dpth (ft)	41.38	Hydr. Depth (ft)	5.14	28.45	12.40
Conv. Total (cfs)	6506376.0	Conv. (cfs)	182332.6	4558914.0	1765130.0
Length Wtd. (ft)	422.41	Wetted Per. (ft)	321.13	324.13	924.77
Min Ch El (ft)	717.93	Shear (lb/sq ft)	0.03	0.16	0.07
Alpha	2.15	Stream Power (lb/ft s)	0.03	0.80	0.11
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	966.30	5023.28	2292.87
C & E Loss (ft)	0.00	Cum SA (acres)	209.71	191.61	496.48

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	762.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.040	0.027	0.053
W.S. Elev (ft)	762.01	Reach Len. (ft)	388.70	389.29	520.26
Crit W.S. (ft)	741.85	Flow Area (sq ft)	2532.24	9877.29	13964.07
E.G. Slope (ft/ft)	0.000089	Area (sq ft)	2534.49	9877.29	28953.74
Q Total (cfs)	75900.00	Flow (cfs)	3439.08	49920.39	22540.53
Top Width (ft)	3502.22	Top Width (ft)	335.28	317.10	2849.83
Vel Total (ft/s)	2.88	Avg. Vel. (ft/s)	1.36	5.05	1.61
Max Chl Dpth (ft)	44.08	Hydr. Depth (ft)	7.67	31.15	15.10
Conv. Total (cfs)	8063311.0	Conv. (cfs)	365354.2	5303342.0	2394615.0
Length Wtd. (ft)	426.10	Wetted Per. (ft)	330.82	324.13	924.77
Min Ch El (ft)	717.93	Shear (lb/sq ft)	0.04	0.17	0.08
Alpha	2.13	Stream Power (lb/ft s)	0.06	0.85	0.13
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	1604.88	5521.64	3729.73
C & E Loss (ft)	0.00	Cum SA (acres)	253.93	192.02	682.36

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	751.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.027	0.046
W.S. Elev (ft)	751.52	Reach Len. (ft)	388.70	389.29	520.26
Crit W.S. (ft)	735.72	Flow Area (sq ft)		6551.57	4286.99
E.G. Slope (ft/ft)	0.000155	Area (sq ft)		6551.57	4412.66
Q Total (cfs)	38700.00	Flow (cfs)		33394.86	5305.14
Top Width (ft)	1304.64	Top Width (ft)		315.40	989.24
Vel Total (ft/s)	3.57	Avg. Vel. (ft/s)		5.10	1.24
Max Chl Dpth (ft)	33.59	Hydr. Depth (ft)		20.77	4.93
Conv. Total (cfs)	3111752.0	Conv. (cfs)		2685182.0	426570.2
Length Wtd. (ft)	404.89	Wetted Per. (ft)		322.37	869.40
Min Ch El (ft)	717.93	Shear (lb/sq ft)		0.20	0.05
Alpha	1.78	Stream Power (lb/ft s)		1.00	0.06
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	91.96	3679.21	419.35
C & E Loss (ft)	0.01	Cum SA (acres)	42.63	186.14	123.59

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 6.062

INPUT
Description: COE Riverstation=35844.64
Preliminary Model Riverstation=5029.525
Station Elevation Data num= 251

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780	6.09	778.39	7.73	778	10.13	777.38	10.66	777.27
11.41	777.14	13.27	776.76	14.4	776.61	15.3	776.47	19.03	776.05
19.46	776	25.9	775	26.93	774.76	28.24	774.53	30.87	774.01
63.77	774	87.39	773.11	90.79	773.07	109.57	772.43	112.58	772
167.03	771.95	170.43	771.89	173.77	771.9	235.92	770.49	237.59	770.47
250.65	770.05	250.86	770.05	251.26	770	252.24	770	303.45	768.76
331.95	768.22	333.22	768.22	348.95	767.77	432.66	766.28	432.95	766.28
438.95	766.14	441.07	766	444.94	766	478.46	765.11	479.73	765.1
501.68	764	535.41	764	535.78	763.89	535.93	763.89	536.48	763.66
536.66	763.74	546.55	762	552.88	762	563.65	762.93	565.13	762.9
567.66	762.9	570.51	762.84	572.92	762.84	578.4	762.71	581.73	762.7
589.11	762.5	598.49	762.24	599.01	762.21	605.86	762	624.71	762
647.86	762.42	650	762.25	650.16	762.28	652	762.14	652.15	762.15
653.42	762.08	653.54	762.1	653.7	762.11	654.55	762.12	654.73	762.14
655.48	762.21	659.06	762.41	659.47	762.44	661.95	762.52	662.34	762.54
665.23	762.57	669.03	762.46	674.32	762.09	675.27	762	681.93	761.81
716.96	760.25	753.64	758.17	777.69	757.04	791.47	756	918.93	754
1002.37	752	1049.13	751.47	1074.62	751.43	1076.51	751.48	1079.57	751.43
1094.44	752	1099.73	752	1106.98	750	1107.96	749.71	1113.49	748
1113.8	747.91	1139.01	740.12	1145.7	738.11	1156.97	734.75	1159.38	734
1180.64	732	1195.42	730	1216.55	724	1244.41	722	1251.29	720.05
1251.49	720	1259.46	717.75	1303.46	717.75	1316.44	721.42	1331.29	722
1343.47	724	1371.69	732	1389.39	734	1402.77	736	1419.43	739.98
1428.66	741.78	1428.84	741.82	1429.75	742	1492.71	744	1588.32	744.03
1744.68	746.05	1844.51	748	1874.25	749.3	1878.65	749.43	1884.81	749.73
1886.23	749.76	1890.68	750	1899.4	751.21	1904.66	751.78	1905.16	751.85
1907.6	752	1917.78	752	1919.94	751.93	1920.12	751.94	1923.73	751.78
1924.26	751.8	1926.9	751.68	1927.64	751.71	1929.53	751.61	1931.15	751.68
1932.7	751.6	1934.11	751.67	1935.49	751.6	1936.72	751.64	1938.35	751.57
2005.73	751.19	2111.89	750	2153.62	750	2170.02	750.5	2173.33	750.53
2228.61	752	2341.68	752	2384.31	751.86	2467.79	752	2471.56	752.06
2482.28	752.22	2482.56	752.22	2498.62	752.44	2499.14	752.43	2571.07	752
3136.1	752	3153.24	750	3218.22	748	3245.43	748	3258.19	750
3329.98	750	3340	752	3367.51	752	3376.05	750.45	3378.66	750
3384.96	750	3421.38	752	3530.75	754	3534.6	754	3535.7	754.04
3544.3	754.1	3585.58	756	3663.05	758	3669.83	762	3680.32	768
3683.91	770	3687	770.07	3713.38	771.08	3722.11	771.05	3737.71	771.44
3738.52	771.47	3749.14	772	3762.41	774	3797.15	775.44	3803.67	775.57
3804.82	775.62	3816.9	775.83	3817.97	775.86	3936.83	776.55	4000.63	776
4003.8	773.07	4007.18	770	4007.85	769.41	4010.88	766.81	4011.84	766
4013.87	764.32	4014.25	764	4014.55	763.76	4023.83	756.21	4024.08	756
4026.56	754	4027.58	753.4	4029.75	752	4032.01	750.29	4032.38	750
4032.59	749.82	4034.84	748	4039.13	746.16	4039.4	746.04	4039.83	745.89
4046.05	744	4050.85	744	4079.35	752	4084.48	754	4088.9	756
4091.47	757.24	4093.11	758	4100.89	761.8	4109.41	766	4121.5	772
4129.88	772	4152.28	770	4186.49	768	4229.68	768	4255.66	766
4277.34	764	4278.17	763.86	4297.65	760	4304.66	758	4310.85	756
4324.21	756	4341.57	758	4364.36	758.85	4364.79	758.86	4369.49	759.05
4408.74	760	4440.07	760	4486.35	762	4502.03	764	4514.01	766
4530.9	770	4564.72	774	4583.5	775.95	4584.06	776	4595.34	780
4595.38	780.01								

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	650	.04	1099.73	.027	1429.75	.04	1938.35	.15
2499.14	.04	3376.05	.06	4121.5	.04				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1099.73	1429.75	72.23	488.6	324.11	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	637	764	F
1908	2538	752.5	F
2538	4560	770	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev

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    3775    3850     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  737.96  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.            *          *    0.027 *          *
* W.S. Elev (ft)         *  737.68  * Reach Len. (ft)       *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  727.22  * Flow Area (sq ft)     *          * 3049.78  *          *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)          *          * 3049.78  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)            *          *12800.00  *          *
* Top Width (ft)         *  262.69  * Top Width (ft)        *          *  262.69  *          *
* Vel Total (ft/s)       *    4.20  * Avg. Vel. (ft/s)      *          *    4.20  *          *
* Max Chl Dpth (ft)      *   19.93  * Hydr. Depth (ft)      *          *   11.61  *          *
* Conv. Total (cfs)      *850830.5  * Conv. (cfs)           *          *850830.5  *          *
* Length Wtd. (ft)       *  488.60  * Wetted Per. (ft)      *          *  267.21  *          *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)      *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.68  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *          * 1685.67  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  140.69  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.59  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.            *          *    0.027 *   0.040  *
* W.S. Elev (ft)         *  742.24  * Reach Len. (ft)       *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  729.65  * Flow Area (sq ft)     *          * 4327.78  *    0.93  *
* E.G. Slope (ft/ft)     *0.000214  * Area (sq ft)          *          * 4327.78  *    0.93  *
* Q Total (cfs)          *20500.00  * Flow (cfs)            *          *20499.88  *    0.12  *
* Top Width (ft)         *  305.28  * Top Width (ft)        *          *  297.61  *    7.67  *
* Vel Total (ft/s)       *    4.74  * Avg. Vel. (ft/s)      *          *    4.74  *    0.13  *
* Max Chl Dpth (ft)      *   24.49  * Hydr. Depth (ft)      *          *   14.54  *    0.12  *
* Conv. Total (cfs)      *1401249.0  * Conv. (cfs)          *          *1401240.0  *     8.5  *
* Length Wtd. (ft)       *  488.60  * Wetted Per. (ft)      *          *  303.28  *    7.67  *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)      *          *    0.19  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.90  *    0.00  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *    1.51  * 2300.47  *    7.79  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  159.19  *    9.05  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.28  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.            *          *    0.027 *   0.040  *
* W.S. Elev (ft)         *  745.91  * Reach Len. (ft)       *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  731.48  * Flow Area (sq ft)     *          * 5440.41  *  500.92  *
* E.G. Slope (ft/ft)     *0.000179  * Area (sq ft)          *          * 5440.41  *  522.57  *
* Q Total (cfs)          *27100.00  * Flow (cfs)            *          *26752.40  *  347.60  *
* Top Width (ft)         *  631.38  * Top Width (ft)        *          *  309.47  *  321.90  *
* Vel Total (ft/s)       *    4.56  * Avg. Vel. (ft/s)      *          *    4.92  *    0.69  *
* Max Chl Dpth (ft)      *   28.16  * Hydr. Depth (ft)      *          *   17.58  *    1.65  *
* Conv. Total (cfs)      *2023547.0  * Conv. (cfs)          *          *1997591.0  * 25955.4  *
* Length Wtd. (ft)       *  487.15  * Wetted Per. (ft)      *          *  315.69  *  304.07  *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)      *          *    0.19  *    0.02  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *          *    0.95  *    0.01  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   15.75  * 2830.05  *   68.94  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  172.12  *   34.70  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.            *          *    0.027 *   0.040  *
* W.S. Elev (ft)         *  749.58  * Reach Len. (ft)       *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  733.42  * Flow Area (sq ft)     *          * 6598.37  * 1940.24  *
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* E.G. Slope (ft/ft)     *0.000144  * Area (sq ft)           *          * 6598.37  * 2157.62  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *32216.30  * 2283.70  *
* Top Width (ft)         *  899.83  * Top Width (ft)         *          *  321.37  *  578.46  *
* Vel Total (ft/s)       *    4.04  * Avg. Vel. (ft/s)       *          *    4.88  *    1.18  *
* Max Chl Dpth (ft)      *   31.83  * Hydr. Depth (ft)       *          *   20.53  *    4.29  *
* Conv. Total (cfs)      *2875591.0  * Conv. (cfs)            *          *2685244.0  *190347.7  *
* Length Wtd. (ft)       *  480.56  * Wetted Per. (ft)       *          *  328.14  *  452.08  *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)       *          *    0.18  *    0.04  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *          *    0.88  *    0.05  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   54.76  * 3350.63  *  228.97  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.18  *  180.30  *   75.74  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.040  *   0.027  *   0.047  *
* W.S. Elev (ft)         *  755.14  * Reach Len. (ft)        *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  735.56  * Flow Area (sq ft)      *  559.30  * 8422.96  * 6893.53  *
* E.G. Slope (ft/ft)     *0.000089  * Area (sq ft)           *  559.30  * 8422.96  *10906.23  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  332.57  *37423.62  * 7743.82  *
* Top Width (ft)         * 2782.56  * Top Width (ft)         *  253.52  *  330.02  * 2199.03  *
* Vel Total (ft/s)       *    2.87  * Avg. Vel. (ft/s)       *    0.59  *    4.44  *    1.12  *
* Max Chl Dpth (ft)      *   37.39  * Hydr. Depth (ft)       *    2.21  *   25.52  *    6.22  *
* Conv. Total (cfs)      *4816633.0  * Conv. (cfs)            * 35205.6  *3961666.0  *819760.7  *
* Length Wtd. (ft)       *  463.58  * Wetted Per. (ft)       *  253.57  *  337.13  * 1108.54  *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)       *    0.01  *    0.14  *    0.03  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *    0.01  *    0.62  *    0.04  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  253.77  * 4134.80  *  855.31  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  112.70  *  186.38  *  200.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.040  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  757.67  * Reach Len. (ft)        *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  737.00  * Flow Area (sq ft)      * 1334.08  * 9256.22  * 9691.75  *
* E.G. Slope (ft/ft)     *0.000081  * Area (sq ft)           * 1334.08  * 9256.22  *16600.79  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1119.64  *41729.26  *11551.10  *
* Top Width (ft)         * 2989.07  * Top Width (ft)         *  335.36  *  330.02  * 2323.69  *
* Vel Total (ft/s)       *    2.68  * Avg. Vel. (ft/s)       *    0.84  *    4.51  *    1.19  *
* Max Chl Dpth (ft)      *   39.92  * Hydr. Depth (ft)       *    3.98  *   28.05  *    8.75  *
* Conv. Total (cfs)      *6043914.0  * Conv. (cfs)            *124394.0  *4636178.0  *1283343.0  *
* Length Wtd. (ft)       *  450.87  * Wetted Per. (ft)       *  335.47  *  337.13  * 1108.54  *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)       *    0.02  *    0.14  *    0.04  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *    0.02  *    0.63  *    0.05  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  639.04  * 4632.06  * 1457.81  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  178.71  *  188.51  *  305.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.040  *   0.027  *   0.052  *
* W.S. Elev (ft)         *  759.28  * Reach Len. (ft)        *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  738.29  * Flow Area (sq ft)      * 1900.99  * 9789.02  *11480.95  *
* E.G. Slope (ft/ft)     *0.000083  * Area (sq ft)           * 1900.99  * 9789.02  *20407.56  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1926.91  *46288.93  *14784.16  *
* Top Width (ft)         * 3085.67  * Top Width (ft)         *  365.67  *  330.02  * 2389.98  *
* Vel Total (ft/s)       *    2.72  * Avg. Vel. (ft/s)       *    1.01  *    4.73  *    1.29  *
* Max Chl Dpth (ft)      *   41.53  * Hydr. Depth (ft)       *    5.20  *   29.66  *   10.36  *
* Conv. Total (cfs)      *6926800.0  * Conv. (cfs)            *211861.8  *5089431.0  *1625507.0  *
* Length Wtd. (ft)       *  441.96  * Wetted Per. (ft)       *  365.82  *  337.13  * 1108.54  *
```

```
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)       *    0.03  *    0.15  *    0.05  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.03  *    0.71  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  950.46  * 4939.23  * 2042.92  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  206.65  *  188.72  *  466.35  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.040  *   0.027  *   0.054  *
* W.S. Elev (ft)         *  761.99  * Reach Len. (ft)        *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  740.04  * Flow Area (sq ft)      * 2962.10  *10681.73  *14478.79  *
* E.G. Slope (ft/ft)     *0.000079  * Area (sq ft)           * 2962.10  *10681.73  *27084.09  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3564.16  *52185.72  *20150.12  *
* Top Width (ft)         * 3276.94  * Top Width (ft)         *  423.95  *  330.02  * 2522.97  *
* Vel Total (ft/s)       *    2.70  * Avg. Vel. (ft/s)       *    1.20  *    4.89  *    1.39  *
* Max Chl Dpth (ft)      *   44.24  * Hydr. Depth (ft)       *    6.99  *   32.37  *   13.06  *
* Conv. Total (cfs)      *8561108.0  * Conv. (cfs)           *402018.1  *5886266.0  *2272824.0  *
* Length Wtd. (ft)       *  424.81  * Wetted Per. (ft)       *  424.17  *  337.13  * 1108.54  *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)       *    0.03  *    0.16  *    0.06  *
* Alpha                  *    2.33  * Stream Power (lb/ft s) *    0.04  *    0.76  *    0.09  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1580.36  * 5429.77  * 3395.09  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  250.55  *  189.13  *  650.28  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  751.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  751.48  * Reach Len. (ft)        *   72.23  *  488.60  *  324.11  *
* Crit W.S. (ft)         *  734.33  * Flow Area (sq ft)      *    1.07  * 7216.70  * 2824.18  *
* E.G. Slope (ft/ft)     *0.000128  * Area (sq ft)           *    1.07  * 7216.70  * 3680.64  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *    0.05  *34788.65  * 3911.30  *
* Top Width (ft)         * 1374.81  * Top Width (ft)         *   33.14  *  328.15  * 1013.52  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    0.04  *    4.82  *    1.38  *
* Max Chl Dpth (ft)      *   33.73  * Hydr. Depth (ft)       *    0.03  *   21.99  *    5.98  *
* Conv. Total (cfs)      *3419358.0  * Conv. (cfs)           *     4.1  *3073769.0  *345584.9  *
* Length Wtd. (ft)       *  476.43  * Wetted Per. (ft)       *   33.15  *  335.19  *  472.39  *
* Min Ch El (ft)         *  717.75  * Shear (lb/sq ft)       *    0.00  *    0.17  *    0.05  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    0.00  *    0.83  *    0.07  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   91.96  * 3617.69  *  371.02  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.48  *  183.27  *  111.63  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.969

INPUT
Description: Expanded Section u/s of 23rd St.

COE
             Riverstation=36333.24
Preliminary Model
             Riverstation=4540.935

Reach lengths have been increased by
             5.66, 46.54 and 95.08 to account for the distance between the
             assumed and the actual location of the 23rd St. bridge face
             sections.
Station Elevation Data    num=     268
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
       0  785.85   14.38  785.19   26.76  784.14   41.59  782.84   55.57  781.79
   56.12  781.76   72.67  780.16   91.28     778   98.48  777.29   99.77  777.21
  101.37  777.04  103.54  776.96  106.67  776.72  127.71  776.13  128.09  776.13
  204.31  772.24  207.54     772  207.73  771.99  210.53  771.73  210.89  771.72
  213.85  771.52  219.19  771.34  248.54  770.98  250.14  770.92  253.33  770.89
  254.47  770.81  256.22  770.77  257.17  770.72  270.94  769.71   271.5  769.64
  274.48  769.41  283.71  768.46  287.48  768.16  287.81  768.12   289.6     768
  313.56     768  321.98  766.49  323.64  766.42   325.8  766.17  326.24  766.15
   328.5     766  354.42     766  360.26  764.69  362.75   764.6  363.59   764.5
  366.86  764.39  369.57  764.39  370.47  764.37  373.75  764.43  374.56  764.42
   377.8   764.5  378.75  764.48  381.55  764.53   382.7  764.48  384.85  764.47
  385.86  764.42  389.58  764.32  390.17  764.29  392.63  764.24  392.94  764.22
  396.21  764.21  396.65  764.23  399.97  764.29  415.94  765.28  420.16  765.57
  421.39  765.62  422.32   765.7  425.93  765.63  426.88  765.69   433.5  765.62
  434.57  765.68  438.74  765.66  439.66   765.7  444.03  765.69  444.75  765.72
  449.31  765.71  449.85  765.73  454.71  765.71  455.63  765.76   460.9  765.73
  461.48  765.77  466.77  765.74  467.38  765.77   472.3  765.75  472.82  765.77
   477.2  765.76  477.76  765.78  482.58  765.77  482.85  765.78  489.19  765.76
  492.09  765.82   504.3  765.76  505.63  765.72  515.04  765.69   517.1  765.63
  530.78  765.58  533.62  765.51  533.81  765.51  533.93   765.5  534.12   765.5
  566.51  764.88  584.06  764.94  592.38  764.78  594.51  764.85  621.04  764.84
  627.77  764.68  638.45     764  654.39     764     660  763.59  661.38   763.5
  666.17  763.09  683.19     762  732.52  760.72  750.78     760  776.82     758
  858.77  757.36  1126.3  755.23 1192.29  755.65 1246.16  755.51 1250.31  755.57
 1297.66  754.73 1414.31     752 1430.46     752 1437.47     750 1470.77     740
 1476.92     738  1484.7     736 1500.92     734 1512.88     732 1519.28  730.26
 1549.33     722  1549.5  721.99 1574.08     720 1585.34  717.39 1607.34  717.39
 1629.34  717.39 1640.59     720  1651.2     722 1666.59     724 1676.67  727.52
 1678.16     728 1691.44     732 1707.97     734 1721.57     736 1746.23     742
 1783.56     744 1784.34     744  1882.9  745.55 1883.31  745.55 1906.17     746
 1977.89     750 2002.57  750.42 2049.63     752 2080.19     754 2094.35     758
 2186.67  758.61 2315.45     758 2320.54   757.4 2330.35     756 2338.18     754
 2506.92  752.45 2786.66     752 2988.56  750.08 3001.23     750 3061.57     748
 3095.24     748 3111.03     750 3182.16     750 3190.09     752 3217.47     752
 3230.56     748 3237.14     748 3241.97     750 3370.32   751.7 3445.05     754
 3460.97     754 3474.81  753.29  3486.6  753.17 3545.55  753.43 3546.26  753.41
 3547.92   753.5 3548.33  753.49 3554.29  753.79  3554.5  753.79 3558.23     754
 3592.92     754 3627.15  755.43 3630.71  755.58 3631.69  755.57 3632.71  755.62
 3634.53  755.61 3647.64     756 3742.82     756 3746.55  755.39  3753.4     754
 3761.47  750.14 3761.75     750 3765.62     748  3770.4  746.06 3770.54     746
 3775.89     744 3776.05  743.93 3781.12     742 3785.82     740 3791.94     740
 3810.34     746 3829.18  753.93 3829.34     754 3833.98  755.93 3834.13     756
  3838.9     758 3842.99  759.88 3879.39     778 3927.22     778 3945.17     784
 3968.68     784 4000.18     782 4020.77     782 4031.99   781.7 4033.38  781.73
 4039.28  781.67 4040.84  781.59 4041.56  781.58 4067.86     780 4085.63     778
 4094.68     774 4109.58     768 4182.54     768 4183.28  767.68 4207.32     756
  4221.6     750 4231.41     750 4243.09  750.66  4243.8  750.67 4251.61   751.1
 4259.57  751.15 4280.24  751.85 4330.04     752 4351.42     753  4417.1  754.11
 4417.31  754.12 4445.52  754.53  4522.2  755.16 4541.16  755.02 4629.93  754.94
 4630.87  754.91 4631.69  754.94 4635.56   754.9 4639.25  755.01 4641.78  754.99
 4642.89  755.03  4646.8  755.01 4648.67  755.03 4661.96     756 4662.63     756
 4684.76  754.74 4703.27  754.39 4744.69     754 4773.51     754 4777.93     752
 4792.74     752 4801.65     754 4801.77  754.06 4805.86  755.91 4806.07     756
 4831.46  767.31 4833.08     768 4838.27     770

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05     660     .04 1430.46    .027 1746.23     .04 2988.56     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1430.46 1746.23          64.325 517.825   599.2             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       0     624     764        F
     624    1250   757.8        F
    2050    2919     753        F
    2919    4000     770        F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
    2892    2955     780    3237    3433     780    4000    4825     780

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
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```
* E.G. Elev (ft)         *  737.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.55  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  726.69  * Flow Area (sq ft)      *          * 2954.15  *          *
* E.G. Slope (ft/ft)     *0.000235  * Area (sq ft)           *          * 2954.15  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)         *  249.28  * Top Width (ft)         *          *  249.28  *          *
* Vel Total (ft/s)       *    4.33  * Avg. Vel. (ft/s)       *          *    4.33  *          *
* Max Chl Dpth (ft)      *   20.16  * Hydr. Depth (ft)       *          *   11.85  *          *
* Conv. Total (cfs)      *834958.4  * Conv. (cfs)            *          *834958.4  *          *
* Length Wtd. (ft)       *  517.83  * Wetted Per. (ft)       *          *  253.82  *          *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.74  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *          * 1652.00  *    0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  137.82  *    0.15  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  742.11  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  729.22  * Flow Area (sq ft)      *          * 4166.04  *    0.10  *
* E.G. Slope (ft/ft)     *0.000227  * Area (sq ft)           *          * 4166.04  *   25.00  *
* Q Total (cfs)          *20500.00  * Flow (cfs)             *          *20499.99  *    0.01  *
* Top Width (ft)         *  302.00  * Top Width (ft)         *          *  282.47  *   19.53  *
* Vel Total (ft/s)       *    4.92  * Avg. Vel. (ft/s)       *          *    4.92  *    0.08  *
* Max Chl Dpth (ft)      *   24.72  * Hydr. Depth (ft)       *          *   14.75  *    0.05  *
* Conv. Total (cfs)      *1360440.0  * Conv. (cfs)           *          *1360440.0  *     0.5  *
* Length Wtd. (ft)       *  517.83  * Wetted Per. (ft)       *          *  288.23  *    1.97  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *          *    0.20  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.01  *    0.00  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    1.51  * 2252.83  *    7.69  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  155.94  *    8.95  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  745.77  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  731.04  * Flow Area (sq ft)      *          * 5224.29  *  204.57  *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *          * 5224.29  *  332.16  *
* Q Total (cfs)          *27100.00  * Flow (cfs)             *          *26968.33  *  131.67  *
* Top Width (ft)         *  481.57  * Top Width (ft)         *          *  294.68  *  186.89  *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)       *          *    5.16  *    0.64  *
* Max Chl Dpth (ft)      *   28.38  * Hydr. Depth (ft)       *          *   17.73  *    1.38  *
* Conv. Total (cfs)      *1936872.0  * Conv. (cfs)           *          *1927462.0  *  9410.4  *
* Length Wtd. (ft)       *  518.06  * Wetted Per. (ft)       *          *  300.98  *  148.46  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *          *    0.21  *    0.02  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *          *    1.10  *    0.01  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   15.75  * 2770.24  *   65.77  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.30  *  168.73  *   32.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  749.42  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  732.94  * Flow Area (sq ft)      *          * 6322.67  *  892.50  *
* E.G. Slope (ft/ft)     *0.000168  * Area (sq ft)           *          * 6322.67  * 1292.20  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *33411.63  * 1088.37  *
* Top Width (ft)         *  682.80  * Top Width (ft)         *          *  306.84  *  375.96  *
* Vel Total (ft/s)       *    4.78  * Avg. Vel. (ft/s)       *          *    5.28  *    1.22  *
```

```
* Max Chl Dpth (ft)      *   32.03  * Hydr. Depth (ft)       *          *   20.61  *    4.03  *
* Conv. Total (cfs)      *2661128.0  * Conv. (cfs)            *          *2577178.0  * 83950.5  *
* Length Wtd. (ft)       *  519.52  * Wetted Per. (ft)       *          *  313.68  *  221.51  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *          *    0.21  *    0.04  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *          *    1.12  *    0.05  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   54.76  * 3278.16  *  216.13  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.18  *  176.77  *   72.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  754.99  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  735.47  * Flow Area (sq ft)      *  239.94  * 8068.84  * 3979.29  *
* E.G. Slope (ft/ft)     *0.000114  * Area (sq ft)           *  239.94  * 8068.84  * 6384.07  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  131.36  *40445.83  * 4922.81  *
* Top Width (ft)         * 1907.33  * Top Width (ft)         *  147.53  *  315.77  * 1444.03  *
* Vel Total (ft/s)       *    3.70  * Avg. Vel. (ft/s)       *    0.55  *    5.01  *    1.24  *
* Max Chl Dpth (ft)      *   37.60  * Hydr. Depth (ft)       *    1.63  *   25.55  *    4.45  *
* Conv. Total (cfs)      *4269224.0  * Conv. (cfs)            * 12325.0  *3794996.0  *461902.9  *
* Length Wtd. (ft)       *  524.20  * Wetted Per. (ft)       *  147.56  *  322.97  *  899.71  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *    0.01  *    0.18  *    0.03  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    0.01  *    0.89  *    0.04  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  253.11  * 4042.31  *  790.99  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  112.37  *  182.76  *  186.84  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  757.53  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  737.04  * Flow Area (sq ft)      *  688.88  * 8871.24  * 6281.70  *
* E.G. Slope (ft/ft)     *0.000102  * Area (sq ft)           * 1272.72  * 8871.24  *10307.81  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  629.86  *44793.99  * 8976.14  *
* Top Width (ft)         * 2515.36  * Top Width (ft)         *  593.76  *  315.77  * 1605.83  *
* Vel Total (ft/s)       *    3.43  * Avg. Vel. (ft/s)       *    0.91  *    5.05  *    1.43  *
* Max Chl Dpth (ft)      *   40.14  * Hydr. Depth (ft)       *    3.82  *   28.09  *    6.84  *
* Conv. Total (cfs)      *5397741.0  * Conv. (cfs)            * 62497.2  *4444603.0  *890641.3  *
* Length Wtd. (ft)       *  525.77  * Wetted Per. (ft)       *  180.50  *  322.97  *  926.72  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *    0.02  *    0.17  *    0.04  *
* Alpha                  *    1.81  * Stream Power (lb/ft s) *    0.02  *    0.88  *    0.06  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  636.88  * 4530.39  * 1357.70  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  177.94  *  184.89  *  290.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  759.14  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  738.35  * Flow Area (sq ft)      * 2314.67  * 9377.31  * 7945.84  *
* E.G. Slope (ft/ft)     *0.000105  * Area (sq ft)           * 2314.67  * 9377.31  *13075.55  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2019.36  *50025.60  *10955.04  *
* Top Width (ft)         * 2820.33  * Top Width (ft)         *  668.42  *  315.77  * 1836.14  *
* Vel Total (ft/s)       *    3.21  * Avg. Vel. (ft/s)       *    0.87  *    5.33  *    1.38  *
* Max Chl Dpth (ft)      *   41.75  * Hydr. Depth (ft)       *    3.46  *   29.70  *    6.93  *
* Conv. Total (cfs)      *6139570.0  * Conv. (cfs)            *196793.3  *4875170.0  *1067607.0  *
* Length Wtd. (ft)       *  517.35  * Wetted Per. (ft)       *  668.51  *  322.97  * 1155.14  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *    0.02  *    0.19  *    0.05  *
* Alpha                  *    2.23  * Stream Power (lb/ft s) *    0.02  *    1.02  *    0.06  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  946.96  * 4831.74  * 1918.36  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  205.79  *  185.10  *  450.63  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  762.21  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  761.90  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  740.20  * Flow Area (sq ft)      * 4244.71  *10250.69  *11114.89  *
* E.G. Slope (ft/ft)     *0.000089  * Area (sq ft)           * 4244.71  *10250.69  *18162.06  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4764.13  *53494.79  *17641.08  *
* Top Width (ft)         * 2901.04  * Top Width (ft)         *  743.45  *  315.77  * 1841.82  *
* Vel Total (ft/s)       *    2.96  * Avg. Vel. (ft/s)       *    1.12  *    5.22  *    1.59  *
* Max Chl Dpth (ft)      *   44.51  * Hydr. Depth (ft)       *    5.71  *   32.46  *    9.70  *
* Conv. Total (cfs)      *8023761.0  * Conv. (cfs)           *503639.4  *5655197.0  *1864925.0  *
* Length Wtd. (ft)       *  504.95  * Wetted Per. (ft)       *  743.61  *  322.97  * 1157.91  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *    0.03  *    0.18  *    0.05  *
* Alpha                  *    2.26  * Stream Power (lb/ft s) *    0.04  *    0.93  *    0.09  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   * 1574.38  * 5312.38  * 3226.76  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  249.58  *  185.51  *  634.04  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  751.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  751.31  * Reach Len. (ft)        *   64.33  *  517.83  *  599.20  *
* Crit W.S. (ft)         *  733.97  * Flow Area (sq ft)      *          * 6907.75  * 1365.70  *
* E.G. Slope (ft/ft)     *0.000157  * Area (sq ft)           *          * 6907.75  * 2259.76  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *36885.54  * 1814.46  *
* Top Width (ft)         *  942.78  * Top Width (ft)         *          *  313.36  *  629.43  *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)       *          *    5.34  *    1.33  *
* Max Chl Dpth (ft)      *   33.92  * Hydr. Depth (ft)       *          *   22.04  *    4.83  *
* Conv. Total (cfs)      *3089350.0  * Conv. (cfs)           *          *2944505.0  *144844.8  *
* Length Wtd. (ft)       *  520.37  * Wetted Per. (ft)       *          *  320.46  *  283.10  *
* Min Ch El (ft)         *  717.39  * Shear (lb/sq ft)       *          *    0.21  *    0.05  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *          *    1.13  *    0.06  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   91.95  * 3538.47  *  348.92  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.46  *  179.67  *  105.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.871

INPUT
Description: u/s Face of 23rd St.

COE Riverstation=36804.53
Preliminary
             Model Riverstation=4069.637

This section was cut beyond the
             influence of the roadway embankment, but the face sections are
             being modeled as if they were one foot from the bridge face.  The
             remaining distance between the cross sections is being added to
             the reach lengths of the adjacent sections, so that the true
             length of the river is modeled.
Station Elevation Data    num=     389
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     790     .31  789.95     .95  789.77    1.43  789.75    4.72  788.92
    7.53  788.88    9.71  788.64   13.55  788.58   14.78  788.47   18.92  788.41
```

19.16	788.38	32.19	788	32.74	787.88	34.63	787.55	36.98	787.49
41.6	787.03	44.43	786.98	45.71	786.86	47.08	786.84	47.96	786.74
48.37	786.74	49.07	786.64	53.02	786.6	53.84	786.52	56.53	786.47
57.2	786.4	60.94	786.31	61.34	786.28	66.28	786.13	66.39	786.12
70.18	786	74.22	785.5	77.17	785.43	80.74	785.11	81.47	785.01
86.48	784.93	88.82	784.66	92.87	784.59	93.79	784.51	99.43	784.31
100.04	784.26	106.01	784	109.38	783.47	111.44	783.41	114.5	783.02
119.03	782.91	121.16	782.68	126.94	782.55	128.2	782.44	133.46	782.3
134.3	782.23	141.22	782	145.08	781.47	146.72	781.43	149.05	781.17
151.1	781.13	152.95	780.93	155.11	780.87	156.38	780.72	158.93	780.67
159.82	780.56	163.44	780.49	164.08	780.42	168.44	780.32	168.85	780.28
177.52	780	181.77	779.5	183.99	779.43	189.42	778.91	192.09	778.86
192.77	778.78	194.36	778.75	194.89	778.68	198.13	778.63	198.8	778.55
201.6	778.49	202.37	778.41	206.06	778.31	206.66	778.25	214.16	778
217.97	777.53	220.94	777.45	226	777.01	226.37	776.96	231.79	776.85
232.26	776.81	233.88	776.6	238.12	776.53	238.89	776.46	243.72	776.31
244.27	776.26	250.93	776	252.52	775.79	253.21	775.76	258.07	775.21
262.18	775.03	264.49	774.76	272.41	774.46	274.25	774.27	283.03	774.05
283.16	774.04	284.86	774	290	773.62	290.16	773.6	290.47	773.54
291.49	773.49	293.73	773.13	296.04	773.02	298.77	772.62	305.56	772.4
306.43	772.3	311.32	772	313.73	772	317.12	771.49	318.67	771.47
321	771.21	323.46	771.19	324.72	771.06	344.85	770	363.03	768.33
371.87	767.97	386.15	767.66	414.45	766	419.06	766	426.71	765.51
493.86	762.49	511.93	762	541.15	760.15	553.7	760	556.84	759.79
574.18	759.33	575.71	759.34	607.81	758	712.97	757.44	814.88	756.43
848.8	756.6	912.44	756	1084.93	755.94	1205.18	756.16	1225.55	756.45
1226.93	756.57	1247.55	756.88	1302.41	756.6	1369.97	755.21	1397.47	754.96
1406.79	755.12	1416.07	755.69	1419.34	755.7	1423.64	755.46	1438.86	754.01
1441.61	753.57	1442.93	753.16	1444.83	752.71	1446.69	752	1449.04	750.38
1449.53	750	1451.82	748	1451.92	747.98	1463.59	746	1492.89	735.81
1502.59	732	1520	726	1525.17	724	1531.14	722	1539.61	720
1554.79	717.02	1576.79	717.02	1598.79	717.02	1613.96	720	1635.47	722
1639.06	722	1642.73	722.47	1644	722.56	1644.34	722.6	1646.29	722.91
1650.81	724	1661.85	728	1669.43	730.52	1669.6	730.56	1671.18	731.05
1671.51	731.1	1672.11	731.28	1674.04	731.45	1674.31	731.52	1675.77	732
1681.43	732	1682.64	732.1	1688.32	732.34	1689.4	732.52	1693.63	732.74
1694.5	732.92	1696.97	733.05	1697.87	733.26	1699.19	733.31	1700.22	733.52
1700.81	733.54	1702.07	733.82	1702.19	733.82	1704.04	734.33	1704.72	734.6
1706.26	735.11	1708.5	736	1708.76	736.09	1713.69	738	1714.92	738.35
1729.03	744	1740.31	744	1768.05	745.12	1783.77	746	1798.02	746
1801.94	746.39	1802.49	746.42	1805.57	746.75	1809.09	746.84	1811.57	747.12
1815.44	747.2	1816.7	747.41	1828.91	747.57	1834.61	748	1861.81	748
1864.59	748.31	1865.63	748.31	1868.32	748.64	1870.42	748.64	1872.62	748.94
1876.82	748.94	1878.66	749.19	1886.35	749.2	1905.84	750	2047.5	750.06
2086.04	752	2425.59	752	2482.84	750.34	2525.37	750	2530.26	748.96
2539.29	746	2540.28	746	2548.48	748	2595.91	748	2609.06	746.79
2626.35	747.07	2633.97	748	2645.19	750	2698.53	750	2704.85	748
2711.93	748	2718.68	749.99	2820.2	751.99	3019.36	754	3060.86	754
3111.98	753.18	3136.45	752.6	3170.48	752.55	3175.36	752.71	3180.63	752.67
3181.32	752.72	3183.33	752.66	3183.92	752.69	3188.27	752.57	3201.98	752.53
3203.55	752.67	3206.05	752.69	3207.52	752.88	3209.42	752.93	3212.37	753.41
3213.28	753.46	3216.04	754	3227.13	757.56	3264.33	772	3266.13	772.55
3266.65	772.58	3267.44	772.58	3270.24	773.1	3272.31	773.08	3273.55	773.25
3276.15	773.21	3277.29	773.33	3279.82	773.29	3280.89	773.39	3282.9	773.34
3283.94	773.43	3295.4	773.5	3319.66	772	3336.39	766	3342.71	764
3362.17	756	3373.01	752	3374.14	751.72	3382.59	750.16	3383.7	750
3388.97	749.52	3390.43	749.48	3394.6	749.16	3405.58	748.83	3406.94	748.88
3409.95	748.8	3412.7	748.93	3415.89	748.79	3416.9	748.85	3417.72	748.81
3419.69	748.98	3420.25	748.97	3421.69	749.18	3422.11	749.19	3424.64	749.65
3424.8	749.66	3424.93	749.68	3426.48	750	3438.38	753.8	3450.82	758.28
3457.35	760.85	3477.97	769.92	3478.14	770	3482.81	772	3521.28	772
3535.72	768	3538.43	768	3563.39	778	3594.88	792	3607.91	792
3631.86	791.05	3650.16	790	3682.12	790	3716.29	788	3737.29	786
3782.7	766	3792.07	764	3793.67	764	3810.7	766	3853.94	766
3864.8	765.15	3872.86	764.4	3873.36	764.38	3886.78	762	3893.56	762
3899.3	762.77	3899.98	762.81	3903.57	763.24	3904.45	763.24	3909.83	763.5
3928.71	763.25	3954.06	762.45	3976.47	762.4	4006.99	762.91	4044.77	764
4056.38	764.03	4056.6	764.05	4077.52	764.08	4087.78	764.35	4095.22	764
4149.48	764	4210.03	762.56	4223.11	762	4238.22	761.96	4262.1	761.35
4291.64	760.86	4305.28	760.97	4360.41	760.17	4417.49	756.92	4427.5	756.58
4429.19	756.46	4429.47	756.46	4436.62	756	4446.79	756	4467.09	754.29
4468.34	754.3	4470.6	754.18	4476.45	754	4537.87	754	4559.33	756
4584.79	756	4584.93	755.97	4585.19	755.94	4594.74	754.51	4599.83	754
4606.85	752	4617.22	752	4622.85	753.12	4626.42	754	4629.79	755.17
4635.73	757.67	4638.54	758.98	4640.5	760	4641.9	760.57	4644.63	762
4713.17	764	4719.72	764.81	4727.25	766	4732.41	769.11		

```
Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .05 1419.34    .027 1729.03     .04 2530.26     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1419.34 1729.03               54      54      54             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0     457     764       F
     457    1437   757.6       F
 1783.17 2406.79     768       F
 2406.79    3100     753       F
    3100    3600     770       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
    2718    3100     780    3382    3434     780    3700    4750     770

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  737.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.42  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  726.27  * Flow Area (sq ft)      *          * 2899.77  *          *
* E.G. Slope (ft/ft)     *0.000219  * Area (sq ft)           *          * 2899.77  *          *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  223.94  * Top Width (ft)         *          *  223.94  *          *
* Vel Total (ft/s)       *    4.41  * Avg. Vel. (ft/s)       *          *    4.41  *          *
* Max Chl Dpth (ft)      *   20.40  * Hydr. Depth (ft)       *          *   12.95  *          *
* Conv. Total (cfs)      *864941.5  * Conv. (cfs)             *          *864941.5  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  229.81  *          *
* Min Ch El (ft)         *  717.02  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.76  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *          * 1617.20  *    0.18  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *  135.01  *    0.15  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  742.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.95  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  728.82  * Flow Area (sq ft)      *          * 3969.40  *          *
* E.G. Slope (ft/ft)     *0.000228  * Area (sq ft)           *          * 3969.40  *          *
* Q Total (cfs)          *20500.00  * Flow (cfs)              *          *20500.00  *          *
* Top Width (ft)         *  248.65  * Top Width (ft)         *          *  248.65  *          *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)       *          *    5.16  *          *
* Max Chl Dpth (ft)      *   24.93  * Hydr. Depth (ft)       *          *   15.96  *          *
* Conv. Total (cfs)      *1357862.0  * Conv. (cfs)            *          *1357862.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  256.14  *          *
* Min Ch El (ft)         *  717.02  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.14  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    1.51  * 2204.47  *    7.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  152.78  *    8.81  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. Elev (ft)         *  746.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  745.60  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  730.68  * Flow Area (sq ft)      *          * 4911.10  *   49.03  *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           *          * 4911.10  *   49.03  *
* Q Total (cfs)          *27100.00  * Flow (cfs)              *          *27072.94  *   27.06  *
* Top Width (ft)         *  311.92  * Top Width (ft)         *          *  264.29  *   47.62  *
* Vel Total (ft/s)       *    5.46  * Avg. Vel. (ft/s)       *          *    5.51  *    0.55  *
* Max Chl Dpth (ft)      *   28.58  * Hydr. Depth (ft)       *          *   18.58  *    1.03  *
* Conv. Total (cfs)      *1858402.0  * Conv. (cfs)            *          *1856546.0  *  1856.0  *
```

```
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  272.79  *   47.66  *
* Min Ch El (ft)         *  717.02  * Shear (lb/sq ft)       *          *    0.24  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *          *    1.32  *    0.01  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   15.75  * 2709.99  *   63.14  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    9.30  *  165.41  *   31.19  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  749.23  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  732.82  * Flow Area (sq ft)      *          * 5900.06  *  244.07  *
* E.G. Slope (ft/ft)     *0.000197  * Area (sq ft)           *          * 5900.06  *  600.77  *
* Q Total (cfs)          *34500.00  * Flow (cfs)             *          *34152.75  *  347.25  *
* Top Width (ft)         *  563.52  * Top Width (ft)         *          *  278.61  *  284.91  *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *          *    5.79  *    1.42  *
* Max Chl Dpth (ft)      *   32.21  * Hydr. Depth (ft)       *          *   21.18  *    4.51  *
* Conv. Total (cfs)      *2456866.0  * Conv. (cfs)            *          *2432137.0  * 24729.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  287.81  *   54.19  *
* Min Ch El (ft)         *  717.02  * Shear (lb/sq ft)       *          *    0.25  *    0.06  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *          *    1.46  *    0.08  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   54.76  * 3205.51  *  203.11  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   25.18  *  173.29  *   67.64  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *   0.045  *
* W.S. Elev (ft)         *  754.79  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.08  * Flow Area (sq ft)      *          * 7479.06  * 2216.87  *
* E.G. Slope (ft/ft)     *0.000148  * Area (sq ft)           *          * 7480.96  * 5057.93  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *42561.77  * 2938.23  *
* Top Width (ft)         * 1429.48  * Top Width (ft)         *          *  298.34  * 1131.14  *
* Vel Total (ft/s)       *    4.69  * Avg. Vel. (ft/s)       *          *    5.69  *    1.33  *
* Max Chl Dpth (ft)      *   37.77  * Hydr. Depth (ft)       *          *   25.61  *    6.07  *
* Conv. Total (cfs)      *3734873.0  * Conv. (cfs)            *          *3493688.0  *241185.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  302.44  *  372.10  *
* Min Ch El (ft)         *  717.02  * Shear (lb/sq ft)       *          *    0.23  *    0.06  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *          *    1.30  *    0.07  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  252.93  * 3949.88  *  712.29  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  112.26  *  179.11  *  169.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.027  *   0.045  *
* W.S. Elev (ft)         *  757.27  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.64  * Flow Area (sq ft)      *          * 8204.27  * 3124.15  *
* E.G. Slope (ft/ft)     *0.000146  * Area (sq ft)           *  751.68  * 8244.26  * 7893.23  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *49248.19  * 5151.81  *
* Top Width (ft)         * 2151.23  * Top Width (ft)         *  689.40  *  309.69  * 1152.15  *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)       *          *    6.00  *    1.65  *
* Max Chl Dpth (ft)      *   40.25  * Hydr. Depth (ft)       *          *   28.09  *    8.55  *
* Conv. Total (cfs)      *4502782.0  * Conv. (cfs)            *          *4076358.0  *426424.1  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  302.44  *  374.58  *
* Min Ch El (ft)         *  717.02  * Shear (lb/sq ft)       *          *    0.25  *    0.08  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *          *    1.48  *    0.13  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  635.38  * 4428.66  * 1232.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  177.00  *  181.17  *  271.94  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	759.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.050	0.027	0.045
W.S. Elev (ft)	758.88	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	738.06	Flow Area (sq ft)	2015.89	8741.70	3711.00
E.G. Slope (ft/ft)	0.000156	Area (sq ft)	2015.89	8741.70	9754.10
Q Total (cfs)	63000.00	Flow (cfs)	1350.93	54555.63	7093.45
Top Width (ft)	2306.92	Top Width (ft)	832.56	309.69	1164.67
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)	0.67	6.24	1.91
Max Chl Dpth (ft)	41.86	Hydr. Depth (ft)	2.42	28.23	10.16
Conv. Total (cfs)	5037414.0	Conv. (cfs)	108018.6	4362211.0	567185.1
Length Wtd. (ft)	1.00	Wetted Per. (ft)	832.64	320.17	376.19
Min Ch El (ft)	717.02	Shear (lb/sq ft)	0.02	0.27	0.10
Alpha	1.80	Stream Power (lb/ft s)	0.02	1.66	0.18
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	943.77	4724.05	1761.34
C & E Loss (ft)	0.01	Cum SA (acres)	204.68	181.38	429.99

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	762.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.050	0.027	0.045
W.S. Elev (ft)	761.61	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	740.01	Flow Area (sq ft)	4397.87	9587.51	4708.82
E.G. Slope (ft/ft)	0.000145	Area (sq ft)	4397.87	9587.51	12963.05
Q Total (cfs)	75900.00	Flow (cfs)	4526.03	61251.55	10122.42
Top Width (ft)	2396.01	Top Width (ft)	901.24	309.69	1185.08
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	1.03	6.39	2.15
Max Chl Dpth (ft)	44.59	Hydr. Depth (ft)	4.88	30.96	12.89
Conv. Total (cfs)	6304943.0	Conv. (cfs)	375972.9	5088110.0	840860.4
Length Wtd. (ft)	1.00	Wetted Per. (ft)	901.38	320.17	378.92
Min Ch El (ft)	717.02	Shear (lb/sq ft)	0.04	0.27	0.11
Alpha	2.04	Stream Power (lb/ft s)	0.05	1.73	0.24
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1568.00	5194.46	3012.69
C & E Loss (ft)	0.01	Cum SA (acres)	248.36	181.79	613.22

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	751.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	751.10	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	733.77	Flow Area (sq ft)		6423.12	345.30
E.G. Slope (ft/ft)	0.000187	Area (sq ft)		6423.12	1451.10
Q Total (cfs)	38700.00	Flow (cfs)		38096.32	603.68
Top Width (ft)	885.78	Top Width (ft)		281.03	604.75
Vel Total (ft/s)	5.72	Avg. Vel. (ft/s)		5.93	1.75
Max Chl Dpth (ft)	34.08	Hydr. Depth (ft)		22.86	6.38
Conv. Total (cfs)	2826439.0	Conv. (cfs)		2782349.0	44089.7
Length Wtd. (ft)	1.00	Wetted Per. (ft)		290.87	54.19
Min Ch El (ft)	717.02	Shear (lb/sq ft)		0.26	0.07
Alpha	1.06	Stream Power (lb/ft s)		1.53	0.13
Frctn Loss (ft)		Cum Volume (acre-ft)	91.95	3459.24	323.40
C & E Loss (ft)		Cum SA (acres)	42.46	176.14	97.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 5.866

INPUT
Description: 23rd ST Bridge
COE River Station=36878.07
Preliminary Model
River Station=4005

Distance from Upstream XS = 1
Deck/Roadway Width = 52
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 45

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1	791	700	100	785.5	700	200	780	700
300	774.5	700	400	768	700	500	763	700
600	759.5	700	700	758	700	800	757.5	700
900	757	700	1000	757	700	1100	757.2	700
1200	757.5	700	1300	759	700	1438.43	762.55	756.23
1529.54	766.62	758.69	1621.41	768.5	760.5	1713.27	769.57	761.48
1782.17	769.81	761.81	1782.17	769.81	700	2407.79	780.83	700
2407.79	780.83	772.15	2522.62	784.27	776.41	2637.45	786.46	777.56
2752.28	787.39	778.38	2862.52	787.13	778.22	2977.35	785.65	776.74
3098.74	781.34	774.44	3100	781	700	3200	778.5	700
3300	776.5	700	3400	775	700	3500	773	700
3600	772	700	3700	770	700	3800	768	700
3900	767	700	4000	765.5	700	4100	764.5	700
4200	764	700	4300	764	700	4400	764	700
4500	764	700	4600	764	700	4700	763	700

Upstream Bridge Cross Section Data
Station Elevation Data num= 389

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	790	.31	789.95	.95	789.77	1.43	789.75	4.72	788.92
7.53	788.88	9.71	788.64	13.55	788.58	14.78	788.47	18.92	788.41
19.16	788.38	32.19	788	32.74	787.88	34.63	787.55	36.98	787.49
41.6	787.03	44.43	786.98	45.71	786.86	47.08	786.84	47.96	786.74
48.37	786.74	49.07	786.64	53.02	786.6	53.84	786.52	56.53	786.47
57.2	786.4	60.94	786.31	61.34	786.28	66.28	786.13	66.39	786.12
70.18	786	74.22	785.5	77.17	785.43	80.74	785.11	81.47	785.01
86.48	784.93	88.82	784.66	92.87	784.59	93.79	784.51	99.43	784.31
100.04	784.26	106.01	784	109.38	783.47	111.44	783.41	114.5	783.02
119.03	782.91	121.16	782.68	126.94	782.55	128.2	782.44	133.46	782.3
134.3	782.23	141.22	782	145.08	781.47	146.72	781.43	149.05	781.17
151.1	781.13	152.95	780.93	155.11	780.87	156.38	780.72	158.93	780.67
159.82	780.56	163.44	780.49	164.08	780.42	168.44	780.32	168.85	780.28
177.52	780	181.77	779.5	183.99	779.43	189.42	778.91	192.09	778.86
192.77	778.78	194.36	778.75	194.89	778.68	198.13	778.63	198.8	778.55
201.6	778.49	202.37	778.41	206.06	778.31	206.66	778.25	214.16	778
217.97	777.53	220.94	777.45	226	777.01	226.37	776.96	231.79	776.85
232.26	776.81	233.88	776.6	238.12	776.53	238.89	776.46	243.72	776.31
244.27	776.26	250.93	776	252.52	775.79	253.21	775.76	258.07	775.21
262.18	775.03	264.49	774.76	272.41	774.46	274.25	774.27	283.03	774.05
283.16	774.04	284.86	774	290	773.62	290.16	773.6	290.47	773.54
291.49	773.49	293.73	773.13	296.04	773.02	298.77	772.62	305.56	772.4
306.43	772.3	311.32	772	313.73	772	317.12	771.49	318.67	771.47
321	771.21	323.46	771.19	324.72	771.06	344.85	770	363.03	768.33
371.87	767.97	386.15	767.66	414.45	766	419.06	766	426.71	765.51
493.86	762.49	511.93	762	541.15	760.15	553.7	760	556.84	759.79
574.18	759.33	575.71	759.34	607.81	758	712.97	757.44	814.88	756.43
848.8	756.6	912.44	756	1084.93	755.94	1205.18	756.16	1225.55	756.45
1226.93	756.57	1247.55	756.88	1302.41	756.6	1369.97	755.21	1397.47	754.96
1406.79	755.12	1416.07	755.69	1419.34	755.7	1423.64	755.46	1438.86	754.01
1441.61	753.57	1442.93	753.16	1444.83	752.71	1446.69	752	1449.04	750.38
1449.53	750	1451.82	748	1451.92	747.98	1463.59	746	1492.89	735.81
1502.59	732	1520	726	1525.17	724	1531.14	722	1539.61	720
1554.79	717.02	1576.79	717.02	1598.79	717.02	1613.96	720	1635.47	722
1639.06	722	1642.73	722.47	1644	722.56	1644.34	722.6	1646.29	722.91
1650.81	724	1661.85	728	1669.43	730.52	1669.6	730.56	1671.18	731.05
1671.51	731.1	1672.11	731.28	1674.04	731.45	1674.31	731.52	1675.77	732
1681.43	732	1682.64	732.1	1688.32	732.34	1689.4	732.52	1693.63	732.74

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  1694.5  732.92 1696.97  733.05 1697.87  733.26 1699.19  733.31 1700.22  733.52
 1700.81  733.54 1702.07  733.82 1702.19  733.82 1704.04  734.33 1704.72   734.6
 1706.26  735.11  1708.5     736 1708.76  736.09 1713.69     738 1714.92  738.35
 1729.03     744 1740.31     744 1768.05  745.12 1783.77     746 1798.02     746
 1801.94  746.39 1802.49  746.42 1805.57  746.75 1809.09  746.84 1811.57  747.12
 1815.44   747.2  1816.7  747.41 1828.91  747.57 1834.61     748 1861.81     748
 1864.59  748.31 1865.63  748.31 1868.32  748.64 1870.42  748.64 1872.62  748.94
 1876.82  748.94 1878.66  749.19 1886.35   749.2 1905.84     750  2047.5  750.06
 2086.04     752 2425.59     752 2482.84  750.34 2525.37     750 2530.26  748.96
 2539.29     746 2540.28     746 2548.48     748 2595.91     748 2609.06  746.79
 2626.35  747.07 2633.97     748 2645.19     750 2698.53     750 2704.85     748
 2711.93     748 2718.68  749.99  2820.2  751.99 3019.36     754 3060.86     754
 3111.98  753.18 3136.45   752.6 3170.48  752.55 3175.36  752.71 3180.63  752.67
 3181.32  752.72 3183.33  752.66 3183.92  752.69 3188.27  752.57 3201.98  752.53
 3203.55  752.67 3206.05  752.69 3207.52  752.88 3209.42  752.93 3212.37  753.41
 3213.28  753.46 3216.04     754 3227.13  757.56 3264.33     772 3266.13  772.55
 3266.65  772.58 3267.44  772.58 3270.24   773.1 3272.31  773.08 3273.55  773.25
 3276.15  773.21 3277.29  773.33 3279.82  773.29 3280.89  773.39  3282.9  773.34
 3283.94  773.43  3295.4   773.5 3319.66     772 3336.39     766 3342.71     764
 3362.17     756 3373.01     752 3374.14  751.72 3382.59  750.16  3383.7     750
 3388.97  749.52 3390.43  749.48  3394.6  749.16 3405.58  748.83 3406.94  748.88
 3409.95   748.8  3412.7  748.93 3415.89  748.79  3416.9  748.85 3417.72  748.81
 3419.69  748.98 3420.25  748.97 3421.69  749.18 3422.11  749.19 3424.64  749.65
  3424.8  749.66 3424.93  749.68 3426.48     750 3438.38   753.8 3450.82  758.28
 3457.35  760.85 3477.97  769.92 3478.14     770 3482.81     772 3521.28     772
 3535.72     768 3538.43     768 3563.39     778 3594.88     792 3607.91     792
 3631.86  791.05 3650.16     790 3682.12     790 3716.29     788 3737.29     786
  3782.7     766 3792.07     764 3793.67     764  3810.7     766 3853.94     766
  3864.8  765.15 3872.86   764.4 3873.36  764.38 3886.78     762 3893.56     762
  3899.3  762.77 3899.98  762.81 3903.57  763.24 3904.45  763.24 3909.83   763.5
 3928.71  763.25 3954.06  762.45 3976.47   762.4 4006.99  762.91 4044.77     764
 4056.38  764.03  4056.6  764.05 4077.52  764.08 4087.78  764.35 4095.22     764
 4149.48     764 4210.03  762.56 4223.11     762 4238.22  761.96  4262.1  761.35
 4291.64  760.86 4305.28  760.97 4360.41  760.17 4417.49  756.92  4427.5  756.58
 4429.19  756.46 4429.47  756.46 4436.62     756 4446.79     756 4467.09  754.29
 4468.34   754.3  4470.6  754.18 4476.45     754 4537.87     754 4559.33     756
 4584.79     756 4584.93  755.97 4585.19  755.94 4594.74  754.51 4599.83     754
 4606.85     752 4617.22     752 4622.85  753.12 4626.42     754 4629.79  755.17
 4635.73  757.67 4638.54  758.98  4640.5     760  4641.9  760.57 4644.63     762
 4713.17     764 4719.72  764.81 4727.25     766 4732.41  769.11

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .05 1419.34    .027 1729.03     .04 2530.26     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1419.34 1729.03           .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0     457     764        F
     457    1437   757.6        F
 1783.17 2406.79     768        F
 2406.79    3100     753        F
    3100    3600     770        F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
    2718    3100     780    3382    3434     780    3700    4750     770

Downstream  Deck/Roadway Coordinates
    num=      47
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       1     791     700     100   785.5     700     200     780     700
     300   774.5     700     400     768     700     500     763     700
     600   759.5     700     700     758     700     800   757.5     700
     900     757     700    1000     757     700    1100   757.2     700
    1200   757.5     700    1300     759     700 1443.61  762.55  756.23
 1534.72  766.62  758.69 1626.59   768.5   760.5 1718.45  769.57  761.48
 1787.35  769.81  761.81 1787.35  769.81     700 2461.47  780.83     700
 2461.47  780.83  772.15  2576.3  784.27  776.41 2691.13  786.46  777.56
 2805.96  787.39  778.38  2916.2  787.13  778.22 3031.03  785.65  776.74
 3152.42  781.34  774.44    3153     781     700    3250     777     700
    3350     775     700    3450   774.5     700    3550     772     700
    3650     771     700    3750     770     700    3850     768     700
```

3950	766.5	700	4050	765.5	700	4150	764	700
4250	764	700	4350	764	700	4450	764	700
4550	764	700	4650	764	700	4750	763.5	700
4850	764	700	4970.63	765	700			

Downstream Bridge Cross Section Data
Station Elevation Data num= 391

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	789.91	7.25	789.46	41.22	788	41.62	788	52.33	786.94
75.83	786	78.85	785.58	80.41	785.45	83.96	784.92	86.38	784.76
87.79	784.55	90.62	784.4	91.09	784.33	93.08	784.28	93.45	784.23
95.71	784.19	95.97	784.16	98.47	784.12	98.63	784.1	105.53	784
110.24	783.55	112.52	783.45	114.95	783.13	116.07	782.91	116.61	782.76
123.57	782.58	125.29	782.35	133.03	782.22	133.83	782.13	138.79	782.08
138.89	782.07	144.26	782	145.43	781.87	146.77	781.62	147.64	781.34
149.97	781.23	152.23	780.8	153.74	780.59	158.51	780.47	159.07	780.41
163.61	780.31	164.25	780.24	167.28	780.19	167.49	780.16	171.09	780.11
171.25	780.1	176.84	780	181.36	779.49	184.28	779.35	189.9	778.62
197.96	778.39	199.16	778.24	207.78	778.06	207.91	778.05	210.89	778
220.11	777.4	221.22	777.25	224.31	777.08	227.05	776.64	232.75	776.42
234	776.25	239.86	776.1	240.02	776.09	244.05	776	256.26	775.27
257.37	775.15	258.13	775.02	261.59	774.86	264.06	774.47	268.14	774.36
268.61	774.3	271.56	774.22	271.82	774.19	274	774.15	274.16	774.13
276.66	774.1	276.77	774.09	283.39	774	289.11	773.61	290.14	773.59
292.93	773.27	294.32	773.25	296.13	773.01	297.41	772.99	298.54	772.84
299.68	772.83	300.82	772.7	302.02	772.69	302.6	772.63	304.11	772.61
304.32	772.59	306.64	772.53	306.8	772.51	309.9	772.44	310.52	772.37
317.71	772	321.99	772	322.13	771.96	326.15	770.44	327.53	770
329.07	770	330.39	769.83	342.77	769.54	351.02	769.15	364.49	768.88
364.59	768.87	369.12	768.82	369.77	768.77	373.06	768.72	374.27	768.63
389.8	768	391.28	768	394	767.65	394.55	767.64	399.19	767.2
427.3	766	428.34	766	428.6	765.97	437.17	765.31	438.92	765.29
464.28	764	470.79	764	505.53	762.05	505.64	762.04	506.56	762
511.09	762	541.82	761.18	560.83	760.38	576.89	760	588.77	760
634.86	758	648.64	758	656.41	757.58	700.53	756.83	724.65	758
794.01	757.31	837.54	757.44	868.08	756.44	919.66	756	1140.76	756
1145.05	756.19	1177.96	756.2	1233.49	756.71	1264.64	756.83	1286.34	757.05
1310.86	756.77	1312.25	756.71	1328.04	756.97	1329.13	757.04	1333.57	757.03
1335.05	757.1	1338.41	757.05	1340.28	757.11	1370.13	757.1	1388.73	757.27
1412.66	757.8	1413.41	757.78	1417.09	757.87	1417.44	757.84	1419.63	757.88
1419.79	757.86	1434.88	757.47	1435.32	757.44	1435.99	757.35	1438.48	757.24
1439.74	757	1441.09	756.87	1443.56	756.3	1443.89	756.24	1446.88	755.51
1452.02	753.66	1452.19	753.59	1452.31	753.53	1454.24	752.45	1454.79	752.18
1455.06	752	1457.75	750.37	1458.3	750	1461.62	748	1473.77	746
1496.02	736	1519.11	726	1526.57	724	1548.36	720	1559.97	716.9
1581.97	716.9	1603.97	716.9	1615.58	720	1636.86	722	1663.53	730
1671.73	731.85	1672.71	732	1694.94	734	1700.96	736	1701.15	736.05
1709.74	738	1710.37	738.17	1718.55	739.71	1722.68	740	1728.09	739.99
1728.27	740	1746.82	740	1752.49	740.21	1752.74	740.21	1777.13	742
1795.31	742	1809.45	742.82	1836.04	743.07	1851.73	742.98	1875.99	743.28
1895.71	743.07	1924.67	743.22	1935.94	743.54	1996.74	744.16	2031.85	744.94
2038.17	745.22	2047.32	746	2073.21	747.73	2083.56	748.34	2101.15	748.8
2163.48	749.02	2231.92	749.48	2248.16	749.26	2251.34	749.09	2255.49	749.1
2259.52	748.89	2309.97	747.91	2370.19	747.73	2398.76	747.42	2399.97	747.35
2462.45	746.33	2463.04	746.29	2467.01	746.33	2468.11	746.28	2485.4	746.41
2491.07	746.66	2492.7	746.81	2495.03	746.9	2497.15	747.15	2498.62	747.22
2502.96	748	2533.37	748	2540.66	746	2547.16	744	2547.32	743.91
2550.97	742.23	2551.56	742	2553.29	740.96	2555.6	740	2556.08	739.71
2557.78	738.74	2559.31	738	2559.55	737.87	2559.72	737.8	2563.86	736.02
2572.91	736	2585.95	736	2586.04	736.41	2586.11	736.78	2586.35	738
2586.57	739.01	2586.79	740	2587.22	741.77	2587.27	742	2587.33	742.14
2588.06	744	2599.64	750	2635.14	750	2647.86	746	2658.64	746
2663.82	748	2672.38	749.93	2672.63	750	2683.77	750.82	2843.13	751.79
2905.62	752	3105.07	752	3177.82	754	3203.81	754	3247.01	753.63
3283.77	753.64	3321.1	754	3407.23	754	3467.61	756	3504.24	758
3519.86	764	3524.57	766	3546.22	776	3597.87	776	3620.92	774
3630.81	774	3645.75	780	3650.33	782.39	3668.75	791.13	3675.37	794
3706.6	794	3738.01	792	3761.45	792	3812.13	790	3812.75	789.95
3864.81	788	3874.97	786	3875.11	785.79	3876.23	784	3877.53	782
3878.32	780.84	3880.01	778.59	3882.06	776.01	3883.98	774	3884.37	773.72
3887.06	772	3890.68	772	3896.53	770.96	3924.38	771.67	3932.12	772
3932.44	772.14	3932.58	772.21	3936.49	773.95	3936.62	774	3937.46	774.96
3938.42	776	3940.13	778	3943.3	782	3944.75	784	3974.06	784.68
4076.01	784.93	4107.19	784.51	4224.03	784	4225.85	783.79	4239.22	783.49
4239.83	783.5	4270.24	783.18	4281.19	782.86	4382.96	782.15	4386.02	782

```
 4400.42     782 4401.87  781.29 4406.07  781.12 4410.68   780.4 4420.45  780.24
 4421.09  780.17 4424.46     780 4435.06     780 4439.35  779.59 4440.79   779.4
 4441.33   779.3 4442.05  779.22  4442.5   779.1 4443.91  778.93 4444.32  778.77
 4444.72  778.53 4448.44  778.24  4448.8  778.13 4451.31     778 4461.71  776.56
 4462.73  776.34 4479.11  774.58 4482.75  774.31 4483.06  774.27 4497.79  773.18
 4517.92  771.01  4527.3  769.77 4564.35  766.46 4633.12  761.78 4669.85  760.08
 4669.98  760.07 4699.02  759.68 4706.46  759.72 4706.69  759.71 4722.15  759.82
 4722.78   759.8 4730.85  759.83 4731.19  759.82 4738.34     760 4752.57     760
 4773.43  760.86 4792.92     762 4824.94     762  4845.6     760 4870.68     758
 4888.49     756 4895.29     754 4920.11     754 4924.01     756 4928.38   757.9
 4928.64     758 4931.61  758.95 4931.76  758.99 4932.24  759.16  4955.7     766
 4970.63     770

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .05 1434.88    .027 1722.68     .04 2572.91     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1434.88 1722.68            .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0     475     764       F
     475    1442   757.6       F
 1788.35 2460.47     768       F
 2460.47    3153     753       F
    3153    3600     780       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
    2718    3153     780    3430    3490     780    3700    4950     770

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  4

Abutment Data
Upstream     num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1438.43  756.23 1438.44  755.23 1442.18  755.23 1490.79  730.92 1519.79  721.26
 1542.79  720.96 1554.79  716.93
Downstream     num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1443.61  756.23 1443.62  755.23 1447.36  755.23 1495.97  730.92 1524.97  721.26
 1547.97  720.96 1559.97  716.93

Abutment Data
Upstream     num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1598.79  716.93 1610.79  720.93 1633.79  721.26 1662.79  730.93 1692.79  733.93
 1716.93     746 1748.15     746 1777.77  760.81 1782.16  760.81 1782.17  761.81
Downstream     num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 1603.97  716.93 1615.97  720.93 1638.97  721.26 1667.97  730.93 1697.97  733.93
 1722.11     746 1753.33     746 1782.95  760.81 1787.34  760.81 1787.35  761.81

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
 2407.79  772.15 2456.03  748.03
Downstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
 2461.47  772.15 2509.71  748.03
```

```
Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
 3049.86     750 3098.74  774.44
Downstream     num=       2
     Sta    Elev     Sta    Elev
*********************************
 3103.54     750 3152.42  774.44

Number of Piers =  8

Pier Data
Pier Station     Upstream= 1529.54    Downstream= 1534.72
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     710       4  758.69
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     710       4  758.69

Pier Data
Pier Station     Upstream= 1621.41    Downstream= 1626.59
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     715       4   760.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     715       4   760.5

Pier Data
Pier Station     Upstream= 1713.27    Downstream= 1718.45
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     715       4  761.48
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       4     715       4  761.48

Pier Data
Pier Station     Upstream= 2522.62    Downstream=  2576.3
Upstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
    3.94  744.26    3.94  756.72     3.5  756.73     3.5  769.65    3.94  769.66
    3.94  772.15
Downstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
    3.94  744.26    3.94  756.72     3.5  756.73     3.5  769.65    3.94  769.66
    3.94  772.15

Pier Data
Pier Station     Upstream= 2637.45    Downstream= 2691.13
Upstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
    3.94  742.29    3.94  759.01     3.5  759.02     3.5  771.93    3.94  771.94
    3.94  777.56
Downstream     num=       6
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
    3.94  742.29    3.94  759.01     3.5  759.02     3.5  771.93    3.94  771.94
    3.94  777.56

Pier Data
Pier Station     Upstream= 2752.28    Downstream= 2805.96
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
```

```
     3.5  751.15     3.5  772.95    3.94  772.96    3.94  778.38
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
     3.5  751.15     3.5  772.95    3.94  772.96    3.94  778.38

Pier Data
Pier Station     Upstream= 2862.52    Downstream=  2916.2
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
     3.5  750.66     3.5   772.7    3.94  772.71    3.94  778.22
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
     3.5  750.66     3.5   772.7    3.94  772.71    3.94  778.22

Pier Data
Pier Station     Upstream= 2977.35    Downstream= 3031.03
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
     3.5  749.02     3.5  771.06    3.94  771.07    3.94  776.74
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
     3.5  749.02     3.5  771.06    3.94  771.07    3.94  776.74

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =      .5
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =  761.81

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     737.72  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     737.42  * E.G. Elev (ft)         *     737.72  *     737.70  *
* Q Total (cfs)          *   12800.00  * W.S. Elev (ft)         *     737.34  *     737.32  *
* Q Bridge (cfs)         *   12800.00  * Crit W.S. (ft)         *     726.88  *     726.92  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      20.32  *      20.42  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.95  *       4.95  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2585.88  *    2587.24  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   22700.70  *   22722.85  *
* Min El Weir Flow (ft)  *     757.61  * Hydr Depth (ft)        *      12.73  *      12.70  *
* Min El Prs (ft)        *     761.81  * W.P. Total (ft)        *     271.46  *     271.91  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *   639505.4  *   639362.4  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *     203.10  *     225.07  *
* BR Open Area (sq ft)   *   15245.27  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       4.95  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.24  *       0.24  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.18  *       1.18  *
*********************************************************************************************

Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based solution.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	742.36	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	741.95	E.G. Elev (ft)	742.35	742.33
Q Total (cfs)	20500.00	W.S. Elev (ft)	741.83	741.81
Q Bridge (cfs)	20500.00	Crit W.S. (ft)	729.63	729.62
Q Weir (cfs)		Max Chl Dpth (ft)	24.81	24.91
Weir Sta Lft (ft)		Vel Total (ft/s)	5.78	5.78
Weir Sta Rgt (ft)		Flow Area (sq ft)	3548.06	3544.65
Weir Submerg		Froude # Chl	0.26	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	38160.55	38178.49
Min El Weir Flow (ft)	757.61	Hydr Depth (ft)	15.77	15.92
Min El Prs (ft)	761.81	W.P. Total (ft)	313.17	310.88
Delta EG (ft)	0.05	Conv. Total (cfs)	984980.8	988238.4
Delta WS (ft)	0.09	Top Width (ft)	225.01	254.03
BR Open Area (sq ft)	15245.27	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	5.78	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.31	0.31
Br Sel Method	Energy only	Power Total (lb/ft s)	1.77	1.77

Warning: The Yarnell method gave an invalid answer. The upstream energy was less than the downstream energy. The program defaulted to the next valid (user selected) method. If the Yarnell method was the only one selected, the program will default to an energy based solution.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	746.07	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	745.60	E.G. Elev (ft)	746.15	746.16
Q Total (cfs)	27100.00	W.S. Elev (ft)	745.57	745.57
Q Bridge (cfs)	27100.00	Crit W.S. (ft)	731.70	731.57
Q Weir (cfs)		Max Chl Dpth (ft)	28.55	28.67
Weir Sta Lft (ft)		Vel Total (ft/s)	6.13	6.15
Weir Sta Rgt (ft)		Flow Area (sq ft)	4418.01	4406.73
Weir Submerg		Froude # Chl	0.25	0.48
Weir Max Depth (ft)		Specif Force (cu ft)	54524.05	54620.40
Min El Weir Flow (ft)	757.61	Hydr Depth (ft)	18.47	18.79
Min El Prs (ft)	761.81	W.P. Total (ft)	346.21	341.85
Delta EG (ft)	0.01	Conv. Total (cfs)	1327757.0	1333317.0
Delta WS (ft)	0.03	Top Width (ft)	239.25	279.62
BR Open Area (sq ft)	15245.27	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.15	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.33	0.33
Br Sel Method	Yarnell	Power Total (lb/ft s)	2.04	2.04

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	749.74	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	749.23	E.G. Elev (ft)	749.83	749.84
Q Total (cfs)	34500.00	W.S. Elev (ft)	749.19	749.19
Q Bridge (cfs)	34500.00	Crit W.S. (ft)	733.83	733.74
Q Weir (cfs)		Max Chl Dpth (ft)	32.17	32.29
Weir Sta Lft (ft)		Vel Total (ft/s)	6.36	6.39
Weir Sta Rgt (ft)		Flow Area (sq ft)	5420.60	5400.53
Weir Submerg		Froude # Chl	0.42	0.38
Weir Max Depth (ft)		Specif Force (cu ft)	74020.70	74092.20
Min El Weir Flow (ft)	757.61	Hydr Depth (ft)	18.80	18.75
Min El Prs (ft)	761.81	W.P. Total (ft)	418.56	418.58
Delta EG (ft)	0.02	Conv. Total (cfs)	1685444.0	1691806.0
Delta WS (ft)	0.03	Top Width (ft)	410.77	406.26
BR Open Area (sq ft)	15245.27	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.39	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.34	0.33
Br Sel Method	Yarnell	Power Total (lb/ft s)	2.16	2.14

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*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     755.26  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     754.79  * E.G. Elev (ft)         *     755.33  *     755.30  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     754.77  *     754.77  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     736.01  *     736.06  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      37.75  *      37.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.29  *       5.23  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8599.63  *    8704.26  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  114830.80  *  118577.00  *
* Min El Weir Flow (ft)  *     757.61  * Hydr Depth (ft)        *      14.84  *      16.62  *
* Min El Prs (ft)        *     761.81  * W.P. Total (ft)        *     775.90  *     752.51  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  2521913.0  *  2569852.0  *
* Delta WS (ft)          *       0.02  * Top Width (ft)         *     581.76  *     523.82  *
* BR Open Area (sq ft)   *   15245.27  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.29  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.23  *       0.23  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.19  *       1.18  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     757.78  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     757.27  * E.G. Elev (ft)         *     757.77  *     757.75  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     757.18  *     757.17  *
* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     737.72  *     737.70  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.16  *      40.27  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.44  *       5.46  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10000.67  *    9966.59  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  139164.90  *  142974.40  *
* Min El Weir Flow (ft)  *     757.61  * Hydr Depth (ft)        *      17.93  *      19.76  *
* Min El Prs (ft)        *     761.81  * W.P. Total (ft)        *     857.74  *     830.02  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  2815322.0  *  2854492.0  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     557.63  *     504.27  *
* BR Open Area (sq ft)   *   15245.27  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       5.46  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.27  *       0.27  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.48  *       1.49  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     759.41  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     758.88  * E.G. Elev (ft)         *     759.40  *     759.37  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     758.76  *     758.74  *
* Q Bridge (cfs)         *   62389.00  * Crit W.S. (ft)         *     739.19  *     739.15  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.74  *      41.84  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.41  *       5.48  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11644.68  *   11503.60  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  158199.70  *  161829.10  *
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* Min El Weir Flow (ft)  *     757.61  * Hydr Depth (ft)        *      10.19  *      10.58  *
* Min El Prs (ft)        *     761.81  * W.P. Total (ft)        *    1581.42  *    1544.09  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  2891762.0  *  2930010.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *    1142.94  *    1087.48  *
* BR Open Area (sq ft)   *   15245.27  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       5.82  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.22  *       0.22  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.18  *       1.18  *
*********************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     762.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     761.61  * E.G. Elev (ft)         *     762.13  *     762.09  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     761.54  *     761.50  *
* Q Bridge (cfs)         *   70829.41  * Crit W.S. (ft)         *     741.21  *     741.18  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      44.52  *      44.60  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.07  *       5.18  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   14981.99  *   14663.11  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  196950.60  *  199803.20  *
* Min El Weir Flow (ft)  *     757.61  * Hydr Depth (ft)        *      12.54  *      12.73  *
* Min El Prs (ft)        *     761.81  * W.P. Total (ft)        *    2033.71  *    1990.59  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  2942037.0  *  2956009.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *    1195.17  *    1151.74  *
* BR Open Area (sq ft)   *   15245.27  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       6.01  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.31  *       0.30  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.55  *       1.57  *
*********************************************************************************************

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Warning: The pressure flow/weir calculations did not converge within the given number of iterations.
Warning: The sluice gate calculations did not converge during the pressure flow only calculation.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The water surface computed by the sluice gate equation (during pressure only calculations) is
         below the physical low chord of the bridge.
Note:    The downstream water surface is below the minimum elevation for pressure flow.  The sluice
         gate equations were used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     751.63  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     751.10  * E.G. Elev (ft)         *     751.73  *     751.74  *
* Q Total (cfs)          *   38700.00  * W.S. Elev (ft)         *     751.06  *     751.06  *
* Q Bridge (cfs)         *   38700.00  * Crit W.S. (ft)         *     734.73  *     734.68  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      34.04  *      34.16  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.49  *       6.51  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5966.47  *    5945.37  *
* Weir Submerg           *             * Froude # Chl           *       0.38  *       0.35  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   85665.58  *   85710.36  *
* Min El Weir Flow (ft)  *     757.61  * Hydr Depth (ft)        *      20.17  *      20.16  *
* Min El Prs (ft)        *     761.81  * W.P. Total (ft)        *     438.13  *     437.54  *
* Delta EG (ft)          *       0.02  * Conv. Total (cfs)      *  1909357.0  *  1910537.0  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     548.00  *     501.33  *
```

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* BR Open Area (sq ft)   *   15245.27  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.51  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.35  *       0.35  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.27  *       2.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.861

INPUT
Description: d/s Face of 23rd St.

COE Riverstation=36951.60
Preliminary
             Model Riverstation=3922.565

Reach lengths have been increased
             by 5.66, 46.54 and 95.08 to account for the distance between the
             assumed and the actual location of the 23rd St. bridge face
             sections.
Station Elevation Data    num=     391
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0  789.91    7.25  789.46   41.22     788   41.62     788   52.33  786.94
   75.83     786   78.85  785.58   80.41  785.45   83.96  784.92   86.38  784.76
   87.79  784.55   90.62   784.4   91.09  784.33   93.08  784.28   93.45  784.23
   95.71  784.19   95.97  784.16   98.47  784.12   98.63   784.1  105.53     784
  110.24  783.55  112.52  783.45  114.95  783.13  116.07  782.91  116.61  782.76
  123.57  782.58  125.29  782.35  133.03  782.22  133.83  782.13  138.79  782.08
  138.89  782.07  144.26     782  145.43  781.87  146.77  781.62  147.64  781.34
  149.97  781.23  152.23   780.8  153.74  780.59  158.51  780.47  159.07  780.41
  163.61  780.31  164.25  780.24  167.28  780.19  167.49  780.16  171.09  780.11
  171.25   780.1  176.84     780  181.36  779.49  184.28  779.35   189.9  778.62
  197.96  778.39  199.16  778.24  207.78  778.06  207.91  778.05  210.89     778
  220.11   777.4  221.22  777.25  224.31  777.08  227.05  776.64  232.75  776.42
     234  776.25  239.86   776.1  240.02  776.09  244.05     776  256.26  775.27
  257.37  775.15  258.13  775.02  261.59  774.86  264.06  774.47  268.14  774.36
  268.61   774.3  271.56  774.22  271.82  774.19     274  774.15  274.16  774.13
  276.66   774.1  276.77  774.09  283.39     774  289.11  773.61  290.14  773.59
  292.93  773.27  294.32  773.25  296.13  773.01  297.41  772.99  298.54  772.84
  299.68  772.83  300.82   772.7  302.02  772.69   302.6  772.63  304.11  772.61
  304.32  772.59  306.64  772.53   306.8  772.51   309.9  772.44  310.52  772.37
  317.71     772  321.99     772  322.13  771.96  326.15  770.44  327.53     770
  329.07     770  330.39  769.83  342.77  769.54  351.02  769.15  364.49  768.88
  364.59  768.87  369.12  768.82  369.77  768.77  373.06  768.72  374.27  768.63
   389.8     768  391.28     768     394  767.65  394.55  767.64  399.19   767.2
   427.3     766  428.34     766   428.6  765.97  437.17  765.31  438.92  765.29
  464.28     764  470.79     764  505.53  762.05  505.64  762.04  506.56     762
  511.09     762  541.82  761.18  560.83  760.38  576.89     760  588.77     760
  634.86     758  648.64     758  656.41  757.58  700.53  756.83  724.65     758
  794.01  757.31  837.54  757.44  868.08  756.44  919.66     756 1140.76     756
 1145.05  756.19 1177.96   756.2 1233.49  756.71 1264.64  756.83 1286.34  757.05
 1310.86  756.77 1312.25  756.71 1328.04  756.97 1329.13  757.04 1333.57  757.03
 1335.05   757.1 1338.41  757.05 1340.28  757.11 1370.13   757.1 1388.73  757.27
 1412.66   757.8 1413.41  757.78 1417.09  757.87 1417.44  757.84 1419.63  757.88
 1419.79  757.86 1434.88  757.47 1435.32  757.44 1435.99  757.35 1438.48  757.24
 1439.74     757 1441.09  756.87 1443.56   756.3 1443.89  756.24 1446.88  755.51
 1452.02  753.66 1452.19  753.59 1452.31  753.53 1454.24  752.45 1454.79  752.18
 1455.06     752 1457.75  750.37  1458.3     750 1461.62     748 1473.77     746
 1496.02     736 1519.11     726 1526.57     724 1548.36     720 1559.97   716.9
 1581.97   716.9 1603.97   716.9 1615.58     720 1636.86     722 1663.53     730
 1671.73  731.85 1672.71     732 1694.94     734 1700.96     736 1701.15  736.05
 1709.74     738 1710.37  738.17 1718.55  739.71 1722.68     740 1728.09  739.99
 1728.27     740 1746.82     740 1752.49  740.21 1752.74  740.21 1777.13     742
 1795.31     742 1809.45  742.82 1836.04  743.07 1851.73  742.98 1875.99  743.28
 1895.71  743.07 1924.67  743.22 1935.94  743.54 1996.74  744.16 2031.85  744.94
 2038.17  745.22 2047.32     746 2073.21  747.73 2083.56  748.34 2101.15   748.8
 2163.48  749.02 2231.92  749.48 2248.16  749.26 2251.34  749.09 2255.49   749.1
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 2259.52  748.89 2309.97  747.91 2370.19  747.73 2398.76  747.42 2399.97  747.35
 2462.45  746.33 2463.04  746.29 2467.01  746.33 2468.11  746.28  2485.4  746.41
 2491.07  746.66  2492.7  746.81 2495.03   746.9 2497.15  747.15 2498.62  747.22
 2502.96     748 2533.37     748 2540.66     746 2547.16     744 2547.32  743.91
 2550.97  742.23 2551.56     742 2553.29  740.96  2555.6     740 2556.08  739.71
 2557.78  738.74 2559.31     738 2559.55  737.87 2559.72   737.8 2563.86  736.02
 2572.91     736 2585.95     736 2586.04  736.41 2586.11  736.78 2586.35     738
 2586.57  739.01 2586.79     740 2587.22  741.77 2587.27     742 2587.33  742.14
 2588.06     744 2599.64     750 2635.14     750 2647.86     746 2658.64     746
 2663.82     748 2672.38  749.93 2672.63     750 2683.77  750.82 2843.13  751.79
 2905.62     752 3105.07     752 3177.82     754 3203.81     754 3247.01  753.63
 3283.77  753.64  3321.1     754 3407.23     754 3467.61     756 3504.24     758
 3519.86     764 3524.57     766 3546.22     776 3597.87     776 3620.92     774
 3630.81     774 3645.75     780 3650.33  782.39 3668.75  791.13 3675.37     794
  3706.6     794 3738.01     792 3761.45     792 3812.13     790 3812.75  789.95
 3864.81     788 3874.97     786 3875.11  785.79 3876.23     784 3877.53     782
 3878.32  780.84 3880.01  778.59 3882.06  776.01 3883.98     774 3884.37  773.72
 3887.06     772 3890.68     772 3896.53  770.96 3924.38  771.67 3932.12     772
 3932.44  772.14 3932.58  772.21 3936.49  773.95 3936.62     774 3937.46  774.96
 3938.42     776 3940.13     778  3943.3     782 3944.75     784 3974.06  784.68
 4076.01  784.93 4107.19  784.51 4224.03     784 4225.85  783.79 4239.22  783.49
 4239.83   783.5 4270.24  783.18 4281.19  782.86 4382.96  782.15 4386.02     782
 4400.42     782 4401.87  781.29 4406.07  781.12 4410.68   780.4 4420.45  780.24
 4421.09  780.17 4424.46     780 4435.06     780 4439.35  779.59 4440.79   779.4
 4441.33   779.3 4442.05  779.22  4442.5   779.1 4443.91  778.93 4444.32  778.77
 4444.72  778.53 4448.44  778.24  4448.8  778.13 4451.31     778 4461.71  776.56
 4462.73  776.34 4479.11  774.58 4482.75  774.31 4483.06  774.27 4497.79  773.18
 4517.92  771.01  4527.3  769.77 4564.35  766.46 4633.12  761.78 4669.85  760.08
 4669.98  760.07 4699.02  759.68 4706.46  759.72 4706.69  759.71 4722.15  759.82
 4722.78   759.8 4730.85  759.83 4731.19  759.82 4738.34     760 4752.57     760
 4773.43  760.86 4792.92     762 4824.94     762  4845.6     760 4870.68     758
 4888.49     756 4895.29     754 4920.11     754 4924.01     756 4928.38   757.9
 4928.64     758 4931.61  758.95 4931.76  758.99 4932.24  759.16  4955.7     766
 4970.63     770

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0     .05 1434.88    .027 1722.68     .04 2572.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1434.88 1722.68           62.345 296.955  454.45             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0     475     764       F
     475    1442   757.6       F
 1788.35 2460.47     768       F
 2460.47    3153     753       F
    3153    3600     780       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
    2718    3153     780    3430    3490     780    3700    4950     770

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  737.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.34  * Reach Len. (ft)        *   62.35  *  296.96  *  454.45  *
* Crit W.S. (ft)         *  726.59  * Flow Area (sq ft)      *          * 2735.81  *          *
* E.G. Slope (ft/ft)     *0.000250  * Area (sq ft)           *          * 2735.81  *   31.79  *
* Q Total (cfs)          *12800.00  * Flow (cfs)              *          *12800.00  *          *
* Top Width (ft)         *  239.25  * Top Width (ft)          *          *  213.81  *   25.44  *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)        *          *    4.68  *          *
* Max Chl Dpth (ft)      *   20.44  * Hydr. Depth (ft)        *          *   12.80  *          *
* Conv. Total (cfs)      *808977.1  * Conv. (cfs)             *          *808977.1  *          *
* Length Wtd. (ft)       *  296.96  * Wetted Per. (ft)        *          *  219.66  *          *
* Min Ch El (ft)         *  716.90  * Shear (lb/sq ft)        *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.91  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *          * 1613.99  *    0.17  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *          *  134.76  *    0.13  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	742.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	741.85	Reach Len. (ft)	62.35	296.96	454.45
Crit W.S. (ft)	729.19	Flow Area (sq ft)		3769.00	73.39
E.G. Slope (ft/ft)	0.000256	Area (sq ft)		3769.00	242.84
Q Total (cfs)	20500.00	Flow (cfs)		20445.42	54.58
Top Width (ft)	327.54	Top Width (ft)		239.68	87.86
Vel Total (ft/s)	5.34	Avg. Vel. (ft/s)		5.42	0.74
Max Chl Dpth (ft)	24.95	Hydr. Depth (ft)		15.73	1.40
Conv. Total (cfs)	1280356.0	Conv. (cfs)		1276946.0	3409.1
Length Wtd. (ft)	297.16	Wetted Per. (ft)		246.75	52.49
Min Ch El (ft)	716.90	Shear (lb/sq ft)		0.24	0.02
Alpha	1.03	Stream Power (lb/ft s)		1.33	0.02
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1.51	2200.07	7.43
C & E Loss (ft)	0.03	Cum SA (acres)	2.36	152.50	8.79

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	746.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	745.57	Reach Len. (ft)	62.35	296.96	454.45
Crit W.S. (ft)	731.09	Flow Area (sq ft)		4675.74	315.80
E.G. Slope (ft/ft)	0.000222	Area (sq ft)		4675.74	1162.78
Q Total (cfs)	27100.00	Flow (cfs)		26602.38	497.62
Top Width (ft)	616.59	Top Width (ft)		247.95	368.64
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)		5.69	1.58
Max Chl Dpth (ft)	28.67	Hydr. Depth (ft)		18.86	4.81
Conv. Total (cfs)	1818896.0	Conv. (cfs)		1785497.0	33399.1
Length Wtd. (ft)	298.40	Wetted Per. (ft)		255.82	65.74
Min Ch El (ft)	716.90	Shear (lb/sq ft)		0.25	0.07
Alpha	1.08	Stream Power (lb/ft s)		1.44	0.10
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	15.75	2704.52	62.96
C & E Loss (ft)	0.02	Cum SA (acres)	9.30	165.11	31.16

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	749.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.027	0.040
W.S. Elev (ft)	749.19	Reach Len. (ft)	62.35	296.96	454.45
Crit W.S. (ft)	733.13	Flow Area (sq ft)		5605.40	553.78
E.G. Slope (ft/ft)	0.000205	Area (sq ft)		5605.40	3178.34
Q Total (cfs)	34500.00	Flow (cfs)		33279.18	1220.82
Top Width (ft)	1109.89	Top Width (ft)		263.04	846.85
Vel Total (ft/s)	5.60	Avg. Vel. (ft/s)		5.94	2.20
Max Chl Dpth (ft)	32.29	Hydr. Depth (ft)		21.31	8.43
Conv. Total (cfs)	2406841.0	Conv. (cfs)		2321672.0	85168.5
Length Wtd. (ft)	299.82	Wetted Per. (ft)		271.50	65.74
Min Ch El (ft)	716.90	Shear (lb/sq ft)		0.26	0.11
Alpha	1.09	Stream Power (lb/ft s)		1.57	0.24
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	54.76	3198.90	202.50
C & E Loss (ft)	0.02	Cum SA (acres)	25.18	172.97	67.45

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	755.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.027	0.042
W.S. Elev (ft)	754.77	Reach Len. (ft)	62.35	296.96	454.45
Crit W.S. (ft)	735.51	Flow Area (sq ft)		7098.72	2996.38

```
* E.G. Slope (ft/ft)     *0.000142  * Area (sq ft)           *          * 7098.72  * 8856.02  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *39874.27  * 5625.73  *
* Top Width (ft)         * 1546.06  * Top Width (ft)         *          *  273.74  * 1272.32  *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)       *          *    5.62  *    1.88  *
* Max Chl Dpth (ft)      *   37.87  * Hydr. Depth (ft)       *          *   25.93  *    9.27  *
* Conv. Total (cfs)      *3814485.0  * Conv. (cfs)            *          *3342853.0  *471631.9  *
* Length Wtd. (ft)       *  311.99  * Wetted Per. (ft)       *          *  283.61  *  338.41  *
* Min Ch El (ft)         *  716.90  * Shear (lb/sq ft)       *          *    0.22  *    0.08  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *          *    1.25  *    0.15  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  252.93  * 3941.46  *  709.86  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  112.26  *  178.78  *  168.76  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.027  *   0.042  *
* W.S. Elev (ft)         *  757.25  * Reach Len. (ft)        *   62.35  *  296.96  *  454.45  *
* Crit W.S. (ft)         *  737.13  * Flow Area (sq ft)      *          * 7786.19  * 3796.32  *
* E.G. Slope (ft/ft)     *0.000145  * Area (sq ft)           *  472.73  * 7787.20  *12005.06  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *46175.49  * 8224.51  *
* Top Width (ft)         * 2132.56  * Top Width (ft)         *  575.50  *  284.32  * 1272.74  *
* Vel Total (ft/s)       *    4.70  * Avg. Vel. (ft/s)       *          *    5.93  *    2.17  *
* Max Chl Dpth (ft)      *   40.35  * Hydr. Depth (ft)       *          *   27.74  *   11.75  *
* Conv. Total (cfs)      *4518094.0  * Conv. (cfs)            *          *3835022.0  *683071.9  *
* Length Wtd. (ft)       *  315.97  * Wetted Per. (ft)       *          *  290.81  *  340.88  *
* Min Ch El (ft)         *  716.90  * Shear (lb/sq ft)       *          *    0.24  *    0.10  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *          *    1.44  *    0.22  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  635.37  * 4419.45  * 1229.17  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  176.98  *  180.87  *  271.55  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.050  *   0.027  *   0.043  *
* W.S. Elev (ft)         *  758.82  * Reach Len. (ft)        *   62.35  *  296.96  *  454.45  *
* Crit W.S. (ft)         *  738.64  * Flow Area (sq ft)      * 1664.50  * 8240.16  * 4305.34  *
* E.G. Slope (ft/ft)     *0.000155  * Area (sq ft)           * 1664.50  * 8240.16  *14026.99  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  988.18  *51633.26  *10378.56  *
* Top Width (ft)         * 2395.42  * Top Width (ft)         *  818.92  *  287.80  * 1288.70  *
* Vel Total (ft/s)       *    4.43  * Avg. Vel. (ft/s)       *    0.59  *    6.27  *    2.41  *
* Max Chl Dpth (ft)      *   41.92  * Hydr. Depth (ft)       *    2.03  *   28.63  *   13.32  *
* Conv. Total (cfs)      *5059792.0  * Conv. (cfs)            * 79365.2  *4146882.0  *833545.0  *
* Length Wtd. (ft)       *  315.74  * Wetted Per. (ft)       *  819.04  *  297.99  *  342.46  *
* Min Ch El (ft)         *  716.90  * Shear (lb/sq ft)       *    0.02  *    0.27  *    0.12  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.01  *    1.68  *    0.29  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  942.76  * 4714.42  * 1757.38  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  203.89  *  181.15  *  429.59  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  762.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *   0.050  *   0.027  *   0.043  *
* W.S. Elev (ft)         *  761.55  * Reach Len. (ft)        *   62.35  *  296.96  *  454.45  *
* Crit W.S. (ft)         *  740.82  * Flow Area (sq ft)      * 4012.42  * 9024.78  * 5186.47  *
* E.G. Slope (ft/ft)     *0.000147  * Area (sq ft)           * 4012.42  * 9024.78  *17549.98  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3891.13  *58432.77  *13576.09  *
* Top Width (ft)         * 2490.38  * Top Width (ft)         *  906.79  *  287.80  * 1295.79  *
* Vel Total (ft/s)       *    4.16  * Avg. Vel. (ft/s)       *    0.97  *    6.47  *    2.62  *
* Max Chl Dpth (ft)      *   44.65  * Hydr. Depth (ft)       *    4.42  *   31.36  *   16.05  *
* Conv. Total (cfs)      *6268185.0  * Conv. (cfs)            *321348.1  *4825658.0  *1121179.0  *
* Length Wtd. (ft)       *  311.46  * Wetted Per. (ft)       *  906.96  *  297.99  *  345.19  *
```

```
* Min Ch El (ft)         *  716.90  * Shear (lb/sq ft)       *    0.04  *    0.28  *    0.14  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.04  *    1.79  *    0.36  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1564.38  * 5184.46  * 3007.62  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  247.30  *  181.78  *  612.81  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  751.62  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  751.06  * Reach Len. (ft)        *   62.35  *  296.96  *  454.45  *
* Crit W.S. (ft)         *  734.16  * Flow Area (sq ft)      *          * 6099.94  *  676.53  *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           *          * 6099.94  * 4925.48  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *37038.03  * 1661.97  *
* Top Width (ft)         * 1261.40  * Top Width (ft)         *          *  266.07  *  995.32  *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)       *          *    6.07  *    2.46  *
* Max Chl Dpth (ft)      *   34.16  * Hydr. Depth (ft)       *          *   22.93  *   10.30  *
* Conv. Total (cfs)      *2768774.0  * Conv. (cfs)            *          *2649869.0  *118905.0  *
* Length Wtd. (ft)       *  300.62  * Wetted Per. (ft)       *          *  275.06  *   65.74  *
* Min Ch El (ft)         *  716.90  * Shear (lb/sq ft)       *          *    0.27  *    0.13  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *          *    1.64  *    0.31  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   91.95  * 3452.03  *  322.29  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   42.46  *  175.81  *   96.69  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.805

INPUT
Description: Expanded Section d/s of 23rd St.

COE
             Riverstation=37202.02
Preliminary Model Riverstation=3672.15
Station Elevation Data    num=     214
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     790   17.19  788.57   22.79     788   39.11     782   41.95  780.92
   44.53     780   49.16     778    53.4     776   57.11  774.33   57.94     774
   60.48  773.14   64.38     772   64.58     772  102.47  770.44  104.13   770.4
  105.62  770.39   108.6  770.29  110.26  770.28  114.08  770.19  114.63  770.19
  121.07  770.05   121.2  770.05  129.86   769.9  130.08  769.89  137.88  769.75
  138.26  769.75  142.91  769.64  143.39  769.64  153.23  769.36  155.59  769.26
  173.02  768.77   192.9  768.51  200.33     768  227.36     768  228.15  767.98
  228.32  767.98  234.93  767.73  264.67  766.72  275.42  766.56  285.65     766
  318.09     766  343.05  765.31  375.14     764  378.93     764  424.68  762.87
  427.96  762.85   428.9  762.83  432.02  762.81  443.41     762  475.69     762
  503.05  760.73  509.44  760.58  514.62  760.36  529.73     760   538.6     760
  545.96  758.77  551.81     758  565.79     758  566.26  758.01  569.16  758.11
   569.4  758.11  578.54  758.35  581.85  758.39  604.41  758.07  604.65  758.06
   606.8     758  651.06     758  652.46  757.92  656.93  757.88   675.3  757.22
  676.39  757.21  680.41  757.09  688.11  757.08  704.63   757.4   704.9  757.41
  720.55  757.56  723.24  757.51  736.92  757.48  747.37     758  780.01   757.9
  846.18     756  848.76     756  851.56  755.53  854.45  755.38  854.94  755.38
  857.14  755.21  857.67  755.23   860.9  754.99  862.57  754.94  863.17  754.98
  866.23  755.13  868.72   755.1  871.97  755.16  877.78  755.11  879.47  755.13
  883.04  755.07  887.06  755.09   890.7  755.03  899.24  755.03  916.78  755.22
  932.64  755.13  945.76  754.95  950.03  754.76  956.78  754.74  960.39  754.58
  968.18  754.58  971.23  754.47  978.65  754.46   983.3  754.36 1015.39   754.3
 1016.02  754.29  1056.7   754.3 1067.42     754 1151.07     754 1160.62  754.49
 1175.49   754.5 1176.16  754.53 1178.98  754.56  1180.3  754.62 1187.82   754.7
 1189.39  754.69 1190.73  754.76 1192.33  754.76 1198.23  755.16 1199.54  755.19
  1206.8     756 1251.98     756 1271.96  755.62 1277.29  755.68 1314.32     754
 1316.66  753.33 1321.52     752    1347     744  1366.2  737.31 1370.13     736
 1371.96  735.58 1379.45     734 1403.17     732  1422.6     726 1430.39     724
 1447.84     722 1453.42     720 1468.52  716.79 1490.52  716.79 1512.52  716.79
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 1527.61     720 1551.78     722 1562.75     726 1574.01     730 1574.52  730.17
 1579.82     732 1597.98     734 1614.39     736 1618.81     738 1621.71  739.25
 1626.27  741.01 1637.67  745.07 1640.38     746 1687.94     750 1835.03  750.53
 1903.82  750.63 1905.52  750.61 2013.44  750.42 2022.61  750.58 2027.34  750.58
 2036.74  750.84 2050.44  751.07 2050.65  751.07 2101.78     752  2149.8  752.12
 2193.96     752 2226.11  750.47 2227.87  750.43  2237.6  750.01 2243.74  750.04
 2429.88     750  2442.4  749.11 2457.84     748 2531.57     748 2589.83     750
 2671.91     750 2722.28     750 2732.69  750.21 2870.66     752 3337.88     752
 3457.42     754 3493.19     754  3551.8  755.44 3582.73     756 3730.76     756
 3738.27  756.35 3765.96     758 3770.25     760 3778.83     764 3803.89   775.5
 3805.01     776 3854.99  776.39 3864.52     776 3894.37     776  3900.6     778
 3905.87     780 3909.42     782 3913.21     784 3921.07  787.92 3921.24     788
 3921.34  788.05 3925.44     790 3929.64  791.86 3929.94     792 3934.65     794
 3936.73     794 3955.78  794.88 3996.93     792 4005.06     792

Manning's n Values         num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05 1314.32    .027 1640.38     .05 1687.94     .15 2243.74     .04
  2442.4     .15 2671.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1314.32 1640.38            84.75  384.94   87.41             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
       0     459     764       F
     820    1251     757       F
    2050    3613     752       F
    3613    3950     778       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     650     748     758    2790    3750     780

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  737.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  737.31  * Reach Len. (ft)        *   84.75  *  384.94  *   87.41  *
* Crit W.S. (ft)          *  726.23  * Flow Area (sq ft)      *          * 2998.76  *          *
* E.G. Slope (ft/ft)      *0.000226  * Area (sq ft)           *          * 2998.76  *          *
* Q Total (cfs)           *12800.00  * Flow (cfs)             *          *12800.00  *          *
* Top Width (ft)          *  251.10  * Top Width (ft)         *          *  251.10  *          *
* Vel Total (ft/s)        *    4.27  * Avg. Vel. (ft/s)       *          *    4.27  *          *
* Max Chl Dpth (ft)       *   20.52  * Hydr. Depth (ft)       *          *   11.94  *          *
* Conv. Total (cfs)       *850715.9  * Conv. (cfs)            *          *850715.9  *          *
* Length Wtd. (ft)        *  384.94  * Wetted Per. (ft)       *          *  256.23  *          *
* Min Ch El (ft)          *  716.79  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.71  *          *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)   *          * 1594.44  *          *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *          *  133.17  *          *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  742.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.37  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  741.84  * Reach Len. (ft)        *   84.75  *  384.94  *   87.41  *
* Crit W.S. (ft)          *  728.73  * Flow Area (sq ft)      *          * 4189.71  *          *
* E.G. Slope (ft/ft)      *0.000217  * Area (sq ft)           *          * 4189.71  *          *
* Q Total (cfs)           *20500.00  * Flow (cfs)             *          *20500.00  *          *
* Top Width (ft)          *  275.40  * Top Width (ft)         *          *  275.40  *          *
* Vel Total (ft/s)        *    4.89  * Avg. Vel. (ft/s)       *          *    4.89  *          *
* Max Chl Dpth (ft)       *   25.05  * Hydr. Depth (ft)       *          *   15.21  *          *
* Conv. Total (cfs)       *1392904.0  * Conv. (cfs)            *          *1392904.0  *          *
* Length Wtd. (ft)        *  384.94  * Wetted Per. (ft)       *          *  282.18  *          *
* Min Ch El (ft)          *  716.79  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.98  *          *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)   *    1.51  * 2172.94  *    6.16  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *    2.36  *  150.75  *    8.33  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	745.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.027	
W.S. Elev (ft)	745.56	Reach Len. (ft)	84.75	384.94	87.41
Crit W.S. (ft)	730.54	Flow Area (sq ft)		5255.23	
E.G. Slope (ft/ft)	0.000197	Area (sq ft)		5255.23	
Q Total (cfs)	27100.00	Flow (cfs)		27100.00	
Top Width (ft)	297.10	Top Width (ft)		297.10	
Vel Total (ft/s)	5.16	Avg. Vel. (ft/s)		5.16	
Max Chl Dpth (ft)	28.77	Hydr. Depth (ft)		17.69	
Conv. Total (cfs)	1928882.0	Conv. (cfs)		1928882.0	
Length Wtd. (ft)	384.94	Wetted Per. (ft)		305.12	
Min Ch El (ft)	716.79	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		1.09	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	15.75	2670.67	56.89
C & E Loss (ft)	0.01	Cum SA (acres)	9.30	163.26	29.24

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	749.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.027	0.050
W.S. Elev (ft)	749.19	Reach Len. (ft)	84.75	384.94	87.41
Crit W.S. (ft)	732.51	Flow Area (sq ft)		6357.20	60.46
E.G. Slope (ft/ft)	0.000179	Area (sq ft)		6357.20	178.56
Q Total (cfs)	34500.00	Flow (cfs)		34467.24	32.76
Top Width (ft)	472.75	Top Width (ft)		309.91	162.84
Vel Total (ft/s)	5.38	Avg. Vel. (ft/s)		5.42	0.54
Max Chl Dpth (ft)	32.40	Hydr. Depth (ft)		20.51	1.59
Conv. Total (cfs)	2576496.0	Conv. (cfs)		2574049.0	2446.7
Length Wtd. (ft)	384.71	Wetted Per. (ft)		318.56	38.05
Min Ch El (ft)	716.79	Shear (lb/sq ft)		0.22	0.02
Alpha	1.02	Stream Power (lb/ft s)		1.21	0.01
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	54.76	3158.13	184.99
C & E Loss (ft)	0.01	Cum SA (acres)	25.18	171.02	62.18

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	755.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.050	0.027	0.082
W.S. Elev (ft)	754.76	Reach Len. (ft)	84.75	384.94	87.41
Crit W.S. (ft)	735.13	Flow Area (sq ft)	6.32	8132.75	5285.41
E.G. Slope (ft/ft)	0.000128	Area (sq ft)	125.86	8132.75	5285.41
Q Total (cfs)	45500.00	Flow (cfs)	1.11	42437.06	3061.83
Top Width (ft)	1732.02	Top Width (ft)	256.34	326.06	1149.62
Vel Total (ft/s)	3.39	Avg. Vel. (ft/s)	0.18	5.22	0.58
Max Chl Dpth (ft)	37.97	Hydr. Depth (ft)	0.38	24.94	4.60
Conv. Total (cfs)	4020129.0	Conv. (cfs)	98.2	3749504.0	270526.5
Length Wtd. (ft)	365.89	Wetted Per. (ft)	16.70	335.41	1153.77
Min Ch El (ft)	716.79	Shear (lb/sq ft)	0.00	0.19	0.04
Alpha	2.21	Stream Power (lb/ft s)	0.00	1.01	0.02
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	252.84	3889.54	636.09
C & E Loss (ft)	0.01	Cum SA (acres)	112.08	176.73	156.13

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	757.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.050	0.027	0.083
W.S. Elev (ft)	757.26	Reach Len. (ft)	84.75	384.94	87.41
Crit W.S. (ft)	736.65	Flow Area (sq ft)	1187.05	8949.73	8165.92

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* E.G. Slope (ft/ft)     *0.000118  * Area (sq ft)           * 1187.05  * 8949.73  * 8166.30  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  671.57  *47817.31  * 5911.12  *
* Top Width (ft)         * 1991.38  * Top Width (ft)         *  512.11  *  326.06  * 1153.21  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    0.57  *    5.34  *    0.72  *
* Max Chl Dpth (ft)      *   40.47  * Hydr. Depth (ft)       *    2.32  *   27.45  *    7.10  *
* Conv. Total (cfs)      *5003513.0  * Conv. (cfs)            * 61768.6  *4398061.0  *543683.2  *
* Length Wtd. (ft)       *  350.41  * Wetted Per. (ft)       *  512.34  *  335.41  * 1156.27  *
* Min Ch El (ft)         *  716.79  * Shear (lb/sq ft)       *    0.02  *    0.20  *    0.05  *
* Alpha                  *    2.85  * Stream Power (lb/ft s) *    0.01  *    1.05  *    0.04  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  634.18  * 4362.40  * 1123.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  176.20  *  178.79  *  258.90  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.050  *   0.027  *   0.083  *
* W.S. Elev (ft)         *  758.85  * Reach Len. (ft)        *   84.75  *  384.94  *   87.41  *
* Crit W.S. (ft)         *  737.94  * Flow Area (sq ft)      * 2214.37  * 9465.91  * 9985.85  *
* E.G. Slope (ft/ft)     *0.000121  * Area (sq ft)           * 2214.37  * 9465.91  *10007.70  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1468.02  *53226.73  * 8305.26  *
* Top Width (ft)         * 2262.27  * Top Width (ft)         *  768.81  *  326.06  * 1167.39  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    0.66  *    5.62  *    0.83  *
* Max Chl Dpth (ft)      *   42.06  * Hydr. Depth (ft)       *    2.88  *   29.03  *    8.69  *
* Conv. Total (cfs)      *5715566.0  * Conv. (cfs)            *133183.3  *4828903.0  *753479.9  *
* Length Wtd. (ft)       *  340.61  * Wetted Per. (ft)       *  769.11  *  335.41  * 1157.86  *
* Min Ch El (ft)         *  716.79  * Shear (lb/sq ft)       *    0.02  *    0.21  *    0.07  *
* Alpha                  *    3.17  * Stream Power (lb/ft s) *    0.01  *    1.20  *    0.05  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  939.98  * 4654.07  * 1632.01  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  202.76  *  179.06  *  416.78  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.050  *   0.027  *   0.084  *
* W.S. Elev (ft)         *  761.59  * Reach Len. (ft)        *   84.75  *  384.94  *   87.41  *
* Crit W.S. (ft)         *  739.72  * Flow Area (sq ft)      * 4395.58  *10361.20  *13142.46  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           * 4395.58  *10361.20  *13221.20  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4189.07  *59265.24  *12445.70  *
* Top Width (ft)         * 2329.18  * Top Width (ft)         *  829.83  *  326.06  * 1173.28  *
* Vel Total (ft/s)       *    2.72  * Avg. Vel. (ft/s)       *    0.95  *    5.72  *    0.95  *
* Max Chl Dpth (ft)      *   44.80  * Hydr. Depth (ft)       *    5.30  *   31.78  *   11.43  *
* Conv. Total (cfs)      *7189573.0  * Conv. (cfs)            *396806.1  *5613857.0  *1178910.0  *
* Length Wtd. (ft)       *  323.19  * Wetted Per. (ft)       *  830.25  *  335.41  * 1160.60  *
* Min Ch El (ft)         *  716.79  * Shear (lb/sq ft)       *    0.04  *    0.21  *    0.08  *
* Alpha                  *    3.48  * Stream Power (lb/ft s) *    0.04  *    1.23  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1558.36  * 5118.38  * 2847.10  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  246.06  *  179.69  *  599.93  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  751.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.027  *   0.065  *
* W.S. Elev (ft)         *  751.06  * Reach Len. (ft)        *   84.75  *  384.94  *   87.41  *
* Crit W.S. (ft)         *  733.70  * Flow Area (sq ft)      *          * 6942.86  *  367.54  *
* E.G. Slope (ft/ft)     *0.000172  * Area (sq ft)           *          * 6942.86  * 1161.77  *
* Q Total (cfs)          *38700.00  * Flow (cfs)             *          *38559.99  *  140.01  *
* Top Width (ft)         * 1301.69  * Top Width (ft)         *          *  315.87  *  985.82  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *          *    5.55  *    0.38  *
* Max Chl Dpth (ft)      *   34.27  * Hydr. Depth (ft)       *          *   21.98  *    0.90  *
* Conv. Total (cfs)      *2953613.0  * Conv. (cfs)            *          *2942927.0  * 10685.9  *
* Length Wtd. (ft)       *  383.85  * Wetted Per. (ft)       *          *  324.81  *  409.69  *
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* Min Ch El (ft)         *  716.79  * Shear (lb/sq ft)       *          *    0.23  *    0.01  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *          *    1.27  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   91.95  * 3407.57  *  290.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.46  *  173.83  *   86.36  *
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Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 5.732

INPUT
Description: COE Riverstation=37586.96
Preliminary Model Riverstation=3287.214
Station Elevation Data num= 300

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	789.62	1.57	788.99	4.5	788	7.91	786.4	8.74	786
9.1	785.82	12.87	784	14.78	783.05	16.93	782	20.09	780.41
20.93	780	22.06	779.51	25.56	778	28.75	776.81	30.85	776
35.16	774.28	35.87	774	36.32	773.82	40.77	772	65.77	770
66.04	770	82.44	769.41	92.64	769.07	103.16	768.66	121.08	768.02
121.19	768.01	121.29	768.01	121.6	768	124.92	768	135.51	767.68
140.96	767.55	152.91	767.34	154.89	767.31	159.04	767.19	161.36	767.15
166.71	767	169.67	766.94	177.74	766.71	180.84	766.64	183.65	766.57
195.69	766.21	196.64	766.19	197.29	766.17	197.79	766.17	198.28	766.16
202.8	766	209.89	765.87	210.03	765.87	232.78	765.52	249.98	765.32
323.54	764.28	325.96	764.25	352.26	763.67	370.52	763.3	382.54	763.1
429.84	762.29	448.34	762	454.58	761.83	466.75	761.47	467.85	761.47
475.83	761.25	477.53	761.26	483.39	761.11	488.24	761.13	490.79	761.13
496.22	761.03	554.88	760.79	558.28	760.8	593.34	760.75	598.48	760.68
606.34	760.61	608.75	760.61	619.07	760.55	619.58	760.55	632.48	760.48
665.83	760	677.34	760	692.02	759.69	783.44	758	812.7	758
814.04	757.96	814.32	757.96	814.54	757.95	823.99	757.62	828.97	757.56
831.69	757.51	834.38	757.47	837.03	757.42	850.11	757.05	853.86	756.99
859.43	756.92	870.61	756.76	902.25	756	920.35	756	954.26	754
956.09	753.71	967.4	752	973.09	750.38	973.57	750.24	976.91	749.25
986.62	746.46	988.31	746	995.55	744	996.04	743.86	1002.09	742
1002.24	741.95	1014.17	738.12	1014.53	738	1015.09	737.82	1020.69	736
1025.65	734.93	1029.76	734	1040.69	732.95	1050.25	732	1062.79	730
1064.58	729.42	1068.93	728	1077.69	725.11	1081.04	724	1083.62	723.34
1089.04	722	1089.15	721.98	1090.33	721.81	1101.44	720.19	1102.68	720
1119.74	716.63	1141.74	716.63	1163.74	716.63	1180.8	720	1207.9	722
1212.11	723.3	1214.39	724	1219.32	725.53	1220.86	726	1222.78	726.6
1227.29	728	1229.98	728.84	1238.3	731.48	1239.92	732	1244.98	732.65
1255.95	734	1265.64	735.49	1269.17	736	1280.56	740	1283.6	741.06
1285.95	741.89	1286.28	742	1291.1	743.69	1291.99	744	1292.04	744.01
1296.38	745.53	1297.71	746	1307.24	747.37	1312.81	748	1358.31	749.44
1383.45	750	1487.33	750	1526.53	751.23	1527.74	751.25	1535.17	751.5
1541.95	751.5	1543.07	751.47	1543.32	751.47	1554.26	751.52	1788.19	751.86
1794.04	751.86	1826.91	751.92	1833.43	751.92	1863.46	752	1950.23	752
1952.37	752.06	1956.2	752	2075.96	752	2128.49	752.63	2149.83	752.84
2156.94	752.89	2159.21	752.9	2160.77	752.91	2163.77	752.92	2164.8	752.92
2166.06	752.91	2171.8	752.92	2173.27	752.91	2174.91	752.91	2176.49	752.9
2177.77	752.9	2210	752.52	2248.12	752	2248.89	752	2288.82	751.83
2306.94	751.76	2316.32	751.47	2322.26	751.47	2355.24	751.37	2470.95	750
2481.99	749.39	2493.81	748.86	2513.31	748	2529.39	748	2552.53	748.53
2563.16	748.75	2586.08	749.3	2611.87	750	2670.47	750	2727.04	750
2736.85	750.3	2742.31	750.49	2761.49	751.11	2769.32	751.35	2770.86	751.39
2776.56	751.57	2777.4	751.57	2778.16	751.61	2808.81	752	2910.41	752
2914.24	751.98	2923.88	751.94	2927.39	751.92	2928.73	751.92	2932.64	751.89
2949.88	751.8	2952.14	751.8	2954.41	751.79	2965.71	751.79	2987.36	752
3245.11	752	3265.15	751.77	3294.46	751.69	3351.78	751.91	3352.96	751.91
3362.76	752	3378.22	752	3507.02	753.2	3513.09	753.24	3572.56	754
3579.42	754	3677.98	755.71	3696.79	756	3763.87	756	3768.7	756.14
3769.79	756.18	3783.46	756.53	3785.71	756.6	3795.59	756.89	3797.4	756.94
3799.81	757	3811.09	757.3	3816.71	757.48	3836.71	758	3837.58	758.11
3837.91	758.17	3840.8	758.66	3847.16	759.71	3848.52	760	3852.48	761.83
3852.87	762	3853.39	762.24	3859.43	764.99	3861.64	766	3864.61	767.45
3865.71	768	3869.3	769.79	3869.73	770	3871.55	770.91	3873.78	772
3874.91	772.55	3877.87	774	3881.99	776	3885.46	777.7	3886.07	778

```
 3888.87  778.69 3890.88   778.7 3893.02     779 3894.39  779.18 3905.81  779.54
 3909.77  779.38 3917.71  779.13 3928.26  778.61 3934.46  778.28 3937.84  778.09
  3938.6  778.06 3939.52     778 3975.08     778 3978.77  779.65 3983.58  781.81
 3988.43     784  3992.2  785.69  3992.9     786 3993.54  786.29 3998.95  788.73
 4004.83  791.41 4006.13     792 4008.08  792.89 4012.08  794.66 4013.69  795.35
 4015.13     796  4020.4     796  4044.1   794.6 4054.48     794  4079.3     792

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .04   967.4    .027 1297.71     .05 1383.45     .15 2288.82     .04
 2493.81     .15 2670.47     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         967.4 1297.71           117.57  266.01   66.37             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       1     443     764       F
    1536    3479     752       F
    3479    4000     780       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2820    3820     780

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  737.50  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.26  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  725.68  * Flow Area (sq ft)      *          * 3135.18  *          *
* E.G. Slope (ft/ft)     *0.000190  * Area (sq ft)           *          * 3135.18  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  255.93  * Top Width (ft)         *          *  255.93  *          *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *          *    3.99  *          *
* Max Chl Dpth (ft)      *   20.63  * Hydr. Depth (ft)       *          *   12.25  *          *
* Conv. Total (cfs)      *905671.3  * Conv. (cfs)            *          *905671.3  *          *
* Length Wtd. (ft)       *  266.01  * Wetted Per. (ft)       *          *  260.70  *          *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)       *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.57  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          * 1567.34  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  130.93  *          *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  742.12  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.81  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  727.97  * Flow Area (sq ft)      *          * 4361.42  *          *
* E.G. Slope (ft/ft)     *0.000177  * Area (sq ft)           *          * 4361.42  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  283.04  * Top Width (ft)         *          *  283.04  *          *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *          *    4.47  *          *
* Max Chl Dpth (ft)      *   25.18  * Hydr. Depth (ft)       *          *   15.41  *          *
* Conv. Total (cfs)      *1464805.0  * Conv. (cfs)            *          *1464805.0  *          *
* Length Wtd. (ft)       *  266.01  * Wetted Per. (ft)       *          *  289.30  *          *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.75  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.51  * 2135.16  *    6.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  148.28  *    8.33  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  745.89  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  745.52  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  729.91  * Flow Area (sq ft)      *          * 5455.86  *          *
* E.G. Slope (ft/ft)     *0.000174  * Area (sq ft)           *          * 5455.86  *          *
```

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* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  306.33  * Top Width (ft)          *          *  306.33  *          *
* Vel Total (ft/s)       *    4.88  * Avg. Vel. (ft/s)        *          *    4.88  *          *
* Max Chl Dpth (ft)      *   28.89  * Hydr. Depth (ft)        *          *   17.81  *          *
* Conv. Total (cfs)      *2015292.0  * Conv. (cfs)             *          *2015292.0  *          *
* Length Wtd. (ft)       *  265.98  * Wetted Per. (ft)        *          *  313.76  *          *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)        *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.92  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)    *   15.75  * 2623.34  *   56.89  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    9.30  *  160.59  *   29.24  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *          *   0.027  *   0.050  *
* W.S. Elev (ft)         *  749.15  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  731.85  * Flow Area (sq ft)      *          * 6594.75  *   52.59  *
* E.G. Slope (ft/ft)     *0.000163  * Area (sq ft)           *          * 6594.75  *  115.37  *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34179.82  *   20.17  *
* Top Width (ft)         *  464.46  * Top Width (ft)          *          *  320.45  *  144.00  *
* Vel Total (ft/s)       *    5.14  * Avg. Vel. (ft/s)        *          *    5.18  *    0.38  *
* Max Chl Dpth (ft)      *   32.52  * Hydr. Depth (ft)        *          *   20.58  *    1.02  *
* Conv. Total (cfs)      *2682585.0  * Conv. (cfs)             *          *2681003.0  *  1582.4  *
* Length Wtd. (ft)       *  265.29  * Wetted Per. (ft)        *          *  328.47  *   51.61  *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)        *          *    0.20  *    0.01  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *    1.06  *    0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)    *   54.76  * 3100.90  *  184.69  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   25.18  *  168.24  *   61.87  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.              *   0.040  *   0.027  *   0.081  *
* W.S. Elev (ft)         *  754.73  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  734.50  * Flow Area (sq ft)      *   27.21  * 8421.98  * 5622.22  *
* E.G. Slope (ft/ft)     *0.000117  * Area (sq ft)           *   27.21  * 8421.98  * 5622.22  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *   11.39  *42735.89  * 2752.72  *
* Top Width (ft)         * 1878.04  * Top Width (ft)          *   25.44  *  330.31  * 1522.29  *
* Vel Total (ft/s)       *    3.23  * Avg. Vel. (ft/s)        *    0.42  *    5.07  *    0.49  *
* Max Chl Dpth (ft)      *   38.10  * Hydr. Depth (ft)        *    1.07  *   25.50  *    3.69  *
* Conv. Total (cfs)      *4203753.0  * Conv. (cfs)             *  1052.4  *3948376.0  *254324.2  *
* Length Wtd. (ft)       *  251.73  * Wetted Per. (ft)        *   25.61  *  338.73  * 1525.33  *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)        *    0.01  *    0.18  *    0.03  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.00  *    0.92  *    0.01  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *  252.69  * 3816.40  *  625.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *  111.80  *  173.83  *  153.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.              *   0.040  *   0.027  *   0.084  *
* W.S. Elev (ft)         *  757.23  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  736.08  * Flow Area (sq ft)      *  187.88  * 9249.75  * 9437.15  *
* E.G. Slope (ft/ft)     *0.000110  * Area (sq ft)           *  187.88  * 9249.75  * 9437.15  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *   96.49  *48361.67  * 5941.83  *
* Top Width (ft)         * 1976.31  * Top Width (ft)          *  123.71  *  330.31  * 1522.29  *
* Vel Total (ft/s)       *    2.88  * Avg. Vel. (ft/s)        *    0.51  *    5.23  *    0.63  *
* Max Chl Dpth (ft)      *   40.60  * Hydr. Depth (ft)        *    1.52  *   28.00  *    6.20  *
* Conv. Total (cfs)      *5192494.0  * Conv. (cfs)             *  9210.4  *4616134.0  *567149.6  *
* Length Wtd. (ft)       *  241.31  * Wetted Per. (ft)        *  123.93  *  338.73  * 1527.84  *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)        *    0.01  *    0.19  *    0.04  *
* Alpha                  *    2.93  * Stream Power (lb/ft s) *    0.01  *    0.98  *    0.03  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *  632.84  * 4281.98  * 1106.29  *
```

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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  175.58  *  175.89  *  256.21  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.040  *   0.027  *   0.085  *
* W.S. Elev (ft)         *  758.81  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  737.37  * Flow Area (sq ft)      *  462.76  * 9771.62  *11842.30  *
* E.G. Slope (ft/ft)     *0.000114  * Area (sq ft)           *  462.76  * 9771.62  *11861.59  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  294.20  *54016.88  * 8688.92  *
* Top Width (ft)         * 2102.18  * Top Width (ft)         *  227.86  *  330.31  * 1544.01  *
* Vel Total (ft/s)       *    2.85  * Avg. Vel. (ft/s)       *    0.64  *    5.53  *    0.73  *
* Max Chl Dpth (ft)      *   42.18  * Hydr. Depth (ft)       *    2.03  *   29.58  *    7.78  *
* Conv. Total (cfs)      *5899530.0  * Conv. (cfs)           * 27549.5  *5058321.0  *813659.5  *
* Length Wtd. (ft)       *  235.13  * Wetted Per. (ft)       *  228.10  *  338.73  * 1529.42  *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)       *    0.01  *    0.21  *    0.06  *
* Alpha                  *    3.23  * Stream Power (lb/ft s) *    0.01  *    1.14  *    0.04  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  937.38  * 4569.07  * 1610.06  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  201.79  *  176.16  *  414.06  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  761.95  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.040  *   0.027  *   0.086  *
* W.S. Elev (ft)         *  761.54  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  739.16  * Flow Area (sq ft)      * 1394.04  *10673.93  *16000.72  *
* E.G. Slope (ft/ft)     *0.000109  * Area (sq ft)           * 1394.04  *10673.93  *16096.63  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1064.34  *61079.03  *13756.63  *
* Top Width (ft)         * 2387.59  * Top Width (ft)         *  503.13  *  330.31  * 1554.15  *
* Vel Total (ft/s)       *    2.70  * Avg. Vel. (ft/s)       *    0.76  *    5.72  *    0.86  *
* Max Chl Dpth (ft)      *   44.91  * Hydr. Depth (ft)       *    2.77  *   32.31  *   10.51  *
* Conv. Total (cfs)      *7282580.0  * Conv. (cfs)           *102122.9  *5860512.0  *1319945.0  *
* Length Wtd. (ft)       *  225.49  * Wetted Per. (ft)       *  503.39  *  338.73  * 1532.15  *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)       *    0.02  *    0.21  *    0.07  *
* Alpha                  *    3.62  * Stream Power (lb/ft s) *    0.01  *    1.22  *    0.06  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1552.73  * 5025.44  * 2817.69  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  244.76  *  176.79  *  597.19  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  751.46  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *         *   0.027  *   0.060  *
* W.S. Elev (ft)         *  751.03  * Reach Len. (ft)        *  117.57  *  266.01  *   66.37  *
* Crit W.S. (ft)         *  732.93  * Flow Area (sq ft)      *          * 7202.41  *  321.61  *
* E.G. Slope (ft/ft)     *0.000155  * Area (sq ft)           *          * 7202.41  *  808.62  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38157.91  *  142.09  *
* Top Width (ft)         *  924.16  * Top Width (ft)         *          *  326.90  *  597.26  *
* Vel Total (ft/s)       *    5.09  * Avg. Vel. (ft/s)       *          *    5.30  *    0.44  *
* Max Chl Dpth (ft)      *   34.40  * Hydr. Depth (ft)       *          *   22.03  *    1.45  *
* Conv. Total (cfs)      *3075069.0  * Conv. (cfs)           *          *3063661.0  * 11407.9  *
* Length Wtd. (ft)       *  264.07  * Wetted Per. (ft)       *          *  335.18  *  222.57  *
* Min Ch El (ft)         *  716.63  * Shear (lb/sq ft)       *          *    0.21  *    0.01  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *          *    1.10  *    0.01  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   91.95  * 3345.07  *  288.56  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.46  *  170.99  *   84.77  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION
```

RIVER: Blue River
REACH: Main RS: 5.681

INPUT
Description: COE Riverstation=37852.97
Preliminary Model Riverstation=3019.239
Station Elevation Data num= 273

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	789.28	1.87	788.18	2.18	788	5.01	786.33	5.56	786
8.85	784	9.61	783.54	12.09	782	15.32	780	17.52	778.65
18.6	778	20.49	777.24	23.78	776	25.71	775.05	27.2	774.31
27.8	774	28.22	773.78	31.68	772	50.52	770	50.68	769.99
98.48	768	152.84	766	196.47	764.95	241.18	764	360.73	764
367.39	763.89	371.02	763.84	487.75	762	504.73	761.95	596.91	760.55
601.43	760.49	602.81	760.46	612.7	760.26	614.46	760.23	625.47	760
625.92	759.97	643.73	758.51	649.62	758	660.09	754.76	662.53	754
680.1	752.11	681.08	752	699.51	750	702.07	749.09	705.17	748
707.71	747.1	727.84	740	730.29	739.14	733.5	738	739.16	736
747.31	734	763.54	732	773.74	730	776.15	729.28	779.14	728.41
780.58	728	783.61	727.12	787.4	726	791.63	724.73	794.08	724
801.96	722.51	804.93	722	823.94	720.11	824.99	720	846.44	716.51
868.44	716.51	890.44	716.51	911.89	720	928.89	724	931.83	724.7
937.39	726	941.26	726.97	943.61	727.55	945.49	728	949.1	728.88
953.76	730	957.62	730.81	963.17	732	973.44	733	984.37	734
984.61	734.08	990.62	736	994.6	737.29	1003.08	739.96	1003.23	740
1003.42	740.06	1016.4	743.98	1016.47	744	1044.35	745.31	1048.8	745.44
1052.12	745.53	1066.89	746	1068.68	746.06	1069.18	746.08	1085.34	746.6
1090.81	746.82	1097.48	747.05	1110.38	747.56	1111.06	747.59	1111.37	747.61
1111.57	747.61	1131.83	748.48	1142.73	748.98	1146.84	749.19	1152.21	749.24
1154.35	749.34	1155.49	749.4	1156.16	749.43	1156.61	749.47	1160.13	749.59
1161.23	749.6	1171.85	749.75	1173.14	749.75	1183.77	749.78	1187.13	749.78
1278.52	749.18	1283.09	749.16	1290.94	749.22	1295.64	749.2	1305.98	749.27
1307.66	749.27	1309.88	749.28	1312	749.28	1322.4	749.35	1392.2	750
1413.3	750	1416.34	750.08	1425.48	750.3	1436.74	750.54	1440.58	750.63
1443.74	750.69	1451.68	750.82	1454.67	750.86	1547.43	751.7	1549.19	751.71
1551.65	751.71	1558.19	751.72	1559.55	751.72	1697.52	751.92	1701.15	751.92
1704.37	751.93	1714.48	751.93	1757	752	1839.6	752	1854.29	752.67
1861.95	752.18	1862.72	752.19	1864.79	752	1874.6	751.98	1875.53	751.98
1889.93	751.94	1894.19	751.94	1897.84	751.93	1904.16	751.93	1906.71	751.92
2079.39	752	2152.92	751.98	2175.18	751.89	2176.58	751.88	2178.45	751.86
2184.38	751.81	2286.75	751.11	2380.84	750	2411.67	749.18	2439.6	748.46
2449.08	748.16	2454.69	748	2463.34	748	2464.14	748.03	2465.24	748.08
2470.19	748.29	2501.91	750	2554.36	750	2635.29	751.27	2676.19	751.84
2680.6	752	3168.37	752	3219.42	751.41	3223.07	751.4	3225.49	751.4
3244.85	751.47	3257.98	751.59	3262.99	751.65	3299.69	752	3310.08	752
3502.77	753.94	3502.96	753.94	3507	754	3513.44	754	3579.34	755.06
3627.01	755.68	3651.59	756	3681.99	756	3682.91	756.04	3682.96	756.04
3691.57	756.29	3747.93	758	3758.4	758.64	3766.52	759.16	3774.16	759.63
3779.41	760	3782.69	761.23	3784.77	762	3787.29	762.95	3790.03	764
3794.59	765.8	3795.07	766	3796.25	766.56	3799.3	768	3800.52	768.63
3803.2	770	3806.9	771.93	3807.04	772	3807.15	772.06	3810.85	774
3813.8	775.56	3814.64	776	3815.89	776.66	3818.4	778	3819.57	778.63
3822.18	780	3826.57	780	3835.07	781.14	3835.31	781.13	3844.56	780.72
3846.8	780.61	3849.58	780.49	3859.62	780.04	3859.87	780.03	3860.59	780
3867.33	779.61	3868.08	779.57	3869.6	779.5	3873.68	779.28	3875.57	779.17
3876.65	779.12	3881.01	778.93	3881.86	778.89	3882.66	778.86	3886.98	778.66
3887.67	778.63	3892.05	778.42	3892.61	778.39	3897.03	778.16	3897.3	778.14
3899.69	778	3906.05	778	3910.55	779.82	3910.98	780	3911.11	780.06
3914.3	781.37	3915.81	782	3920.24	783.84	3920.63	784	3921.06	784.17
3925.48	786	3926.9	786.57	3930.37	788	3933.64	789.58	3934.89	790.22
3938.31	792	3941.59	793.7	3942.16	794	3942.77	794.31	3946.02	796
3948.97	796	3975.06	794.73	3989.33	794	3995.08	793.54	3995.19	793.54
3999.15	793.19	4001.02	792.99	4011.54	792.66				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	649.62	.027	1016.47	.05	1171.85	.15	2184.38	.04
2380.84	.15	2554.36	.05						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
649.62	1016.47	335.69	226.23	68.44	.1	.3

Ineffective Flow num= 3

```
   Sta L   Sta R    Elev  Permanent
       0     442     764       F
    1547    3435     752       F
    3435    3960     780       F
Blocked Obstructions     num=       1
   Sta L    Sta R     Elev
************************
    2705    3655     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  737.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.22  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  725.51  * Flow Area (sq ft)      *          * 3241.56  *          *
* E.G. Slope (ft/ft)     *0.000173  * Area (sq ft)           *          * 3241.56  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  258.68  * Top Width (ft)         *          *  258.68  *          *
* Vel Total (ft/s)       *    3.86  * Avg. Vel. (ft/s)       *          *    3.86  *          *
* Max Chl Dpth (ft)      *   20.71  * Hydr. Depth (ft)       *          *   12.53  *          *
* Conv. Total (cfs)      *951530.8  * Conv. (cfs)            *          *951530.8  *          *
* Length Wtd. (ft)       *  226.23  * Wetted Per. (ft)       *          *  263.15  *          *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *          *    0.13  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.51  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *          * 1547.87  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *  129.36  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  742.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.77  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  727.78  * Flow Area (sq ft)      *          * 4482.02  *          *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           *          * 4482.02  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  286.29  * Top Width (ft)         *          *  286.29  *          *
* Vel Total (ft/s)       *    4.35  * Avg. Vel. (ft/s)       *          *    4.35  *          *
* Max Chl Dpth (ft)      *   25.26  * Hydr. Depth (ft)       *          *   15.66  *          *
* Conv. Total (cfs)      *1522684.0  * Conv. (cfs)            *          *1522684.0  *          *
* Length Wtd. (ft)       *  226.23  * Wetted Per. (ft)       *          *  292.22  *          *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.68  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *    1.51  * 2108.16  *    6.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  146.54  *    8.33  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  745.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.027  *   0.050  *
* W.S. Elev (ft)         *  745.49  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  729.73  * Flow Area (sq ft)      *          * 5585.18  *   23.90  *
* E.G. Slope (ft/ft)     *0.000159  * Area (sq ft)           *          * 5585.18  *   23.90  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26592.95  *    7.05  *
* Top Width (ft)         *  338.45  * Top Width (ft)         *          *  304.20  *   34.25  *
* Vel Total (ft/s)       *    4.74  * Avg. Vel. (ft/s)       *          *    4.76  *    0.29  *
* Max Chl Dpth (ft)      *   28.98  * Hydr. Depth (ft)       *          *   18.36  *    0.70  *
* Conv. Total (cfs)      *2108002.0  * Conv. (cfs)            *          *2107443.0  *   558.6  *
* Length Wtd. (ft)       *  226.21  * Wetted Per. (ft)       *          *  311.10  *   34.28  *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *          *    0.18  *    0.01  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *    0.85  *    0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   15.75  * 2589.63  *   56.87  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.30  *  158.72  *   29.21  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
```

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*****************************************************************************************
* E.G. Elev (ft)         *  749.52  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.027  *   0.050  *
* W.S. Elev (ft)         *  749.12  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  731.58  * Flow Area (sq ft)      *          * 6708.96  *  334.57  *
* E.G. Slope (ft/ft)     *0.000148  * Area (sq ft)           *          * 6708.96  *  379.63  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *33972.14  *  227.86  *
* Top Width (ft)         *  515.45  * Top Width (ft)         *          *  314.50  *  200.95  *
* Vel Total (ft/s)       *    4.86  * Avg. Vel. (ft/s)       *          *    5.06  *    0.68  *
* Max Chl Dpth (ft)      *   32.61  * Hydr. Depth (ft)       *          *   21.33  *    2.59  *
* Conv. Total (cfs)      *2814289.0  * Conv. (cfs)           *          *2795539.0  * 18750.5  *
* Length Wtd. (ft)       *  224.68  * Wetted Per. (ft)       *          *  322.02  *  129.20  *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *          *    0.19  *    0.02  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *          *    0.97  *    0.02  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   54.76  * 3060.28  *  184.31  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   25.18  *  166.30  *   61.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.06  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *          *   0.027  *   0.079  *
* W.S. Elev (ft)         *  754.72  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  734.19  * Flow Area (sq ft)      *          * 8583.71  * 6921.63  *
* E.G. Slope (ft/ft)     *0.000116  * Area (sq ft)           *          * 8583.71  * 6921.63  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *41749.92  * 3750.08  *
* Top Width (ft)         * 2044.79  * Top Width (ft)         *          *  356.26  * 1688.53  *
* Vel Total (ft/s)       *    2.93  * Avg. Vel. (ft/s)       *          *    4.86  *    0.54  *
* Max Chl Dpth (ft)      *   38.21  * Hydr. Depth (ft)       *          *   24.09  *    4.10  *
* Conv. Total (cfs)      *4231570.0  * Conv. (cfs)           *          *3882807.0  *348763.3  *
* Length Wtd. (ft)       *  211.45  * Wetted Per. (ft)       *          *  364.26  * 1691.53  *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *          *    0.17  *    0.03  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *          *    0.83  *    0.02  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  252.65  * 3764.47  *  615.59  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  111.77  *  171.73  *  151.00  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.57  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *   0.083  *
* W.S. Elev (ft)         *  757.24  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  735.64  * Flow Area (sq ft)      *          * 9490.50  *11170.99  *
* E.G. Slope (ft/ft)     *0.000108  * Area (sq ft)           *          * 9490.50  *11229.74  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *46955.02  * 7444.98  *
* Top Width (ft)         * 2120.79  * Top Width (ft)         *          *  364.39  * 1756.40  *
* Vel Total (ft/s)       *    2.63  * Avg. Vel. (ft/s)       *          *    4.95  *    0.67  *
* Max Chl Dpth (ft)      *   40.73  * Hydr. Depth (ft)       *          *   26.04  *    6.62  *
* Conv. Total (cfs)      *5236793.0  * Conv. (cfs)           *          *4520105.0  *716687.9  *
* Length Wtd. (ft)       *  202.87  * Wetted Per. (ft)       *          *  372.78  * 1694.05  *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *          *    0.17  *    0.04  *
* Alpha                  *    3.06  * Stream Power (lb/ft s) *          *    0.85  *    0.03  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  632.59  * 4224.76  * 1090.54  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  175.42  *  173.77  *  253.71  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.18  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.050  *   0.027  *   0.084  *
* W.S. Elev (ft)         *  758.82  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  736.94  * Flow Area (sq ft)      *    3.96  *10071.01  *13847.24  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           *    3.96  *10071.01  *14049.31  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *    0.68  *52419.02  *10580.29  *
* Top Width (ft)         * 2171.39  * Top Width (ft)         *    9.73  *  366.85  * 1794.81  *
```

```
* Vel Total (ft/s)       *    2.63  * Avg. Vel. (ft/s)       *    0.17  *    5.20  *    0.76  *
* Max Chl Dpth (ft)      *   42.31  * Hydr. Depth (ft)       *    0.41  *   27.45  *    8.20  *
* Conv. Total (cfs)      *5970111.0  * Conv. (cfs)            *    64.4  *4967419.0  *1002627.0  *
* Length Wtd. (ft)       *  198.04  * Wetted Per. (ft)       *    9.76  *  375.35  * 1695.64  *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *    0.00  *    0.19  *    0.06  *
* Alpha                  *    3.26  * Stream Power (lb/ft s) *    0.00  *    0.97  *    0.04  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  936.75  * 4508.48  * 1590.32  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  201.47  *  174.03  *  411.52  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.              *   0.050  *   0.027  *   0.086  *
* W.S. Elev (ft)         *  761.56  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  738.70  * Flow Area (sq ft)      *  131.10  *11073.67  *18462.26  *
* E.G. Slope (ft/ft)     *0.000105  * Area (sq ft)           *  131.10  *11073.67  *18997.16  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   42.55  *59627.50  *16229.95  *
* Top Width (ft)         * 2303.02  * Top Width (ft)         *  119.06  *  366.85  * 1817.11  *
* Vel Total (ft/s)       *    2.56  * Avg. Vel. (ft/s)       *    0.32  *    5.38  *    0.88  *
* Max Chl Dpth (ft)      *   45.05  * Hydr. Depth (ft)       *    1.10  *   30.19  *   10.93  *
* Conv. Total (cfs)      *7406676.0  * Conv. (cfs)            *  4152.2  *5818730.0  *1583794.0  *
* Length Wtd. (ft)       *  190.95  * Wetted Per. (ft)       *  119.16  *  375.35  * 1698.37  *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *    0.01  *    0.19  *    0.07  *
* Alpha                  *    3.51  * Stream Power (lb/ft s) *    0.00  *    1.04  *    0.06  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1550.67  * 4959.04  * 2790.95  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  243.92  *  174.66  *  594.62  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  751.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.              *          *   0.027  *   0.059  *
* W.S. Elev (ft)         *  751.01  * Reach Len. (ft)        *  335.69  *  226.23  *   68.44  *
* Crit W.S. (ft)         *  732.58  * Flow Area (sq ft)      *          * 7309.60  *  991.95  *
* E.G. Slope (ft/ft)     *0.000143  * Area (sq ft)           *          * 7309.60  * 1371.91  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *37696.68  *  603.32  *
* Top Width (ft)         * 1104.07  * Top Width (ft)         *          *  326.25  *  777.82  *
* Vel Total (ft/s)       *    4.61  * Avg. Vel. (ft/s)       *          *    5.16  *    0.61  *
* Max Chl Dpth (ft)      *   34.50  * Hydr. Depth (ft)       *          *   22.40  *    2.18  *
* Conv. Total (cfs)      *3197914.0  * Conv. (cfs)            *          *3147539.0  * 50375.3  *
* Length Wtd. (ft)       *  222.56  * Wetted Per. (ft)       *          *  333.98  *  454.71  *
* Min Ch El (ft)         *  716.51  * Shear (lb/sq ft)       *          *    0.20  *    0.02  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *          *    1.01  *    0.01  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   91.95  * 3300.76  *  286.90  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.46  *  168.99  *   83.72  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.638

INPUT
Description: COE Riverstation=38079.20
Preliminary Model Riverstation=2787.002
Station Elevation Data    num=     125
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  789.64   27.04     786   69.27     782   83.95     780   92.82     779
   96.48   778.7   97.11  778.66  104.67  778.08  105.92     778  107.26     778
   110.1  777.86  111.16  777.79  117.59  777.51  194.51     772  199.61  771.52
  201.99  771.42  225.03     770  235.97     770  240.54  768.95  243.92     768
```

```
   247.1     768   252.1   767.1  253.88  767.03  263.25     766  263.93     766
  280.14     762  295.15     758  295.91  757.87  307.72     756  327.91     754
  350.52     752  393.54     738     404     736  424.07     734  429.98  732.41
  431.62     732  455.66     724  462.82     722  477.78     720   498.2  716.41
   520.2  716.41   542.2  716.41  562.62     720  574.67     722  597.79     730
  607.56     732  628.85     734  644.05  739.44   657.5     744  692.32     746
  764.97     746  785.09  746.57  791.71   746.6  792.86  746.64  812.89  747.03
  813.88  747.03  821.53  747.18  822.89  747.16   847.4  747.35  862.66  747.26
  951.27  747.76  952.95  747.79   966.4  747.81  967.87  747.83  981.17  747.83
 1103.84  748.72 1174.94  749.88 1175.62  749.88 1180.97     750 1181.88     750
 1406.88  751.94 1511.48     752 1564.81  751.63 1641.13  751.57 1665.59  751.82
 1815.76  751.86 1903.11  751.54    2118     750 2218.01  749.93 2219.41     750
 2272.39     750  2367.4  751.44 2412.39     752    2444     752 2479.83  751.54
 2949.01     752 3000.36  751.54 3066.69     752 3108.77     752  3290.9  754.03
 3291.32  754.04 3291.71  754.04 3432.25     756  3451.5     756 3495.73  757.97
 3497.31     758  3510.7     758    3511  758.02 3544.38     760 3550.94   761.9
 3551.31     762 3566.45     768 3574.06     772 3574.51  772.23 3577.86     774
 3578.12  774.13 3589.18  779.71 3593.78     782 3620.85     782 3627.71  781.73
 3628.19   781.7 3642.89  781.03  3658.4     780 3674.81     780 3679.57     782
 3692.54  787.87 3692.82     788 3693.51  788.33 3697.16     790 3697.79  790.28
 3705.92     794 3721.52     794 3733.45  794.67  3745.3     794 3775.16  793.28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  201.99     .05  350.52    .027  692.32     .04  862.66     .15
 1903.11     .04    2118     .15  2367.4     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        350.52  692.32           533.18   360.4   71.29             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1407    3120     752       F
    3120    3775     780       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2430    3400     780

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  737.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  737.12  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)          *  725.55  * Flow Area (sq ft)      *          * 2934.86  *          *
* E.G. Slope (ft/ft)      *0.000218  * Area (sq ft)           *          * 2934.86  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  239.43  * Top Width (ft)         *          *  239.43  *          *
* Vel Total (ft/s)        *    4.26  * Avg. Vel. (ft/s)       *          *    4.26  *          *
* Max Chl Dpth (ft)       *   20.71  * Hydr. Depth (ft)       *          *   12.26  *          *
* Conv. Total (cfs)       *846585.3  * Conv. (cfs)            *          *846585.3  *          *
* Length Wtd. (ft)        *  360.40  * Wetted Per. (ft)       *          *  244.57  *          *
* Min Ch El (ft)          *  716.41  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.70  *          *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)   *          * 1531.83  *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *          *  128.07  *          *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  742.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  741.67  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)          *  727.95  * Flow Area (sq ft)      *          * 4092.61  *          *
* E.G. Slope (ft/ft)      *0.000205  * Area (sq ft)           *          * 4092.61  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)          *  268.36  * Top Width (ft)         *          *  268.36  *          *
* Vel Total (ft/s)        *    4.76  * Avg. Vel. (ft/s)       *          *    4.76  *          *
* Max Chl Dpth (ft)       *   25.26  * Hydr. Depth (ft)       *          *   15.25  *          *
* Conv. Total (cfs)       *1362946.0  * Conv. (cfs)            *          *1362946.0  *          *
* Length Wtd. (ft)        *  360.40  * Wetted Per. (ft)       *          *  274.93  *          *
* Min Ch El (ft)          *  716.41  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.91  *          *
```

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* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    1.51  * 2085.89  *    6.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  145.10  *    8.33  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  745.38  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)         *  730.02  * Flow Area (sq ft)      *          * 5144.10  *          *
* E.G. Slope (ft/ft)     *0.000216  * Area (sq ft)           *          * 5144.10  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  310.68  * Top Width (ft)         *          *  310.68  *          *
* Vel Total (ft/s)       *    5.17  * Avg. Vel. (ft/s)       *          *    5.17  *          *
* Max Chl Dpth (ft)      *   28.97  * Hydr. Depth (ft)       *          *   16.56  *          *
* Conv. Total (cfs)      *1809738.0  * Conv. (cfs)           *          *1809738.0  *          *
* Length Wtd. (ft)       *  360.27  * Wetted Per. (ft)       *          *  318.27  *          *
* Min Ch El (ft)         *  716.41  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.13  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   15.75  * 2561.76  *   56.85  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  157.13  *   29.18  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.027  *   0.049  *
* W.S. Elev (ft)         *  749.04  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)         *  732.00  * Flow Area (sq ft)      *          * 6338.94  *  700.00  *
* E.G. Slope (ft/ft)     *0.000190  * Area (sq ft)           *          * 6338.94  *  700.00  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *33754.43  *  445.57  *
* Top Width (ft)         *  764.09  * Top Width (ft)         *          *  332.72  *  431.38  *
* Vel Total (ft/s)       *    4.86  * Avg. Vel. (ft/s)       *          *    5.32  *    0.64  *
* Max Chl Dpth (ft)      *   32.63  * Hydr. Depth (ft)       *          *   19.05  *    1.62  *
* Conv. Total (cfs)      *2480830.0  * Conv. (cfs)           *          *2448509.0  * 32321.0  *
* Length Wtd. (ft)       *  353.57  * Wetted Per. (ft)       *          *  340.91  *  431.40  *
* Min Ch El (ft)         *  716.41  * Shear (lb/sq ft)       *          *    0.22  *    0.02  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *          *    1.17  *    0.01  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   54.76  * 3026.40  *  183.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.18  *  164.62  *   61.11  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.050  *   0.027  *   0.075  *
* W.S. Elev (ft)         *  754.70  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)         *  734.79  * Flow Area (sq ft)      *   40.84  * 8257.94  * 7850.96  *
* E.G. Slope (ft/ft)     *0.000119  * Area (sq ft)           *   40.84  * 8257.94  * 7850.96  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   16.33  *40699.40  * 4784.28  *
* Top Width (ft)         * 2109.13  * Top Width (ft)         *   29.65  *  341.80  * 1737.68  *
* Vel Total (ft/s)       *    2.82  * Avg. Vel. (ft/s)       *    0.40  *    4.93  *    0.61  *
* Max Chl Dpth (ft)      *   38.29  * Hydr. Depth (ft)       *    1.38  *   24.16  *    4.52  *
* Conv. Total (cfs)      *4175894.0  * Conv. (cfs)           *  1498.3  *3735305.0  *439090.7  *
* Length Wtd. (ft)       *  323.39  * Wetted Per. (ft)       *   29.78  *  350.46  * 1740.44  *
* Min Ch El (ft)         *  716.41  * Shear (lb/sq ft)       *    0.01  *    0.17  *    0.03  *
* Alpha                  *    2.74  * Stream Power (lb/ft s) *    0.00  *    0.86  *    0.02  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  252.49  * 3720.74  *  603.98  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  111.65  *  169.92  *  148.31  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.55  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.050  *   0.027  *   0.080  *
* W.S. Elev (ft)         *  757.22  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)         *  736.49  * Flow Area (sq ft)      *  144.92  * 9119.98  *12233.45  *
* E.G. Slope (ft/ft)     *0.000107  * Area (sq ft)           *  144.92  * 9119.98  *12320.21  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   89.62  *45586.86  * 8723.53  *
* Top Width (ft)         * 2208.87  * Top Width (ft)         *   50.50  *  341.80  * 1816.56  *
* Vel Total (ft/s)       *    2.53  * Avg. Vel. (ft/s)       *    0.62  *    5.00  *    0.71  *
* Max Chl Dpth (ft)      *   40.81  * Hydr. Depth (ft)       *    2.87  *   26.68  *    7.04  *
* Conv. Total (cfs)      *5259625.0  * Conv. (cfs)           *  8664.4  *4407532.0  *843427.9  *
* Length Wtd. (ft)       *  307.12  * Wetted Per. (ft)       *   50.79  *  350.46  * 1742.96  *
* Min Ch El (ft)         *  716.41  * Shear (lb/sq ft)       *    0.02  *    0.17  *    0.05  *
* Alpha                  *    3.28  * Stream Power (lb/ft s) *    0.01  *    0.87  *    0.03  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  632.03  * 4176.43  * 1072.04  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  175.22  *  171.94  *  250.91  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.15  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.050  *   0.027  *   0.082  *
* W.S. Elev (ft)         *  758.81  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)         *  737.89  * Flow Area (sq ft)      *  232.07  * 9662.07  *14989.41  *
* E.G. Slope (ft/ft)     *0.000109  * Area (sq ft)           *  232.07  * 9662.07  *15239.21  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  180.10  *50765.92  *12053.98  *
* Top Width (ft)         * 2262.12  * Top Width (ft)         *   58.39  *  341.80  * 1861.93  *
* Vel Total (ft/s)       *    2.53  * Avg. Vel. (ft/s)       *    0.78  *    5.25  *    0.80  *
* Max Chl Dpth (ft)      *   42.40  * Hydr. Depth (ft)       *    3.97  *   28.27  *    8.63  *
* Conv. Total (cfs)      *6022239.0  * Conv. (cfs)           * 17216.1  *4852770.0  *1152253.0  *
* Length Wtd. (ft)       *  298.15  * Wetted Per. (ft)       *   58.84  *  350.46  * 1744.55  *
* Min Ch El (ft)         *  716.41  * Shear (lb/sq ft)       *    0.03  *    0.19  *    0.06  *
* Alpha                  *    3.49  * Stream Power (lb/ft s) *    0.02  *    0.99  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  935.84  * 4457.24  * 1567.32  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  201.20  *  172.19  *  408.65  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.89  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.050  *   0.027  *   0.084  *
* W.S. Elev (ft)         *  761.54  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)         *  739.72  * Flow Area (sq ft)      *  405.96  *10597.64  *19745.75  *
* E.G. Slope (ft/ft)     *0.000103  * Area (sq ft)           *  405.96  *10597.64  *20382.83  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  397.44  *57482.87  *18019.69  *
* Top Width (ft)         * 2297.85  * Top Width (ft)         *   68.66  *  341.80  * 1887.39  *
* Vel Total (ft/s)       *    2.47  * Avg. Vel. (ft/s)       *    0.98  *    5.42  *    0.91  *
* Max Chl Dpth (ft)      *   45.13  * Hydr. Depth (ft)       *    5.91  *   31.01  *   11.36  *
* Conv. Total (cfs)      *7474659.0  * Conv. (cfs)           * 39140.4  *5660933.0  *1774585.0  *
* Length Wtd. (ft)       *  284.93  * Wetted Per. (ft)       *   69.47  *  350.46  * 1747.29  *
* Min Ch El (ft)         *  716.41  * Shear (lb/sq ft)       *    0.04  *    0.19  *    0.07  *
* Alpha                  *    3.69  * Stream Power (lb/ft s) *    0.04  *    1.06  *    0.07  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   * 1548.60  * 4902.76  * 2760.02  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  243.20  *  172.82  *  591.71  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  751.38  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *          *   0.027  *   0.058  *
* W.S. Elev (ft)         *  750.95  * Reach Len. (ft)        *  533.18  *  360.40  *   71.29  *
* Crit W.S. (ft)         *  733.12  * Flow Area (sq ft)      *          * 6979.47  * 1659.17  *
* E.G. Slope (ft/ft)     *0.000171  * Area (sq ft)           *          * 6979.47  * 1902.92  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *37119.28  * 1180.72  *
* Top Width (ft)         * 1288.69  * Top Width (ft)         *          *  338.58  *  950.10  *
* Vel Total (ft/s)       *    4.43  * Avg. Vel. (ft/s)       *          *    5.32  *    0.71  *
```

```
* Max Chl Dpth (ft)      *   34.54  * Hydr. Depth (ft)       *          *   20.61  *    2.77  *
* Conv. Total (cfs)      *2930802.0  * Conv. (cfs)            *          *2840450.0  * 90351.5  *
* Length Wtd. (ft)       *  347.00  * Wetted Per. (ft)       *          *  347.07  *  600.04  *
* Min Ch El (ft)         *  716.41  * Shear (lb/sq ft)       *          *    0.21  *    0.03  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *          *    1.14  *    0.02  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   91.95  * 3263.66  *  284.33  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.46  *  167.27  *   82.36  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.570

INPUT
Description: COE Riverstation=38439.60
Preliminary Model Riverstation=2422.92
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     790    4.69     788    53.6     766   70.87     764   90.33     764
   94.66  762.56  107.96     758  114.81     756  137.31     754  164.49     752
   176.7  748.17  208.32     738  215.16     736  231.46     734  244.73     732
  262.57     726  274.78     722  284.41     720  307.53  716.26  329.53  716.26
  351.53  716.26  374.65     720  384.67     722  390.37  723.87  396.87     726
  397.03  726.05  408.99     730  429.28     732  443.95     734  451.34     736
  457.44     738  467.15  741.85  467.51     742  492.24     744  567.36  745.05
  786.93  746.72  931.42     748  987.07  749.33 1007.96  749.98  1008.1  749.98
 1008.59     750 1201.15  751.55 1241.84  751.58 1368.31  750.72 1467.65  750.55
 1518.53  751.07 1523.12  751.03 1530.06  751.07 1536.22  751.27 1558.35  751.57
 1681.88  751.11 1894.17     750 1976.64     750 1986.26  750.65 1993.47  750.58
  1996.4     750 2022.58     750 2067.38  750.67 2069.79  750.71 2075.86   750.7
 2079.38  750.75 2177.02     752 2178.98     752 2270.04  750.78  2523.4  751.62
 2785.53     752 2868.32     752  2899.7  751.71 3043.43  752.99 3108.31     754
  3138.1  754.18 3248.51     756 3281.74  758.13 3316.26     760 3337.66     760
 3343.63  760.42 3358.11  761.69  3361.2     762 3375.12     768 3392.92     776
 3405.38     782 3412.11  783.96 3415.76  783.99 3423.03  783.82 3444.99  783.24
 3454.45  782.54 3457.69  782.47 3461.33     782 3473.26   780.8 3474.68  780.72
 3482.58  781.17 3482.86  781.19 3484.92     782 3502.59  789.94 3502.82  790.04
 3511.57     794 3548.55     794 3551.35  793.85 3575.58  793.33

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  164.49    .027  492.24     .04  786.93     .15 1681.88     .04
 1894.17     .15 2067.38     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        164.49  492.24          359.09  275.31   51.72             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1241    3276     752       F
    3276    3525     778       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
    2197    3315     780    3040    3315     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  737.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.05  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)         *  725.39  * Flow Area (sq ft)      *          * 2964.06  *          *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           *          * 2964.06  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  242.95  * Top Width (ft)          *          *  242.95  *          *
* Vel Total (ft/s)       *    4.22  * Avg. Vel. (ft/s)        *          *    4.22  *          *
* Max Chl Dpth (ft)      *   20.79  * Hydr. Depth (ft)        *          *   12.20  *          *
* Conv. Total (cfs)      *852844.3  * Conv. (cfs)             *          *852844.3  *          *
* Length Wtd. (ft)       *  275.31  * Wetted Per. (ft)        *          *  247.95  *          *
```

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* Min Ch El (ft)         *  716.26  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.68  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          * 1507.43  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *  126.07  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.60  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)         *  727.84  * Flow Area (sq ft)      *          * 4132.10  *          *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)           *          * 4132.10  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  269.40  * Top Width (ft)         *          *  269.40  *          *
* Vel Total (ft/s)       *    4.72  * Avg. Vel. (ft/s)       *          *    4.72  *          *
* Max Chl Dpth (ft)      *   25.34  * Hydr. Depth (ft)       *          *   15.34  *          *
* Conv. Total (cfs)      *1381594.0  * Conv. (cfs)           *          *1381594.0  *          *
* Length Wtd. (ft)       *  275.31  * Wetted Per. (ft)       *          *  275.93  *          *
* Min Ch El (ft)         *  716.26  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.88  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.51  * 2051.87  *    6.16  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    2.36  *  142.88  *    8.33  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  745.31  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)         *  729.92  * Flow Area (sq ft)      *          * 5214.65  *   63.86  *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           *          * 5214.65  *   63.86  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26576.50  *   23.50  *
* Top Width (ft)         *  416.50  * Top Width (ft)         *          *  306.66  *  109.84  *
* Vel Total (ft/s)       *    5.04  * Avg. Vel. (ft/s)       *          *    5.10  *    0.37  *
* Max Chl Dpth (ft)      *   29.05  * Hydr. Depth (ft)       *          *   17.00  *    0.58  *
* Conv. Total (cfs)      *1869942.0  * Conv. (cfs)           *          *1868290.0  *  1652.3  *
* Length Wtd. (ft)       *  274.70  * Wetted Per. (ft)       *          *  313.94  *  109.84  *
* Min Ch El (ft)         *  716.26  * Shear (lb/sq ft)       *          *    0.21  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *          *    1.07  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   15.75  * 2518.91  *   56.80  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    9.30  *  154.57  *   29.09  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.027  *   0.044  *
* W.S. Elev (ft)         *  749.00  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)         *  732.14  * Flow Area (sq ft)      *          * 6366.79  * 1278.98  *
* E.G. Slope (ft/ft)     *0.000169  * Area (sq ft)           *          * 6366.79  * 1278.98  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *33030.29  * 1169.71  *
* Top Width (ft)         *  799.30  * Top Width (ft)         *          *  318.19  *  481.11  *
* Vel Total (ft/s)       *    4.47  * Avg. Vel. (ft/s)       *          *    5.19  *    0.91  *
* Max Chl Dpth (ft)      *   32.74  * Hydr. Depth (ft)       *          *   20.01  *    2.66  *
* Conv. Total (cfs)      *2630831.0  * Conv. (cfs)           *          *2540851.0  * 89979.9  *
* Length Wtd. (ft)       *  266.71  * Wetted Per. (ft)       *          *  326.05  *  481.14  *
* Min Ch El (ft)         *  716.26  * Shear (lb/sq ft)       *          *    0.21  *    0.03  *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *          *    1.07  *    0.03  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   54.76  * 2973.84  *  181.85  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   25.18  *  161.92  *   60.36  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
```

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*****************************************************************************************
* E.G. Elev (ft)          *  754.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.              *   0.150  *   0.027  *   0.061  *
* W.S. Elev (ft)          *  754.69  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)          *  734.74  * Flow Area (sq ft)      *   48.75  * 8217.98  * 8779.08  *
* E.G. Slope (ft/ft)      *0.000103  * Area (sq ft)           *   48.75  * 8217.98  * 8779.08  *
* Q Total (cfs)           *45500.00  * Flow (cfs)              *    6.09  *38614.08  * 6879.83  *
* Top Width (ft)          * 2067.50  * Top Width (ft)         *   34.99  *  327.75  * 1704.76  *
* Vel Total (ft/s)        *    2.67  * Avg. Vel. (ft/s)       *    0.12  *    4.70  *    0.78  *
* Max Chl Dpth (ft)       *   38.43  * Hydr. Depth (ft)       *    1.39  *   25.07  *    5.15  *
* Conv. Total (cfs)       *4489781.0  * Conv. (cfs)            *   601.2  *3810303.0  *678877.1  *
* Length Wtd. (ft)        *  238.54  * Wetted Per. (ft)       *   35.09  *  336.06  * 1707.86  *
* Min Ch El (ft)          *  716.26  * Shear (lb/sq ft)       *    0.01  *    0.16  *    0.03  *
* Alpha                   *    2.64  * Stream Power (lb/ft s) *    0.00  *    0.74  *    0.03  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)   *  251.95  * 3652.58  *  590.37  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  111.26  *  167.15  *  145.49  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  757.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.              *   0.150  *   0.027  *   0.066  *
* W.S. Elev (ft)          *  757.22  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)          *  736.36  * Flow Area (sq ft)      *  167.32  * 9046.65  *13089.37  *
* E.G. Slope (ft/ft)      *0.000092  * Area (sq ft)           *  167.32  * 9046.65  *13089.37  *
* Q Total (cfs)           *54400.00  * Flow (cfs)              *   33.76  *42966.42  *11399.82  *
* Top Width (ft)          * 2086.38  * Top Width (ft)         *   53.87  *  327.75  * 1704.76  *
* Vel Total (ft/s)        *    2.44  * Avg. Vel. (ft/s)       *    0.20  *    4.75  *    0.87  *
* Max Chl Dpth (ft)       *   40.96  * Hydr. Depth (ft)       *    3.11  *   27.60  *    7.68  *
* Conv. Total (cfs)       *5661970.0  * Conv. (cfs)            *  3514.0  *4471959.0  *1186497.0  *
* Length Wtd. (ft)        *  225.23  * Wetted Per. (ft)       *   54.20  *  336.06  * 1710.39  *
* Min Ch El (ft)          *  716.26  * Shear (lb/sq ft)       *    0.02  *    0.16  *    0.04  *
* Alpha                   *    3.02  * Stream Power (lb/ft s) *    0.00  *    0.74  *    0.04  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)   *  630.12  * 4101.28  * 1051.25  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  174.58  *  169.17  *  248.03  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  759.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.30  * Wt. n-Val.              *   0.150  *   0.027  *   0.067  *
* W.S. Elev (ft)          *  758.81  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)          *  737.69  * Flow Area (sq ft)      *  257.08  * 9567.48  *15798.42  *
* E.G. Slope (ft/ft)      *0.000094  * Area (sq ft)           *  257.08  * 9567.48  *15798.42  *
* Q Total (cfs)           *63000.00  * Flow (cfs)              *   65.67  *47710.75  *15223.58  *
* Top Width (ft)          * 2091.41  * Top Width (ft)         *   58.90  *  327.75  * 1704.76  *
* Vel Total (ft/s)        *    2.46  * Avg. Vel. (ft/s)       *    0.26  *    4.99  *    0.96  *
* Max Chl Dpth (ft)       *   42.55  * Hydr. Depth (ft)       *    4.36  *   29.19  *    9.27  *
* Conv. Total (cfs)       *6482439.0  * Conv. (cfs)            *  6757.2  *4909239.0  *1566443.0  *
* Length Wtd. (ft)        *  217.94  * Wetted Per. (ft)       *   59.48  *  336.06  * 1711.97  *
* Min Ch El (ft)          *  716.26  * Shear (lb/sq ft)       *    0.03  *    0.17  *    0.05  *
* Alpha                   *    3.15  * Stream Power (lb/ft s) *    0.01  *    0.84  *    0.05  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)   *  932.84  * 4377.69  * 1541.92  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *  200.49  *  169.42  *  405.73  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  761.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.30  * Wt. n-Val.              *   0.150  *   0.027  *   0.069  *
* W.S. Elev (ft)          *  761.55  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)          *  739.54  * Flow Area (sq ft)      *  429.47  *10465.84  *20471.11  *
* E.G. Slope (ft/ft)      *0.000089  * Area (sq ft)           *  429.47  *10465.84  *20521.65  *
* Q Total (cfs)           *75900.00  * Flow (cfs)              *  137.35  *53835.88  *21926.76  *
* Top Width (ft)          * 2140.94  * Top Width (ft)         *   66.89  *  327.75  * 1746.30  *
* Vel Total (ft/s)        *    2.42  * Avg. Vel. (ft/s)       *    0.32  *    5.14  *    1.07  *
* Max Chl Dpth (ft)       *   45.29  * Hydr. Depth (ft)       *    6.42  *   31.93  *   12.01  *
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* Conv. Total (cfs)      *8037934.0  * Conv. (cfs)            * 14546.0  *5701308.0  *2322080.0  *
* Length Wtd. (ft)       *  207.25  * Wetted Per. (ft)        *   67.93  *  336.06  * 1714.72  *
* Min Ch El (ft)         *  716.26  * Shear (lb/sq ft)        *    0.04  *    0.17  *    0.07  *
* Alpha                  *    3.26  * Stream Power (lb/ft s) *    0.01  *    0.89  *    0.07  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1543.49  * 4815.63  * 2726.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  242.37  *  170.05  *  588.74  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  751.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.027  *   0.047  *
* W.S. Elev (ft)         *  750.92  * Reach Len. (ft)        *  359.09  *  275.31  *   51.72  *
* Crit W.S. (ft)         *  733.17  * Flow Area (sq ft)      *          * 6984.30  * 2308.04  *
* E.G. Slope (ft/ft)     *0.000151  * Area (sq ft)           *          * 6984.30  * 2568.81  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *35930.11  * 2369.89  *
* Top Width (ft)         * 1497.04  * Top Width (ft)         *          *  324.32  * 1172.72  *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *          *    5.14  *    1.03  *
* Max Chl Dpth (ft)      *   34.66  * Hydr. Depth (ft)       *          *   21.54  *    3.66  *
* Conv. Total (cfs)      *3119437.0  * Conv. (cfs)            *          *2926415.0  *193021.7  *
* Length Wtd. (ft)       *  259.73  * Wetted Per. (ft)        *          *  332.47  *  631.22  *
* Min Ch El (ft)         *  716.26  * Shear (lb/sq ft)        *          *    0.20  *    0.03  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *          *    1.02  *    0.04  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   91.95  * 3205.89  *  280.67  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.46  *  164.53  *   80.63  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.518

INPUT
Description: COE Riverstation=38714.91
Preliminary Model Riverstation=2147.607
Station Elevation Data    num=     121
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     800    4.78  798.19   14.04  794.69   19.69  792.76   28.94  790.03
   29.05     790   37.79     788   57.89     784   69.31     782   69.41  781.98
   93.77     778  104.04  776.14  104.72     776  123.82     774   154.5     772
  168.35     770  187.27  766.11  187.77     766  195.15     764  212.98     764
  218.76  762.33  219.82     762  237.74     756  285.19     752  329.06     736
  334.91     734  343.84     732  358.94     730     371     728  387.89     722
  393.68  721.14  402.76     720  427.84  716.04  449.84  716.04  471.84  716.04
  496.91     720  510.23     722  536.74     730  565.24     732  570.57  733.39
  572.75     734  582.05  737.12  589.99  739.97  590.12  740.02  595.51     742
  655.27     744  736.73  744.69  826.57     746 1043.66  747.88 1055.11     748
 1071.13     748  1081.8   748.3 1083.04  748.35 1083.41  748.37 1123.24     750
 1301.53  750.93 1470.02     750 1578.42     750 1580.58  750.08 1653.09  751.09
 1739.81  750.79 1950.66     750 2064.13     750  2067.8  750.06 2186.93   751.6
 2187.71  751.62 2188.06  751.62 2188.94  751.64 2190.04  751.65 2190.44  751.66
 2233.14     752 2300.77  750.76 2301.06  750.76  2338.5  750.34 2591.05   751.3
    2750  751.71 2751.49  751.69 2821.07     752 2983.43  751.68 3069.17  752.09
 3188.03     754 3203.45     754 3306.75     756 3369.79     760  3370.6  760.01
 3387.59  760.59 3408.78     761 3409.69  760.99 3420.73  761.56 3421.63  761.59
 3429.06     762 3446.01     764 3472.26  775.99 3472.55  776.12 3480.73   779.9
 3480.94     780 3489.56     784 3492.17     784 3514.78  785.05 3517.75  785.02
 3531.42  784.55 3533.12  784.55 3541.02  784.06 3541.33  784.06 3541.93     784
 3550.62     782 3556.81     782 3561.67   783.2  3564.1     784 3568.02  785.48
 3571.43  786.85 3574.44     788 3576.06  788.71 3579.24     790 3581.09  790.95
 3583.35     792  3584.6   792.7 3587.01     794  3615.2     794 3649.63  792.26
 3653.12  792.18

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
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       0     .15  285.19    .027  595.51     .04 1043.66     .15 1739.81     .04
 1950.66     .15  2067.8     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        285.19  595.51            384.9  311.01   77.95             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
    1302    3365     752       F
    3365    3525     778       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2250    3370     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  737.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  737.03  * Reach Len. (ft)        *  384.90  *  311.01  *   77.95  *
* Crit W.S. (ft)         *  724.96  * Flow Area (sq ft)      *          * 3278.21  *          *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           *          * 3278.21  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  255.55  * Top Width (ft)         *          *  255.55  *          *
* Vel Total (ft/s)       *    3.81  * Avg. Vel. (ft/s)       *          *    3.81  *          *
* Max Chl Dpth (ft)      *   20.99  * Hydr. Depth (ft)       *          *   12.83  *          *
* Conv. Total (cfs)      *976014.6  * Conv. (cfs)            *          *976014.6  *          *
* Length Wtd. (ft)       *  311.01  * Wetted Per. (ft)       *          *  260.53  *          *
* Min Ch El (ft)         *  716.04  * Shear (lb/sq ft)       *          *    0.13  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.49  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          * 1487.70  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *  124.50  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  741.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.59  * Reach Len. (ft)        *  384.90  *  311.01  *   77.95  *
* Crit W.S. (ft)         *  727.28  * Flow Area (sq ft)      *          * 4500.81  *          *
* E.G. Slope (ft/ft)     *0.000158  * Area (sq ft)           *          * 4500.81  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  280.66  * Top Width (ft)         *          *  280.66  *          *
* Vel Total (ft/s)       *    4.33  * Avg. Vel. (ft/s)       *          *    4.33  *          *
* Max Chl Dpth (ft)      *   25.55  * Hydr. Depth (ft)       *          *   16.04  *          *
* Conv. Total (cfs)      *1551010.0  * Conv. (cfs)            *          *1551010.0  *          *
* Length Wtd. (ft)       *  311.01  * Wetted Per. (ft)       *          *  287.24  *          *
* Min Ch El (ft)         *  716.04  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.67  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.51  * 2024.59  *    6.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  141.14  *    8.33  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  745.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  745.30  * Reach Len. (ft)        *  384.90  *  311.01  *   77.95  *
* Crit W.S. (ft)         *  729.35  * Flow Area (sq ft)      *          * 5565.88  *  228.61  *
* E.G. Slope (ft/ft)     *0.000152  * Area (sq ft)           *          * 5565.88  *  228.61  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26478.83  *  121.17  *
* Top Width (ft)         *  475.24  * Top Width (ft)         *          *  291.96  *  183.28  *
* Vel Total (ft/s)       *    4.59  * Avg. Vel. (ft/s)       *          *    4.76  *    0.53  *
* Max Chl Dpth (ft)      *   29.26  * Hydr. Depth (ft)       *          *   19.06  *    1.25  *
* Conv. Total (cfs)      *2160030.0  * Conv. (cfs)            *          *2150190.0  *  9839.2  *
* Length Wtd. (ft)       *  310.36  * Wetted Per. (ft)       *          *  299.27  *  183.32  *
* Min Ch El (ft)         *  716.04  * Shear (lb/sq ft)       *          *    0.18  *    0.01  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *          *    0.84  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   15.75  * 2484.84  *   56.63  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.30  *  152.68  *   28.92  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	749.35	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.36	Wt. n-Val.		0.027	0.040	
W.S. Elev (ft)	748.99	Reach Len. (ft)	384.90	311.01	77.95	
Crit W.S. (ft)	731.54	Flow Area (sq ft)		6661.84	1553.07	
E.G. Slope (ft/ft)	0.000133	Area (sq ft)		6661.84	1553.07	
Q Total (cfs)	34200.00	Flow (cfs)		32738.92	1461.08	
Top Width (ft)	805.20	Top Width (ft)		302.08	503.13	
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)		4.91	0.94	
Max Chl Dpth (ft)	32.95	Hydr. Depth (ft)		22.05	3.09	
Conv. Total (cfs)	2960081.0	Conv. (cfs)		2833622.0	126459.4	
Length Wtd. (ft)	302.28	Wetted Per. (ft)		310.04	503.20	
Min Ch El (ft)	716.04	Shear (lb/sq ft)		0.18	0.03	
Alpha	1.34	Stream Power (lb/ft s)		0.88	0.02	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	54.76	2932.66	180.17	
C & E Loss (ft)	0.01	Cum SA (acres)	25.18	159.96	59.78	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	754.95	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.25	Wt. n-Val.	0.150	0.027	0.053	
W.S. Elev (ft)	754.70	Reach Len. (ft)	384.90	311.01	77.95	
Crit W.S. (ft)	733.79	Flow Area (sq ft)	43.20	8419.99	9263.56	
E.G. Slope (ft/ft)	0.000083	Area (sq ft)	43.20	8419.99	9263.56	
Q Total (cfs)	45500.00	Flow (cfs)	4.75	37407.60	8087.66	
Top Width (ft)	1996.82	Top Width (ft)	32.01	310.32	1654.49	
Vel Total (ft/s)	2.57	Avg. Vel. (ft/s)	0.11	4.44	0.87	
Max Chl Dpth (ft)	38.66	Hydr. Depth (ft)	1.35	27.13	5.60	
Conv. Total (cfs)	4998528.0	Conv. (cfs)	521.3	4109515.0	888491.6	
Length Wtd. (ft)	272.97	Wetted Per. (ft)	32.13	318.82	1657.62	
Min Ch El (ft)	716.04	Shear (lb/sq ft)	0.01	0.14	0.03	
Alpha	2.48	Stream Power (lb/ft s)	0.00	0.61	0.03	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	251.57	3600.00	579.66	
C & E Loss (ft)	0.00	Cum SA (acres)	110.98	165.14	143.50	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	757.47	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.24	Wt. n-Val.	0.150	0.027	0.056	
W.S. Elev (ft)	757.23	Reach Len. (ft)	384.90	311.01	77.95	
Crit W.S. (ft)	735.22	Flow Area (sq ft)	155.49	9205.30	13450.48	
E.G. Slope (ft/ft)	0.000075	Area (sq ft)	155.49	9205.30	13450.48	
Q Total (cfs)	54400.00	Flow (cfs)	27.93	41379.66	12992.42	
Top Width (ft)	2015.93	Top Width (ft)	51.12	310.32	1654.49	
Vel Total (ft/s)	2.38	Avg. Vel. (ft/s)	0.18	4.50	0.97	
Max Chl Dpth (ft)	41.19	Hydr. Depth (ft)	3.04	29.66	8.13	
Conv. Total (cfs)	6268250.0	Conv. (cfs)	3218.2	4767978.0	1497054.0	
Length Wtd. (ft)	260.54	Wetted Per. (ft)	51.49	318.82	1660.15	
Min Ch El (ft)	716.04	Shear (lb/sq ft)	0.01	0.14	0.04	
Alpha	2.74	Stream Power (lb/ft s)	0.00	0.61	0.04	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	628.79	4043.60	1035.50	
C & E Loss (ft)	0.00	Cum SA (acres)	174.15	167.15	246.03	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	759.08	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.26	Wt. n-Val.	0.150	0.027	0.057	
W.S. Elev (ft)	758.82	Reach Len. (ft)	384.90	311.01	77.95	
Crit W.S. (ft)	736.52	Flow Area (sq ft)	240.61	9699.02	16082.78	

```
* E.G. Slope (ft/ft)     *0.000078  * Area (sq ft)           *  240.61  * 9699.02  *16082.78  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *   55.13  *45795.80  *17149.07  *
* Top Width (ft)         * 2020.68  * Top Width (ft)         *   55.87  *  310.32  * 1654.49  *
* Vel Total (ft/s)       *    2.42  * Avg. Vel. (ft/s)       *    0.23  *    4.72  *    1.07  *
* Max Chl Dpth (ft)      *   42.78  * Hydr. Depth (ft)       *    4.31  *   31.25  *    9.72  *
* Conv. Total (cfs)      *7155925.0  * Conv. (cfs)            *  6262.0  *5201767.0  *1947896.0  *
* Length Wtd. (ft)       *  253.83  * Wetted Per. (ft)       *   56.50  *  318.82  * 1661.74  *
* Min Ch El (ft)         *  716.04  * Shear (lb/sq ft)       *    0.02  *    0.15  *    0.05  *
* Alpha                  *    2.82  * Stream Power (lb/ft s) *    0.00  *    0.70  *    0.05  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  930.79  * 4316.81  * 1522.99  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  200.01  *  167.40  *  403.73  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.150  *   0.027  *   0.059  *
* W.S. Elev (ft)         *  761.56  * Reach Len. (ft)        *  384.90  *  311.01  *   77.95  *
* Crit W.S. (ft)         *  738.32  * Flow Area (sq ft)      *  405.11  *10550.26  *20621.22  *
* E.G. Slope (ft/ft)     *0.000074  * Area (sq ft)           *  405.11  *10550.26  *20663.61  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  116.57  *51405.68  *24377.76  *
* Top Width (ft)         * 2079.71  * Top Width (ft)         *   64.07  *  310.32  * 1705.33  *
* Vel Total (ft/s)       *    2.40  * Avg. Vel. (ft/s)       *    0.29  *    4.87  *    1.18  *
* Max Chl Dpth (ft)      *   45.52  * Hydr. Depth (ft)       *    6.32  *   34.00  *   12.46  *
* Conv. Total (cfs)      *8836367.0  * Conv. (cfs)            * 13571.4  *5984709.0  *2838087.0  *
* Length Wtd. (ft)       *  244.06  * Wetted Per. (ft)       *   65.14  *  318.82  * 1664.49  *
* Min Ch El (ft)         *  716.04  * Shear (lb/sq ft)       *    0.03  *    0.15  *    0.06  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    0.01  *    0.74  *    0.07  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1540.05  * 4749.21  * 2702.09  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  241.83  *  168.04  *  586.69  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  751.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *          *   0.027  *   0.041  *
* W.S. Elev (ft)         *  750.92  * Reach Len. (ft)        *  384.90  *  311.01  *   77.95  *
* Crit W.S. (ft)         *  732.46  * Flow Area (sq ft)      *          * 7249.16  * 2639.09  *
* E.G. Slope (ft/ft)     *0.000120  * Area (sq ft)           *          * 7249.16  * 3092.63  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *35332.95  * 2967.05  *
* Top Width (ft)         * 1781.64  * Top Width (ft)         *          *  307.36  * 1474.28  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *          *    4.87  *    1.12  *
* Max Chl Dpth (ft)      *   34.88  * Hydr. Depth (ft)       *          *   23.59  *    3.75  *
* Conv. Total (cfs)      *3493904.0  * Conv. (cfs)            *          *3223235.0  *270668.4  *
* Length Wtd. (ft)       *  294.41  * Wetted Per. (ft)       *          *  315.67  *  704.33  *
* Min Ch El (ft)         *  716.04  * Shear (lb/sq ft)       *          *    0.17  *    0.03  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *          *    0.84  *    0.03  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   91.95  * 3160.91  *  277.31  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.46  *  162.53  *   79.06  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.459

INPUT
Description: COE Riverstation=39025.92
Preliminary Model Riverstation=1836.597
Station Elevation Data    num=     123
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  800.02    4.73     798    9.68     796   14.42  794.21   14.96     794
   47.74     782   55.04     780   66.27     778   76.21     776   87.38   774.3
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   90.08     774  126.27     772  131.31  771.59  146.52     770  170.12     768
  209.75     766  223.92  764.15  225.19     764  240.14     762  281.27     754
  301.37     754  315.69  753.29  328.84  752.98   332.1  752.95  339.74  752.77
  361.86  752.61  395.87     752  407.33     752  429.77     750  450.46     750
   457.3     748  457.48  747.95  464.13     746  483.16     740  501.76     734
  510.37     732  524.49     730  537.36     728  547.68  724.27  559.74     720
  598.68  716.01  620.68  716.01  642.68  716.01  681.61     720   703.5     728
     714     730  736.83     732  737.28  732.16  763.97     742  792.96     744
  976.35  745.84 1030.81     746 1216.66   747.9 1217.14  747.91 1228.18     748
 1264.75  749.03 1300.66  749.97 1300.81  749.97 1301.81     750 1308.98  750.04
 1309.17  750.05 1349.05  750.22 1712.16     750 1746.31  750.47 1882.23     750
 1945.57     750 1983.37  750.57 1992.74     750 2004.53     750 2069.16     750
 2247.31     752 2274.85     752 2335.23  750.74 2341.49  750.45 2375.62     750
 2474.13     750 2474.28  750.01 2647.95  750.84  2826.4  751.36  2955.2  752.14
 3042.22  751.92 3150.57     752 3351.51  755.47 3353.62  755.48 3357.34  755.62
 3360.44  755.64 3363.86  755.78 3364.34  755.78 3368.11  755.91 3368.38  755.91
 3371.17     756 3383.83  757.16 3390.72     758 3415.93     760 3448.44  760.45
 3448.92  760.45 3449.06  760.46 3449.77  760.46 3450.66  760.48 3454.77  760.65
 3455.12  760.66 3456.87  760.74 3466.76     761 3517.51     764 3517.66     764
 3519.02  764.29 3523.93     766 3536.94  771.97 3563.17     784 3566.37  785.41
 3567.84     786 3611.79     786 3625.08     784 3630.84     784 3632.27  784.42
 3638.15     786 3641.55  787.39 3642.97     788 3646.78     790 3654.06     794
 3671.46     794 3716.48     792 3719.65     792

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .15  170.12     .04  450.46    .027  792.96     .04 1264.75     .15
 1882.23     .04 2004.53     .15 2247.31     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        450.46  792.96           124.41  364.77   98.65              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1349    3420     752       F
    3420    3575     778       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2165    3420     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  737.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.20  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  737.00  * Reach Len. (ft)        *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)          *  724.17  * Flow Area (sq ft)      *          * 3469.84  *          *
* E.G. Slope (ft/ft)      *0.000138  * Area (sq ft)           *          * 3469.84  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)          *  257.95  * Top Width (ft)          *          *  257.95  *          *
* Vel Total (ft/s)        *    3.60  * Avg. Vel. (ft/s)        *          *    3.60  *          *
* Max Chl Dpth (ft)       *   20.99  * Hydr. Depth (ft)        *          *   13.45  *          *
* Conv. Total (cfs)       *1065332.0  * Conv. (cfs)            *          *1065332.0  *          *
* Length Wtd. (ft)        *  364.77  * Wetted Per. (ft)        *          *  263.33  *          *
* Min Ch El (ft)          *  716.01  * Shear (lb/sq ft)        *          *    0.11  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.41  *          *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)    *          * 1463.61  *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *          *  122.66  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  741.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.27  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  741.56  * Reach Len. (ft)        *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)          *  726.45  * Flow Area (sq ft)      *          * 4706.78  *          *
* E.G. Slope (ft/ft)      *0.000139  * Area (sq ft)           *          * 4706.78  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)          *  284.57  * Top Width (ft)          *          *  284.57  *          *
* Vel Total (ft/s)        *    4.14  * Avg. Vel. (ft/s)        *          *    4.14  *          *
* Max Chl Dpth (ft)       *   25.55  * Hydr. Depth (ft)        *          *   16.54  *          *
* Conv. Total (cfs)       *1654903.0  * Conv. (cfs)            *          *1654903.0  *          *
* Length Wtd. (ft)        *  364.77  * Wetted Per. (ft)        *          *  291.47  *          *
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* Min Ch El (ft)         *  716.01  * Shear (lb/sq ft)       *           *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    0.58  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.51  * 1991.72  *    6.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.36  *  139.12  *    8.33  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  745.28  * Reach Len. (ft)        *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)         *  728.43  * Flow Area (sq ft)      *          * 5856.55  *   81.37  *
* E.G. Slope (ft/ft)     *0.000149  * Area (sq ft)           *          * 5856.55  *   81.37  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26572.60  *   27.40  *
* Top Width (ft)         *  453.90  * Top Width (ft)         *          *  326.54  *  127.36  *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)       *          *    4.54  *    0.34  *
* Max Chl Dpth (ft)      *   29.27  * Hydr. Depth (ft)       *          *   17.94  *    0.64  *
* Conv. Total (cfs)      *2176939.0  * Conv. (cfs)           *          *2174697.0  *  2242.3  *
* Length Wtd. (ft)       *  364.18  * Wetted Per. (ft)       *          *  334.16  *  127.36  *
* Min Ch El (ft)         *  716.01  * Shear (lb/sq ft)       *          *    0.16  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *          *    0.74  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   15.75  * 2444.07  *   56.35  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  150.47  *   28.64  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  748.98  * Reach Len. (ft)        *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)         *  730.49  * Flow Area (sq ft)      *          * 7086.69  * 1315.17  *
* E.G. Slope (ft/ft)     *0.000129  * Area (sq ft)           *          * 7086.69  * 1315.17  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *33097.56  * 1102.44  *
* Top Width (ft)         *  808.84  * Top Width (ft)         *          *  339.00  *  469.85  *
* Vel Total (ft/s)       *    4.07  * Avg. Vel. (ft/s)       *          *    4.67  *    0.84  *
* Max Chl Dpth (ft)      *   32.97  * Hydr. Depth (ft)       *          *   20.90  *    2.80  *
* Conv. Total (cfs)      *3010133.0  * Conv. (cfs)           *          *2913102.0  * 97031.9  *
* Length Wtd. (ft)       *  356.28  * Wetted Per. (ft)       *          *  347.15  *  469.88  *
* Min Ch El (ft)         *  716.01  * Shear (lb/sq ft)       *          *    0.16  *    0.02  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *          *    0.77  *    0.02  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   54.76  * 2883.58  *  177.60  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   25.18  *  157.67  *   58.91  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.93  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.040  *   0.027  *   0.054  *
* W.S. Elev (ft)         *  754.69  * Reach Len. (ft)        *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)         *  732.93  * Flow Area (sq ft)      *  405.71  * 9041.33  * 8097.60  *
* E.G. Slope (ft/ft)     *0.000078  * Area (sq ft)           *  405.71  * 9041.33  * 8097.60  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  235.51  *38421.70  * 6842.79  *
* Top Width (ft)         * 1887.27  * Top Width (ft)         *  172.72  *  342.50  * 1372.04  *
* Vel Total (ft/s)       *    2.59  * Avg. Vel. (ft/s)       *    0.58  *    4.25  *    0.85  *
* Max Chl Dpth (ft)      *   38.68  * Hydr. Depth (ft)       *    2.35  *   26.40  *    5.90  *
* Conv. Total (cfs)      *5141340.0  * Conv. (cfs)           * 26612.3  *4341516.0  *773211.0  *
* Length Wtd. (ft)       *  325.96  * Wetted Per. (ft)       *  172.91  *  350.80  * 1375.73  *
* Min Ch El (ft)         *  716.01  * Shear (lb/sq ft)       *    0.01  *    0.13  *    0.03  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.01  *    0.54  *    0.02  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  249.58  * 3537.67  *  564.13  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  110.08  *  162.81  *  140.79  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  757.45  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.23  * Wt. n-Val.              *   0.040  *   0.027  *   0.057  *
* W.S. Elev (ft)          *  757.22  * Reach Len. (ft)         *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)          *  734.39  * Flow Area (sq ft)       *  859.18  * 9907.88  *11568.99  *
* E.G. Slope (ft/ft)      *0.000072  * Area (sq ft)            *  859.18  * 9907.88  *11568.99  *
* Q Total (cfs)           *54400.00  * Flow (cfs)              *  749.44  *42836.37  *10814.20  *
* Top Width (ft)          * 1900.27  * Top Width (ft)          *  185.73  *  342.50  * 1372.04  *
* Vel Total (ft/s)        *    2.44  * Avg. Vel. (ft/s)        *    0.87  *    4.32  *    0.93  *
* Max Chl Dpth (ft)       *   41.21  * Hydr. Depth (ft)        *    4.63  *   28.93  *    8.43  *
* Conv. Total (cfs)       *6422076.0  * Conv. (cfs)            * 88473.3  *5056956.0  *1276647.0  *
* Length Wtd. (ft)        *  311.40  * Wetted Per. (ft)        *  186.16  *  350.80  * 1378.26  *
* Min Ch El (ft)          *  716.01  * Shear (lb/sq ft)        *    0.02  *    0.13  *    0.04  *
* Alpha                   *    2.51  * Stream Power (lb/ft s)  *    0.02  *    0.55  *    0.04  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *  624.31  * 3975.37  * 1013.11  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  173.10  *  164.82  *  243.32  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  759.05  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.25  * Wt. n-Val.              *   0.040  *   0.027  *   0.059  *
* W.S. Elev (ft)          *  758.81  * Reach Len. (ft)         *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)          *  735.71  * Flow Area (sq ft)       * 1160.92  *10452.34  *13750.07  *
* E.G. Slope (ft/ft)      *0.000074  * Area (sq ft)            * 1160.92  *10452.34  *13750.07  *
* Q Total (cfs)           *63000.00  * Flow (cfs)              * 1222.08  *47609.58  *14168.34  *
* Top Width (ft)          * 1908.45  * Top Width (ft)          *  193.91  *  342.50  * 1372.04  *
* Vel Total (ft/s)        *    2.48  * Avg. Vel. (ft/s)        *    1.05  *    4.55  *    1.03  *
* Max Chl Dpth (ft)       *   42.80  * Hydr. Depth (ft)        *    5.99  *   30.52  *   10.02  *
* Conv. Total (cfs)       *7315711.0  * Conv. (cfs)            *141910.3  *5528539.0  *1645262.0  *
* Length Wtd. (ft)        *  302.60  * Wetted Per. (ft)        *  194.49  *  350.80  * 1379.85  *
* Min Ch El (ft)          *  716.01  * Shear (lb/sq ft)        *    0.03  *    0.14  *    0.05  *
* Alpha                   *    2.58  * Stream Power (lb/ft s)  *    0.03  *    0.63  *    0.05  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *  924.60  * 4244.87  * 1496.30  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  198.91  *  165.07  *  401.03  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  761.80  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.25  * Wt. n-Val.              *   0.040  *   0.027  *   0.060  *
* W.S. Elev (ft)          *  761.55  * Reach Len. (ft)         *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)          *  737.50  * Flow Area (sq ft)       * 1712.02  *11391.61  *17512.71  *
* E.G. Slope (ft/ft)      *0.000071  * Area (sq ft)            * 1712.02  *11391.61  *17567.12  *
* Q Total (cfs)           *75900.00  * Flow (cfs)              * 2178.50  *53764.53  *19956.97  *
* Top Width (ft)          * 1978.60  * Top Width (ft)          *  208.00  *  342.50  * 1428.10  *
* Vel Total (ft/s)        *    2.48  * Avg. Vel. (ft/s)        *    1.27  *    4.72  *    1.14  *
* Max Chl Dpth (ft)       *   45.54  * Hydr. Depth (ft)        *    8.23  *   33.26  *   12.76  *
* Conv. Total (cfs)       *9008278.0  * Conv. (cfs)            *258558.1  *6381105.0  *2368615.0  *
* Length Wtd. (ft)        *  289.48  * Wetted Per. (ft)        *  208.85  *  350.80  * 1382.59  *
* Min Ch El (ft)          *  716.01  * Shear (lb/sq ft)        *    0.04  *    0.14  *    0.06  *
* Alpha                   *    2.63  * Stream Power (lb/ft s)  *    0.05  *    0.68  *    0.06  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    * 1530.69  * 4670.88  * 2667.89  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  240.62  *  165.71  *  583.89  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  751.22  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.31  * Wt. n-Val.              *   0.040  *   0.027  *   0.040  *
* W.S. Elev (ft)          *  750.91  * Reach Len. (ft)         *  124.41  *  364.77  *   98.65  *
* Crit W.S. (ft)          *  731.53  * Flow Area (sq ft)       *   23.40  * 7746.65  * 2315.58  *
* E.G. Slope (ft/ft)      *0.000114  * Area (sq ft)            *   23.40  * 7746.65  * 2912.43  *
* Q Total (cfs)           *38300.00  * Flow (cfs)              *    7.70  *35799.73  * 2492.57  *
* Top Width (ft)          * 1730.41  * Top Width (ft)          *   30.87  *  342.50  * 1357.03  *
* Vel Total (ft/s)        *    3.80  * Avg. Vel. (ft/s)        *    0.33  *    4.62  *    1.08  *
```

```
* Max Chl Dpth (ft)      *   34.90  * Hydr. Depth (ft)       *    0.76  *   22.62  *    4.16  *
* Conv. Total (cfs)      *3590014.0  * Conv. (cfs)            *   721.8  *3355654.0  *233638.5  *
* Length Wtd. (ft)       *  348.58  * Wetted Per. (ft)       *   30.91  *  350.80  *  556.09  *
* Min Ch El (ft)         *  716.01  * Shear (lb/sq ft)       *    0.01  *    0.16  *    0.03  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.00  *    0.73  *    0.03  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   91.85  * 3107.38  *  271.93  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   42.32  *  160.21  *   76.52  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.390

INPUT
Description: COE Riverstation=39390.69
Preliminary Model Riverstation=1471.833
Station Elevation Data    num=     146
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  799.71    4.46     798    4.92  797.84    10.6     796   19.84     794
   20.17  793.94    20.5  793.86   25.29  792.78   28.22     792   30.57  791.45
   35.95     790   44.63  788.55   47.66     788   51.58  786.96   55.61     786
   60.25   784.2   60.85  783.96   61.08  783.88   67.47     782   68.39  781.83
   69.08  781.73   78.99  780.05   79.24     780   92.15     778  115.03     776
  141.56     774  153.85     772  190.92     770  201.34     768  209.95     766
  211.34  765.73  247.27     758  259.44     756  372.09  756.22   389.6     756
  390.97     756  506.95     754  515.91     754  611.07     752  659.09  749.51
  684.49     748  701.66     748  731.03  747.11  732.91  747.09  764.26     746
  803.41     746  804.05  745.86  808.77  744.72  829.57     738  842.73     734
  853.97     732  868.45     730  879.66     728  884.56     726   894.7  722.07
  894.87     722   900.1     720  937.79  715.85  959.79  715.85  981.79  715.85
 1019.48     720 1042.92     728 1053.46     730 1073.95     732 1100.49     740
 1110.09  741.98  1110.2     742 1110.36  742.01 1127.61  742.66 1131.48  742.72
 1164.56  743.75 1198.07  743.71 1242.38     744 1271.85     744 1411.08     748
 1462.13     750 1571.18     750  1659.2  749.33 1681.96  749.31 1722.42     750
 1762.42     750 1834.44     750 1869.57     750 1921.33  750.73 2011.61     752
 2030.92     752 2055.02     750 2103.87     750 2300.78     752 2327.25     752
 2334.68     750 2669.51     750 2674.11  749.94 2917.51  750.78 2927.07  750.75
 2943.96  751.59 2946.03  751.55 2946.14  751.55 2970.44     752 3101.81   752.3
  3295.4     752 3321.59  752.54 3456.45     754 3493.98  755.45    3498  755.65
 3500.21  755.72 3501.35  755.77 3509.33     756 3510.24  756.39 3510.56   756.8
  3512.1     758 3514.56  759.52 3514.91  759.72  3515.2     760 3544.05  760.13
 3574.35  761.62 3575.57  761.66 3581.41     762 3608.74     764 3609.15     764
 3630.99     766 3650.38  774.62  3653.4     776 3657.53  777.97  3657.8  778.09
 3669.79  783.98 3669.91  784.04 3673.97     786 3679.18   786.8 3684.86  787.13
 3689.59  787.62 3698.09  787.87 3698.78  787.92 3700.27  787.95 3700.85  787.91
 3705.48     788 3710.48  787.94 3712.17  787.74 3718.57  787.22 3722.22  786.79
  3727.1     786 3734.76     786 3752.41     794 3763.28     794 3811.66     792
 3818.87     792

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0     .05  803.41    .027 1164.56     .04 1462.13     .15 1762.42     .04
 1834.44     .15 1921.33     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        803.41 1164.56          137.38  341.14  256.81             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1571    2880     752       F
    2880    3680     778       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2230    2880     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  737.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *          *   0.027  *          *
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* W.S. Elev (ft)         *  736.94  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)         *  724.17  * Flow Area (sq ft)      *          * 3409.77  *          *
* E.G. Slope (ft/ft)     *0.000145  * Area (sq ft)           *          * 3409.77  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  257.29  * Top Width (ft)         *          *  257.29  *          *
* Vel Total (ft/s)       *    3.67  * Avg. Vel. (ft/s)       *          *    3.67  *          *
* Max Chl Dpth (ft)      *   21.09  * Hydr. Depth (ft)       *          *   13.25  *          *
* Conv. Total (cfs)      *1036878.0  * Conv. (cfs)            *          *1036878.0  *          *
* Length Wtd. (ft)       *  341.14  * Wetted Per. (ft)       *          *  262.52  *          *
* Min Ch El (ft)         *  715.85  * Shear (lb/sq ft)       *          *    0.12  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.43  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          * 1434.81  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  120.50  *          *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  741.77  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.50  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)         *  726.44  * Flow Area (sq ft)      *          * 4652.54  *          *
* E.G. Slope (ft/ft)     *0.000147  * Area (sq ft)           *          * 4652.54  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  289.04  * Top Width (ft)         *          *  289.04  *          *
* Vel Total (ft/s)       *    4.19  * Avg. Vel. (ft/s)       *          *    4.19  *          *
* Max Chl Dpth (ft)      *   25.65  * Hydr. Depth (ft)       *          *   16.10  *          *
* Conv. Total (cfs)      *1608121.0  * Conv. (cfs)            *          *1608121.0  *          *
* Length Wtd. (ft)       *  341.12  * Wetted Per. (ft)       *          *  295.59  *          *
* Min Ch El (ft)         *  715.85  * Shear (lb/sq ft)       *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.61  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.51  * 1952.53  *    6.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.36  *  136.72  *    8.33  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  745.54  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.027  *   0.040  *
* W.S. Elev (ft)         *  745.22  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)         *  728.47  * Flow Area (sq ft)      *          * 5884.44  *  172.94  *
* E.G. Slope (ft/ft)     *0.000165  * Area (sq ft)           *          * 5884.44  *  172.94  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26509.35  *   90.65  *
* Top Width (ft)         *  507.79  * Top Width (ft)         *          *  357.88  *  149.91  *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *          *    4.50  *    0.52  *
* Max Chl Dpth (ft)      *   29.37  * Hydr. Depth (ft)       *          *   16.44  *    1.15  *
* Conv. Total (cfs)      *2073486.0  * Conv. (cfs)            *          *2066420.0  *  7066.0  *
* Length Wtd. (ft)       *  340.59  * Wetted Per. (ft)       *          *  365.07  *  149.93  *
* Min Ch El (ft)         *  715.85  * Shear (lb/sq ft)       *          *    0.17  *    0.01  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *          *    0.75  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   15.75  * 2394.91  *   56.06  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    9.30  *  147.61  *   28.33  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  749.25  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *   0.050  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  748.94  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)         *  730.54  * Flow Area (sq ft)      *  257.54  * 7224.06  *  965.39  *
* E.G. Slope (ft/ft)     *0.000131  * Area (sq ft)           *  257.54  * 7224.06  *  965.39  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  134.99  *33105.94  *  959.07  *
* Top Width (ft)         *  766.28  * Top Width (ft)         *  134.69  *  361.15  *  270.45  *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *    0.52  *    4.58  *    0.99  *
* Max Chl Dpth (ft)      *   33.09  * Hydr. Depth (ft)       *    1.91  *   20.00  *    3.57  *
* Conv. Total (cfs)      *2986382.0  * Conv. (cfs)            * 11787.3  *2890847.0  * 83746.8  *
* Length Wtd. (ft)       *  337.83  * Wetted Per. (ft)       *  134.75  *  368.44  *  270.52  *
* Min Ch El (ft)         *  715.85  * Shear (lb/sq ft)       *    0.02  *    0.16  *    0.03  *
```

```
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    0.01  *    0.74  *    0.03  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   54.40  * 2823.66  *  175.02  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   24.99  *  154.74  *   58.07  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.050  *   0.027  *   0.051  *
* W.S. Elev (ft)         *  754.66  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)         *  733.02  * Flow Area (sq ft)      * 1444.95  * 9291.06  * 6006.24  *
* E.G. Slope (ft/ft)     *0.000079  * Area (sq ft)           * 1444.95  * 9291.06  * 7399.02  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1014.15  *39186.52  * 5299.32  *
* Top Width (ft)         * 2354.92  * Top Width (ft)         *  334.78  *  361.15  * 1658.99  *
* Vel Total (ft/s)       *    2.72  * Avg. Vel. (ft/s)       *    0.70  *    4.22  *    0.88  *
* Max Chl Dpth (ft)      *   38.81  * Hydr. Depth (ft)       *    4.32  *   25.73  *    5.64  *
* Conv. Total (cfs)      *5105519.0  * Conv. (cfs)            *113797.1  *4397089.0  *594633.0  *
* Length Wtd. (ft)       *  327.83  * Wetted Per. (ft)       *  334.95  *  368.44  * 1069.03  *
* Min Ch El (ft)         *  715.85  * Shear (lb/sq ft)       *    0.02  *    0.13  *    0.03  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    0.02  *    0.53  *    0.02  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  246.94  * 3460.91  *  546.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  109.35  *  159.86  *  137.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.050  *   0.027  *   0.053  *
* W.S. Elev (ft)         *  757.19  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)         *  734.54  * Flow Area (sq ft)      * 2583.60  *10205.14  * 8702.87  *
* E.G. Slope (ft/ft)     *0.000073  * Area (sq ft)           * 2583.60  *10205.14  *11664.79  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1835.15  *43892.48  * 8672.38  *
* Top Width (ft)         * 2608.88  * Top Width (ft)         *  551.22  *  361.15  * 1696.50  *
* Vel Total (ft/s)       *    2.53  * Avg. Vel. (ft/s)       *    0.71  *    4.30  *    1.00  *
* Max Chl Dpth (ft)      *   41.34  * Hydr. Depth (ft)       *    4.69  *   28.26  *    8.17  *
* Conv. Total (cfs)      *6372303.0  * Conv. (cfs)            *214965.6  *5141474.0  *1015864.0  *
* Length Wtd. (ft)       *  321.95  * Wetted Per. (ft)       *  551.50  *  368.44  * 1071.56  *
* Min Ch El (ft)         *  715.85  * Shear (lb/sq ft)       *    0.02  *    0.13  *    0.04  *
* Alpha                  *    2.36  * Stream Power (lb/ft s) *    0.02  *    0.54  *    0.04  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  619.39  * 3891.16  *  986.80  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  172.05  *  161.87  *  239.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.050  *   0.027  *   0.054  *
* W.S. Elev (ft)         *  758.79  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)         *  735.87  * Flow Area (sq ft)      * 3469.36  *10780.70  *10400.85  *
* E.G. Slope (ft/ft)     *0.000074  * Area (sq ft)           * 3469.36  *10780.70  *14370.22  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2996.25  *48548.64  *11455.12  *
* Top Width (ft)         * 2619.75  * Top Width (ft)         *  559.79  *  361.15  * 1698.81  *
* Vel Total (ft/s)       *    2.56  * Avg. Vel. (ft/s)       *    0.86  *    4.50  *    1.10  *
* Max Chl Dpth (ft)      *   42.94  * Hydr. Depth (ft)       *    6.20  *   29.85  *    9.76  *
* Conv. Total (cfs)      *7310792.0  * Conv. (cfs)            *347697.4  *5633793.0  *1329301.0  *
* Length Wtd. (ft)       *  317.99  * Wetted Per. (ft)       *  560.22  *  368.44  * 1073.15  *
* Min Ch El (ft)         *  715.85  * Shear (lb/sq ft)       *    0.03  *    0.14  *    0.04  *
* Alpha                  *    2.43  * Stream Power (lb/ft s) *    0.02  *    0.61  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  917.99  * 4155.96  * 1464.46  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  197.83  *  162.13  *  397.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  761.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.24  * Wt. n-Val.             *   0.050  *   0.027  *   0.055  *
* W.S. Elev (ft)          *  761.53  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)          *  737.72  * Flow Area (sq ft)      * 5025.97  *11773.62  *13330.09  *
* E.G. Slope (ft/ft)      *0.000069  * Area (sq ft)           * 5025.97  *11773.62  *19107.26  *
* Q Total (cfs)           *75900.00  * Flow (cfs)             * 5291.19  *54364.75  *16244.06  *
* Top Width (ft)          * 2691.78  * Top Width (ft)         *  572.57  *  361.15  * 1758.06  *
* Vel Total (ft/s)        *    2.52  * Avg. Vel. (ft/s)       *    1.05  *    4.62  *    1.22  *
* Max Chl Dpth (ft)       *   45.68  * Hydr. Depth (ft)       *    8.78  *   32.60  *   12.51  *
* Conv. Total (cfs)       *9109553.0  * Conv. (cfs)           *635051.1  *6524882.0  *1949620.0  *
* Length Wtd. (ft)        *  311.69  * Wetted Per. (ft)       *  573.29  *  368.44  * 1075.90  *
* Min Ch El (ft)          *  715.85  * Shear (lb/sq ft)       *    0.04  *    0.14  *    0.05  *
* Alpha                   *    2.47  * Stream Power (lb/ft s) *    0.04  *    0.64  *    0.07  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)   * 1521.07  * 4573.89  * 2626.36  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *  239.51  *  162.76  *  580.28  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)          *  751.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.30  * Wt. n-Val.             *   0.050  *   0.027  *   0.041  *
* W.S. Elev (ft)          *  750.87  * Reach Len. (ft)        *  137.38  *  341.14  *  256.81  *
* Crit W.S. (ft)          *  731.59  * Flow Area (sq ft)      *  551.87  * 7922.76  * 1621.60  *
* E.G. Slope (ft/ft)      *0.000115  * Area (sq ft)           *  551.87  * 7922.76  * 2059.50  *
* Q Total (cfs)           *38300.00  * Flow (cfs)             *  383.95  *36100.98  * 1815.07  *
* Top Width (ft)          * 1493.34  * Top Width (ft)         *  170.59  *  361.15  *  961.60  *
* Vel Total (ft/s)        *    3.79  * Avg. Vel. (ft/s)       *    0.70  *    4.56  *    1.12  *
* Max Chl Dpth (ft)       *   35.02  * Hydr. Depth (ft)       *    3.24  *   21.94  *    3.99  *
* Conv. Total (cfs)       *3577089.0  * Conv. (cfs)           * 35859.5  *3371707.0  *169521.6  *
* Length Wtd. (ft)        *  335.80  * Wetted Per. (ft)       *  170.70  *  368.44  *  406.54  *
* Min Ch El (ft)          *  715.85  * Shear (lb/sq ft)       *    0.02  *    0.15  *    0.03  *
* Alpha                   *    1.36  * Stream Power (lb/ft s) *    0.02  *    0.70  *    0.03  *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)   *   91.03  * 3041.77  *  266.30  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   42.03  *  157.26  *   73.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.325

INPUT
Description: Expanded section u/s of RR Bridge B-15

COE
             Riverstation=39731.83
Preliminary Model
             Riverstation=1130.682

Equivelant to RS 5.31 from previous FIS
             Submittal
Station Elevation Data    num=     241
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  789.58   22.26     786   25.14  785.65   36.77     784   45.16     780
   48.94     778   55.88     774   95.28     774  121.95  773.26  128.58   772.9
  130.39  772.89  143.34     772  176.94     768  224.37  763.75  247.27     762
  250.87  761.79  251.43  761.77  252.08  761.76  292.21     760  303.78  759.15
  307.93  759.03  313.36  758.73  317.36  758.64  320.67  758.48  334.15  758.24
  336.09  758.17  346.98     758  366.57   756.6  374.11  756.03  374.52     756
     395  754.97  412.79     754  436.57     754  482.23  752.39  490.44  752.28
  503.65  752.33  520.47     752  524.58     752  533.22  751.58  534.62  751.49
  559.31  750.28  563.81  750.21  564.22  750.19  572.23     750   638.5     750
  680.96  750.47  731.05  750.31  770.51  750.08  775.12  750.15   817.3     750
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  855.47     748  884.84   746.3  888.93  746.14  889.57   746.1  891.89     746
   918.7  745.41  947.82  744.53  951.67     744  958.41     744  958.86  743.98
  959.02  743.98  963.24  743.72  964.28   743.7     982  743.03 1018.15   742.3
 1024.17     742 1024.55     742 1043.18  740.91 1059.04  740.29 1060.11  740.21
 1060.33  740.22 1062.07     740 1063.75     740 1063.97     740 1065.34  739.54
 1066.16  739.22 1069.18     738 1070.34  737.64 1070.78  737.47 1074.92     736
 1078.99   734.7    1081     734 1082.91  733.47  1087.6     732 1088.11  731.91
  1088.3  731.89 1090.97  731.49 1092.39  731.32 1094.93  730.97 1102.84     730
 1104.42  729.72 1105.02  729.67 1108.11  729.19 1109.68  729.07 1118.55     728
  1118.8     728 1123.66     726 1123.86  725.91 1133.35     722 1135.26  721.18
 1138.12     720 1179.51   715.7 1201.51   715.7 1223.51   715.7 1264.89     720
  1275.6  723.95 1275.97  724.09 1286.89     728 1304.27     730 1317.07     732
  1343.9     740 1349.67     742 1362.52     744  1428.2     746 1508.56     748
 1556.64  749.73 1574.96  750.29 1618.85  751.08 1651.38     752 1692.75  751.98
 1693.11  751.99 1744.26   750.7 1896.56  751.96 1913.97  751.62 1914.79  751.64
 1926.78  751.44 1960.34     750 1963.04     750 2014.04  751.67 2029.78  751.53
 2034.75  751.66 2068.77     752 2119.33  751.21 2234.35     750 2495.96     750
 2505.14  748.42 2510.41  748.54 2512.86  748.65 2543.15  748.28 2603.58  748.71
 2720.82     750 2860.51     750 2910.84   750.6 2993.26     752 3354.16  752.18
 3354.56  752.19 3354.99  752.19 3356.76  752.22  3357.2  752.22 3474.73     754
 3491.66     754    3533     756 3562.45     758 3563.13  758.41 3565.86     760
 3573.03  761.47 3579.28     762 3580.92  762.09 3581.41  762.13 3587.86  762.51
 3589.08  762.66 3593.23  763.27 3595.53  763.48 3598.04     764 3600.69  765.18
 3615.06     772 3615.24  772.08 3644.77     786 3648.88     788 3656.24     788
 3691.67  788.52 3695.53   788.3    3699  788.55 3703.42  789.72 3704.18  789.89
 3704.49     790 3704.81  790.14  3709.4     792 3717.27  792.33 3725.32  793.45
 3772.25     792 3848.97     792 3849.88  791.88 3862.58     790 3863.16  789.86
 3870.19     788 3874.09     786 3887.11     786 3907.33  785.18 3925.92  785.97
 3926.18     786 3926.22  786.26 3926.35  787.06 3926.51     788 3926.79  789.59
 3926.87     790 3927.27     792 3927.51  793.21 3927.67     794 3927.96  795.26
 3928.14     796 3928.25  796.49 3928.61     798 3928.81  798.82 3929.08     800
 3929.34  800.96  3929.6     802 3929.97  803.35 3930.15     804 3930.69     806
 3931.07  807.43 3931.22     808 3931.39  808.61 3931.65  809.55 3931.77     810
 3933.37  810.34 3942.46     812 3952.11     814 3958.37     816 3958.55  816.05
 3964.94     818 3975.12  820.83 3979.01     822 3979.11     822 3987.65     824
 3995.63     826 4034.58     834 4080.22     842 4094.02     844  4115.4  847.59
 4125.07  849.02 4149.87     852 4172.38  854.27 4192.88     856 4222.27     856
 4229.77  856.42 4230.55  856.44 4235.16  856.68 4237.59  856.71    4242  856.92
 4248.65  857.04

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0      .1 1063.75    .027 1362.52     .04 1556.64     .15 1896.56     .04
 1926.78     .15 2014.04     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1063.75 1362.52             150  311.97      72             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    3225 4248.65     780       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    2072    3225     780

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  737.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  736.91  * Reach Len. (ft)        *  150.00  *  311.97  *   72.00  *
* Crit W.S. (ft)         *  723.85  * Flow Area (sq ft)      *          * 3552.21  *          *
* E.G. Slope (ft/ft)     *0.000129  * Area (sq ft)           *          * 3552.21  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  261.15  * Top Width (ft)         *          *  261.15  *          *
* Vel Total (ft/s)       *    3.52  * Avg. Vel. (ft/s)       *          *    3.52  *          *
* Max Chl Dpth (ft)      *   21.21  * Hydr. Depth (ft)       *          *   13.60  *          *
* Conv. Total (cfs)      *1098656.0  * Conv. (cfs)            *          *1098656.0  *          *
* Length Wtd. (ft)       *  311.97  * Wetted Per. (ft)       *          *  266.63  *          *
* Min Ch El (ft)         *  715.70  * Shear (lb/sq ft)       *          *    0.11  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.38  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          * 1407.55  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *  118.47  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	741.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.100	0.027	
W.S. Elev (ft)	741.47	Reach Len. (ft)	150.00	311.97	72.00
Crit W.S. (ft)	726.08	Flow Area (sq ft)	22.81	4803.51	
E.G. Slope (ft/ft)	0.000129	Area (sq ft)	22.81	4803.51	
Q Total (cfs)	19500.00	Flow (cfs)	3.20	19496.80	
Top Width (ft)	314.47	Top Width (ft)	30.09	284.38	
Vel Total (ft/s)	4.04	Avg. Vel. (ft/s)	0.14	4.06	
Max Chl Dpth (ft)	25.77	Hydr. Depth (ft)	0.76	16.89	
Conv. Total (cfs)	1713686.0	Conv. (cfs)	281.4	1713404.0	
Length Wtd. (ft)	311.96	Wetted Per. (ft)	30.14	291.11	
Min Ch El (ft)	715.70	Shear (lb/sq ft)	0.01	0.13	
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.54	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.48	1915.50	6.16
C & E Loss (ft)	0.01	Cum SA (acres)	2.32	134.47	8.33

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	745.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.100	0.027	0.040
W.S. Elev (ft)	745.18	Reach Len. (ft)	150.00	311.97	72.00
Crit W.S. (ft)	728.02	Flow Area (sq ft)	334.24	5891.54	22.71
E.G. Slope (ft/ft)	0.000129	Area (sq ft)	334.24	5891.54	22.71
Q Total (cfs)	26600.00	Flow (cfs)	102.09	26491.18	6.73
Top Width (ft)	474.70	Top Width (ft)	137.31	298.77	38.62
Vel Total (ft/s)	4.26	Avg. Vel. (ft/s)	0.31	4.50	0.30
Max Chl Dpth (ft)	29.48	Hydr. Depth (ft)	2.43	19.72	0.59
Conv. Total (cfs)	2340046.0	Conv. (cfs)	8981.2	2330473.0	591.9
Length Wtd. (ft)	311.63	Wetted Per. (ft)	137.45	305.74	38.64
Min Ch El (ft)	715.70	Shear (lb/sq ft)	0.02	0.16	0.00
Alpha	1.11	Stream Power (lb/ft s)	0.01	0.70	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	15.23	2348.80	55.49
C & E Loss (ft)	0.02	Cum SA (acres)	9.09	145.04	27.77

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	749.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.100	0.027	0.040
W.S. Elev (ft)	748.86	Reach Len. (ft)	150.00	311.97	72.00
Crit W.S. (ft)	730.17	Flow Area (sq ft)	1028.89	6992.54	413.47
E.G. Slope (ft/ft)	0.000116	Area (sq ft)	1028.89	6992.54	413.47
Q Total (cfs)	34200.00	Flow (cfs)	454.41	33446.00	299.58
Top Width (ft)	693.46	Top Width (ft)	224.72	298.77	169.97
Vel Total (ft/s)	4.05	Avg. Vel. (ft/s)	0.44	4.78	0.72
Max Chl Dpth (ft)	33.16	Hydr. Depth (ft)	4.58	23.40	2.43
Conv. Total (cfs)	3170564.0	Conv. (cfs)	42126.9	3100664.0	27773.4
Length Wtd. (ft)	309.84	Wetted Per. (ft)	224.95	305.74	170.04
Min Ch El (ft)	715.70	Shear (lb/sq ft)	0.03	0.17	0.02
Alpha	1.36	Stream Power (lb/ft s)	0.01	0.79	0.01
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	52.37	2768.00	170.95
C & E Loss (ft)	0.03	Cum SA (acres)	24.43	152.16	56.77

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	754.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.100	0.027	0.054
W.S. Elev (ft)	754.55	Reach Len. (ft)	150.00	311.97	72.00
Crit W.S. (ft)	732.52	Flow Area (sq ft)	3841.63	8691.01	3195.16
E.G. Slope (ft/ft)	0.000086	Area (sq ft)	3841.63	8691.01	3693.14
Q Total (cfs)	45500.00	Flow (cfs)	1710.55	41311.89	2477.56

```
* Top Width (ft)         * 1947.17  * Top Width (ft)         *  660.97  *  298.77  *  987.43  *
* Vel Total (ft/s)       *    2.89  * Avg. Vel. (ft/s)       *    0.45  *    4.75  *    0.78  *
* Max Chl Dpth (ft)      *   38.85  * Hydr. Depth (ft)       *    5.81  *   29.09  *    4.50  *
* Conv. Total (cfs)      *4906629.0  * Conv. (cfs)           *184462.0  *4454992.0  *267175.2  *
* Length Wtd. (ft)       *  299.92  * Wetted Per. (ft)       *  661.33  *  305.74  *  712.28  *
* Min Ch El (ft)         *  715.70  * Shear (lb/sq ft)       *    0.03  *    0.15  *    0.02  *
* Alpha                  *    2.46  * Stream Power (lb/ft s) *    0.01  *    0.73  *    0.02  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  238.60  * 3390.50  *  513.88  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  107.78  *  157.28  *  129.56  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.39  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.100  *   0.027  *   0.059  *
* W.S. Elev (ft)         *  757.06  * Reach Len. (ft)        *  150.00  *  311.97  *   72.00  *
* Crit W.S. (ft)         *  734.00  * Flow Area (sq ft)      * 5558.79  * 9441.18  * 4976.57  *
* E.G. Slope (ft/ft)     *0.000085  * Area (sq ft)           * 5558.79  * 9441.18  * 6234.27  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 3010.97  *47014.96  * 4374.07  *
* Top Width (ft)         * 2035.39  * Top Width (ft)         *  703.57  *  298.77  * 1033.04  *
* Vel Total (ft/s)       *    2.72  * Avg. Vel. (ft/s)       *    0.54  *    4.98  *    0.88  *
* Max Chl Dpth (ft)      *   41.36  * Hydr. Depth (ft)       *    7.90  *   31.60  *    7.01  *
* Conv. Total (cfs)      *5917476.0  * Conv. (cfs)           *327524.7  *5114153.0  *475798.3  *
* Length Wtd. (ft)       *  292.45  * Wetted Per. (ft)       *  704.01  *  305.74  *  714.79  *
* Min Ch El (ft)         *  715.70  * Shear (lb/sq ft)       *    0.04  *    0.16  *    0.04  *
* Alpha                  *    2.90  * Stream Power (lb/ft s) *    0.02  *    0.81  *    0.03  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  606.55  * 3814.23  *  934.04  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  170.07  *  159.29  *  231.80  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.99  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.100  *   0.027  *   0.062  *
* W.S. Elev (ft)         *  758.62  * Reach Len. (ft)        *  150.00  *  311.97  *   72.00  *
* Crit W.S. (ft)         *  735.30  * Flow Area (sq ft)      * 6683.48  * 9908.26  * 6085.74  *
* E.G. Slope (ft/ft)     *0.000091  * Area (sq ft)           * 6683.48  * 9908.26  * 7864.77  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4086.12  *52889.97  * 6023.91  *
* Top Width (ft)         * 2092.72  * Top Width (ft)         *  745.98  *  298.77  * 1047.97  *
* Vel Total (ft/s)       *    2.78  * Avg. Vel. (ft/s)       *    0.61  *    5.34  *    0.99  *
* Max Chl Dpth (ft)      *   42.92  * Hydr. Depth (ft)       *    8.96  *   33.16  *    8.58  *
* Conv. Total (cfs)      *6602264.0  * Conv. (cfs)           *428216.1  *5542755.0  *631292.8  *
* Length Wtd. (ft)       *  288.03  * Wetted Per. (ft)       *  746.46  *  305.74  *  716.36  *
* Min Ch El (ft)         *  715.70  * Shear (lb/sq ft)       *    0.05  *    0.18  *    0.05  *
* Alpha                  *    3.11  * Stream Power (lb/ft s) *    0.03  *    0.98  *    0.05  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  901.98  * 4074.95  * 1398.91  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  195.77  *  159.54  *  389.45  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.100  *   0.027  *   0.064  *
* W.S. Elev (ft)         *  761.34  * Reach Len. (ft)        *  150.00  *  311.97  *   72.00  *
* Crit W.S. (ft)         *  737.12  * Flow Area (sq ft)      * 8785.36  *10719.98  * 8013.29  *
* E.G. Slope (ft/ft)     *0.000092  * Area (sq ft)           * 8785.36  *10719.98  *10721.12  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6177.67  *60665.36  * 9056.96  *
* Top Width (ft)         * 2157.66  * Top Width (ft)         *  802.03  *  298.77  * 1056.86  *
```

```
* Vel Total (ft/s)       *    2.76  * Avg. Vel. (ft/s)       *    0.70  *    5.66  *    1.13  *
* Max Chl Dpth (ft)      *   45.64  * Hydr. Depth (ft)       *   10.95  *   35.88  *   11.29  *
* Conv. Total (cfs)      *7907161.0  * Conv. (cfs)            *643581.8  *6320037.0  *943542.1  *
* Length Wtd. (ft)       *  280.72  * Wetted Per. (ft)       *  802.58  *  305.74  *  719.07  *
* Min Ch El (ft)         *  715.70  * Shear (lb/sq ft)       *    0.06  *    0.20  *    0.06  *
* Alpha                  *    3.39  * Stream Power (lb/ft s) *    0.04  *    1.14  *    0.07  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1499.29  * 4485.81  * 2538.43  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  237.34  *  160.18  *  571.98  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  751.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.100  *   0.027  *   0.040  *
* W.S. Elev (ft)         *  750.78  * Reach Len. (ft)        *  150.00  *  311.97  *   72.00  *
* Crit W.S. (ft)         *  731.12  * Flow Area (sq ft)      * 1647.86  * 7564.39  *  813.80  *
* E.G. Slope (ft/ft)     *0.000109  * Area (sq ft)           * 1647.86  * 7564.39  *  813.80  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  556.44  *36984.16  *  759.40  *
* Top Width (ft)         * 1109.21  * Top Width (ft)         *  514.54  *  298.77  *  295.89  *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *    0.34  *    4.89  *    0.93  *
* Max Chl Dpth (ft)      *   35.08  * Hydr. Depth (ft)       *    3.20  *   25.32  *    2.75  *
* Conv. Total (cfs)      *3660459.0  * Conv. (cfs)            * 53180.8  *3534700.0  * 72578.2  *
* Length Wtd. (ft)       *  308.38  * Wetted Per. (ft)       *  514.82  *  305.74  *  296.02  *
* Min Ch El (ft)         *  715.70  * Shear (lb/sq ft)       *    0.02  *    0.17  *    0.02  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *    0.01  *    0.83  *    0.02  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   87.56  * 2981.13  *  257.83  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   40.95  *  154.68  *   70.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.266

INPUT
Description: u/s face RR Bridge B-15

COE Riverstation=40043.80
Preliminary
             Model Riverstation=842.874

Equivelant to RS 5.26 from previous
             FIS Submittal
Station Elevation Data    num=     127
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     775      25     776    69.5     776    97.5     774   118.2     772
   168.9     770   192.7     768     219     766   284.2     764   315.2     762
   419.1     760   478.6     758   523.5     756   569.5     754   660.6     752
   902.2     752  1160.8     750  1190.7     748  1231.5     746  1260.9     746
  1275.6     748  1286.7     750  1312.4     750  1314.3     748  1315.9     746
  1318.4     744  1322.7     742  1327.3     740  1331.7     738  1336.1     736
  1340.3     734  1344.7     732  1348.9     730    1353     728    1358     726
  1363.5     724  1369.1     722  1374.4     720 1396.71  719.52 1408.71  715.52
 1430.71  715.52 1452.71  715.52 1464.71  719.52    1487     720  1492.3     722
  1497.9     724  1503.4     726  1508.9     728  1514.3     730  1519.5     732
  1525.1     734  1530.3     736  1535.5     738  1540.5     740  1541.3     742
  1541.7     744  1541.8     746  1541.9     748    1542     750  1619.6     750
  1641.8     752  1683.3     752  1997.4     750  2319.7     750  2332.4     748
  2417.1     748  2574.5     750  2658.3     750  2824.3     752  3137.9     752
  3350.9     754    3399     756  3408.5     758  3441.4     760  3445.7     762
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  3449.9     764  3454.2     766  3458.5     768  3462.6     770    3467     772
  3470.7     774  3474.6     776  3478.6     778  3482.7     780  3486.5     782
  3490.4     784  3494.3     786  3498.1     788  3504.7     790  3625.6     792
  3628.3     792  3694.7     790  3703.3     788  3755.1     786  3766.3     786
  3773.5     788  3779.6     790  3783.4     792  3784.4     794  3785.4     796
  3786.3     798  3787.3     800  3788.3     802  3789.3     804  3790.4     806
  3791.7     808    3793     810  3799.6     812  3826.9     814  3834.9     816
  3840.8     818  3846.7     820  3852.6     822  3858.6     824  3865.2     826
  3871.8     828  3878.4     830  3885.7     832  3893.2     834  3900.5     836
  3909.1     838  3918.9     840  3929.2     842  3940.4     844    3952     846
  3963.8     848    3976     850

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0      .1  1312.4    .028    1542     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1312.4    1542             22.2    22.2    22.2              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     760     780       F
    3125    3976     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************************************
     460     640     780     760    1160     780  1160.8  1286.7     750
    1825    3125     780

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  737.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  736.75  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  724.86  * Flow Area (sq ft)      *          * 2888.57  *          *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *          * 2888.57  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  197.79  * Top Width (ft)         *          *  197.79  *          *
* Vel Total (ft/s)       *    4.33  * Avg. Vel. (ft/s)       *          *    4.33  *          *
* Max Chl Dpth (ft)      *   21.23  * Hydr. Depth (ft)       *          *   14.60  *          *
* Conv. Total (cfs)      *892792.7  * Conv. (cfs)            *          *892792.7  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  205.51  *          *
* Min Ch El (ft)         *  715.52  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.74  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          * 1384.48  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *  116.83  *          *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  741.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  741.25  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  727.18  * Flow Area (sq ft)      *          * 3826.37  *          *
* E.G. Slope (ft/ft)     *0.000213  * Area (sq ft)           *          * 3826.37  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  216.59  * Top Width (ft)         *          *  216.59  *          *
* Vel Total (ft/s)       *    5.10  * Avg. Vel. (ft/s)       *          *    5.10  *          *
* Max Chl Dpth (ft)      *   25.73  * Hydr. Depth (ft)       *          *   17.67  *          *
* Conv. Total (cfs)      *1335980.0  * Conv. (cfs)            *          *1335980.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  226.74  *          *
* Min Ch El (ft)         *  715.52  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.14  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  * 1884.60  *    6.16  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *  132.68  *    8.33  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	745.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.028	
W.S. Elev (ft)	744.90	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	729.17	Flow Area (sq ft)		4633.24	
E.G. Slope (ft/ft)	0.000224	Area (sq ft)		4633.24	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	224.48	Top Width (ft)		224.48	
Vel Total (ft/s)	5.74	Avg. Vel. (ft/s)		5.74	
Max Chl Dpth (ft)	29.38	Hydr. Depth (ft)		20.64	
Conv. Total (cfs)	1776615.0	Conv. (cfs)		1776615.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		238.55	
Min Ch El (ft)	715.52	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.56	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	14.65	2311.11	55.47
C & E Loss (ft)	0.02	Cum SA (acres)	8.85	143.16	27.74

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	749.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.028	
W.S. Elev (ft)	748.52	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	731.03	Flow Area (sq ft)		5452.41	
E.G. Slope (ft/ft)	0.000226	Area (sq ft)		5452.41	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	
Top Width (ft)	228.12	Top Width (ft)		228.12	
Vel Total (ft/s)	6.27	Avg. Vel. (ft/s)		6.27	
Max Chl Dpth (ft)	33.00	Hydr. Depth (ft)		23.90	
Conv. Total (cfs)	2275678.0	Conv. (cfs)		2275678.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		247.21	
Min Ch El (ft)	715.52	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.95	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	50.60	2723.43	170.61
C & E Loss (ft)	0.03	Cum SA (acres)	24.04	150.27	56.63

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	754.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.	0.100	0.028	0.050
W.S. Elev (ft)	754.13	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	733.52	Flow Area (sq ft)	629.99	6739.66	845.19
E.G. Slope (ft/ft)	0.000192	Area (sq ft)	881.38	6739.66	1114.43
Q Total (cfs)	45500.00	Flow (cfs)	328.08	44455.67	716.25
Top Width (ft)	1014.12	Top Width (ft)	272.40	229.60	512.12
Vel Total (ft/s)	5.54	Avg. Vel. (ft/s)	0.52	6.60	0.85
Max Chl Dpth (ft)	38.61	Hydr. Depth (ft)	4.13	29.35	2.99
Conv. Total (cfs)	3284894.0	Conv. (cfs)	23685.8	3209498.0	51709.9
Length Wtd. (ft)	1.00	Wetted Per. (ft)	156.53	250.72	286.13
Min Ch El (ft)	715.52	Shear (lb/sq ft)	0.05	0.32	0.04
Alpha	1.39	Stream Power (lb/ft s)	0.03	2.12	0.03
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	230.47	3335.24	509.91
C & E Loss (ft)	0.06	Cum SA (acres)	106.18	155.38	128.32

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	757.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.100	0.028	0.050
W.S. Elev (ft)	756.57	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	735.26	Flow Area (sq ft)	1001.50	7299.37	1535.07
E.G. Slope (ft/ft)	0.000199	Area (sq ft)	1545.43	7299.37	2431.15
Q Total (cfs)	54400.00	Flow (cfs)	716.21	51722.37	1961.42
Top Width (ft)	1061.72	Top Width (ft)	272.40	229.60	559.71
Vel Total (ft/s)	5.53	Avg. Vel. (ft/s)	0.72	7.09	1.28
Max Chl Dpth (ft)	41.05	Hydr. Depth (ft)	6.57	31.79	5.42
Conv. Total (cfs)	3855697.0	Conv. (cfs)	50762.7	3665915.0	139019.3
Length Wtd. (ft)	1.00	Wetted Per. (ft)	158.97	250.72	288.57
Min Ch El (ft)	715.52	Shear (lb/sq ft)	0.08	0.36	0.07
Alpha	1.56	Stream Power (lb/ft s)	0.06	2.56	0.08
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	594.32	3754.28	926.88
C & E Loss (ft)	0.04	Cum SA (acres)	168.39	157.40	230.49

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	758.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.100	0.028	0.050
W.S. Elev (ft)	758.04	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	736.83	Flow Area (sq ft)	1225.46	7636.78	1950.95
E.G. Slope (ft/ft)	0.000222	Area (sq ft)	1945.73	7636.78	3258.81
Q Total (cfs)	63000.00	Flow (cfs)	1051.89	58870.98	3077.13
Top Width (ft)	1069.18	Top Width (ft)	272.40	229.60	567.18
Vel Total (ft/s)	5.83	Avg. Vel. (ft/s)	0.86	7.71	1.58
Max Chl Dpth (ft)	42.52	Hydr. Depth (ft)	8.04	33.26	6.89
Conv. Total (cfs)	4229896.0	Conv. (cfs)	70625.2	3952668.0	206602.0
Length Wtd. (ft)	1.00	Wetted Per. (ft)	160.44	250.72	290.04
Min Ch El (ft)	715.52	Shear (lb/sq ft)	0.11	0.42	0.09
Alpha	1.64	Stream Power (lb/ft s)	0.09	3.25	0.15
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	887.12	4012.12	1389.72
C & E Loss (ft)	0.03	Cum SA (acres)	194.02	157.65	388.12

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	761.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.	0.100	0.028	0.050
W.S. Elev (ft)	760.65	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	739.00	Flow Area (sq ft)	1623.47	8236.40	2690.04
E.G. Slope (ft/ft)	0.000236	Area (sq ft)	2723.02	8236.40	4793.12
Q Total (cfs)	75900.00	Flow (cfs)	1713.43	68803.06	5383.51
Top Width (ft)	1177.61	Top Width (ft)	347.21	229.60	600.80
Vel Total (ft/s)	6.05	Avg. Vel. (ft/s)	1.06	8.35	2.00
Max Chl Dpth (ft)	45.13	Hydr. Depth (ft)	10.65	35.87	9.51
Conv. Total (cfs)	4945807.0	Conv. (cfs)	111650.7	4483356.0	350800.8
Length Wtd. (ft)	1.00	Wetted Per. (ft)	163.05	250.72	292.65
Min Ch El (ft)	715.52	Shear (lb/sq ft)	0.15	0.48	0.14
Alpha	1.74	Stream Power (lb/ft s)	0.15	4.03	0.27
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1479.48	4417.93	2525.61
C & E Loss (ft)	0.01	Cum SA (acres)	235.36	158.28	570.61

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

```
*****************************************************************************************
* E.G. Elev (ft)          *  751.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.66  * Wt. n-Val.             *   0.100  *   0.028  *   0.050  *
* W.S. Elev (ft)          *  750.40  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  731.98  * Flow Area (sq ft)      *   60.91  * 5882.32  *   31.90  *
* E.G. Slope (ft/ft)      *0.000224  * Area (sq ft)           *   60.91  * 5882.32  *   31.90  *
* Q Total (cfs)           *38300.00  * Flow (cfs)              *    7.34  *38285.10  *    7.56  *
* Top Width (ft)          *  464.04  * Top Width (ft)         *  152.40  *  229.60  *   82.04  *
* Vel Total (ft/s)        *    6.41  * Avg. Vel. (ft/s)       *    0.12  *    6.51  *    0.24  *
* Max Chl Dpth (ft)       *   34.88  * Hydr. Depth (ft)       *    0.40  *   25.62  *    0.39  *
* Conv. Total (cfs)       *2559313.0  * Conv. (cfs)           *   490.3  *2558318.0  *   505.1  *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)       *  152.79  *  250.72  *   82.05  *
* Min Ch El (ft)          *  715.52  * Shear (lb/sq ft)       *    0.01  *    0.33  *    0.01  *
* Alpha                   *    1.03  * Stream Power (lb/ft s) *    0.00  *    2.13  *    0.00  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)   *   84.62  * 2932.97  *  257.13  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   39.80  *  152.79  *   69.88  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 5.264

INPUT
Description: B-15
Distance from Upstream XS =       1
Deck/Roadway Width        =      20
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
 1317.54   753.3     700 1317.55   753.3   747.3 1381.08   753.3   747.3
 1381.09   754.3   747.3 1430.71   754.3   747.3 1480.35   754.3   747.3
 1480.36   753.3   747.3 1543.88   753.3   747.3 1543.89   753.3     700

Upstream Bridge Cross Section Data
Station Elevation Data    num=     127
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     775      25     776    69.5     776    97.5     774   118.2     772
   168.9     770   192.7     768     219     766   284.2     764   315.2     762
   419.1     760   478.6     758   523.5     756   569.5     754   660.6     752
   902.2     752  1160.8     750  1190.7     748  1231.5     746  1260.9     746
  1275.6     748  1286.7     750  1312.4     750  1314.3     748  1315.9     746
  1318.4     744  1322.7     742  1327.3     740  1331.7     738  1336.1     736
  1340.3     734  1344.7     732  1348.9     730    1353     728    1358     726
  1363.5     724  1369.1     722  1374.4     720 1396.71  719.52 1408.71  715.52
 1430.71  715.52 1452.71  715.52 1464.71  719.52    1487     720  1492.3     722
  1497.9     724  1503.4     726  1508.9     728  1514.3     730  1519.5     732
  1525.1     734  1530.3     736  1535.5     738  1540.5     740  1541.3     742
  1541.7     744  1541.8     746  1541.9     748    1542     750  1619.6     750
  1641.8     752  1683.3     752  1997.4     750  2319.7     750  2332.4     748
  2417.1     748  2574.5     750  2658.3     750  2824.3     752  3137.9     752
  3350.9     754    3399     756  3408.5     758  3441.4     760  3445.7     762
  3449.9     764  3454.2     766  3458.5     768  3462.6     770    3467     772
  3470.7     774  3474.6     776  3478.6     778  3482.7     780  3486.5     782
  3490.4     784  3494.3     786  3498.1     788  3504.7     790  3625.6     792
  3628.3     792  3694.7     790  3703.3     788  3755.1     786  3766.3     786
  3773.5     788  3779.6     790  3783.4     792  3784.4     794  3785.4     796
  3786.3     798  3787.3     800  3788.3     802  3789.3     804  3790.4     806
  3791.7     808    3793     810  3799.6     812  3826.9     814  3834.9     816
  3840.8     818  3846.7     820  3852.6     822  3858.6     824  3865.2     826
  3871.8     828  3878.4     830  3885.7     832  3893.2     834  3900.5     836
  3909.1     838  3918.9     840  3929.2     842  3940.4     844    3952     846
  3963.8     848    3976     850

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
```

```
       0      .1  1312.4    .028    1542     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
        1312.4    1542             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0     760     780       F
    3125    3976     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
     460     640     780     760    1160     780  1160.8  1286.7     750
    1825    3125     780

Downstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
 1317.54   753.3     700 1317.55   753.3   747.3 1381.08   753.3   747.3
 1381.09   754.3   747.3 1430.71   754.3   747.3 1480.35   754.3   747.3
 1480.36   753.3   747.3 1543.88   753.3   747.3 1543.89   753.3     700

Downstream Bridge Cross Section Data
Station Elevation Data    num=     127
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     775      25     776    69.5     776    97.5     774   118.2     772
   168.9     770   192.7     768     219     766   284.2     764   315.2     762
   419.1     760   478.6     758   523.5     756   569.5     754   660.6     752
   902.2     752  1160.8     750  1190.7     748  1231.5     746  1260.9     746
  1275.6     748  1286.7     750  1312.4     750  1314.3     748  1315.9     746
  1318.4     744  1322.7     742  1327.3     740  1331.7     738  1336.1     736
  1340.3     734  1344.7     732  1348.9     730    1353     728    1358     726
  1363.5     724  1369.1     722  1374.4     720 1396.71  719.48 1408.71  715.48
 1430.71  715.48 1452.71  715.48 1464.71  719.48    1487     720  1492.3     722
  1497.9     724  1503.4     726  1508.9     728  1514.3     730  1519.5     732
  1525.1     734  1530.3     736  1535.5     738  1540.5     740  1541.3     742
  1541.7     744  1541.8     746  1541.9     748    1542     750  1619.6     750
  1641.8     752  1683.3     752  1997.4     750  2319.7     750  2332.4     748
  2417.1     748  2574.5     750  2658.3     750  2824.3     752  3137.9     752
  3350.9     754    3399     756  3408.5     758  3441.4     760  3445.7     762
  3449.9     764  3454.2     766  3458.5     768  3462.6     770    3467     772
  3470.7     774  3474.6     776  3478.6     778  3482.7     780  3486.5     782
  3490.4     784  3494.3     786  3498.1     788  3504.7     790  3625.6     792
  3628.3     792  3694.7     790  3703.3     788  3755.1     786  3766.3     786
  3773.5     788  3779.6     790  3783.4     792  3784.4     794  3785.4     796
  3786.3     798  3787.3     800  3788.3     802  3789.3     804  3790.4     806
  3791.7     808    3793     810  3799.6     812  3826.9     814  3834.9     816
  3840.8     818  3846.7     820  3852.6     822  3858.6     824  3865.2     826
  3871.8     828  3878.4     830  3885.7     832  3893.2     834  3900.5     836
  3909.1     838  3918.9     840  3929.2     842  3940.4     844    3952     846
  3963.8     848    3976     850

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0      .1  1312.4    .028    1542     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
        1312.4    1542             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0     760     780       F
    3125    3976     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
     460     640     780     760    1160     780  1160.8  1286.7     750
    1825    3125     780

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
```

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Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream= 1381.08    Downstream= 1381.08
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    11.2   678.2    11.2   747.3
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    11.2   678.2    11.2   747.3

Pier Data
Pier Station     Upstream= 1480.35    Downstream= 1480.35
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    11.2   678.2    11.2   747.3
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    11.2   678.2    11.2   747.3

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     737.04  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     736.75  * E.G. Elev (ft)         *     737.08  *     737.08  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     736.69  *     736.69  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     725.44  *     725.39  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.17  *      21.21  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.00  *       4.99  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2500.72  *    2504.07  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   23581.74  *   23645.62  *
* Min El Weir Flow (ft)  *     744.70  * Hydr Depth (ft)        *      14.28  *      14.30  *
* Min El Prs (ft)        *     747.30  * W.P. Total (ft)        *     250.18  *     250.22  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *   615813.9  *   617108.5  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *     175.13  *     175.13  *
* BR Open Area (sq ft)   *    4555.59  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.00  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.26  *       0.26  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.29  *       1.28  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     741.66  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     741.25  * E.G. Elev (ft)         *     741.71  *     741.71  *
```

```
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     741.18  *     741.18  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     728.03  *     728.03  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.66  *      25.70  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.85  *       5.85  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3332.55  *    3335.90  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   38232.81  *   38310.73  *
* Min El Weir Flow (ft)  *     744.70  * Hydr Depth (ft)        *      17.18  *      17.20  *
* Min El Prs (ft)        *     747.30  * W.P. Total (ft)        *     289.35  *     289.40  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *   901943.0  *   903352.2  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *     193.98  *     193.98  *
* BR Open Area (sq ft)   *    4555.59  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.85  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.34  *       0.34  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.97  *       1.96  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     745.42  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     744.90  * E.G. Elev (ft)         *     745.40  *     745.39  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     744.73  *     744.72  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     730.24  *     730.21  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.21  *      29.24  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.59  *       6.59  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4035.94  *    4037.16  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   53192.00  *   53241.07  *
* Min El Weir Flow (ft)  *     744.70  * Hydr Depth (ft)        *      20.00  *      20.00  *
* Min El Prs (ft)        *     747.30  * W.P. Total (ft)        *     315.18  *     315.15  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  1172306.0  *  1172971.0  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *     201.83  *     201.82  *
* BR Open Area (sq ft)   *    4555.59  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *       6.59  * C & E Loss (ft)        *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.41  *       0.41  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.71  *       2.71  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     749.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     748.52  * E.G. Elev (ft)         *     749.11  *     749.08  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     748.23  *     748.21  *
* Q Bridge (cfs)         *   34189.66  * Crit W.S. (ft)         *     732.29  *     732.28  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.71  *      32.73  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.50  *       7.49  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4562.33  *    4565.60  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   71033.03  *   71030.44  *
* Min El Weir Flow (ft)  *     744.70  * Hydr Depth (ft)        *    1317.58  *    1326.67  *
* Min El Prs (ft)        *     747.30  * W.P. Total (ft)        *     541.02  *     541.02  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *  1003085.0  *  1004289.0  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *       3.46  *       3.44  *
* BR Open Area (sq ft)   *    4555.59  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       7.50  * C & E Loss (ft)        *       0.00  *       0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.61  *       0.61  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.59  *       4.58  *
*********************************************************************************************
```

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	754.79	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	754.13	E.G. Elev (ft)	754.73	754.68
Q Total (cfs)	45500.00	W.S. Elev (ft)	753.44	753.39
Q Bridge (cfs)	43296.16	Crit W.S. (ft)	734.98	734.95
Q Weir (cfs)		Max Chl Dpth (ft)	37.92	37.91
Weir Sta Lft (ft)		Vel Total (ft/s)	7.88	7.92
Weir Sta Rgt (ft)		Flow Area (sq ft)	5773.86	5745.03
Weir Submerg		Froude # Chl	0.26	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	101286.80	101132.30
Min El Weir Flow (ft)	744.70	Hydr Depth (ft)	10.21	10.16
Min El Prs (ft)	747.30	W.P. Total (ft)	1118.57	1118.39
Delta EG (ft)	0.30	Conv. Total (cfs)	930261.5	927207.8
Delta WS (ft)	0.32	Top Width (ft)	852.33	846.27
BR Open Area (sq ft)	4555.59	Frctn Loss (ft)	0.05	0.00
BR Open Vel (ft/s)	9.50	C & E Loss (ft)	0.00	0.18
Coef of Q		Shear Total (lb/sq ft)	0.77	0.77
Br Sel Method	Energy only	Power Total (lb/ft s)	6.08	6.12

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	757.31	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	756.57	E.G. Elev (ft)	757.28	757.23
Q Total (cfs)	54400.00	W.S. Elev (ft)	756.17	756.11
Q Bridge (cfs)	44569.34	Crit W.S. (ft)	736.85	736.85
Q Weir (cfs)		Max Chl Dpth (ft)	40.65	40.63
Weir Sta Lft (ft)		Vel Total (ft/s)	7.25	7.29
Weir Sta Rgt (ft)		Flow Area (sq ft)	7501.21	7466.89
Weir Submerg		Froude # Chl	0.23	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	120526.80	120301.60
Min El Weir Flow (ft)	744.70	Hydr Depth (ft)	11.28	11.23
Min El Prs (ft)	747.30	W.P. Total (ft)	1224.99	1224.93
Delta EG (ft)	0.19	Conv. Total (cfs)	1131178.0	1125182.0
Delta WS (ft)	0.21	Top Width (ft)	1059.80	1059.53
BR Open Area (sq ft)	4555.59	Frctn Loss (ft)	0.05	0.00
BR Open Vel (ft/s)	9.78	C & E Loss (ft)	0.00	0.11
Coef of Q		Shear Total (lb/sq ft)	0.88	0.89
Br Sel Method	Energy only	Power Total (lb/ft s)	6.41	6.48

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	758.91	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	758.04	E.G. Elev (ft)	758.88	758.83
Q Total (cfs)	63000.00	W.S. Elev (ft)	757.75	757.70
Q Bridge (cfs)	45710.63	Crit W.S. (ft)	738.54	738.53
Q Weir (cfs)		Max Chl Dpth (ft)	42.23	42.22
Weir Sta Lft (ft)		Vel Total (ft/s)	7.37	7.39
Weir Sta Rgt (ft)		Flow Area (sq ft)	8552.73	8520.36
Weir Submerg		Froude # Chl	0.23	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	135537.60	135282.90
Min El Weir Flow (ft)	744.70	Hydr Depth (ft)	12.86	12.81
Min El Prs (ft)	747.30	W.P. Total (ft)	1228.15	1228.09
Delta EG (ft)	0.15	Conv. Total (cfs)	1337351.0	1331064.0
Delta WS (ft)	0.16	Top Width (ft)	1067.31	1067.06
BR Open Area (sq ft)	4555.59	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	10.03	C & E Loss (ft)	0.00	0.08
Coef of Q		Shear Total (lb/sq ft)	0.96	0.97
Br Sel Method	Energy only	Power Total (lb/ft s)	7.11	7.17

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	761.64	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	760.65	E.G. Elev (ft)	761.63	761.59
Q Total (cfs)	75900.00	W.S. Elev (ft)	760.56	760.52
Q Bridge (cfs)	43573.23	Crit W.S. (ft)	740.79	740.76
Q Weir (cfs)		Max Chl Dpth (ft)	45.04	45.04
Weir Sta Lft (ft)		Vel Total (ft/s)	7.28	7.30
Weir Sta Rgt (ft)		Flow Area (sq ft)	10423.74	10398.10
Weir Submerg		Froude # Chl	0.21	0.21
Weir Max Depth (ft)		Specif Force (cu ft)	165031.40	164775.80
Min El Weir Flow (ft)	744.70	Hydr Depth (ft)	15.67	15.64
Min El Prs (ft)	747.30	W.P. Total (ft)	1233.78	1233.74
Delta EG (ft)	0.07	Conv. Total (cfs)	1751994.0	1746257.0
Delta WS (ft)	0.08	Top Width (ft)	1172.78	1170.43
BR Open Area (sq ft)	4555.59	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	9.56	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.99	0.99
Br Sel Method	Energy only	Power Total (lb/ft s)	7.21	7.26

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	751.06	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	750.40	E.G. Elev (ft)	751.01	750.98
Q Total (cfs)	38300.00	W.S. Elev (ft)	749.92	749.89
Q Bridge (cfs)	38269.97	Crit W.S. (ft)	733.32	733.30
Q Weir (cfs)		Max Chl Dpth (ft)	34.40	34.41
Weir Sta Lft (ft)		Vel Total (ft/s)	8.38	8.38
Weir Sta Rgt (ft)		Flow Area (sq ft)	4569.53	4572.73
Weir Submerg		Froude # Chl	0.29	0.29

```
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   80748.93  *   80723.76  *
* Min El Weir Flow (ft)  *     744.70  * Hydr Depth (ft)        *     901.90  *     907.35  *
* Min El Prs (ft)        *     747.30  * W.P. Total (ft)        *     545.04  *     545.02  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *  1000777.0  *  1001970.0  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *       5.07  *       5.04  *
* BR Open Area (sq ft)   *    4555.59  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       8.40  * C & E Loss (ft)        *       0.00  *       0.13  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.77  *       0.77  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       6.43  *       6.41  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 5.262

INPUT
Description: d/s face RR Bridge B-15

COE Riverstation=40066.00
Preliminary
             Model Riverstation=842.874

Equivelant to RS 5.26 from previous
             FIS Submittal
Station Elevation Data    num=     127
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     775      25     776    69.5     776    97.5     774   118.2     772
   168.9     770   192.7     768     219     766   284.2     764   315.2     762
   419.1     760   478.6     758   523.5     756   569.5     754   660.6     752
   902.2     752  1160.8     750  1190.7     748  1231.5     746  1260.9     746
  1275.6     748  1286.7     750  1312.4     750  1314.3     748  1315.9     746
  1318.4     744  1322.7     742  1327.3     740  1331.7     738  1336.1     736
  1340.3     734  1344.7     732  1348.9     730    1353     728    1358     726
  1363.5     724  1369.1     722  1374.4     720 1396.71  719.48 1408.71  715.48
 1430.71  715.48 1452.71  715.48 1464.71  719.48    1487     720  1492.3     722
  1497.9     724  1503.4     726  1508.9     728  1514.3     730  1519.5     732
  1525.1     734  1530.3     736  1535.5     738  1540.5     740  1541.3     742
  1541.7     744  1541.8     746  1541.9     748    1542     750  1619.6     750
  1641.8     752  1683.3     752  1997.4     750  2319.7     750  2332.4     748
  2417.1     748  2574.5     750  2658.3     750  2824.3     752  3137.9     752
  3350.9     754    3399     756  3408.5     758  3441.4     760  3445.7     762
  3449.9     764  3454.2     766  3458.5     768  3462.6     770    3467     772
  3470.7     774  3474.6     776  3478.6     778  3482.7     780  3486.5     782
  3490.4     784  3494.3     786  3498.1     788  3504.7     790  3625.6     792
  3628.3     792  3694.7     790  3703.3     788  3755.1     786  3766.3     786
  3773.5     788  3779.6     790  3783.4     792  3784.4     794  3785.4     796
  3786.3     798  3787.3     800  3788.3     802  3789.3     804  3790.4     806
  3791.7     808    3793     810  3799.6     812  3826.9     814  3834.9     816
  3840.8     818  3846.7     820  3852.6     822  3858.6     824  3865.2     826
  3871.8     828  3878.4     830  3885.7     832  3893.2     834  3900.5     836
  3909.1     838  3918.9     840  3929.2     842  3940.4     844    3952     846
  3963.8     848    3976     850

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0      .1  1312.4    .028    1542     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1312.4    1542              108      33      31              .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
```

```
       0     760     780       F
    3125    3976     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
     460     640     780     760    1160     780  1160.8  1286.7     750
    1825    3125     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  736.69  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  724.83  * Flow Area (sq ft)      *          * 2881.50  *          *
* E.G. Slope (ft/ft)     *0.000197  * Area (sq ft)           *          * 2881.50  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  197.53  * Top Width (ft)         *          *  197.53  *          *
* Vel Total (ft/s)       *    4.34  * Avg. Vel. (ft/s)       *          *    4.34  *          *
* Max Chl Dpth (ft)      *   21.21  * Hydr. Depth (ft)       *          *   14.59  *          *
* Conv. Total (cfs)      *889959.3  * Conv. (cfs)             *          *889959.3  *          *
* Length Wtd. (ft)       *   33.00  * Wetted Per. (ft)        *          *  205.23  *          *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)        *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.75  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *          * 1383.20  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  116.74  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  741.18  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  727.15  * Flow Area (sq ft)      *          * 3813.79  *          *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           *          * 3813.79  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  216.38  * Top Width (ft)         *          *  216.38  *          *
* Vel Total (ft/s)       *    5.11  * Avg. Vel. (ft/s)       *          *    5.11  *          *
* Max Chl Dpth (ft)      *   25.70  * Hydr. Depth (ft)       *          *   17.63  *          *
* Conv. Total (cfs)      *1329709.0  * Conv. (cfs)             *          *1329709.0  *          *
* Length Wtd. (ft)       *   33.00  * Wetted Per. (ft)        *          *  226.47  *          *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)        *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.16  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    1.44  * 1882.89  *    6.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *  132.58  *    8.33  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  744.83  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  729.14  * Flow Area (sq ft)      *          * 4619.16  *          *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           *          * 4619.16  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  224.37  * Top Width (ft)         *          *  224.37  *          *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *          *    5.76  *          *
* Max Chl Dpth (ft)      *   29.35  * Hydr. Depth (ft)       *          *   20.59  *          *
* Conv. Total (cfs)      *1768627.0  * Conv. (cfs)             *          *1768627.0  *          *
* Length Wtd. (ft)       *   33.04  * Wetted Per. (ft)        *          *  238.35  *          *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)        *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.58  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   14.65  * 2309.04  *   55.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.85  *  143.06  *   27.74  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  749.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  748.39  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  731.00  * Flow Area (sq ft)      *          * 5425.68  *          *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           *          * 5425.68  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  227.99  * Top Width (ft)         *          *  227.99  *          *
* Vel Total (ft/s)       *    6.30  * Avg. Vel. (ft/s)       *          *    6.30  *          *
* Max Chl Dpth (ft)      *   32.91  * Hydr. Depth (ft)       *          *   23.80  *          *
* Conv. Total (cfs)      *2259043.0  * Conv. (cfs)            *          *2259043.0  *          *
* Length Wtd. (ft)       *   33.26  * Wetted Per. (ft)       *          *  246.89  *          *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.98  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   50.60  * 2721.08  *  170.61  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   24.04  *  150.26  *   56.63  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  754.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.100  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  753.82  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  733.49  * Flow Area (sq ft)      *  581.74  * 6670.59  *  755.59  *
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           *  795.14  * 6670.59  *  954.88  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  293.60  *44599.48  *  606.93  *
* Top Width (ft)         *  991.43  * Top Width (ft)         *  272.40  *  229.60  *  489.43  *
* Vel Total (ft/s)       *    5.68  * Avg. Vel. (ft/s)       *    0.50  *    6.69  *    0.80  *
* Max Chl Dpth (ft)      *   38.34  * Hydr. Depth (ft)       *    3.82  *   29.05  *    2.67  *
* Conv. Total (cfs)      *3218550.0  * Conv. (cfs)            * 20768.3  *3154849.0  * 42932.5  *
* Length Wtd. (ft)       *   34.36  * Wetted Per. (ft)       *  156.21  *  250.73  *  285.81  *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)       *    0.05  *    0.33  *    0.03  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.02  *    2.22  *    0.03  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  230.12  * 3332.84  *  509.52  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  106.04  *  155.31  *  128.09  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  757.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.100  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  756.36  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  735.23  * Flow Area (sq ft)      *  969.98  * 7255.49  * 1476.53  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           * 1489.08  * 7255.49  * 2315.47  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  688.18  *51849.45  * 1862.38  *
* Top Width (ft)         * 1060.73  * Top Width (ft)         *  272.40  *  229.60  *  558.73  *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)       *    0.71  *    7.15  *    1.26  *
* Max Chl Dpth (ft)      *   40.88  * Hydr. Depth (ft)       *    6.36  *   31.60  *    5.22  *
* Conv. Total (cfs)      *3807773.0  * Conv. (cfs)            * 48169.5  *3629245.0  *130358.8  *
* Length Wtd. (ft)       *   35.77  * Wetted Per. (ft)       *  158.76  *  250.73  *  288.36  *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)       *    0.08  *    0.37  *    0.07  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.06  *    2.64  *    0.08  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  593.59  * 3751.61  *  925.76  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  168.25  *  157.28  *  230.20  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  758.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *   0.100  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  757.88  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  736.81  * Flow Area (sq ft)      * 1200.61  * 7602.96  * 1904.82  *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           * 1901.32  * 7602.96  * 3166.48  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1026.86  *58987.36  * 2985.78  *
* Top Width (ft)         * 1067.92  * Top Width (ft)         *  272.40  *  229.60  *  565.92  *
* Vel Total (ft/s)       *    5.88  * Avg. Vel. (ft/s)       *    0.86  *    7.76  *    1.57  *
```

```
* Max Chl Dpth (ft)      *   42.40  * Hydr. Depth (ft)       *    7.88  *   33.11  *    6.73  *
* Conv. Total (cfs)      *4190421.0  * Conv. (cfs)            * 68301.2  *3923522.0  *198597.9  *
* Length Wtd. (ft)       *   36.61  * Wetted Per. (ft)       *  160.27  *  250.73  *  289.87  *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)       *    0.11  *    0.43  *    0.09  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.09  *    3.32  *    0.15  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  886.17  * 4009.27  * 1388.15  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  193.88  *  157.53  *  387.83  *
***************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
***************************************************************************************************
* E.G. Elev (ft)         *  761.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.              *   0.100  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  760.58  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  738.96  * Flow Area (sq ft)      * 1611.71  * 8222.31  * 2668.21  *
* E.G. Slope (ft/ft)     *0.000237  * Area (sq ft)           * 2696.38  * 8222.31  * 4746.77  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              * 1699.79  *68868.15  * 5332.07  *
* Top Width (ft)         * 1173.44  * Top Width (ft)         *  343.20  *  229.60  *  600.64  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *    1.05  *    8.38  *    2.00  *
* Max Chl Dpth (ft)      *   45.10  * Hydr. Depth (ft)       *   10.58  *   35.81  *    9.43  *
* Conv. Total (cfs)      *4927021.0  * Conv. (cfs)            *110341.1  *4470551.0  *346129.1  *
* Length Wtd. (ft)       *   37.99  * Wetted Per. (ft)       *  162.97  *  250.73  *  292.57  *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)       *    0.15  *    0.49  *    0.14  *
* Alpha                  *    1.74  * Stream Power (lb/ft s) *    0.15  *    4.07  *    0.27  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   * 1478.11  * 4414.74  * 2523.20  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  235.19  *  158.17  *  570.31  *
***************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
***************************************************************************************************
* E.G. Elev (ft)         *  750.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.              *   0.100  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  750.19  * Reach Len. (ft)        *  108.00  *   33.00  *   31.00  *
* Crit W.S. (ft)         *  731.93  * Flow Area (sq ft)      *   28.74  * 5837.46  *   14.83  *
* E.G. Slope (ft/ft)     *0.000230  * Area (sq ft)           *   28.74  * 5837.46  *   14.83  *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *    2.13  *38295.70  *    2.18  *
* Top Width (ft)         *  461.69  * Top Width (ft)         *  152.40  *  229.60  *   79.69  *
* Vel Total (ft/s)       *    6.51  * Avg. Vel. (ft/s)       *    0.07  *    6.56  *    0.15  *
* Max Chl Dpth (ft)      *   34.71  * Hydr. Depth (ft)       *    0.19  *   25.42  *    0.19  *
* Conv. Total (cfs)      *2526158.0  * Conv. (cfs)            *   140.3  *2525874.0  *   143.7  *
* Length Wtd. (ft)       *   33.23  * Wetted Per. (ft)       *  152.58  *  250.73  *   79.70  *
* Min Ch El (ft)         *  715.48  * Shear (lb/sq ft)       *    0.00  *    0.33  *    0.00  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    2.19  *    0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   84.62  * 2930.61  *  257.13  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   39.80  *  152.78  *   69.88  *
***************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.256

INPUT
Description: Between RR Bridges B-14 & B-15

COE
             Riverstation=40099.00
Preliminary Model
             Riverstation=711.957

Equivelant to RS 5.23 from previous FIS
             Submittal
Station Elevation Data    num=     119
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

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*******************************************************************************
       0   776.8    51.5     776   161.6     774   199.7     772   253.1     770
   351.8     768   363.2     766   516.2     764   559.6     762   634.9     760
     704     758   765.5     756  1096.7     754  1291.7     752  1329.3     750
  1363.7     748  1414.4     748  1426.7     750  1451.2     750  1459.5     748
  1469.1     746    1488     744  1508.6     742  1513.4     740  1518.3     738
  1523.4     736  1528.8     734    1534     732  1539.1     730  1544.1     728
  1549.1     726    1554     724    1559     722  1564.3     720 1586.55  719.43
 1598.55  715.43 1620.55  715.43 1642.55  715.43 1654.55  719.43  1676.8     720
  1682.4     722  1688.3     724  1694.1     726  1699.8     728  1705.6     730
  1710.3     732  1714.9     734  1719.6     736  1724.3     738  1729.1     740
  1740.2     742  1753.1     744  1763.1     746  1774.7     748  1788.3     750
  1802.5     752  1827.5     752  2153.5     750  2382.3     750  2507.7     748
    2611     748  2833.3     750  2998.9     752  3336.1     752    3486     754
  3566.3     756  3588.7     758    3613     760  3617.5     762  3621.7     764
  3626.4     766    3631     768  3635.4     770  3639.7     772    3644     774
    3648     776  3651.9     778  3655.8     780  3659.7     782  3663.7     784
  3667.6     786  3671.6     788  3675.5     790  3711.7     792  3743.4     792
  3855.5     790  3863.9     788  3912.5     788  3917.4     790  3922.5     792
  3927.4     794  3931.8     796  3936.6     798  3940.9     800  3944.9     802
    3947     804  3949.2     806  3955.8     808  3980.1     810  3995.9     812
  4005.8     814    4013     816  4020.3     818    4028     820  4034.8     822
  4041.9     824  4048.9     826  4056.2     828  4063.2     830  4070.6     832
  4078.3     834  4086.1     836  4094.8     838  4104.4     840  4113.1     842
  4122.8     844  4132.6     846  4142.3     848  4152.2     850

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0      .1  1096.7     .04  1508.6    .028  1740.2     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1508.6  1740.2                 80   23.52      34              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     675     780       F
    3300  4152.2     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     400     630     780     675    1160     780  1329.3  1426.7     750
    1865    3300     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  736.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)          *  736.69  * Reach Len. (ft)        *   80.00  *   23.52  *   34.00  *
* Crit W.S. (ft)          *  724.80  * Flow Area (sq ft)      *          * 2895.18  *          *
* E.G. Slope (ft/ft)      *0.000197  * Area (sq ft)           *          * 2895.18  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  199.58  * Top Width (ft)         *          *  199.58  *          *
* Vel Total (ft/s)        *    4.32  * Avg. Vel. (ft/s)       *          *    4.32  *          *
* Max Chl Dpth (ft)       *   21.26  * Hydr. Depth (ft)       *          *   14.51  *          *
* Conv. Total (cfs)       *891607.8  * Conv. (cfs)             *          *891607.8  *          *
* Length Wtd. (ft)        *   23.52  * Wetted Per. (ft)        *          *  207.10  *          *
* Min Ch El (ft)          *  715.43  * Shear (lb/sq ft)        *          *    0.17  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.74  *          *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *          * 1381.01  *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *          *  116.59  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  741.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.40  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)          *  741.18  * Reach Len. (ft)        *   80.00  *   23.52  *   34.00  *
* Crit W.S. (ft)          *  727.11  * Flow Area (sq ft)      *          * 3841.78  *          *
* E.G. Slope (ft/ft)      *0.000220  * Area (sq ft)           *          * 3841.78  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)          *  225.05  * Top Width (ft)         *          *  225.05  *          *
* Vel Total (ft/s)        *    5.08  * Avg. Vel. (ft/s)       *          *    5.08  *          *
* Max Chl Dpth (ft)       *   25.75  * Hydr. Depth (ft)       *          *   17.07  *          *
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```
* Conv. Total (cfs)      *1316163.0  * Conv. (cfs)            *          *1316163.0  *          *
* Length Wtd. (ft)       *   23.52  * Wetted Per. (ft)        *          *  234.22  *          *
* Min Ch El (ft)         *  715.43  * Shear (lb/sq ft)        *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.14  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *    1.44  * 1879.99  *    6.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    2.27  *  132.41  *    8.33  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  745.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.              *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  744.83  * Reach Len. (ft)        *   80.00  *   23.52  *   34.00  *
* Crit W.S. (ft)         *  729.12  * Flow Area (sq ft)      *   40.97  * 4685.49  *   25.34  *
* E.G. Slope (ft/ft)     *0.000218  * Area (sq ft)           *   40.97  * 4685.49  *   25.34  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *   28.57  *26557.07  *   14.35  *
* Top Width (ft)         *  277.10  * Top Width (ft)         *   28.45  *  231.60  *   17.05  *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)        *    0.70  *    5.67  *    0.57  *
* Max Chl Dpth (ft)      *   29.40  * Hydr. Depth (ft)        *    1.44  *   20.23  *    1.49  *
* Conv. Total (cfs)      *1800696.0  * Conv. (cfs)            *  1934.3  *1797791.0  *   971.5  *
* Length Wtd. (ft)       *   23.55  * Wetted Per. (ft)        *   28.59  *  241.01  *   17.29  *
* Min Ch El (ft)         *  715.43  * Shear (lb/sq ft)        *    0.02  *    0.26  *    0.02  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.01  *    1.50  *    0.01  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *   14.60  * 2305.51  *   55.46  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    8.81  *  142.89  *   27.73  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  748.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.              *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  748.41  * Reach Len. (ft)        *   80.00  *   23.52  *   34.00  *
* Crit W.S. (ft)         *  731.01  * Flow Area (sq ft)      *  189.71  * 5514.20  *  120.77  *
* E.G. Slope (ft/ft)     *0.000206  * Area (sq ft)           *  189.71  * 5514.20  *  120.77  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  242.02  *33846.31  *  111.67  *
* Top Width (ft)         *  319.68  * Top Width (ft)         *   50.80  *  231.60  *   37.28  *
* Vel Total (ft/s)       *    5.87  * Avg. Vel. (ft/s)        *    1.28  *    6.14  *    0.92  *
* Max Chl Dpth (ft)      *   32.98  * Hydr. Depth (ft)        *    3.73  *   23.81  *    3.24  *
* Conv. Total (cfs)      *2383048.0  * Conv. (cfs)            * 16863.6  *2358403.0  *  7781.0  *
* Length Wtd. (ft)       *   23.74  * Wetted Per. (ft)        *   51.25  *  241.01  *   37.83  *
* Min Ch El (ft)         *  715.43  * Shear (lb/sq ft)        *    0.05  *    0.29  *    0.04  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.06  *    1.81  *    0.04  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *   50.36  * 2716.94  *  170.57  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   23.98  *  150.09  *   56.62  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  754.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.              *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  753.86  * Reach Len. (ft)        *   80.00  *   23.52  *   34.00  *
* Crit W.S. (ft)         *  733.47  * Flow Area (sq ft)      * 1230.12  * 6775.84  *  535.07  *
* E.G. Slope (ft/ft)     *0.000172  * Area (sq ft)           * 1230.12  * 6775.84  *  731.20  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1384.93  *43573.41  *  541.65  *
* Top Width (ft)         *  880.22  * Top Width (ft)         *  348.60  *  231.60  *  300.02  *
* Vel Total (ft/s)       *    5.33  * Avg. Vel. (ft/s)        *    1.13  *    6.43  *    1.01  *
* Max Chl Dpth (ft)      *   38.43  * Hydr. Depth (ft)        *    3.53  *   29.26  *    4.29  *
* Conv. Total (cfs)      *3471704.0  * Conv. (cfs)            *105672.1  *3324703.0  * 41328.8  *
* Length Wtd. (ft)       *   25.17  * Wetted Per. (ft)        *  349.81  *  241.01  *  127.70  *
* Min Ch El (ft)         *  715.43  * Shear (lb/sq ft)        *    0.04  *    0.30  *    0.04  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.04  *    1.94  *    0.05  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *  227.61  * 3327.75  *  508.92  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *  105.27  *  155.14  *  127.81  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	757.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	756.43	Reach Len. (ft)	80.00	23.52	34.00
Crit W.S. (ft)	735.21	Flow Area (sq ft)	2127.65	7372.13	856.38
E.G. Slope (ft/ft)	0.000170	Area (sq ft)	2127.65	7372.13	1646.56
Q Total (cfs)	54400.00	Flow (cfs)	3412.43	49824.66	1162.92
Top Width (ft)	976.13	Top Width (ft)	348.60	231.60	395.93
Vel Total (ft/s)	5.25	Avg. Vel. (ft/s)	1.60	6.76	1.36
Max Chl Dpth (ft)	41.00	Hydr. Depth (ft)	6.10	31.83	6.86
Conv. Total (cfs)	4177889.0	Conv. (cfs)	262072.4	3826506.0	89311.3
Length Wtd. (ft)	26.95	Wetted Per. (ft)	352.39	241.01	130.27
Min Ch El (ft)	715.43	Shear (lb/sq ft)	0.06	0.32	0.07
Alpha	1.52	Stream Power (lb/ft s)	0.10	2.19	0.09
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	589.11	3746.07	924.35
C & E Loss (ft)	0.02	Cum SA (acres)	167.48	157.11	229.86

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	758.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	757.97	Reach Len. (ft)	80.00	23.52	34.00
Crit W.S. (ft)	736.76	Flow Area (sq ft)	2663.80	7728.34	1048.33
E.G. Slope (ft/ft)	0.000184	Area (sq ft)	2663.80	7728.34	2268.75
Q Total (cfs)	63000.00	Flow (cfs)	5155.86	56160.07	1684.07
Top Width (ft)	993.35	Top Width (ft)	348.60	231.60	413.15
Vel Total (ft/s)	5.51	Avg. Vel. (ft/s)	1.94	7.27	1.61
Max Chl Dpth (ft)	42.54	Hydr. Depth (ft)	7.64	33.37	8.40
Conv. Total (cfs)	4643768.0	Conv. (cfs)	380041.6	4139592.0	124133.9
Length Wtd. (ft)	27.99	Wetted Per. (ft)	353.92	241.01	131.81
Min Ch El (ft)	715.43	Shear (lb/sq ft)	0.09	0.37	0.09
Alpha	1.56	Stream Power (lb/ft s)	0.17	2.68	0.15
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	880.51	4003.46	1386.22
C & E Loss (ft)	0.03	Cum SA (acres)	193.11	157.36	387.48

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	761.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	760.70	Reach Len. (ft)	80.00	23.52	34.00
Crit W.S. (ft)	738.93	Flow Area (sq ft)	3616.58	8361.33	1389.43
E.G. Slope (ft/ft)	0.000187	Area (sq ft)	3671.12	8361.33	3440.82
Q Total (cfs)	75900.00	Flow (cfs)	8615.00	64604.79	2680.21
Top Width (ft)	1064.58	Top Width (ft)	393.60	231.60	439.38
Vel Total (ft/s)	5.68	Avg. Vel. (ft/s)	2.38	7.73	1.93
Max Chl Dpth (ft)	45.27	Hydr. Depth (ft)	10.37	36.10	11.13
Conv. Total (cfs)	5545201.0	Conv. (cfs)	629405.9	4719981.0	195814.5
Length Wtd. (ft)	29.71	Wetted Per. (ft)	356.66	241.01	134.54
Min Ch El (ft)	715.43	Shear (lb/sq ft)	0.12	0.41	0.12
Alpha	1.60	Stream Power (lb/ft s)	0.28	3.14	0.23
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1470.21	4408.46	2520.29
C & E Loss (ft)	0.03	Cum SA (acres)	234.28	157.99	569.94

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	750.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	750.21	Reach Len. (ft)	80.00	23.52	34.00

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* Crit W.S. (ft)         *  731.94  * Flow Area (sq ft)      *  314.16  * 5931.75  *  199.04  *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           *  314.16  * 5931.75  *  199.04  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  236.99  *37852.67  *  210.34  *
* Top Width (ft)         *  464.48  * Top Width (ft)         *  183.28  *  231.60  *   49.60  *
* Vel Total (ft/s)       *    5.94  * Avg. Vel. (ft/s)       *    0.75  *    6.38  *    1.06  *
* Max Chl Dpth (ft)      *   34.78  * Hydr. Depth (ft)       *    1.71  *   25.61  *    4.01  *
* Conv. Total (cfs)      *2694977.0  * Conv. (cfs)           * 16675.9  *2663500.0  * 14800.6  *
* Length Wtd. (ft)       *   23.73  * Wetted Per. (ft)       *  183.93  *  241.01  *   50.29  *
* Min Ch El (ft)         *  715.43  * Shear (lb/sq ft)       *    0.02  *    0.31  *    0.05  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    0.02  *    1.98  *    0.05  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   84.19  * 2926.15  *  257.06  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   39.38  *  152.60  *   69.83  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.251

INPUT
Description: u/s face RR Bridge B-14

COE Riverstation=40122.52
Preliminary
             Model Riverstation=711.957

Equivelant to RS 5.23 from previous
             FIS Submittal
Station Elevation Data    num=     115
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      774    72.4      772    127.9      770    161.6      768    272.5      766
   340.3      764   455.2      762    530.3      760    594.8      758      755      756
     985      754    1152      752     1230      750   1310.1      750   1318.3      748
    1330      746  1376.9      746     1381      748   1387.3      750   1397.2      752
    1448      752  1450.6      750   1453.3      748   1455.6      746   1481.4      744
  1488.1      742  1493.3      740   1498.5      738     1504      736   1509.3      734
  1514.2      732  1519.3      730     1524      728   1528.6      726   1533.2      724
  1537.6      722  1542.2      720  1563.74    719.4  1575.74    715.4  1597.74    715.4
 1619.74    715.4 1631.74    719.4   1653.3      720   1658.9      722   1664.3      724
  1669.9      726  1675.4      728   1680.7      730   1686.2      732   1691.4      734
  1696.8      736  1701.8      738   1707.2      740   1722.2      742   1725.9      744
  1729.4      746  1736.9      748   1743.5      750   2287.1      750   2441.7      748
  2601.5      748  2794.6      750   2999.4      752   3229.3      752     3431      754
  3505.4      756  3538.7      758   3566.5      760   3571.8      762   3576.4      764
  3581.1      766  3585.8      768   3590.8      770     3595      772   3598.7      774
  3602.9      776  3606.1      778   3610.1      780     3614      782     3618      784
    3622      786  3626.1      788   3640.5      790   3847.6      790   3850.1      792
  3851.8      794  3853.6      796   3855.3      798   3857.1      800   3858.9      802
  3860.9      804  3862.9      806   3871.4      808   3881.1      810   3887.7      812
  3904.7      812  3926.2      814   3945.2      816     3966      818     3985      820
  3995.5      822  4002.8      824   4009.3      826   4017.4      828   4025.5      830
  4036.1      832  4045.6      834   4054.9      836   4065.2      838     4076      840
  4086.9      842  4098.2      844   4109.5      846   4119.9      848     4130      850

Manning's n Values        num=       4
     Sta    n Val     Sta    n Val     Sta    n Val     Sta    n Val
*****************************************************************
       0      .1    1152      .04  1455.6     .028  1743.5      .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1450.6  1743.5             28.21   28.21   28.21              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     675     780       F
    3300    4130     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
     400     630     780     675    1160     780  1310.1  1387.3     750
    1865    3300     780
```

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	736.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.028	
W.S. Elev (ft)	736.67	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	724.80	Flow Area (sq ft)		2833.27	
E.G. Slope (ft/ft)	0.000207	Area (sq ft)		2833.27	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	196.32	Top Width (ft)		196.32	
Vel Total (ft/s)	4.41	Avg. Vel. (ft/s)		4.41	
Max Chl Dpth (ft)	21.27	Hydr. Depth (ft)		14.43	
Conv. Total (cfs)	868878.1	Conv. (cfs)		868878.1	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		203.96	
Min Ch El (ft)	715.40	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.79	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1379.46	
C & E Loss (ft)	0.02	Cum SA (acres)		116.48	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	741.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.028	
W.S. Elev (ft)	741.15	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	727.17	Flow Area (sq ft)		3769.57	
E.G. Slope (ft/ft)	0.000234	Area (sq ft)		3769.57	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	225.55	Top Width (ft)		225.55	
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)		5.17	
Max Chl Dpth (ft)	25.75	Hydr. Depth (ft)		16.71	
Conv. Total (cfs)	1273455.0	Conv. (cfs)		1273455.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		234.70	
Min Ch El (ft)	715.40	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		1.22	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.44	1877.93	6.16
C & E Loss (ft)	0.02	Cum SA (acres)	2.27	132.29	8.33

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	745.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.028	
W.S. Elev (ft)	744.81	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	729.21	Flow Area (sq ft)		4646.28	
E.G. Slope (ft/ft)	0.000258	Area (sq ft)		4646.28	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	256.41	Top Width (ft)		256.41	
Vel Total (ft/s)	5.73	Avg. Vel. (ft/s)		5.73	
Max Chl Dpth (ft)	29.41	Hydr. Depth (ft)		18.12	
Conv. Total (cfs)	1656563.0	Conv. (cfs)		1656563.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		266.81	
Min Ch El (ft)	715.40	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.60	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	14.56	2302.99	55.45
C & E Loss (ft)	0.04	Cum SA (acres)	8.79	142.76	27.73

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

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*****************************************************************************************
* E.G. Elev (ft)         *  748.98  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  748.41  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  731.13  * Flow Area (sq ft)      *          * 5634.58  *          *
* E.G. Slope (ft/ft)     *0.000262  * Area (sq ft)           *          * 5634.58  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  285.50  * Top Width (ft)         *          *  285.50  *          *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *          *    6.07  *          *
* Max Chl Dpth (ft)      *   33.01  * Hydr. Depth (ft)       *          *   19.74  *          *
* Conv. Total (cfs)      *2112274.0  * Conv. (cfs)            *          *2112274.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  297.47  *          *
* Min Ch El (ft)         *  715.40  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.88  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   50.19  * 2713.93  *  170.52  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   23.93  *  149.95  *   56.61  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  753.90  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  733.65  * Flow Area (sq ft)      *  955.06  * 7235.87  *  473.28  *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *  955.06  * 7235.87  *  545.20  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              * 1091.42  *43930.81  *  477.77  *
* Top Width (ft)         *  825.44  * Top Width (ft)         *  290.60  *  292.90  *  241.94  *
* Vel Total (ft/s)       *    5.25  * Avg. Vel. (ft/s)       *    1.14  *    6.07  *    1.01  *
* Max Chl Dpth (ft)      *   38.50  * Hydr. Depth (ft)       *    3.29  *   24.70  *    3.90  *
* Conv. Total (cfs)      *3247126.0  * Conv. (cfs)            * 77889.6  *3135140.0  * 34096.1  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  293.60  *  305.63  *  125.40  *
* Min Ch El (ft)         *  715.40  * Shear (lb/sq ft)       *    0.04  *    0.29  *    0.05  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    0.05  *    1.76  *    0.05  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  225.60  * 3323.97  *  508.42  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  104.68  *  155.00  *  127.60  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.06  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  756.48  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.45  * Flow Area (sq ft)      * 1705.33  * 7992.07  *  786.97  *
* E.G. Slope (ft/ft)     *0.000187  * Area (sq ft)           * 1705.33  * 7992.07  * 1308.34  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              * 2780.14  *50547.45  * 1072.41  *
* Top Width (ft)         *  918.34  * Top Width (ft)         *  290.60  *  292.90  *  334.84  *
* Vel Total (ft/s)       *    5.19  * Avg. Vel. (ft/s)       *    1.63  *    6.32  *    1.36  *
* Max Chl Dpth (ft)      *   41.08  * Hydr. Depth (ft)       *    5.87  *   27.29  *    6.48  *
* Conv. Total (cfs)      *3982031.0  * Conv. (cfs)            *203503.9  *3700027.0  * 78499.4  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  296.19  *  305.63  *  127.98  *
* Min Ch El (ft)         *  715.40  * Shear (lb/sq ft)       *    0.07  *    0.30  *    0.07  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.11  *    1.93  *    0.10  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  585.59  * 3741.92  *  923.20  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  166.90  *  156.96  *  229.58  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
```

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  758.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  758.02  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.94  * Flow Area (sq ft)      * 2154.51  * 8444.81  *  974.77  *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)           * 2187.96  * 8444.81  * 1845.81  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4223.42  *57207.43  * 1569.15  *
* Top Width (ft)         *  989.02  * Top Width (ft)         *  335.60  *  292.90  *  360.52  *
* Vel Total (ft/s)       *    5.44  * Avg. Vel. (ft/s)       *    1.96  *    6.77  *    1.61  *
* Max Chl Dpth (ft)      *   42.62  * Hydr. Depth (ft)       *    7.41  *   28.83  *    8.02  *
* Conv. Total (cfs)      *4466604.0  * Conv. (cfs)            *299433.8  *4055920.0  *111250.1  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  297.73  *  305.63  *  129.52  *
* Min Ch El (ft)         *  715.40  * Shear (lb/sq ft)       *    0.09  *    0.34  *    0.09  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    0.18  *    2.32  *    0.15  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  876.06  * 3999.09  * 1384.61  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  192.48  *  157.22  *  387.18  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  761.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  760.76  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  739.23  * Flow Area (sq ft)      * 2950.35  * 9246.95  * 1307.51  *
* E.G. Slope (ft/ft)     *0.000198  * Area (sq ft)           * 3107.03  * 9246.95  * 2881.98  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 7064.21  *66319.93  * 2515.86  *
* Top Width (ft)         * 1018.52  * Top Width (ft)         *  335.60  *  292.90  *  390.02  *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)       *    2.39  *    7.17  *    1.92  *
* Max Chl Dpth (ft)      *   45.36  * Hydr. Depth (ft)       *   10.15  *   31.57  *   10.76  *
* Conv. Total (cfs)      *5399674.0  * Conv. (cfs)            *502561.9  *4718129.0  *178983.2  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  300.47  *  305.63  *  132.26  *
* Min Ch El (ft)         *  715.40  * Shear (lb/sq ft)       *    0.12  *    0.37  *    0.12  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.29  *    2.68  *    0.23  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1463.99  * 4403.71  * 2517.82  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  233.61  *  157.85  *  569.61  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  750.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  750.22  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  732.07  * Flow Area (sq ft)      *   36.39  * 6160.57  *   27.23  *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *   36.39  * 6160.57  *   27.23  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    7.80  *38287.43  *    4.76  *
* Top Width (ft)         *  581.84  * Top Width (ft)         *  167.44  *  292.90  *  121.50  *
* Vel Total (ft/s)       *    6.15  * Avg. Vel. (ft/s)       *    0.21  *    6.21  *    0.17  *
* Max Chl Dpth (ft)      *   34.82  * Hydr. Depth (ft)       *    0.22  *   21.03  *    0.22  *
* Conv. Total (cfs)      *2398558.0  * Conv. (cfs)            *   488.7  *2397771.0  *   298.2  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  167.54  *  305.63  *  121.72  *
* Min Ch El (ft)         *  715.40  * Shear (lb/sq ft)       *    0.00  *    0.32  *    0.00  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.00  *    1.99  *    0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   83.87  * 2922.89  *  256.97  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   39.06  *  152.46  *   69.76  *
*********************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 5.249

INPUT
Description: B-14
Distance from Upstream XS = 1
Deck/Roadway Width = 26
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 20

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1451.1	752.8	700	1451.11	752.8	749.5	1471.1	752.8	749.5
1473.35	752.8	749.5	1487.39	752.8	749.5	1488.69	752.8	749.5
1491.1	752.8	749.5	1491.11	752.8	743	1559.8	752.8	743
1562.68	752.8	743	1562.68	755.8	745.5	1597.745	755.8	745.5
1651.81	755.8	745.5	1651.81	752.8	743	1720.36	752.8	743
1721.66	752.8	743	1724.1	752.8	743	1724.11	752.8	749.5
1739.84	752.8	749.5	1739.85	752.8	700			

Upstream Bridge Cross Section Data
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	774	72.4	772	127.9	770	161.6	768	272.5	766
340.3	764	455.2	762	530.3	760	594.8	758	755	756
985	754	1152	752	1230	750	1310.1	750	1318.3	748
1330	746	1376.9	746	1381	748	1387.3	750	1397.2	752
1448	752	1450.6	750	1453.3	748	1455.6	746	1481.4	744
1488.1	742	1493.3	740	1498.5	738	1504	736	1509.3	734
1514.2	732	1519.3	730	1524	728	1528.6	726	1533.2	724
1537.6	722	1542.2	720	1563.74	719.4	1575.74	715.4	1597.74	715.4
1619.74	715.4	1631.74	719.4	1653.3	720	1658.9	722	1664.3	724
1669.9	726	1675.4	728	1680.7	730	1686.2	732	1691.4	734
1696.8	736	1701.8	738	1707.2	740	1722.2	742	1725.9	744
1729.4	746	1736.9	748	1743.5	750	2287.1	750	2441.7	748
2601.5	748	2794.6	750	2999.4	752	3229.3	752	3431	754
3505.4	756	3538.7	758	3566.5	760	3571.8	762	3576.4	764
3581.1	766	3585.8	768	3590.8	770	3595	772	3598.7	774
3602.9	776	3606.1	778	3610.1	780	3614	782	3618	784
3622	786	3626.1	788	3640.5	790	3847.6	790	3850.1	792
3851.8	794	3853.6	796	3855.3	798	3857.1	800	3858.9	802
3860.9	804	3862.9	806	3871.4	808	3881.1	810	3887.7	812
3904.7	812	3926.2	814	3945.2	816	3966	818	3985	820
3995.5	822	4002.8	824	4009.3	826	4017.4	828	4025.5	830
4036.1	832	4045.6	834	4054.9	836	4065.2	838	4076	840
4086.9	842	4098.2	844	4109.5	846	4119.9	848	4130	850

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	1152	.04	1455.6	.028	1743.5	.05

Bank Sta: Left Right Coeff Contr. Expan.
1450.6 1743.5 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	675	780	F
3300	4130	780	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
400	630	780	675	1160	780	1310.1	1387.3	750

```
    1865    3300     780

Downstream  Deck/Roadway Coordinates
    num=      20
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************************************
  1451.1   752.8     700 1451.11   752.8   749.5  1471.1   752.8   749.5
 1473.35   752.8   749.5 1487.39   752.8   749.5 1488.69   752.8   749.5
  1491.1   752.8   749.5 1491.11   752.8     743  1559.8   752.8     743
 1562.68   752.8     743 1562.68   755.8   745.51597.745   755.8   745.5
 1651.81   755.8   745.5 1651.81   752.8     743 1720.36   752.8     743
 1721.66   752.8     743  1724.1   752.8     743 1724.11   752.8   749.5
 1739.84   752.8   749.5 1739.85   752.8     700

Downstream Bridge Cross Section Data
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     774    72.4     772   127.9     770   161.6     768   272.5     766
   340.3     764   455.2     762   530.3     760   594.8     758     755     756
     985     754    1152     752    1230     750  1310.1     750  1318.3     748
    1330     746  1376.9     746    1381     748  1387.3     750  1397.2     752
    1448     752  1450.6     750  1453.3     748  1455.6     746  1481.4     744
  1488.1     742  1493.3     740  1498.5     738    1504     736  1509.3     734
  1514.2     732  1519.3     730    1524     728  1528.6     726  1533.2     724
  1537.6     722  1542.2     720 1563.74  719.36 1575.74  715.36 1597.74  715.36
 1619.74  715.36 1631.74  719.36  1653.3     720  1658.9     722  1664.3     724
  1669.9     726  1675.4     728  1680.7     730  1686.2     732  1691.4     734
  1696.8     736  1701.8     738  1707.2     740  1722.2     742  1725.9     744
  1729.4     746  1736.9     748  1743.5     750  2287.1     750  2441.7     748
  2601.5     748  2794.6     750  2999.4     752  3229.3     752    3431     754
  3505.4     756  3538.7     758  3566.5     760  3571.8     762  3576.4     764
  3581.1     766  3585.8     768  3590.8     770    3595     772  3598.7     774
  3602.9     776  3606.1     778  3610.1     780    3614     782    3618     784
    3622     786  3626.1     788  3640.5     790  3847.6     790  3850.1     792
  3851.8     794  3853.6     796  3855.3     798  3857.1     800  3858.9     802
  3860.9     804  3862.9     806  3871.4     808  3881.1     810  3887.7     812
  3904.7     812  3926.2     814  3945.2     816    3966     818    3985     820
  3995.5     822  4002.8     824  4009.3     826  4017.4     828  4025.5     830
  4036.1     832  4045.6     834  4054.9     836  4065.2     838    4076     840
  4086.9     842  4098.2     844  4109.5     846  4119.9     848    4130     850

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0      .1    1152     .04  1455.6    .028  1743.5     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
        1450.6  1743.5            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     675     780       F
    3300    4130     780       F
Blocked Obstructions      num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     400     630     780     675    1160     780  1310.1  1387.3     750
    1865    3300     780

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  5

Pier Data
Pier Station     Upstream=  1471.1    Downstream=  1471.1
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
        9     700       9     750
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
       9     700       9     750

Pier Data
Pier Station     Upstream=  1491.1    Downstream=  1491.1
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
      11     700      11     750
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
      11     700      11     750

Pier Data
Pier Station     Upstream= 1562.68    Downstream= 1562.68
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
      16     700      16     746
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
      16     700      16     746

Pier Data
Pier Station     Upstream= 1651.81    Downstream= 1651.81
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
      16     700      16     746
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
      16     700      16     746

Pier Data
Pier Station     Upstream=  1724.1    Downstream=  1724.1
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
      11     700      11     750
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
      11     700      11     750

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. US. (ft)          *     736.97  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     736.67  * E.G. Elev (ft)         *     736.96  *     736.94  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     736.48  *     736.47  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     725.76  *     725.74  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.08  *      21.10  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.54  *       5.53  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2258.34  *    2258.94  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   21607.91  *   21633.70  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *      13.83  *      13.84  *
```

```
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *     237.20  *     237.14  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *   538366.1  *   538687.2  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *     163.32  *     163.24  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *       5.54  * C & E Loss (ft)        *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.32  *       0.32  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.77  *       1.77  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     741.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     741.15  * E.G. Elev (ft)         *     741.55  *     741.53  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     740.90  *     740.89  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     728.58  *     728.55  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.50  *      25.53  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.44  *       6.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3027.98  *    3027.81  *
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.28  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   35015.80  *   35036.93  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *      16.34  *      16.35  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *     280.22  *     280.09  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *   785400.4  *   785566.5  *
* Delta WS (ft)          *       0.11  * Top Width (ft)         *     185.36  *     185.24  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       6.44  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.42  *       0.42  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.68  *       2.68  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     745.32  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     744.81  * E.G. Elev (ft)         *     745.28  *     745.25  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     744.40  *     744.37  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     730.94  *     730.94  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.00  *      29.01  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.53  *       7.53  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3533.26  *    3533.61  *
* Weir Submerg           *             * Froude # Chl           *       0.33  *       0.33  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   48987.53  *   48957.64  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *      42.81  *      43.02  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *     427.82  *     427.40  *
* Delta EG (ft)          *       0.18  * Conv. Total (cfs)      *   766111.4  *   766737.6  *
* Delta WS (ft)          *       0.19  * Top Width (ft)         *      82.54  *      82.14  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       7.53  * C & E Loss (ft)        *       0.00  *       0.11  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.62  *       0.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.68  *       4.68  *
*********************************************************************************************
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Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     748.98  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     748.41  * E.G. Elev (ft)         *     748.90  *     748.84  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     747.56  *     747.50  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     733.14  *     733.14  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.16  *      32.14  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.31  *       9.31  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3672.34  *    3673.57  *
* Weir Submerg           *             * Froude # Chl           *       0.37  *       0.37  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   64077.56  *   63943.97  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *     129.21  *     130.61  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *     533.13  *     532.64  *
* Delta EG (ft)          *       0.37  * Conv. Total (cfs)      *   705536.6  *   706359.6  *
* Delta WS (ft)          *       0.39  * Top Width (ft)         *      28.42  *      28.13  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.06  *       0.00  *
* BR Open Vel (ft/s)     *       9.31  * C & E Loss (ft)        *       0.00  *       0.23  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.01  *       1.01  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.41  *       9.40  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     754.45  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.90  * E.G. Elev (ft)         *     754.31  *     754.20  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     752.41  *     752.26  *
* Q Bridge (cfs)         *   42708.02  * Crit W.S. (ft)         *     736.00  *     735.98  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      37.01  *      36.90  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.97  *      10.10  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4562.97  *    4505.29  *
* Weir Submerg           *             * Froude # Chl           *       0.36  *       0.36  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   88598.87  *   88214.41  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *      10.96  *      10.82  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *    1011.83  *    1011.32  *
* Delta EG (ft)          *       0.65  * Conv. Total (cfs)      *   721824.5  *   717428.6  *
* Delta WS (ft)          *       0.70  * Top Width (ft)         *     416.25  *     416.25  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.10  *       0.00  *
* BR Open Vel (ft/s)     *      11.43  * C & E Loss (ft)        *       0.00  *       0.40  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.12  *       1.12  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      11.15  *      11.30  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

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Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     757.06  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     756.48  * E.G. Elev (ft)         *     757.00  *     756.90  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     755.87  *     755.70  *
* Q Bridge (cfs)         *   38094.38  * Crit W.S. (ft)         *     737.97  *     737.96  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.47  *      40.34  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.21  *       8.35  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6622.20  *    6513.30  *
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.28  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  106678.90  *  106071.20  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *       9.39  *      10.58  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *    1314.28  *    1224.69  *
* Delta EG (ft)          *       0.33  * Conv. Total (cfs)      *   908637.3  *   934941.4  *
* Delta WS (ft)          *       0.36  * Top Width (ft)         *     905.49  *     809.97  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.09  *       0.00  *
* BR Open Vel (ft/s)     *      10.20  * C & E Loss (ft)        *       0.01  *       0.18  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.13  *       1.12  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.26  *       9.39  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     758.67  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     758.02  * E.G. Elev (ft)         *     758.63  *     758.56  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     757.58  *     757.48  *
* Q Bridge (cfs)         *   35863.73  * Crit W.S. (ft)         *     739.65  *     739.63  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      42.18  *      42.12  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.05  *       8.12  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7827.17  *    7761.86  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *       0.26  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  120777.90  *  120286.80  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *      11.10  *      11.01  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *    1317.70  *    1317.59  *
* Delta EG (ft)          *       0.24  * Conv. Total (cfs)      *  1176575.0  *  1161282.0  *
* Delta WS (ft)          *       0.26  * Top Width (ft)         *     981.66  *     973.63  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.08  *       0.00  *
* BR Open Vel (ft/s)     *       9.60  * C & E Loss (ft)        *       0.00  *       0.12  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.06  *       1.08  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       8.56  *       8.79  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
```

```
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     761.47  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     760.76  * E.G. Elev (ft)         *     761.45  *     761.39  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     760.51  *     760.45  *
* Q Bridge (cfs)         *   30388.10  * Crit W.S. (ft)         *     742.04  *     742.03  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      45.11  *      45.09  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.67  *       7.70  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9894.49  *    9855.82  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  148977.80  *  148597.90  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *      14.03  *      13.98  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *    1323.57  *    1323.53  *
* Delta EG (ft)          *       0.14  * Conv. Total (cfs)      *  1709005.0  *  1698274.0  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *    1017.85  *    1017.69  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       8.13  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.92  *       0.93  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.06  *       7.15  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     750.82  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.22  * E.G. Elev (ft)         *     750.72  *     750.64  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     749.07  *     749.00  *
* Q Bridge (cfs)         *   38299.98  * Crit W.S. (ft)         *     734.24  *     734.19  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.67  *      33.64  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.29  *      10.29  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3720.98  *    3721.23  *
* Weir Submerg           *             * Froude # Chl           *       0.40  *       0.40  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   72038.89  *   71852.06  *
* Min El Weir Flow (ft)  *     748.90  * Hydr Depth (ft)        *     104.58  *     105.63  *
* Min El Prs (ft)        *     749.50  * W.P. Total (ft)        *     547.28  *     546.59  *
* Delta EG (ft)          *       0.49  * Conv. Total (cfs)      *   708696.8  *   709370.3  *
* Delta WS (ft)          *       0.52  * Top Width (ft)         *      35.58  *      35.23  *
* BR Open Area (sq ft)   *    3735.98  * Frctn Loss (ft)        *       0.08  *       0.00  *
* BR Open Vel (ft/s)     *      10.29  * C & E Loss (ft)        *       0.00  *       0.30  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.24  *       1.24  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      12.76  *      12.75  *
*********************************************************************************************

Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION
```

```
RIVER: Blue River
REACH: Main                RS: 5.246

INPUT
Description: d/s face RR Bridge B-14

COE Riverstation=40150.73
Preliminary
             Model Riverstation=711.957

Equivelant to RS 5.23 from previous
             FIS Submittal
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     774    72.4     772   127.9     770   161.6     768   272.5     766
   340.3     764   455.2     762   530.3     760   594.8     758     755     756
     985     754    1152     752    1230     750  1310.1     750  1318.3     748
    1330     746  1376.9     746    1381     748  1387.3     750  1397.2     752
    1448     752  1450.6     750  1453.3     748  1455.6     746  1481.4     744
  1488.1     742  1493.3     740  1498.5     738    1504     736  1509.3     734
  1514.2     732  1519.3     730    1524     728  1528.6     726  1533.2     724
  1537.6     722  1542.2     720 1563.74  719.36 1575.74  715.36 1597.74  715.36
 1619.74  715.36 1631.74  719.36  1653.3     720  1658.9     722  1664.3     724
  1669.9     726  1675.4     728  1680.7     730  1686.2     732  1691.4     734
  1696.8     736  1701.8     738  1707.2     740  1722.2     742  1725.9     744
  1729.4     746  1736.9     748  1743.5     750  2287.1     750  2441.7     748
  2601.5     748  2794.6     750  2999.4     752  3229.3     752    3431     754
  3505.4     756  3538.7     758  3566.5     760  3571.8     762  3576.4     764
  3581.1     766  3585.8     768  3590.8     770    3595     772  3598.7     774
  3602.9     776  3606.1     778  3610.1     780    3614     782    3618     784
    3622     786  3626.1     788  3640.5     790  3847.6     790  3850.1     792
  3851.8     794  3853.6     796  3855.3     798  3857.1     800  3858.9     802
  3860.9     804  3862.9     806  3871.4     808  3881.1     810  3887.7     812
  3904.7     812  3926.2     814  3945.2     816    3966     818    3985     820
  3995.5     822  4002.8     824  4009.3     826  4017.4     828  4025.5     830
  4036.1     832  4045.6     834  4054.9     836  4065.2     838    4076     840
  4086.9     842  4098.2     844  4109.5     846  4119.9     848    4130     850

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0      .1    1152     .04  1455.6    .028  1743.5     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1450.6  1743.5              75  117.43      75             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     675     780       F
    3300    4130     780       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     400     630     780     675    1160     780  1310.1  1387.3     750
    1865    3300     780

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************
* E.G. Elev (ft)          *  736.89  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.31  * Wt. n-Val.              *          *   0.028  *          *
* W.S. Elev (ft)          *  736.58  * Reach Len. (ft)         *   75.00  *  117.43  *   75.00  *
* Crit W.S. (ft)          *  724.78  * Flow Area (sq ft)       *          * 2819.87  *          *
* E.G. Slope (ft/ft)      *0.000210  * Area (sq ft)            *          * 2819.87  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)          *  195.87  * Top Width (ft)          *          *  195.87  *          *
* Vel Total (ft/s)        *    4.43  * Avg. Vel. (ft/s)        *          *    4.43  *          *
* Max Chl Dpth (ft)       *   21.22  * Hydr. Depth (ft)        *          *   14.40  *          *
* Conv. Total (cfs)       *863403.3  * Conv. (cfs)             *          *863403.3  *          *
* Length Wtd. (ft)        *  117.43  * Wetted Per. (ft)        *          *  203.47  *          *
* Min Ch El (ft)          *  715.36  * Shear (lb/sq ft)        *          *    0.18  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)   *          *    0.80  *          *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)     *          * 1377.99  *          *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)           *          *  116.38  *          *
*************************************************************************************
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Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	741.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.028	
W.S. Elev (ft)	741.04	Reach Len. (ft)	75.00	117.43	75.00
Crit W.S. (ft)	727.13	Flow Area (sq ft)		3747.90	
E.G. Slope (ft/ft)	0.000237	Area (sq ft)		3747.90	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	224.42	Top Width (ft)		224.42	
Vel Total (ft/s)	5.20	Avg. Vel. (ft/s)		5.20	
Max Chl Dpth (ft)	25.68	Hydr. Depth (ft)		16.70	
Conv. Total (cfs)	1265451.0	Conv. (cfs)		1265451.0	
Length Wtd. (ft)	117.43	Wetted Per. (ft)		233.54	
Min Ch El (ft)	715.36	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		1.24	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1.44	1875.95	6.16
C & E Loss (ft)	0.03	Cum SA (acres)	2.27	132.17	8.33

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	745.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.028	
W.S. Elev (ft)	744.62	Reach Len. (ft)	75.00	117.43	75.00
Crit W.S. (ft)	729.16	Flow Area (sq ft)		4601.91	
E.G. Slope (ft/ft)	0.000262	Area (sq ft)		4601.91	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	253.65	Top Width (ft)		253.65	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	29.26	Hydr. Depth (ft)		18.14	
Conv. Total (cfs)	1641827.0	Conv. (cfs)		1641827.0	
Length Wtd. (ft)	117.43	Wetted Per. (ft)		264.00	
Min Ch El (ft)	715.36	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.65	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	14.56	2300.68	55.45
C & E Loss (ft)	0.04	Cum SA (acres)	8.79	142.70	27.73

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	748.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.028	
W.S. Elev (ft)	748.02	Reach Len. (ft)	75.00	117.43	75.00
Crit W.S. (ft)	731.11	Flow Area (sq ft)		5527.80	
E.G. Slope (ft/ft)	0.000276	Area (sq ft)		5527.80	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	
Top Width (ft)	283.69	Top Width (ft)		283.69	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)		6.19	
Max Chl Dpth (ft)	32.66	Hydr. Depth (ft)		19.49	
Conv. Total (cfs)	2057177.0	Conv. (cfs)		2057177.0	
Length Wtd. (ft)	117.43	Wetted Per. (ft)		295.48	
Min Ch El (ft)	715.36	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		2.00	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	50.19	2711.50	170.52
C & E Loss (ft)	0.04	Cum SA (acres)	23.93	149.93	56.61

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	753.80	Element	Left OB	Channel	Right OB

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* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  753.20  * Reach Len. (ft)        *   75.00  *  117.43  *   75.00  *
* Crit W.S. (ft)         *  733.60  * Flow Area (sq ft)      *  752.83  * 7035.62  *  388.73  *
* E.G. Slope (ft/ft)     *0.000220  * Area (sq ft)           *  752.83  * 7035.62  *  401.25  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  777.96  *44356.55  *  365.49  *
* Top Width (ft)         *  755.26  * Top Width (ft)         *  290.60  *  292.90  *  171.76  *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *    1.03  *    6.30  *    0.94  *
* Max Chl Dpth (ft)      *   37.84  * Hydr. Depth (ft)       *    2.59  *   24.02  *    3.20  *
* Conv. Total (cfs)      *3068983.0  * Conv. (cfs)            * 52473.4  *2991858.0  * 24652.3  *
* Length Wtd. (ft)       *  116.66  * Wetted Per. (ft)       *  292.91  *  305.64  *  124.70  *
* Min Ch El (ft)         *  715.36  * Shear (lb/sq ft)       *    0.04  *    0.32  *    0.04  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.04  *    1.99  *    0.04  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  225.27  * 3321.45  *  508.23  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  104.49  *  154.99  *  127.51  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  756.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  756.12  * Reach Len. (ft)        *   75.00  *  117.43  *   75.00  *
* Crit W.S. (ft)         *  735.43  * Flow Area (sq ft)      * 1601.02  * 7890.52  *  743.36  *
* E.G. Slope (ft/ft)     *0.000197  * Area (sq ft)           * 1601.02  * 7890.52  * 1189.23  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2572.52  *50823.94  * 1003.54  *
* Top Width (ft)         *  912.37  * Top Width (ft)         *  290.60  *  292.90  *  328.87  *
* Vel Total (ft/s)       *    5.32  * Avg. Vel. (ft/s)       *    1.61  *    6.44  *    1.35  *
* Max Chl Dpth (ft)      *   40.76  * Hydr. Depth (ft)       *    5.51  *   26.94  *    6.12  *
* Conv. Total (cfs)      *3876835.0  * Conv. (cfs)            *183331.7  *3621985.0  * 71517.5  *
* Length Wtd. (ft)       *  115.06  * Wetted Per. (ft)       *  295.83  *  305.64  *  127.62  *
* Min Ch El (ft)         *  715.36  * Shear (lb/sq ft)       *    0.07  *    0.32  *    0.07  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.11  *    2.04  *    0.10  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  584.61  * 3739.00  *  922.49  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  166.71  *  156.80  *  229.37  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  758.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  757.76  * Reach Len. (ft)        *   75.00  *  117.43  *   75.00  *
* Crit W.S. (ft)         *  736.98  * Flow Area (sq ft)      * 2079.11  * 8372.41  *  943.25  *
* E.G. Slope (ft/ft)     *0.000206  * Area (sq ft)           * 2100.88  * 8372.41  * 1752.81  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4055.56  *57429.61  * 1514.84  *
* Top Width (ft)         *  984.76  * Top Width (ft)         *  335.60  *  292.90  *  356.26  *
* Vel Total (ft/s)       *    5.53  * Avg. Vel. (ft/s)       *    1.95  *    6.86  *    1.61  *
* Max Chl Dpth (ft)      *   42.40  * Hydr. Depth (ft)       *    7.15  *   28.58  *    7.76  *
* Conv. Total (cfs)      *4385901.0  * Conv. (cfs)            *282337.5  *3998104.0  *105459.4  *
* Length Wtd. (ft)       *  114.12  * Wetted Per. (ft)       *  297.47  *  305.64  *  129.26  *
* Min Ch El (ft)         *  715.36  * Shear (lb/sq ft)       *    0.09  *    0.35  *    0.09  *
* Alpha                  *    1.41  * Stream Power (lb/ft s) *    0.18  *    2.42  *    0.15  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  874.74  * 3995.85  * 1383.53  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  192.27  *  157.03  *  386.95  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *   0.040  *   0.028  *   0.050  *
* W.S. Elev (ft)         *  760.61  * Reach Len. (ft)        *   75.00  *  117.43  *   75.00  *
* Crit W.S. (ft)         *  739.19  * Flow Area (sq ft)      * 2905.72  * 9205.56  * 1288.85  *
* E.G. Slope (ft/ft)     *0.000201  * Area (sq ft)           * 3055.49  * 9205.56  * 2822.12  *
```

```
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6955.99  *66462.02  * 2481.98  *
* Top Width (ft)         * 1018.11  * Top Width (ft)         *  335.60  *  292.90  *  389.61  *
* Vel Total (ft/s)       *    5.66  * Avg. Vel. (ft/s)       *    2.39  *    7.22  *    1.93  *
* Max Chl Dpth (ft)      *   45.25  * Hydr. Depth (ft)       *   10.00  *   31.43  *   10.61  *
* Conv. Total (cfs)      *5347964.0  * Conv. (cfs)           *490123.7  *4682958.0  *174882.1  *
* Length Wtd. (ft)       *  112.62  * Wetted Per. (ft)       *  300.32  *  305.64  *  132.11  *
* Min Ch El (ft)         *  715.36  * Shear (lb/sq ft)       *    0.12  *    0.38  *    0.12  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.29  *    2.73  *    0.24  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1462.04  * 4399.90  * 2516.03  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  233.39  *  157.66  *  569.36  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  750.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  749.71  * Reach Len. (ft)        *   75.00  *  117.43  *   75.00  *
* Crit W.S. (ft)         *  732.07  * Flow Area (sq ft)      *          * 6012.96  *          *
* E.G. Slope (ft/ft)     *0.000274  * Area (sq ft)           *          * 6012.96  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  291.54  * Top Width (ft)         *          *  291.54  *          *
* Vel Total (ft/s)       *    6.37  * Avg. Vel. (ft/s)       *          *    6.37  *          *
* Max Chl Dpth (ft)      *   34.35  * Hydr. Depth (ft)       *          *   20.62  *          *
* Conv. Total (cfs)      *2311969.0  * Conv. (cfs)           *          *2311969.0  *          *
* Length Wtd. (ft)       *  117.43  * Wetted Per. (ft)       *          *  304.14  *          *
* Min Ch El (ft)         *  715.36  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.16  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   83.87  * 2920.42  *  256.97  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   39.06  *  152.43  *   69.76  *
*****************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.224

INPUT
Description: Expanded sectin d/s of RR Bridge B-14

COE
             Riverstation=40268.16
Preliminary Model
             Riverstation=594.367

Equivelant to RS 5.21 from previous FIS
             Submittal
Station Elevation Data    num=     298
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  772.63   25.63     772   41.42     772   41.86  771.76   42.37  771.59
   43.42  771.33   49.01     770   82.66     770   87.73  768.91   89.53  768.44
   92.26     768  104.19     768  162.92  767.84  164.69  767.84  171.92  767.82
  175.99  767.82  186.03  767.79  186.66  767.79  187.93  767.76  188.09  767.75
  188.98  767.72  190.45  767.66  206.95  767.17  229.84     766  232.77  765.94
  305.45     764   313.4     764  404.34     762  440.76   761.4  478.49   760.8
  519.98     760  527.27     760  534.82  759.83  540.15   759.7  549.69  759.49
  558.97  759.26  700.13  756.25  702.72   756.2  711.63   756.2  712.52  756.19
  713.51  756.17  726.22     756  739.39     756  773.38  755.46   792.7  755.27
  812.45  755.01  877.72  754.38  886.65  754.27  977.85  753.36  991.83  753.21
  995.08  753.17  997.19  753.15 1047.83  752.62  1102.3     752 1183.48     752
    1185  751.78 1198.91     750 1206.04  749.23 1207.58  749.02 1213.72  748.28
  1215.1  748.12 1216.06     748 1226.37  747.48 1229.17  747.29 1236.65  746.88
 1246.65  746.09 1247.14  746.06 1247.75     746 1266.32     746 1272.13  747.43
 1274.12     748 1275.43  748.38 1280.58     750 1281.44  750.17 1284.91  750.96
 1288.04  751.65 1289.57     752  1366.8     752 1369.45  752.06 1378.08  752.22
 1383.59  752.29 1405.24   752.1 1408.56     752 1412.03  751.78 1412.72  751.74
```

1413.47	751.71	1421.05	751.25	1422.58	751.19	1431.03	750.56	1436.97	750
1439.87	749.12	1443.52	748	1449.23	746.23	1450	746	1456.26	744.06
1456.47	744	1458.35	743.42	1462.93	742	1463.68	741.94	1464.74	741.87
1470.1	741.47	1472.42	741.34	1478.89	740.89	1481.74	740.72	1487.42	740.4
1489.62	740.25	1494.33	740	1496.82	739.36	1500.09	738.51	1501.3	738.19
1502.03	738	1505.54	737.08	1505.8	737	1512.7	734.91	1515.73	734
1518.7	733.09	1521.55	732.26	1522.41	732	1543.2	730	1545.22	729.55
1551.97	728	1557.16	726.12	1557.5	726	1558.05	725.8	1562.98	724
1567.31	722.75	1569.96	722	1574.63	720.73	1577.33	720	1610.08	715.18
1632.08	715.18	1654.08	715.08	1686.83	720	1688.19	720.43	1693.13	722
1694.95	722.6	1699.25	724	1702.72	725.15	1705.27	726	1708.63	727.17
1711.07	728	1716.52	730	1719.61	731.36	1721.05	732	1725	733.75
1725.57	734	1726.12	734.24	1730.09	736	1733.05	737.29	1734.65	738
1738.72	739.68	1739.49	740	1740.8	740.17	1754.71	742	1762.97	743.33
1767.22	744	1767.77	745.63	1767.9	746	1768.1	746.86	1768.35	748
1779.32	748.93	1782.44	749.2	1794.58	750	2274.09	750	2336.49	749.08
2356.26	748.85	2387.9	748.57	2427.56	748.12	2431.1	748.09	2439.39	748
2574.9	748	2587.63	748.13	2590.53	748.17	2592.43	748.15	2635.69	749.23
2639.68	749.28	2667.39	749.69	2680.19	749.91	2686.04	750	2771.21	750
2874.37	751.17	2885.44	751.26	2907.44	751.52	2910.84	751.54	2916.93	751.56
2921.61	751.56	2937.65	751.6	2946.46	751.63	3025.09	752	3160.36	752
3190.56	752.31	3193.7	752.33	3198.73	752.39	3257.8	752.99	3333.38	752.79
3334.16	752.83	3335.27	752.85	3338.86	752.78	3339.96	752.77	3341.05	752.74
3365.77	752.86	3378.7	753.09	3404.44	754	3424.48	754	3432.72	754.51
3454.62	756	3462.36	757.04	3468.05	757.79	3469.79	758	3533.94	760
3538.39	761.65	3539.4	762	3541.43	763.06	3543.21	764	3544.11	764.46
3547.02	766	3549.93	767.49	3550.97	768	3551.59	768.29	3555.09	770
3557.67	771.23	3559.26	772	3563.15	773.85	3563.47	774	3565.86	775.13
3567.71	776	3567.83	776.06	3571.91	778	3576.09	780	3577.86	780.85
3583.03	783.32	3584.44	784	3587.63	785.53	3588.62	786	3592.38	787.81
3592.78	788	3594.09	788.13	3595.21	788.21	3604.6	789.03	3616.46	790
3792.28	790	3794.01	792	3794.8	792.91	3795.74	794	3796.47	794.84
3797.46	796	3798.13	796.76	3799.19	798	3799.74	798.63	3800.9	800
3801.3	800.45	3802.61	802	3802.72	802.12	3803.04	802.51	3803.95	803.57
3804.31	804	3806.7	805.58	3807.34	806	3807.67	806.11	3813.62	808
3815.02	808.45	3820	810	3820.84	810.27	3826.42	812	3826.82	812.13
3832.86	814	3841.91	814	3843.81	814.15	3844.63	814.33	3845.9	814.47
3852.57	816	3854.6	816.52	3860.63	818	3862.57	818.47	3866.52	819.29
3868.74	819.77	3875.57	821.11	3879.94	822	3883.49	822.83	3889.06	824
3889.93	824.18	3895.4	825.22	3898.71	825.86	3899.47	826	3901.23	826.33
3910.26	828	3913.77	828.56	3925.23	830	3928.74	830.52	3938.11	831.47
3943.78	831.72	3944.92	831.78	3950.44	831.83	3951	831.84	3956.3	831.85
3961.87	831.85	3962.15	831.86	3970.01	831.86				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.15	1047.83	.04	1405.24	.028	1794.58	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1405.24	1794.58	69.35	94.4	86.76	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	645.25	780	F
2655	3970.01	780	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
365	565	780	645.25	1055	780	1180	1290	752
1725.6	1728.1	750	1763.6	1767.1	750	1870	2655	780

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	736.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.028	
W.S. Elev (ft)	736.60	Reach Len. (ft)	69.35	94.40	86.76
Crit W.S. (ft)	724.06	Flow Area (sq ft)		3128.23	
E.G. Slope (ft/ft)	0.000176	Area (sq ft)		3128.23	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	221.85	Top Width (ft)		221.85	
Vel Total (ft/s)	4.00	Avg. Vel. (ft/s)		4.00	
Max Chl Dpth (ft)	21.52	Hydr. Depth (ft)		14.10	
Conv. Total (cfs)	941284.5	Conv. (cfs)		941284.5	
Length Wtd. (ft)	94.40	Wetted Per. (ft)		231.70	
Min Ch El (ft)	715.08	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.59	

```
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *          * 1369.97  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  115.81  *          *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  741.07  * Reach Len. (ft)        *   69.35  *   94.40  *   86.76  *
* Crit W.S. (ft)         *  726.42  * Flow Area (sq ft)      *          * 4191.91  *          *
* E.G. Slope (ft/ft)     *0.000217  * Area (sq ft)           *          * 4191.91  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  268.92  * Top Width (ft)         *          *  268.92  *          *
* Vel Total (ft/s)       *    4.65  * Avg. Vel. (ft/s)       *          *    4.65  *          *
* Max Chl Dpth (ft)      *   25.99  * Hydr. Depth (ft)       *          *   15.59  *          *
* Conv. Total (cfs)      *1323268.0  * Conv. (cfs)            *          *1323268.0  *          *
* Length Wtd. (ft)       *   94.40  * Wetted Per. (ft)       *          *  288.94  *          *
* Min Ch El (ft)         *  715.08  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.91  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *    1.44  * 1865.25  *    6.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *  131.50  *    8.33  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.08  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  744.68  * Reach Len. (ft)        *   69.35  *   94.40  *   86.76  *
* Crit W.S. (ft)         *  728.46  * Flow Area (sq ft)      *          * 5255.21  *          *
* E.G. Slope (ft/ft)     *0.000234  * Area (sq ft)           *          * 5255.21  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  307.19  * Top Width (ft)         *          *  307.19  *          *
* Vel Total (ft/s)       *    5.06  * Avg. Vel. (ft/s)       *          *    5.06  *          *
* Max Chl Dpth (ft)      *   29.60  * Hydr. Depth (ft)       *          *   17.11  *          *
* Conv. Total (cfs)      *1739073.0  * Conv. (cfs)            *          *1739073.0  *          *
* Length Wtd. (ft)       *   94.40  * Wetted Per. (ft)       *          *  337.48  *          *
* Min Ch El (ft)         *  715.08  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.15  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   14.56  * 2287.39  *   55.45  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.79  *  141.94  *   27.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.54  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  748.09  * Reach Len. (ft)        *   69.35  *   94.40  *   86.76  *
* Crit W.S. (ft)         *  730.46  * Flow Area (sq ft)      *          * 6322.79  *          *
* E.G. Slope (ft/ft)     *0.000234  * Area (sq ft)           *          * 6322.79  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  320.16  * Top Width (ft)         *          *  320.16  *          *
* Vel Total (ft/s)       *    5.41  * Avg. Vel. (ft/s)       *          *    5.41  *          *
* Max Chl Dpth (ft)      *   33.01  * Hydr. Depth (ft)       *          *   19.75  *          *
* Conv. Total (cfs)      *2237623.0  * Conv. (cfs)            *          *2237623.0  *          *
* Length Wtd. (ft)       *   94.40  * Wetted Per. (ft)       *          *  367.15  *          *
* Min Ch El (ft)         *  715.08  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.36  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   50.19  * 2695.53  *  170.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.93  *  149.11  *   56.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	753.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	753.27	Reach Len. (ft)	69.35	94.40	86.76
Crit W.S. (ft)	733.01	Flow Area (sq ft)	425.61	8198.91	246.72
E.G. Slope (ft/ft)	0.000219	Area (sq ft)	425.61	8198.91	1452.53
Q Total (cfs)	45500.00	Flow (cfs)	266.33	45001.00	232.67
Top Width (ft)	1543.83	Top Width (ft)	350.24	389.34	804.25
Vel Total (ft/s)	5.13	Avg. Vel. (ft/s)	0.63	5.49	0.94
Max Chl Dpth (ft)	38.19	Hydr. Depth (ft)	1.22	21.06	3.27
Conv. Total (cfs)	3071605.0	Conv. (cfs)	17979.3	3037919.0	15706.7
Length Wtd. (ft)	94.22	Wetted Per. (ft)	350.98	444.41	78.69
Min Ch El (ft)	715.08	Shear (lb/sq ft)	0.02	0.25	0.04
Alpha	1.13	Stream Power (lb/ft s)	0.01	1.39	0.04
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	224.25	3300.92	506.64
C & E Loss (ft)	0.01	Cum SA (acres)	103.94	154.07	126.67

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	756.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	756.20	Reach Len. (ft)	69.35	94.40	86.76
Crit W.S. (ft)	734.58	Flow Area (sq ft)	1450.66	9338.39	467.45
E.G. Slope (ft/ft)	0.000189	Area (sq ft)	1450.66	9338.39	3940.00
Q Total (cfs)	54400.00	Flow (cfs)	1897.90	51890.62	611.48
Top Width (ft)	1616.09	Top Width (ft)	350.24	389.34	876.51
Vel Total (ft/s)	4.83	Avg. Vel. (ft/s)	1.31	5.56	1.31
Max Chl Dpth (ft)	41.12	Hydr. Depth (ft)	4.14	23.99	6.20
Conv. Total (cfs)	3956208.0	Conv. (cfs)	138023.4	3773715.0	44469.8
Length Wtd. (ft)	93.39	Wetted Per. (ft)	353.91	444.41	81.62
Min Ch El (ft)	715.08	Shear (lb/sq ft)	0.05	0.25	0.07
Alpha	1.26	Stream Power (lb/ft s)	0.06	1.38	0.09
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	581.98	3715.78	918.08
C & E Loss (ft)	0.01	Cum SA (acres)	166.16	155.88	228.33

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	758.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	757.86	Reach Len. (ft)	69.35	94.40	86.76
Crit W.S. (ft)	736.01	Flow Area (sq ft)	2031.88	9984.50	592.61
E.G. Slope (ft/ft)	0.000194	Area (sq ft)	2036.36	9984.50	5404.85
Q Total (cfs)	63000.00	Flow (cfs)	3358.79	58734.11	907.10
Top Width (ft)	1649.12	Top Width (ft)	370.75	389.34	889.03
Vel Total (ft/s)	5.00	Avg. Vel. (ft/s)	1.65	5.88	1.53
Max Chl Dpth (ft)	42.78	Hydr. Depth (ft)	5.80	25.64	7.86
Conv. Total (cfs)	4525253.0	Conv. (cfs)	241259.7	4218837.0	65156.4
Length Wtd. (ft)	92.86	Wetted Per. (ft)	355.57	444.41	83.28
Min Ch El (ft)	715.08	Shear (lb/sq ft)	0.07	0.27	0.09
Alpha	1.30	Stream Power (lb/ft s)	0.11	1.60	0.13
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	871.18	3971.11	1377.36
C & E Loss (ft)	0.01	Cum SA (acres)	191.66	156.11	385.88

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	761.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.040	0.028	0.050
W.S. Elev (ft)	760.72	Reach Len. (ft)	69.35	94.40	86.76
Crit W.S. (ft)	738.04	Flow Area (sq ft)	3033.47	11097.91	808.29

```
* E.G. Slope (ft/ft)     *0.000183  * Area (sq ft)           * 3229.40  *11097.91  * 8061.39  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6335.48  *68117.78  * 1446.74  *
* Top Width (ft)         * 1776.12  * Top Width (ft)         *  430.49  *  389.34  *  956.29  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *    2.09  *    6.14  *    1.79  *
* Max Chl Dpth (ft)      *   45.64  * Hydr. Depth (ft)       *    8.66  *   28.50  *   10.72  *
* Conv. Total (cfs)      *5606589.0  * Conv. (cfs)            *467990.0  *5031731.0  *106867.6  *
* Length Wtd. (ft)       *   91.99  * Wetted Per. (ft)       *  358.43  *  444.41  *   86.14  *
* Min Ch El (ft)         *  715.08  * Shear (lb/sq ft)       *    0.10  *    0.29  *    0.11  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *    0.20  *    1.75  *    0.19  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1456.63  * 4372.54  * 2506.66  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  232.73  *  156.74  *  568.20  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  750.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  749.78  * Reach Len. (ft)        *   69.35  *   94.40  *   86.76  *
* Crit W.S. (ft)         *  731.51  * Flow Area (sq ft)      *          * 6886.85  *          *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           *          * 6886.85  *    2.51  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  365.28  * Top Width (ft)         *          *  347.57  *   17.71  *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *          *    5.56  *          *
* Max Chl Dpth (ft)      *   34.70  * Hydr. Depth (ft)       *          *   19.81  *          *
* Conv. Total (cfs)      *2430182.0  * Conv. (cfs)            *          *2430182.0  *          *
* Length Wtd. (ft)       *   94.40  * Wetted Per. (ft)       *          *  401.65  *          *
* Min Ch El (ft)         *  715.08  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.48  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   83.87  * 2903.03  *  256.97  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   39.06  *  151.57  *   69.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.206

INPUT
Description: COE Riverstation=40362.56
Preliminary Model
             Riverstation=499.964

Equivelant to RS 5.2 from previous FIS
             Submittal
Station Elevation Data    num=     319
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  771.28   10.45  770.92   21.37  770.48   26.32  770.32   33.58     770
   34.53  769.51   37.57     768  115.17     768  125.56  767.98  180.93     766
   199.8  765.62  207.73  765.49  210.74  765.43  270.92  764.31  286.21     764
  287.76     764  291.93  763.91  292.76   763.9  311.05  763.47  321.36  763.25
  372.81     762  380.52     762  443.95  760.69  448.43  760.61  485.31     760
  539.08     760  557.22  759.62  562.46  759.54  565.33  759.51  594.03  759.06
  597.06     759  625.91  758.55  657.11     758  660.24     758  671.66  757.74
   706.8  756.87  739.26     756  800.44  754.79  851.19     754  885.03   753.6
  918.13  753.35 1006.01  752.46 1047.67     752 1078.93     752 1079.17  751.97
 1079.44  751.93 1093.28   749.9 1093.58  749.85 1094.57  749.71 1101.11  748.74
 1106.35     748 1117.01     748 1117.68  748.07  1127.5  749.11  1135.2     750
 1163.43     750 1168.15  749.47 1172.72     750 1174.63  750.25  1185.2     752
 1296.25     752 1326.52  752.99 1331.28  753.09 1338.33  753.05 1340.52  753.05
 1342.65  753.04 1347.52  752.92 1349.92   752.9  1352.1  752.89 1359.43  752.79
 1385.38  752.73 1388.26  752.68 1392.22  752.62 1402.32  752.49 1407.65  752.41
  1416.9  752.25 1424.66  752.06 1426.38  752.02 1426.46  752.01 1426.96     752
 1428.84   751.6 1429.51  751.47 1431.63     751 1435.21   750.3 1435.75  750.18
 1436.67     750 1441.12  749.28 1442.68  749.07    1445  748.68 1448.52     748
 1453.95  746.92 1456.94   746.3 1458.24     746 1467.94     744 1478.62  742.05
 1478.85  742.01 1478.91     742 1479.49     742 1494.27  740.78 1496.13  740.65
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 1497.31  740.58  1498.2  740.52 1498.86  740.48 1504.29     740 1506.61  739.79
 1515.19   739.1 1522.69  738.46 1524.84  738.28 1528.03     738 1533.76  737.16
 1534.43  737.09 1535.25  736.99 1536.17   736.9 1537.37  736.76 1539.38  736.51
 1543.33     736 1543.65  735.96 1546.92  735.51 1549.31  735.13 1556.49     734
 1560.73  733.21 1567.06     732 1582.63     730 1604.66     728 1608.32  727.14
 1613.23     726 1615.21  725.15    1618     724 1619.09  723.47 1624.44  720.86
 1626.19     720 1656.48  715.04 1678.48  715.04 1700.48  715.04 1730.77     720
 1733.79  721.19 1735.83     722 1736.95  722.44 1740.99     724 1741.86  724.32
 1746.38     726 1749.25  727.06 1751.75     728 1754.57  729.13 1756.81     730
  1762.2     732 1774.36     736 1775.39  736.34 1779.66  737.74 1780.34  737.97
 1780.44     738 1785.84  739.88 1786.18     740  1788.3  740.23  1804.4     742
 1807.84  742.98  1811.6     744 1811.62  744.14 1811.69  744.58 1811.91     746
 1812.12  747.34 1812.23     748 1812.34  748.64 1812.52  749.61 1812.59     750
 1839.19     750 1858.86  750.66 1862.34  750.72 1862.72  750.73 1867.43  750.84
 1923.71  750.99  1924.5  750.93 1925.34   750.9 1930.72   750.8 1931.77  750.77
 1932.93  750.76 1933.87  750.75 1945.38     750 2307.73     750 2309.93  749.98
 2310.51  749.97 2384.18  749.23 2412.76  749.01 2434.88  748.91 2453.99  748.64
 2457.46  748.63 2472.28  748.44 2475.11  748.42 2477.37  748.41 2485.17  748.35
 2485.72  748.34  2486.3  748.34 2486.58  748.33 2535.25  748.05 2536.24  748.04
 2537.47  748.03 2540.02  748.03 2541.22  748.05 2541.71  748.05 2541.91  748.06
 2656.29  749.73 2658.57  749.78  2663.7  749.87 2664.67  749.89 2665.53   749.9
 2670.74     750 2783.35     750 2821.94  750.38 2851.58  750.64 2854.51  750.67
 2861.96  750.76 2878.43   750.9 2880.49  750.92 2907.37  751.06  2909.5  751.06
  2931.1  751.63 2936.71  751.65 2938.06  751.65 3012.93     752 3105.39     752
 3106.98  752.02 3229.57  753.26 3238.81  753.37 3239.98  753.37  3250.2  753.47
    3251  753.48 3303.78     754 3367.03     754 3372.25   754.1 3372.45   754.1
 3377.46  754.15 3380.71   754.2 3381.24  754.21 3381.95  754.21 3384.33  754.33
 3395.55  754.62 3399.73  754.79 3407.55  755.09 3416.65  755.47 3421.01  755.63
 3422.97  755.69 3429.11  755.89 3429.83  755.91  3432.3     756 3433.34     756
 3434.98  756.15 3439.35  756.51 3448.93     758 3452.67  758.12 3454.17  758.16
 3468.92   758.6 3518.16     760 3521.86  761.37 3523.71     762 3527.54  763.66
 3528.15  763.92 3528.33     764 3528.82  764.22 3532.76     766 3535.36  767.21
 3537.08     768  3538.5  768.66 3541.36     770 3544.76   771.6 3545.62     772
 3549.86     774 3550.63  774.36 3557.17  777.46 3558.32     778 3559.93  778.76
 3566.36  781.82 3566.75     782 3567.05  782.15 3570.91     784 3574.78  785.88
  3575.2  786.09 3579.04     788 3598.79  789.46 3606.46     790 3765.07     790
 3771.26   795.5 3771.82     796 3772.14  796.29 3774.05     798 3776.26  799.99
 3778.44     802 3779.94  803.41 3780.59     804 3781.17  804.33 3783.94     806
 3785.67  806.52 3790.68     808 3796.93  809.96 3797.06     810 3801.81     812
 3805.92  813.72 3806.61     814  3825.5     816 3826.58  816.32 3832.34     818
 3835.57  818.93 3844.02  821.29 3846.55     822 3851.01  823.26 3853.17  823.86
 3853.68     824    3868     828 3871.96  829.07 3875.44     830 3879.56  830.85
  3885.2     832  3887.4  832.46  3894.2  833.83 3894.85  833.96 3895.07     834
 3902.35  835.45 3905.32     836  3914.1  837.71 3920.64  838.91

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
       0     .15 1006.01     .04 1426.96    .028 1812.59     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1426.96 1812.59              107     108      85             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     560     780       F
    2892 3920.64     780       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************************************
     415     500     780     560     982     780    1075    1190     752
  1743.6  1746.1     750  1781.6  1785.1     750    1887    2892     780

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  736.83  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  736.56  * Reach Len. (ft)        *  107.00  *  108.00  *   85.00  *
* Crit W.S. (ft)         *  724.17  * Flow Area (sq ft)      *          * 3002.84  *          *
* E.G. Slope (ft/ft)     *0.000239  * Area (sq ft)           *          * 3002.84  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  234.57  * Top Width (ft)         *          *  234.57  *          *
* Vel Total (ft/s)       *    4.16  * Avg. Vel. (ft/s)       *          *    4.16  *          *
* Max Chl Dpth (ft)      *   21.52  * Hydr. Depth (ft)       *          *   12.80  *          *
* Conv. Total (cfs)      *808913.6  * Conv. (cfs)             *          *808913.6  *          *
* Length Wtd. (ft)       *  108.00  * Wetted Per. (ft)       *          *  262.56  *          *
* Min Ch El (ft)         *  715.04  * Shear (lb/sq ft)       *          *    0.17  *          *
```

```
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.71  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *          * 1363.32  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  115.32  *          *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.39  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  741.05  * Reach Len. (ft)        *  107.00  *  108.00  *   85.00  *
* Crit W.S. (ft)         *  726.70  * Flow Area (sq ft)      *          * 4179.03  *          *
* E.G. Slope (ft/ft)     *0.000273  * Area (sq ft)           *          * 4179.03  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  298.72  * Top Width (ft)         *          *  298.72  *          *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *          *    4.67  *          *
* Max Chl Dpth (ft)      *   26.01  * Hydr. Depth (ft)       *          *   13.99  *          *
* Conv. Total (cfs)      *1180230.0  * Conv. (cfs)            *          *1180230.0  *          *
* Length Wtd. (ft)       *  108.00  * Wetted Per. (ft)       *          *  340.40  *          *
* Min Ch El (ft)         *  715.04  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.98  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    1.44  * 1856.18  *    6.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *  130.89  *    8.33  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.05  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  744.67  * Reach Len. (ft)        *  107.00  *  108.00  *   85.00  *
* Crit W.S. (ft)         *  729.10  * Flow Area (sq ft)      *          * 5356.23  *          *
* E.G. Slope (ft/ft)     *0.000274  * Area (sq ft)           *          * 5356.23  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  341.00  * Top Width (ft)         *          *  341.00  *          *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)       *          *    4.97  *          *
* Max Chl Dpth (ft)      *   29.63  * Hydr. Depth (ft)       *          *   15.71  *          *
* Conv. Total (cfs)      *1607321.0  * Conv. (cfs)            *          *1607321.0  *          *
* Length Wtd. (ft)       *  108.00  * Wetted Per. (ft)       *          *  398.34  *          *
* Min Ch El (ft)         *  715.04  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.14  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   14.56  * 2275.89  *   55.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.79  *  141.24  *   27.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.51  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  748.09  * Reach Len. (ft)        *  107.00  *  108.00  *   85.00  *
* Crit W.S. (ft)         *  731.22  * Flow Area (sq ft)      *          * 6551.77  *          *
* E.G. Slope (ft/ft)     *0.000258  * Area (sq ft)           *          * 6551.77  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  358.18  * Top Width (ft)         *          *  358.18  *          *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *          *    5.22  *          *
* Max Chl Dpth (ft)      *   33.05  * Hydr. Depth (ft)       *          *   18.29  *          *
* Conv. Total (cfs)      *2128778.0  * Conv. (cfs)            *          *2128778.0  *          *
* Length Wtd. (ft)       *  108.00  * Wetted Per. (ft)       *          *  432.47  *          *
* Min Ch El (ft)         *  715.04  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.27  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   50.19  * 2681.58  *  170.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.93  *  148.38  *   56.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	753.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.	0.041	0.028	0.050
W.S. Elev (ft)	753.27	Reach Len. (ft)	107.00	108.00	85.00
Crit W.S. (ft)	733.69	Flow Area (sq ft)	458.81	8499.94	213.67
E.G. Slope (ft/ft)	0.000210	Area (sq ft)	458.81	8499.94	611.47
Q Total (cfs)	45500.00	Flow (cfs)	247.86	45070.11	182.04
Top Width (ft)	1243.60	Top Width (ft)	444.96	385.63	413.01
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)	0.54	5.30	0.85
Max Chl Dpth (ft)	38.23	Hydr. Depth (ft)	1.03	22.04	2.87
Conv. Total (cfs)	3139584.0	Conv. (cfs)	17102.8	3109920.0	12560.8
Length Wtd. (ft)	107.92	Wetted Per. (ft)	445.56	469.54	76.80
Min Ch El (ft)	715.04	Shear (lb/sq ft)	0.01	0.24	0.04
Alpha	1.13	Stream Power (lb/ft s)	0.01	1.26	0.03
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	223.55	3282.82	504.58
C & E Loss (ft)	0.02	Cum SA (acres)	103.31	153.23	125.46

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	756.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.	0.041	0.028	0.050
W.S. Elev (ft)	756.20	Reach Len. (ft)	107.00	108.00	85.00
Crit W.S. (ft)	735.39	Flow Area (sq ft)	1762.73	9630.00	431.72
E.G. Slope (ft/ft)	0.000182	Area (sq ft)	1762.73	9630.00	2236.00
Q Total (cfs)	54400.00	Flow (cfs)	2137.36	51728.20	534.44
Top Width (ft)	1448.62	Top Width (ft)	444.96	385.63	618.03
Vel Total (ft/s)	4.60	Avg. Vel. (ft/s)	1.21	5.37	1.24
Max Chl Dpth (ft)	41.16	Hydr. Depth (ft)	3.96	24.97	5.80
Conv. Total (cfs)	4026905.0	Conv. (cfs)	158215.7	3829128.0	39561.7
Length Wtd. (ft)	107.74	Wetted Per. (ft)	448.49	469.54	79.73
Min Ch El (ft)	715.04	Shear (lb/sq ft)	0.04	0.23	0.06
Alpha	1.30	Stream Power (lb/ft s)	0.05	1.26	0.08
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	579.42	3695.23	911.93
C & E Loss (ft)	0.01	Cum SA (acres)	165.52	226.84	226.84

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	758.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.041	0.028	0.050
W.S. Elev (ft)	757.87	Reach Len. (ft)	107.00	108.00	85.00
Crit W.S. (ft)	736.93	Flow Area (sq ft)	2502.96	10271.52	555.51
E.G. Slope (ft/ft)	0.000187	Area (sq ft)	2502.96	10271.52	3275.69
Q Total (cfs)	63000.00	Flow (cfs)	3872.81	58314.79	812.40
Top Width (ft)	1461.07	Top Width (ft)	444.96	385.63	630.48
Vel Total (ft/s)	4.73	Avg. Vel. (ft/s)	1.55	5.68	1.46
Max Chl Dpth (ft)	42.83	Hydr. Depth (ft)	5.63	26.64	7.47
Conv. Total (cfs)	4606199.0	Conv. (cfs)	283157.6	4263643.0	59398.2
Length Wtd. (ft)	107.63	Wetted Per. (ft)	450.15	469.54	81.40
Min Ch El (ft)	715.04	Shear (lb/sq ft)	0.06	0.26	0.08
Alpha	1.34	Stream Power (lb/ft s)	0.10	1.45	0.12
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	867.57	3949.16	1368.72
C & E Loss (ft)	0.02	Cum SA (acres)	191.01	155.27	384.36

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	761.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.041	0.028	0.050
W.S. Elev (ft)	760.73	Reach Len. (ft)	107.00	108.00	85.00

```
* Crit W.S. (ft)         *  738.99  * Flow Area (sq ft)      * 3778.80  *11377.24  *  768.87  *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           * 3827.37  *11377.24  * 5205.80  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 7452.69  *67122.67  * 1324.64  *
* Top Width (ft)         * 1593.14  * Top Width (ft)         *  504.96  *  385.63  *  702.55  *
* Vel Total (ft/s)       *    4.77  * Avg. Vel. (ft/s)       *    1.97  *    5.90  *    1.72  *
* Max Chl Dpth (ft)      *   45.69  * Hydr. Depth (ft)       *    8.49  *   29.50  *   10.33  *
* Conv. Total (cfs)      *5716853.0  * Conv. (cfs)           *561342.9  *5055737.0  * 99773.4  *
* Length Wtd. (ft)       *  107.46  * Wetted Per. (ft)       *  453.02  *  469.54  *   84.26  *
* Min Ch El (ft)         *  715.04  * Shear (lb/sq ft)       *    0.09  *    0.27  *    0.10  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.18  *    1.57  *    0.17  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   * 1451.01  * 4348.18  * 2493.44  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  231.98  *  155.90  *  566.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  750.23  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  749.78  * Reach Len. (ft)        *  107.00  *  108.00  *   85.00  *
* Crit W.S. (ft)         *  732.12  * Flow Area (sq ft)      *          * 7167.71  *          *
* E.G. Slope (ft/ft)     *0.000254  * Area (sq ft)           *          * 7167.71  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  368.54  * Top Width (ft)         *          *  368.54  *          *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)       *          *    5.34  *          *
* Max Chl Dpth (ft)      *   34.74  * Hydr. Depth (ft)       *          *   19.45  *          *
* Conv. Total (cfs)      *2403824.0  * Conv. (cfs)           *          *2403824.0  *          *
* Length Wtd. (ft)       *  108.00  * Wetted Per. (ft)       *          *  451.18  *          *
* Min Ch El (ft)         *  715.04  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.35  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   83.87  * 2887.80  *  256.97  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   39.06  *  150.80  *   69.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.185

INPUT
Description: COE River Station= 40470.44
Preliminary Model River Station
              (miles)=5.18

KC Southern RR Bridge.  B-13 (upstream).
              Normalized to channel flow. Obstructions:  Buildings.
Station Elevation Data    num=     106
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     768   50.72     766  102.34     764  195.75     762   340.6     760
  678.21     756  740.39     754  840.15     752  858.74     750  898.54     750
  922.01     752  974.68   752.6    1469     748 1469.51     746 1469.64     744
 1473.72     742 1478.59     740 1484.94     738 1492.36     736 1500.09     734
 1508.29     732 1516.49     730 1522.37     728 1527.47     726 1535.97     724
  1549.9     722 1558.57     720 1576.57   719.3  1588.7     715 1602.79     715
 1627.89     715 1640.02   719.3 1658.02     720 1662.36     722 1667.44     724
 1673.02     726 1678.43     728 1684.15     730 1689.87     732 1696.07     734
 1702.57     736  1708.6     738 1714.78     740 1732.58     742 1733.01     744
 1733.17     746 1733.24     748 1733.33     750 1772.81   752.6 2364.21     752
 2378.69     751 2392.89     750 2426.93     750 2632.46     750 2658.55     750
 2663.76     750 2788.59     750 2819.04     750 2857.84     752  3019.5     754
 3049.63     754 3063.78     754 3096.91     754 3106.57     756 3113.12     758
 3120.95     760 3164.63     760 3223.77     760 3224.61     760 3246.17     760
  3268.8     762 3273.88     762 3279.47     760 3282.72     760 3287.05     762
 3340.56     764 3370.16     766 3374.91     768 3381.18     770  3385.6     772
 3389.45     774 3396.45     776 3400.77     778 3405.09     780 3408.03     782
 3414.06     784 3418.25     786 3420.23     788 3491.87     788 3498.83     788
 3583.63     790 3592.24     792  3594.4     794 3599.72     796 3600.91     798
```

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 3607.11     800 3612.79     802 3618.81     804 3623.09     806 3626.56     808
 3648.18     810 3653.85     812 3660.66     814 3665.72     816 3689.66     824
 3696.98     826

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041    1469    .028 1733.33    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1469 1733.33               26      26      26              .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
     750     980     775       F
    2800    3395     775       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
       0  748.98     775 1821.15    2800     775

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  736.51  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  725.05  * Flow Area (sq ft)      *          * 2876.50  *          *
* E.G. Slope (ft/ft)     *0.000218  * Area (sq ft)           *          * 2876.50  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  213.63  * Top Width (ft)         *          *  213.63  *          *
* Vel Total (ft/s)       *    4.35  * Avg. Vel. (ft/s)       *          *    4.35  *          *
* Max Chl Dpth (ft)      *   21.51  * Hydr. Depth (ft)       *          *   13.47  *          *
* Conv. Total (cfs)      *846844.1  * Conv. (cfs)             *          *846844.1  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  220.15  *          *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.77  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          * 1356.04  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *  114.76  *          *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  740.96  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  727.40  * Flow Area (sq ft)      *          * 3895.75  *          *
* E.G. Slope (ft/ft)     *0.000235  * Area (sq ft)           *          * 3895.75  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  247.13  * Top Width (ft)         *          *  247.13  *          *
* Vel Total (ft/s)       *    5.01  * Avg. Vel. (ft/s)       *          *    5.01  *          *
* Max Chl Dpth (ft)      *   25.96  * Hydr. Depth (ft)       *          *   15.76  *          *
* Conv. Total (cfs)      *1273061.0  * Conv. (cfs)             *          *1273061.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  254.95  *          *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.12  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  * 1846.17  *    6.16  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *  130.21  *    8.33  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  744.54  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  729.39  * Flow Area (sq ft)      *          * 4822.28  *          *
* E.G. Slope (ft/ft)     *0.000237  * Area (sq ft)           *          * 4822.28  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
```

```
* Top Width (ft)          *  263.45  * Top Width (ft)          *          *  263.45  *          *
* Vel Total (ft/s)        *    5.52  * Avg. Vel. (ft/s)        *          *    5.52  *          *
* Max Chl Dpth (ft)       *   29.54  * Hydr. Depth (ft)        *          *   18.30  *          *
* Conv. Total (cfs)       *1728893.0  * Conv. (cfs)            *          *1728893.0  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *          *  274.62  *          *
* Min Ch El (ft)          *  715.00  * Shear (lb/sq ft)        *          *    0.26  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.43  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *   14.56  * 2263.27  *   55.45  *
* C & E Loss (ft)         *          * Cum SA (acres)          *    8.79  *  140.49  *   27.73  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)          *  748.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.56  * Wt. n-Val.              *          *   0.028  *          *
* W.S. Elev (ft)          *  747.91  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  731.30  * Flow Area (sq ft)      *          * 5712.11  *          *
* E.G. Slope (ft/ft)      *0.000230  * Area (sq ft)           *          * 5712.11  *          *
* Q Total (cfs)           *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)          *  264.22  * Top Width (ft)          *          *  264.22  *          *
* Vel Total (ft/s)        *    5.99  * Avg. Vel. (ft/s)        *          *    5.99  *          *
* Max Chl Dpth (ft)       *   32.91  * Hydr. Depth (ft)        *          *   21.62  *          *
* Conv. Total (cfs)       *2255499.0  * Conv. (cfs)            *          *2255499.0  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *          *  281.44  *          *
* Min Ch El (ft)          *  715.00  * Shear (lb/sq ft)        *          *    0.29  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.74  *          *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *   50.19  * 2666.38  *  170.52  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   23.93  *  147.61  *   56.61  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  753.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.58  * Wt. n-Val.              *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)          *  753.08  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  733.80  * Flow Area (sq ft)      * 1373.45  * 7078.55  *   95.01  *
* E.G. Slope (ft/ft)      *0.000189  * Area (sq ft)           * 1657.14  * 7078.55  *  282.07  *
* Q Total (cfs)           *45500.00  * Flow (cfs)             * 1361.71  *44088.66  *   49.64  *
* Top Width (ft)          * 1180.52  * Top Width (ft)          *  682.92  *  264.33  *  233.27  *
* Vel Total (ft/s)        *    5.32  * Avg. Vel. (ft/s)        *    0.99  *    6.23  *    0.52  *
* Max Chl Dpth (ft)       *   38.08  * Hydr. Depth (ft)        *    2.81  *   26.78  *    1.08  *
* Conv. Total (cfs)       *3310859.0  * Conv. (cfs)            * 99086.1  *3208161.0  *  3611.8  *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *  489.02  *  283.62  *   88.44  *
* Min Ch El (ft)          *  715.00  * Shear (lb/sq ft)        *    0.03  *    0.29  *    0.01  *
* Alpha                   *    1.33  * Stream Power (lb/ft s) *    0.03  *    1.83  *    0.01  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *  220.95  * 3263.51  *  503.71  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)          *  101.92  *  152.42  *  124.83  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  756.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.57  * Wt. n-Val.              *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)          *  756.02  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  735.52  * Flow Area (sq ft)      * 2813.51  * 7855.76  *  353.23  *
* E.G. Slope (ft/ft)      *0.000170  * Area (sq ft)           * 3760.42  * 7855.76  * 1318.36  *
* Q Total (cfs)           *54400.00  * Flow (cfs)             * 4248.38  *49740.67  *  410.95  *
* Top Width (ft)          * 1378.82  * Top Width (ft)          *  720.02  *  264.33  *  394.47  *
```

```
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *    1.51  *    6.33  *    1.16  *
* Max Chl Dpth (ft)      *   41.02  * Hydr. Depth (ft)       *    5.74  *   29.72  *    4.02  *
* Conv. Total (cfs)      *4173978.0  * Conv. (cfs)           *325968.0  *3816479.0  * 31530.9  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  492.24  *  283.62  *   91.38  *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.06  *    0.29  *    0.04  *
* Alpha                  *    1.51  * Stream Power (lb/ft s) *    0.09  *    1.86  *    0.05  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  572.64  * 3673.55  *  908.46  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  164.09  *  154.24  *  225.86  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  758.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)         *  757.67  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  737.06  * Flow Area (sq ft)      * 3621.31  * 8291.50  *  498.00  *
* E.G. Slope (ft/ft)     *0.000178  * Area (sq ft)           * 4947.37  * 8291.50  * 1973.09  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 6602.61  *55661.18  *  736.20  *
* Top Width (ft)         * 1384.22  * Top Width (ft)         *  720.02  *  264.33  *  399.87  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *    1.82  *    6.71  *    1.48  *
* Max Chl Dpth (ft)      *   42.67  * Hydr. Depth (ft)       *    7.39  *   31.37  *    5.67  *
* Conv. Total (cfs)      *4726357.0  * Conv. (cfs)           *495338.3  *4175788.0  * 55231.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  493.89  *  283.62  *   93.03  *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.08  *    0.32  *    0.06  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.15  *    2.18  *    0.09  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  858.42  * 3926.14  * 1363.60  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  189.58  *  154.46  *  383.36  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  761.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)         *  760.54  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  739.13  * Flow Area (sq ft)      * 5024.52  * 9048.44  *  749.48  *
* E.G. Slope (ft/ft)     *0.000172  * Area (sq ft)           * 7009.21  * 9048.44  * 3204.31  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *11166.58  *63330.82  * 1402.60  *
* Top Width (ft)         * 1530.32  * Top Width (ft)         *  720.02  *  264.33  *  545.97  *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *    2.22  *    7.00  *    1.87  *
* Max Chl Dpth (ft)      *   45.54  * Hydr. Depth (ft)       *   10.25  *   34.23  *    8.53  *
* Conv. Total (cfs)      *5788937.0  * Conv. (cfs)           *851681.3  *4830279.0  *106977.2  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  496.75  *  283.62  *   95.89  *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.11  *    0.34  *    0.08  *
* Alpha                  *    1.59  * Stream Power (lb/ft s) *    0.24  *    2.40  *    0.16  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1437.70  * 4322.86  * 2485.24  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  230.48  *  155.09  *  565.33  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  750.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.041  *   0.028  *          *
* W.S. Elev (ft)         *  749.59  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  732.25  * Flow Area (sq ft)      *  135.34  * 6154.23  *          *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           *  135.34  * 6154.23  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *   63.21  *38236.79  *          *
* Top Width (ft)         *  434.86  * Top Width (ft)         *  170.55  *  264.31  *          *
* Vel Total (ft/s)       *    6.09  * Avg. Vel. (ft/s)       *    0.47  *    6.21  *          *
```

```
* Max Chl Dpth (ft)      *   34.59  * Hydr. Depth (ft)       *    0.79  *   23.28  *          *
* Conv. Total (cfs)      *2547486.0  * Conv. (cfs)            *  4204.1  *2543282.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  170.56  *  283.20  *          *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.01  *    0.31  *          *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    0.01  *    1.91  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   83.70  * 2871.29  *  256.97  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   38.85  *  150.01  *   69.73  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 5.183

INPUT
Description: Bridge B13.  KC Southern RR Bridge.  Bridge has been normalized to
             channel from 18 degree skew.  The top of the side rail was modeled
             as the top of the bridge.  The left pier was aligned with the
             flow, but the width of the right pier has been increased to
             account for skew.
Distance from Upstream XS =       1
Deck/Roadway Width        =      24
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=      11
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
  959.78   751.8         1459.78   751.8         1459.79  755.13  748.13
 1548.78  755.13  748.13 1548.79   760.3  748.13 1602.79   760.3  748.13
 1676.78   760.3  748.13 1676.79   754.8   747.8 1736.79   754.8   747.8
  1736.8   751.8          1836.8   751.8

Upstream Bridge Cross Section Data
Station Elevation Data    num=     106
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     768   50.72     766  102.34     764  195.75     762   340.6     760
  678.21     756  740.39     754  840.15     752  858.74     750  898.54     750
  922.01     752  974.68   752.6    1469     748 1469.51     746 1469.64     744
 1473.72     742 1478.59     740 1484.94     738 1492.36     736 1500.09     734
 1508.29     732 1516.49     730 1522.37     728 1527.47     726 1535.97     724
  1549.9     722 1558.57     720 1576.57   719.3  1588.7     715 1602.79     715
 1627.89     715 1640.02   719.3 1658.02     720 1662.36     722 1667.44     724
 1673.02     726 1678.43     728 1684.15     730 1689.87     732 1696.07     734
 1702.57     736  1708.6     738 1714.78     740 1732.58     742 1733.01     744
 1733.17     746 1733.24     748 1733.33     750 1772.81   752.6 2364.21     752
 2378.69     751 2392.89     750 2426.93     750 2632.46     750 2658.55     750
 2663.76     750 2788.59     750 2819.04     750 2857.84     752  3019.5     754
 3049.63     754 3063.78     754 3096.91     754 3106.57     756 3113.12     758
 3120.95     760 3164.63     760 3223.77     760 3224.61     760 3246.17     760
  3268.8     762 3273.88     762 3279.47     760 3282.72     760 3287.05     762
 3340.56     764 3370.16     766 3374.91     768 3381.18     770  3385.6     772
 3389.45     774 3396.45     776 3400.77     778 3405.09     780 3408.03     782
 3414.06     784 3418.25     786 3420.23     788 3491.87     788 3498.83     788
 3583.63     790 3592.24     792  3594.4     794 3599.72     796 3600.91     798
 3607.11     800 3612.79     802 3618.81     804 3623.09     806 3626.56     808
 3648.18     810 3653.85     812 3660.66     814 3665.72     816 3689.66     824
 3696.98     826

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041    1469    .028 1733.33    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1469 1733.33            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     750     980     775       F
    2800    3395     775       F
```

```
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0  748.98     775 1821.15    2800     775

Downstream  Deck/Roadway Coordinates
    num=      11
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
  951.72   751.8         1451.72   751.8         1451.73  755.13  748.13
 1540.72  755.13  748.13 1540.73   760.3  748.13 1594.73   760.3  748.13
 1668.72   760.3  748.13 1668.73   754.8   747.8 1728.73   754.8   747.8
 1728.74   751.8         1828.74   751.8

Downstream Bridge Cross Section Data
Station Elevation Data    num=     109
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     768   50.72     766  102.34     764  195.75     762   340.6     760
  678.21     756  740.39     754  840.15     752  858.74     750  898.54     750
  922.01     752  974.68   752.6 1449.26     752 1464.43     750    1469     748
 1469.32     746 1469.73     744 1474.49     742 1480.74     740 1487.03     738
  1493.9     736 1500.76     734 1507.48     732 1514.49     730 1518.88     728
 1523.27     726 1528.53     724 1543.29     722 1547.37     720 1565.37   719.3
  1577.5     715  1591.6     715 1616.69     715 1628.82   719.3 1651.41     720
 1655.94     722 1660.32     724 1665.87     726 1671.57     728 1677.12     730
 1682.67     732 1688.97     734 1695.83     736 1702.26     738 1708.84     740
 1724.48     742    1732     744 1732.47     746 1732.95     748 1733.42     750
 1772.81   752.6 2364.21     752 2378.69     751 2392.89     750 2426.93     750
 2632.46     750 2658.55     750 2663.76     750 2788.59     750 2819.04     750
 2857.84     752 2970.94     754  3019.5     754 3049.63     754 3063.78     754
 3096.91     754 3106.57     756 3113.12     758 3120.95     760 3164.63     760
 3223.77     760 3224.61     760 3246.17     760  3268.8     762 3273.88     762
 3279.47     760 3282.72     760 3287.05     762 3340.56     764 3370.16     766
 3374.91     768 3381.18     770  3385.6     772 3389.45     774 3396.45     776
 3400.77     778 3405.09     780 3408.03     782 3414.06     784 3418.25     786
 3420.23     788 3491.87     788 3498.83     788 3583.63     790 3592.24     792
  3594.4     794 3599.72     796 3600.91     798 3607.11     800 3612.79     802
 3618.81     804 3623.09     806 3626.56     808 3648.18     810 3653.85     812
 3660.66     814 3665.72     816 3689.66     824 3696.98     826

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041 1464.43    .028 1733.42    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1464.43 1733.42            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     750     980     775       F
    2800    3395     775       F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0  748.98     775 1821.15    2800     775

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream= 1542.79    Downstream= 1534.73
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1     700       1   739.3       3   739.3       3  745.13
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
```

```
       1     700       1   739.3       3   739.3       3  745.13

Pier Data
Pier Station     Upstream= 1545.79    Downstream= 1537.73
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       1     700       1   739.3
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       1     700       1   739.3

Pier Data
Pier Station     Upstream= 1548.79    Downstream= 1540.73
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1     700       1   739.3       9   739.3       9  748.13
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1     700       1   739.3       9   739.3       9  748.13

Pier Data
Pier Station     Upstream= 1551.79    Downstream= 1543.73
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       1     700       1   739.3
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       1     700       1   739.3

Pier Data
Pier Station     Upstream= 1554.79    Downstream= 1546.73
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1     700       1   739.3       3   739.3       3  745.13
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1     700       1   739.3       3   739.3       3  745.13

Pier Data
Pier Station     Upstream= 1557.79    Downstream= 1549.73
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1     700       1   739.3       3   739.3       3  745.13
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       1     700       1   739.3       3   739.3       3  745.13

Pier Data
Pier Station     Upstream= 1676.79    Downstream= 1668.73
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
     5.5     700     5.5   742.8     6.5   742.8     6.5  748.13
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
     5.5     700     5.5   742.8     6.5   742.8     6.5  748.13

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell
```

```
High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     736.80  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     736.51  * E.G. Elev (ft)         *     736.82  *     736.83  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     736.49  *     736.49  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     725.13  *     725.04  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.49  *      21.49  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.57  *       4.67  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2734.89  *    2676.45  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   24961.01  *   24798.38  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      13.54  *      13.82  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *     403.46  *     396.71  *
* Delta EG (ft)          *       0.00  * Conv. Total (cfs)      *   519838.3  *   507126.4  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     202.03  *     193.71  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.67  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.24  *       0.26  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.12  *       1.20  *
*********************************************************************************************

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     741.35  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     740.96  * E.G. Elev (ft)         *     741.38  *     741.40  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     740.94  *     740.94  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     727.46  *     727.41  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.94  *      25.94  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.30  *       5.44  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3680.77  *    3585.40  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   40642.26  *   40183.81  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      16.48  *      16.68  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *     495.96  *     489.03  *
* Delta EG (ft)          *       0.00  * Conv. Total (cfs)      *   743192.1  *   718084.2  *
* Delta WS (ft)          *       0.02  * Top Width (ft)         *     223.38  *     214.92  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.44  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.32  *       0.34  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.69  *       1.84  *
*********************************************************************************************

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     745.01  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     744.54  * E.G. Elev (ft)         *     745.05  *     745.08  *
```

```
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     744.51  *     744.51  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     729.54  *     729.52  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.51  *      29.51  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.89  *       6.04  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4518.88  *    4400.74  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   56903.53  *   56103.06  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      18.91  *      18.76  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *     531.09  *     526.18  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *   999482.7  *   962255.4  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     238.94  *     234.60  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.04  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.38  *       0.40  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.21  *       2.41  *
*****************************************************************************************

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     748.47  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     747.91  * E.G. Elev (ft)         *     748.46  *     748.44  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     747.82  *     747.76  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     731.56  *     731.56  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.82  *      32.76  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.44  *       6.62  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5309.54  *    5164.00  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   75141.80  *   73681.77  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      28.47  *      21.96  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *     604.17  *     542.48  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  1199942.0  *  1230909.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *     186.49  *     235.19  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       6.62  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.45  *       0.46  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.87  *       3.04  *
*****************************************************************************************

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
         the downstream energy.  This is not physically possible, the momentum answer has been
         disregarded.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     753.67  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.08  * E.G. Elev (ft)         *     753.62  *     753.56  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     752.53  *     752.39  *
* Q Bridge (cfs)         *   45081.43  * Crit W.S. (ft)         *     734.18  *     734.24  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      37.53  *      37.39  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.97  *       8.56  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5711.24  *    5316.34  *
* Weir Submerg           *             * Froude # Chl           *       0.28  *       0.30  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  105498.50  *  103148.40  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      11.14  *      15.05  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *    1324.58  *    1138.81  *
* Delta EG (ft)          *       0.26  * Conv. Total (cfs)      *  1029826.0  *   981779.9  *
* Delta WS (ft)          *       0.35  * Top Width (ft)         *     768.77  *     568.95  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *       0.05  *       0.00  *
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* BR Open Vel (ft/s)     *       8.62  * C & E Loss (ft)        *       0.01  *       0.15  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.53  *       0.63  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.19  *       5.36  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     756.60  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     756.02  * E.G. Elev (ft)         *     756.56  *     756.48  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     755.59  *     755.35  *
* Q Bridge (cfs)         *   46343.33  * Crit W.S. (ft)         *     735.99  *     736.10  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.59  *      40.35  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.23  *       7.76  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7523.44  *    7014.71  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  126913.90  *  123157.90  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      10.53  *       9.82  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *    1536.83  *    1510.03  *
* Delta EG (ft)          *       0.25  * Conv. Total (cfs)      *  1115982.0  *  1025697.0  *
* Delta WS (ft)          *       0.36  * Top Width (ft)         *    1248.75  *    1247.60  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *       0.06  *       0.00  *
* BR Open Vel (ft/s)     *       8.86  * C & E Loss (ft)        *       0.02  *       0.13  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.73  *       0.82  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.25  *       6.33  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     758.30  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     757.67  * E.G. Elev (ft)         *     758.27  *     758.20  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     757.37  *     757.18  *
* Q Bridge (cfs)         *   46244.11  * Crit W.S. (ft)         *     737.58  *     737.72  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      42.37  *      42.18  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.16  *       7.57  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8795.94  *    8321.73  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  143017.10  *  138643.60  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      12.32  *      11.65  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *    1543.98  *    1517.33  *
* Delta EG (ft)          *       0.18  * Conv. Total (cfs)      *  1348830.0  *  1251509.0  *
* Delta WS (ft)          *       0.30  * Top Width (ft)         *    1255.23  *    1254.61  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *       0.06  *       0.00  *
* BR Open Vel (ft/s)     *       8.84  * C & E Loss (ft)        *       0.01  *       0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.78  *       0.87  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.56  *       6.57  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
```

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        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     761.18  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     760.54  * E.G. Elev (ft)         *     761.17  *     761.12  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     760.42  *     760.27  *
* Q Bridge (cfs)         *   42726.36  * Crit W.S. (ft)         *     739.37  *     739.62  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      45.42  *      45.27  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.91  *       7.21  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10987.70  *   10530.56  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  174883.30  *  169480.40  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *      13.05  *      14.74  *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *    1683.92  *    1529.70  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1753418.0  *  1734689.0  *
* Delta WS (ft)          *       0.20  * Top Width (ft)         *    1528.40  *    1398.06  *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       8.17  * C & E Loss (ft)        *       0.01  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.76  *       0.82  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.27  *       5.93  *
*********************************************************************************************

Note:   Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
        The Yarnell answer has been disregarded.
Note:   Momentum answer is not valid if the water surface is above the low chord or if there is weir
        flow.  The momentum answer has been disregarded.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     750.19  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     749.59  * E.G. Elev (ft)         *     750.17  *     750.13  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     749.38  *     749.29  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     732.57  *     732.57  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      34.38  *      34.29  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.13  *       7.32  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5368.66  *    5232.81  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   85142.13  *   83383.45  *
* Min El Weir Flow (ft)  *     751.81  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     748.13  * W.P. Total (ft)        *     810.30  *     784.40  *
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)      *  1020352.0  *   984092.4  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    5232.81  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       7.32  * C & E Loss (ft)        *       0.00  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.58  *       0.63  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.16  *       4.62  *
*********************************************************************************************

Note:   Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
        The Yarnell answer has been disregarded.
Note:   Momentum answer is not valid if the water surface is above the low chord or if there is weir
        flow.  The momentum answer has been disregarded.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
        energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.181

INPUT
Description: COE River Station= 40496.23
```

```
Preliminary Model River Station
             (miles)=5.17 KC Southern RR Bridge.  B13 (downstream).  Normalized
             to channel flow from 18 dergee skew. Obstructions: Buildings. Top
             of side rail modeled as top of bridge. Left pier aligned with
             flow.  Width of right pier increased due to slight skew to channel
             flow. Underwater channel shown on bridge plans. NOTE: Floodway
             wider than necessary here in order to tie in to existing FEMA
             floodway upstream. Can correct this when next reach is modeled.
Station Elevation Data    num=     109
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     768   50.72     766  102.34     764  195.75     762   340.6     760
  678.21     756  740.39     754  840.15     752  858.74     750  898.54     750
  922.01     752  974.68   752.6 1449.26     752 1464.43     750    1469     748
 1469.32     746 1469.73     744 1474.49     742 1480.74     740 1487.03     738
  1493.9     736 1500.76     734 1507.48     732 1514.49     730 1518.88     728
 1523.27     726 1528.53     724 1543.29     722 1547.37     720 1565.37   719.3
  1577.5     715  1591.6     715 1616.69     715 1628.82   719.3 1651.41     720
 1655.94     722 1660.32     724 1665.87     726 1671.57     728 1677.12     730
 1682.67     732 1688.97     734 1695.83     736 1702.26     738 1708.84     740
 1724.48     742    1732     744 1732.47     746 1732.95     748 1733.42     750
 1772.81   752.6 2364.21     752 2378.69     751 2392.89     750 2426.93     750
 2632.46     750 2658.55     750 2663.76     750 2788.59     750 2819.04     750
 2857.84     752 2970.94     754  3019.5     754 3049.63     754 3063.78     754
 3096.91     754 3106.57     756 3113.12     758 3120.95     760 3164.63     760
 3223.77     760 3224.61     760 3246.17     760  3268.8     762 3273.88     762
 3279.47     760 3282.72     760 3287.05     762 3340.56     764 3370.16     766
 3374.91     768 3381.18     770  3385.6     772 3389.45     774 3396.45     776
 3400.77     778 3405.09     780 3408.03     782 3414.06     784 3418.25     786
 3420.23     788 3491.87     788 3498.83     788 3583.63     790 3592.24     792
  3594.4     794 3599.72     796 3600.91     798 3607.11     800 3612.79     802
 3618.81     804 3623.09     806 3626.56     808 3648.18     810 3653.85     812
 3660.66     814 3665.72     816 3689.66     824 3696.98     826

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041 1464.43    .028 1733.42    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1464.43 1733.42             300     483     640              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     750     980     775       F
    2800    3395     775       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
       0  748.98     775 1821.15    2800     775

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  736.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  736.49  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  724.99  * Flow Area (sq ft)      *          * 2817.34  *          *
* E.G. Slope (ft/ft)     *0.000223  * Area (sq ft)           *          * 2817.34  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  205.21  * Top Width (ft)         *          *  205.21  *          *
* Vel Total (ft/s)       *    4.44  * Avg. Vel. (ft/s)       *          *    4.44  *          *
* Max Chl Dpth (ft)      *   21.49  * Hydr. Depth (ft)       *          *   13.73  *          *
* Conv. Total (cfs)      *837797.5  * Conv. (cfs)             *          *837797.5  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)        *          *  212.40  *          *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)        *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.82  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *          * 1354.42  *          *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *          *  114.65  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  741.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.028  *          *
```

```
* W.S. Elev (ft)         *  740.94  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  727.33  * Flow Area (sq ft)      *          * 3797.17  *          *
* E.G. Slope (ft/ft)     *0.000245  * Area (sq ft)           *          * 3797.17  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  238.42  * Top Width (ft)         *          *  238.42  *          *
* Vel Total (ft/s)       *    5.14  * Avg. Vel. (ft/s)       *          *    5.14  *          *
* Max Chl Dpth (ft)      *   25.94  * Hydr. Depth (ft)       *          *   15.93  *          *
* Conv. Total (cfs)      *1246348.0  * Conv. (cfs)            *          *1246348.0  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)       *          *  246.86  *          *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.21  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.44  * 1844.00  *    6.16  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    2.27  *  130.08  *    8.33  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  745.01  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  744.51  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  729.34  * Flow Area (sq ft)      *          * 4701.14  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 4701.14  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  262.49  * Top Width (ft)         *          *  262.49  *          *
* Vel Total (ft/s)       *    5.66  * Avg. Vel. (ft/s)       *          *    5.66  *          *
* Max Chl Dpth (ft)      *   29.51  * Hydr. Depth (ft)       *          *   17.91  *          *
* Conv. Total (cfs)      *1665098.0  * Conv. (cfs)            *          *1665098.0  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)       *          *  272.65  *          *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.55  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   14.56  * 2260.60  *   55.45  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    8.79  *  140.35  *   27.73  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  748.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *          *   0.028  *          *
* W.S. Elev (ft)         *  747.83  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  731.27  * Flow Area (sq ft)      *          * 5573.98  *          *
* E.G. Slope (ft/ft)     *0.000247  * Area (sq ft)           *          * 5573.98  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  263.88  * Top Width (ft)         *          *  263.88  *          *
* Vel Total (ft/s)       *    6.14  * Avg. Vel. (ft/s)       *          *    6.14  *          *
* Max Chl Dpth (ft)      *   32.83  * Hydr. Depth (ft)       *          *   21.12  *          *
* Conv. Total (cfs)      *2175705.0  * Conv. (cfs)            *          *2175705.0  *          *
* Length Wtd. (ft)       *  483.00  * Wetted Per. (ft)       *          *  279.43  *          *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.89  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   50.19  * 2663.24  *  170.52  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   23.93  *  147.48  *   56.61  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  753.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)         *  752.74  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  733.81  * Flow Area (sq ft)      *  233.65  * 6889.67  *   64.53  *
* E.G. Slope (ft/ft)     *0.000222  * Area (sq ft)           *  453.19  * 6889.67  *  199.53  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   77.65  *45393.98  *   28.36  *
* Top Width (ft)         * 1117.42  * Top Width (ft)         *  661.11  *  268.99  *  187.32  *
* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *    0.33  *    6.59  *    0.44  *
* Max Chl Dpth (ft)      *   37.74  * Hydr. Depth (ft)       *    0.48  *   25.61  *    0.74  *
* Conv. Total (cfs)      *3050942.0  * Conv. (cfs)            *  5206.9  *3043833.0  *  1901.7  *
* Length Wtd. (ft)       *  483.32  * Wetted Per. (ft)       *  484.56  *  286.83  *   88.00  *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.01  *    0.33  *    0.01  *
```

```
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.00  *    2.20  *    0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  220.72  * 3260.31  *  503.63  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  101.60  *  152.42  *  124.75  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)         *  755.66  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  735.60  * Flow Area (sq ft)      * 1650.62  * 7675.43  *  320.80  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           * 2513.52  * 7675.43  * 1125.83  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1928.21  *52086.64  *  385.14  *
* Top Width (ft)         * 1377.10  * Top Width (ft)         *  715.45  *  268.99  *  392.66  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    1.17  *    6.79  *    1.20  *
* Max Chl Dpth (ft)      *   40.66  * Hydr. Depth (ft)       *    3.40  *   28.53  *    3.66  *
* Conv. Total (cfs)      *3805984.0  * Conv. (cfs)           *134903.4  *3644135.0  * 26945.5  *
* Length Wtd. (ft)       *  480.78  * Wetted Per. (ft)       *  487.41  *  286.83  *   90.92  *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.04  *    0.34  *    0.05  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.05  *    2.32  *    0.05  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  571.17  * 3670.29  *  907.83  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  163.67  *  154.15  *  225.62  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)         *  757.37  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  737.18  * Flow Area (sq ft)      * 2482.41  * 8136.33  *  471.12  *
* E.G. Slope (ft/ft)     *0.000211  * Area (sq ft)           * 3739.40  * 8136.33  * 1804.25  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 3863.74  *58401.97  *  734.29  *
* Top Width (ft)         * 1383.24  * Top Width (ft)         *  715.45  *  268.99  *  398.80  *
* Vel Total (ft/s)       *    5.68  * Avg. Vel. (ft/s)       *    1.56  *    7.18  *    1.56  *
* Max Chl Dpth (ft)      *   42.37  * Hydr. Depth (ft)       *    5.11  *   30.25  *    5.37  *
* Conv. Total (cfs)      *4332286.0  * Conv. (cfs)           *265695.8  *4016096.0  * 50494.2  *
* Length Wtd. (ft)       *  478.51  * Wetted Per. (ft)       *  489.13  *  286.83  *   92.64  *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.07  *    0.37  *    0.07  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.10  *    2.69  *    0.10  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  856.17  * 3922.73  * 1362.54  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  189.15  *  154.38  *  383.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  761.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *   0.041  *   0.028  *   0.041  *
* W.S. Elev (ft)         *  760.33  * Reach Len. (ft)        *  300.00  *  483.00  *  640.00  *
* Crit W.S. (ft)         *  739.32  * Flow Area (sq ft)      * 3918.85  * 8932.27  *  730.71  *
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           * 5856.41  * 8932.27  * 3043.68  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 8018.57  *66426.60  * 1454.83  *
* Top Width (ft)         * 1526.99  * Top Width (ft)         *  715.45  *  268.99  *  542.55  *
* Vel Total (ft/s)       *    5.59  * Avg. Vel. (ft/s)       *    2.05  *    7.44  *    1.99  *
* Max Chl Dpth (ft)      *   45.33  * Hydr. Depth (ft)       *    8.07  *   33.21  *    8.33  *
* Conv. Total (cfs)      *5361162.0  * Conv. (cfs)           *566388.0  *4692013.0  *102760.9  *
* Length Wtd. (ft)       *  474.44  * Wetted Per. (ft)       *  492.09  *  286.83  *   95.60  *
* Min Ch El (ft)         *  715.00  * Shear (lb/sq ft)       *    0.10  *    0.39  *    0.10  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    0.20  *    2.90  *    0.19  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   * 1434.14  * 4319.18  * 2483.42  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  230.05  *  154.97  *  565.01  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	750.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.028	
W.S. Elev (ft)	749.43	Reach Len. (ft)	300.00	483.00	640.00
Crit W.S. (ft)	732.25	Flow Area (sq ft)		6001.22	
E.G. Slope (ft/ft)	0.000249	Area (sq ft)		6001.22	
Q Total (cfs)	38300.00	Flow (cfs)		38300.00	
Top Width (ft)	267.56	Top Width (ft)		267.56	
Vel Total (ft/s)	6.38	Avg. Vel. (ft/s)		6.38	
Max Chl Dpth (ft)	34.43	Hydr. Depth (ft)		22.43	
Conv. Total (cfs)	2429449.0	Conv. (cfs)		2429449.0	
Length Wtd. (ft)	483.01	Wetted Per. (ft)		284.83	
Min Ch El (ft)	715.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		2.09	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	83.70	2868.11	256.97
C & E Loss (ft)	0.06	Cum SA (acres)	38.85	150.01	69.73

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 5.089

INPUT
Description: COE River Station= 40979.64
Preliminary Model River Station
(miles)=5.08

FEMA XSEC H. Obsturctions are buildings.
Ineffective flow on left is a corridor with high ground dowsntream
which will block the water. Ineffective flow on right is due to
buildings and high ground upstream.

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	768	84.14	766	638.15	758	651.3	756	927.2	754
1027	754	1034.86	754	1109.47	754	1138.01	754	1140.73	754
1284.87	754	1336.11	754	1339	754	1471.29	752	1528.4	752
1546.75	752	1684.3	748	1688.32	746	1693.82	744	1722.78	736
1732.33	734	1744.32	732	1767.79	728	1773.98	726	1779.83	724
1808.3	714.55	1889.59	714.55	1918.08	724	1926.88	726	1931.43	728
1959.07	732	1971.82	734	1977.46	736	2000.8	744	2006.94	746
2013.87	748	2081.62	750	2102.9	750	2173.96	750	2267.88	750
2579.95	746	2730.37	746	2769.11	746	2843.7	746	2853.46	746
2893.86	744	2898.35	744	2911.66	746	2922.23	748	2933.98	748
2941.28	746	2945.95	744	3000.86	742	3014.94	742	3015.6	742
3046.68	742	3057.58	744	3065.92	746	3076	748	3082.02	750
3087.58	752	3092.88	754	3099.01	756	3116.76	756	3127.5	754
3150.65	754	3154.75	756	3162.16	758	3173	760	3195.21	762
3227.5	764	3257.84	766	3296.33	768	3324.04	770	3345.04	772
3353.08	774	3358.76	776	3366.87	778	3388.93	780	3423.65	782
3426.25	782	3444.99	780	3445.81	780	3472.43	782	3495.9	784
3532.11	784	3549.88	784	3566.48	786	3582.33	788	3596.44	790
3606.11	792	3618.62	794	3627.71	796	3637.4	798	3652.26	800
3675.26	802	3686.91	804						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1027	.09	1339	.041	1688.32	.027	2081.62	.041
2173.96	.07	2853.46	.041						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1684.3	2013.87	290	413	550	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
615.6	897.75	775	F
2425	3355	775	F

Blocked Obstructions num= 4

```
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
       0   615.6     775  897.75    1026     775 1338.93    1539     775
    2180    2425     775

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  736.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  736.48  * Reach Len. (ft)        *  290.00  *  413.00  *  550.00  *
* Crit W.S. (ft)         *  722.67  * Flow Area (sq ft)      *          * 3474.23  *          *
* E.G. Slope (ft/ft)     *0.000137  * Area (sq ft)           *          * 3474.23  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  257.84  * Top Width (ft)          *          *  257.84  *          *
* Vel Total (ft/s)       *    3.60  * Avg. Vel. (ft/s)        *          *    3.60  *          *
* Max Chl Dpth (ft)      *   21.93  * Hydr. Depth (ft)        *          *   13.47  *          *
* Conv. Total (cfs)      *1066202.0  * Conv. (cfs)            *          *1066202.0  *          *
* Length Wtd. (ft)       *  413.00  * Wetted Per. (ft)        *          *  263.84  *          *
* Min Ch El (ft)         *  714.55  * Shear (lb/sq ft)        *          *    0.11  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.41  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *          * 1319.54  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *  112.08  *          *
*****************************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  741.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.95  * Reach Len. (ft)        *  290.00  *  413.00  *  550.00  *
* Crit W.S. (ft)         *  725.14  * Flow Area (sq ft)      *          * 4691.86  *          *
* E.G. Slope (ft/ft)     *0.000142  * Area (sq ft)           *          * 4691.86  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  287.06  * Top Width (ft)          *          *  287.06  *          *
* Vel Total (ft/s)       *    4.16  * Avg. Vel. (ft/s)        *          *    4.16  *          *
* Max Chl Dpth (ft)      *   26.40  * Hydr. Depth (ft)        *          *   16.34  *          *
* Conv. Total (cfs)      *1635229.0  * Conv. (cfs)            *          *1635229.0  *          *
* Length Wtd. (ft)       *  413.00  * Wetted Per. (ft)        *          *  294.40  *          *
* Min Ch El (ft)         *  714.55  * Shear (lb/sq ft)        *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.59  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *    1.44  * 1796.93  *    6.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    2.27  *  127.17  *    8.33  *
*****************************************************************************************************

Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  744.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.53  * Reach Len. (ft)        *  290.00  *  413.00  *  550.00  *
* Crit W.S. (ft)         *  727.22  * Flow Area (sq ft)      *          * 5761.26  *          *
* E.G. Slope (ft/ft)     *0.000148  * Area (sq ft)           *          * 5761.26  *  224.07  *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  443.98  * Top Width (ft)          *          *  310.08  *  133.90  *
* Vel Total (ft/s)       *    4.62  * Avg. Vel. (ft/s)        *          *    4.62  *          *
* Max Chl Dpth (ft)      *   29.98  * Hydr. Depth (ft)        *          *   18.58  *          *
* Conv. Total (cfs)      *2184745.0  * Conv. (cfs)            *          *2184745.0  *          *
* Length Wtd. (ft)       *  413.00  * Wetted Per. (ft)        *          *  318.52  *          *
* Min Ch El (ft)         *  714.55  * Shear (lb/sq ft)        *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.77  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *   14.56  * 2202.60  *   53.80  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    8.79  *  137.17  *   26.74  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	748.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.027	
W.S. Elev (ft)	747.87	Reach Len. (ft)	290.00	413.00	550.00
Crit W.S. (ft)	729.33	Flow Area (sq ft)		6827.50	
E.G. Slope (ft/ft)	0.000153	Area (sq ft)		6827.50	1469.97
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	
Top Width (ft)	957.13	Top Width (ft)		328.85	628.28
Vel Total (ft/s)	5.01	Avg. Vel. (ft/s)		5.01	
Max Chl Dpth (ft)	33.32	Hydr. Depth (ft)		20.76	
Conv. Total (cfs)	2764360.0	Conv. (cfs)		2764360.0	
Length Wtd. (ft)	413.00	Wetted Per. (ft)		338.49	
Min Ch El (ft)	714.55	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.97	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	50.19	2594.49	159.72
C & E Loss (ft)	0.00	Cum SA (acres)	23.93	144.19	51.99

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	753.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.041	0.027	0.032
W.S. Elev (ft)	752.83	Reach Len. (ft)	290.00	413.00	550.00
Crit W.S. (ft)	731.99	Flow Area (sq ft)	396.25	8463.71	538.53
E.G. Slope (ft/ft)	0.000128	Area (sq ft)	396.25	8463.71	5272.62
Q Total (cfs)	45500.00	Flow (cfs)	315.27	44568.61	616.12
Top Width (ft)	1305.79	Top Width (ft)	145.30	329.57	830.92
Vel Total (ft/s)	4.84	Avg. Vel. (ft/s)	0.80	5.27	1.14
Max Chl Dpth (ft)	38.28	Hydr. Depth (ft)	2.73	25.68	3.24
Conv. Total (cfs)	4029132.0	Conv. (cfs)	27917.7	3946655.0	54559.2
Length Wtd. (ft)	413.70	Wetted Per. (ft)	146.19	339.26	168.99
Min Ch El (ft)	714.55	Shear (lb/sq ft)	0.02	0.20	0.03
Alpha	1.16	Stream Power (lb/ft s)	0.02	1.05	0.03
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	217.79	3175.19	463.43
C & E Loss (ft)	0.00	Cum SA (acres)	98.82	149.10	117.27

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	756.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.047	0.027	0.033
W.S. Elev (ft)	755.76	Reach Len. (ft)	290.00	413.00	550.00
Crit W.S. (ft)	733.73	Flow Area (sq ft)	1370.48	9426.88	1024.04
E.G. Slope (ft/ft)	0.000119	Area (sq ft)	1534.66	9426.88	7765.03
Q Total (cfs)	54400.00	Flow (cfs)	1156.44	51568.78	1674.78
Top Width (ft)	1876.20	Top Width (ft)	671.06	329.57	875.57
Vel Total (ft/s)	4.60	Avg. Vel. (ft/s)	0.84	5.47	1.64
Max Chl Dpth (ft)	41.21	Hydr. Depth (ft)	2.99	28.60	6.16
Conv. Total (cfs)	4982559.0	Conv. (cfs)	105919.7	4723245.0	153394.7
Length Wtd. (ft)	414.83	Wetted Per. (ft)	465.56	339.26	171.92
Min Ch El (ft)	714.55	Shear (lb/sq ft)	0.02	0.21	0.04
Alpha	1.34	Stream Power (lb/ft s)	0.02	1.13	0.07
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	557.23	3575.47	842.52
C & E Loss (ft)	0.00	Cum SA (acres)	158.89	150.83	216.31

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	757.97	Element	Left OB	Channel	Right OB

```
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.052  *   0.027  *   0.033  *
* W.S. Elev (ft)         *  757.47  * Reach Len. (ft)        *  290.00  *  413.00  *  550.00  *
* Crit W.S. (ft)         *  735.11  * Flow Area (sq ft)      * 2156.47  * 9992.18  * 1309.00  *
* E.G. Slope (ft/ft)     *0.000126  * Area (sq ft)           * 2746.40  * 9992.18  * 9301.08  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2063.45  *58369.18  * 2567.38  *
* Top Width (ft)         * 1945.26  * Top Width (ft)         *  714.36  *  329.57  *  901.33  *
* Vel Total (ft/s)       *    4.68  * Avg. Vel. (ft/s)       *    0.96  *    5.84  *    1.96  *
* Max Chl Dpth (ft)      *   42.92  * Hydr. Depth (ft)       *    4.71  *   30.32  *    7.88  *
* Conv. Total (cfs)      *5617610.0  * Conv. (cfs)           *183994.2  *5204687.0  *228928.9  *
* Length Wtd. (ft)       *  415.14  * Wetted Per. (ft)       *  470.70  *  339.26  *  173.63  *
* Min Ch El (ft)         *  714.55  * Shear (lb/sq ft)       *    0.04  *    0.23  *    0.06  *
* Alpha                  *    1.45  * Stream Power (lb/ft s) *    0.03  *    1.35  *    0.12  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  833.84  * 3822.22  * 1280.96  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  184.23  *  151.06  *  373.57  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.056  *   0.027  *   0.033  *
* W.S. Elev (ft)         *  760.42  * Reach Len. (ft)        *  290.00  *  413.00  *  550.00  *
* Crit W.S. (ft)         *  736.97  * Flow Area (sq ft)      * 3506.44  *10963.11  * 1798.43  *
* E.G. Slope (ft/ft)     *0.000124  * Area (sq ft)           * 4911.09  *10963.11  *11978.03  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4011.66  *67599.98  * 4288.36  *
* Top Width (ft)         * 1988.72  * Top Width (ft)         *  740.38  *  329.57  *  918.77  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    1.14  *    6.17  *    2.38  *
* Max Chl Dpth (ft)      *   45.87  * Hydr. Depth (ft)       *    7.65  *   33.26  *   10.83  *
* Conv. Total (cfs)      *6820435.0  * Conv. (cfs)           *360490.7  *6074589.0  *385355.6  *
* Length Wtd. (ft)       *  415.32  * Wetted Per. (ft)       *  479.54  *  339.26  *  176.58  *
* Min Ch El (ft)         *  714.55  * Shear (lb/sq ft)       *    0.06  *    0.25  *    0.08  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    0.06  *    1.54  *    0.19  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 1397.07  * 4208.88  * 2373.07  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  225.04  *  151.65  *  554.27  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  749.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.041  *   0.027  *   0.027  *
* W.S. Elev (ft)         *  749.49  * Reach Len. (ft)        *  290.00  *  413.00  *  550.00  *
* Crit W.S. (ft)         *  730.36  * Flow Area (sq ft)      *   38.25  * 7362.22  *   37.68  *
* E.G. Slope (ft/ft)     *0.000150  * Area (sq ft)           *   38.25  * 7362.22  * 2565.14  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *   13.94  *38265.20  *   20.86  *
* Top Width (ft)         * 1086.88  * Top Width (ft)         *   51.29  *  329.57  *  706.02  *
* Vel Total (ft/s)       *    5.15  * Avg. Vel. (ft/s)       *    0.36  *    5.20  *    0.55  *
* Max Chl Dpth (ft)      *   34.94  * Hydr. Depth (ft)       *    0.75  *   22.34  *    0.75  *
* Conv. Total (cfs)      *3131145.0  * Conv. (cfs)           *  1139.8  *3128301.0  *  1705.0  *
* Length Wtd. (ft)       *  413.02  * Wetted Per. (ft)       *   51.31  *  339.26  *   50.55  *
* Min Ch El (ft)         *  714.55  * Shear (lb/sq ft)       *    0.01  *    0.20  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.00  *    1.05  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   83.57  * 2794.02  *  238.12  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   38.67  *  146.69  *   64.54  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 5.011

INPUT
```

```
Description: COE River Station= 41392.76
Preliminary Model River Station
             (miles)=5

17th Street Bridge.  B12 (upstream).  Obsturctions
             are buildings.  Ineffective flow on left is a corridor with high
             ground dowsntream which will block the water.  Ineffective flow on
             right is due to buildings and high ground upstream.
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     770   36.76     768   72.16     766  258.74     764  459.19     762
  532.63     760  593.49     758  671.08     758  682.46     758  745.07     756
     990     755    1165     755 1429.15     754 1595.56     752 1632.89     750
    1683   753.5 1753.99   754.8    1754   747.5    1759   747.5    1808     731
    1838     728    1866   718.5    1890     718    1901     714    1945     714
    1956     718    1980   718.5    2008     728    2038     731 2086.99   747.5
    2087     749 2087.67     749    2092     749 2092.01   754.8 2094.02   754.5
    2170     753 2186.98     752 2221.87     752 2342.92     751 2370.46     748
 2397.85     746 2435.01     744 2734.78     744 2742.31     744 2751.27     746
 2755.73     748 2787.27     748 2902.44     744 2981.35     742 3031.77     740
 3092.09     740 3106.97     742 3135.01     744 3150.01     746 3159.94     748
 3175.78     750 3207.77     752 3237.76     752 3243.35     754 3248.07     756
 3252.81     758 3262.68     760 3281.88     762 3301.69     764 3315.61     766
  3327.3     768 3339.46     770 3382.19     772 3406.56     772 3435.16     772
 3459.85     774 3483.73     776 3495.74     776 3522.48     774 3537.29     774
 3547.17     776 3560.94     778 3578.58     780 3620.89     782 3662.59     784
 3675.56     786 3704.46     788 3720.55     790 3732.07     792 3771.86     794
 3799.23     794 3841.72     796

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041     990    .033    1165    .041    1754    .027 2086.99    .041
 2342.92     .07 3207.77    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1754 2086.99               45      45      45             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  551.04  754.11     775       F
    2650    3342     770       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
       0  551.04     775  754.11  990.09     775 1164.51 1651.86     775
    2345  2411.1     751  2411.1    2650     770

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  736.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  736.43  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  723.34  * Flow Area (sq ft)      *          * 3551.67  *          *
* E.G. Slope (ft/ft)     *0.000131  * Area (sq ft)           *          * 3551.67  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  262.28  * Top Width (ft)          *          *  262.28  *          *
* Vel Total (ft/s)       *    3.52  * Avg. Vel. (ft/s)        *          *    3.52  *          *
* Max Chl Dpth (ft)      *   22.43  * Hydr. Depth (ft)        *          *   13.54  *          *
* Conv. Total (cfs)      *1092144.0  * Conv. (cfs)             *          *1092144.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  268.91  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)        *          *    0.11  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.38  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          * 1286.23  *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *  109.61  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  741.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.90  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  725.63  * Flow Area (sq ft)      *          * 4782.90  *          *
```

```
* E.G. Slope (ft/ft)     *0.000135  * Area (sq ft)           *          * 4782.90  *   67.78  *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  378.62  * Top Width (ft)         *          *  288.81  *   89.80  *
* Vel Total (ft/s)       *    4.08  * Avg. Vel. (ft/s)       *          *    4.08  *          *
* Max Chl Dpth (ft)      *   26.90  * Hydr. Depth (ft)       *          *   16.56  *          *
* Conv. Total (cfs)      *1678928.0  * Conv. (cfs)            *          *1678928.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  296.91  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.55  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  * 1752.02  *    5.74  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *  124.44  *    7.77  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.48  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  727.58  * Flow Area (sq ft)      *          * 5854.13  *          *
* E.G. Slope (ft/ft)     *0.000141  * Area (sq ft)           *          * 5854.13  *  704.95  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  654.53  * Top Width (ft)         *          *  310.06  *  344.47  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *          *    4.54  *          *
* Max Chl Dpth (ft)      *   30.48  * Hydr. Depth (ft)       *          *   18.88  *          *
* Conv. Total (cfs)      *2239971.0  * Conv. (cfs)            *          *2239971.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  319.33  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.73  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  * 2147.54  *   47.94  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.79  *  134.23  *   23.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.027  *   0.000  *
* W.S. Elev (ft)         *  747.81  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  729.84  * Flow Area (sq ft)      *          * 6922.13  *    0.00  *
* E.G. Slope (ft/ft)     *0.000147  * Area (sq ft)           *    0.00  * 6922.13  * 2072.11  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *    0.00  *
* Top Width (ft)         *  804.72  * Top Width (ft)         *          *  332.99  *  471.72  *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *          *    4.94  *    0.00  *
* Max Chl Dpth (ft)      *   33.81  * Hydr. Depth (ft)       *          *   20.79  *    0.15  *
* Conv. Total (cfs)      *2822422.0  * Conv. (cfs)            *          *2822422.0  *     0.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  343.25  *    0.33  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.91  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   50.19  * 2529.30  *  137.36  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   23.93  *  141.06  *   45.05  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.041  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  752.77  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  732.15  * Flow Area (sq ft)      *   14.94  * 8571.81  *  325.12  *
* E.G. Slope (ft/ft)     *0.000127  * Area (sq ft)           *   14.94  * 8571.81  * 5057.24  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    4.67  *45361.89  *  133.44  *
* Top Width (ft)         * 1185.76  * Top Width (ft)         *   20.68  *  332.99  *  832.10  *
* Vel Total (ft/s)       *    5.11  * Avg. Vel. (ft/s)       *    0.31  *    5.29  *    0.41  *
* Max Chl Dpth (ft)      *   38.77  * Hydr. Depth (ft)       *    0.72  *   25.74  *    1.34  *
* Conv. Total (cfs)      *4042631.0  * Conv. (cfs)            *   415.3  *4030360.0  * 11855.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *   27.41  *  343.25  *  249.52  *
```

```
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.00  *    0.20  *    0.01  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.00  *    1.05  *    0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  216.42  * 3094.43  *  398.21  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   98.27  *  145.96  *  106.78  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.039  *   0.027  *   0.047  *
* W.S. Elev (ft)         *  755.67  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  733.58  * Flow Area (sq ft)      *  326.47  * 9538.20  * 1186.93  *
* E.G. Slope (ft/ft)     *0.000122  * Area (sq ft)           *  326.47  * 9538.20  * 7642.22  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  170.47  *53258.85  *  970.69  *
* Top Width (ft)         * 1530.95  * Top Width (ft)         *  276.56  *  332.99  *  921.40  *
* Vel Total (ft/s)       *    4.92  * Avg. Vel. (ft/s)       *    0.52  *    5.58  *    0.82  *
* Max Chl Dpth (ft)      *   41.67  * Hydr. Depth (ft)       *    1.18  *   28.64  *    3.66  *
* Conv. Total (cfs)      *4918970.0  * Conv. (cfs)           * 15414.0  *4815785.0  * 87771.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  289.63  *  343.25  *  336.37  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.01  *    0.21  *    0.03  *
* Alpha                  *    1.26  * Stream Power (lb/ft s) *    0.00  *    1.18  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  551.03  * 3485.57  *  745.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  155.74  *  147.69  *  204.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.037  *   0.027  *   0.046  *
* W.S. Elev (ft)         *  757.38  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  734.87  * Flow Area (sq ft)      *  798.31  *10106.32  * 1739.90  *
* E.G. Slope (ft/ft)     *0.000130  * Area (sq ft)           *  840.60  *10106.32  * 9217.69  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  724.11  *60370.96  * 1904.93  *
* Top Width (ft)         * 1587.14  * Top Width (ft)         *  328.70  *  332.99  *  925.44  *
* Vel Total (ft/s)       *    4.98  * Avg. Vel. (ft/s)       *    0.91  *    5.97  *    1.09  *
* Max Chl Dpth (ft)      *   43.38  * Hydr. Depth (ft)       *    2.89  *   30.35  *    5.37  *
* Conv. Total (cfs)      *5534229.0  * Conv. (cfs)           * 63609.2  *5303282.0  *167338.5  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  294.74  *  343.25  *  338.08  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.02  *    0.24  *    0.04  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.02  *    1.42  *    0.05  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  821.90  * 3726.94  * 1164.05  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  180.76  *  147.92  *  362.04  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.036  *   0.027  *   0.046  *
* W.S. Elev (ft)         *  760.33  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.68  * Flow Area (sq ft)      * 1614.57  *11089.14  * 2696.51  *
* E.G. Slope (ft/ft)     *0.000127  * Area (sq ft)           * 2138.64  *11089.14  *11966.64  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2281.92  *69687.52  * 3930.56  *
* Top Width (ft)         * 1752.56  * Top Width (ft)         *  479.63  *  332.99  *  939.94  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)       *    1.41  *    6.28  *    1.46  *
* Max Chl Dpth (ft)      *   46.33  * Hydr. Depth (ft)       *    5.84  *   33.30  *    8.32  *
* Conv. Total (cfs)      *6742263.0  * Conv. (cfs)           *202705.3  *6190403.0  *349154.6  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  303.60  *  343.25  *  341.03  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.04  *    0.26  *    0.06  *
```

```
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.06  *    1.61  *    0.09  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1373.60  * 4104.34  * 2221.90  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  220.98  *  148.51  *  542.54  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  749.85  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.000  *   0.027  *   0.041  *
* W.S. Elev (ft)         *  749.44  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  730.86  * Flow Area (sq ft)      *    0.00  * 7462.83  *    2.20  *
* E.G. Slope (ft/ft)     *0.000143  * Area (sq ft)           *    0.00  * 7462.83  * 2904.07  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    0.00  *38299.55  *    0.45  *
* Top Width (ft)         *  859.33  * Top Width (ft)         *          *  332.99  *  526.34  *
* Vel Total (ft/s)       *    5.13  * Avg. Vel. (ft/s)       *    0.01  *    5.13  *    0.20  *
* Max Chl Dpth (ft)      *   35.44  * Hydr. Depth (ft)       *    0.97  *   22.41  *    0.44  *
* Conv. Total (cfs)      *3199388.0  * Conv. (cfs)            *     0.0  *3199351.0  *    37.2  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *    1.94  *  343.25  *    6.92  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.19  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.00  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   83.44  * 2723.74  *  203.59  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   38.50  *  143.55  *   56.76  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 5.007

INPUT
Description: Bridge B12.  17th street bridge.  The piers are aligned with
             channel flow, and the bridge is not skewed.  The top of the side
             rail was modeled as the top of the bridge.
Distance from Upstream XS =       1
Deck/Roadway Width        =      43
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
 1753.99   754.8     749    1838     758   752.5    1923   759.5   753.5
    2008   758.5   752.5 2092.01   754.8     749

Upstream Bridge Cross Section Data
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     770   36.76     768   72.16     766  258.74     764  459.19     762
  532.63     760  593.49     758  671.08     758  682.46     758  745.07     756
     990     755    1165     755 1429.15     754 1595.56     752 1632.89     750
    1683   753.5 1753.99   754.8    1754   747.5    1759   747.5    1808     731
    1838     728    1866   718.5    1890     718    1901     714    1945     714
    1956     718    1980   718.5    2008     728    2038     731 2086.99   747.5
    2087     749 2087.67     749    2092     749 2092.01   754.8 2094.02   754.5
    2170     753 2186.98     752 2221.87     752 2342.92     751 2370.46     748
 2397.85     746 2435.01     744 2734.78     744 2742.31     744 2751.27     746
 2755.73     748 2787.27     748 2902.44     744 2981.35     742 3031.77     740
 3092.09     740 3106.97     742 3135.01     744 3150.01     746 3159.94     748
 3175.78     750 3207.77     752 3237.76     752 3243.35     754 3248.07     756
 3252.81     758 3262.68     760 3281.88     762 3301.69     764 3315.61     766
  3327.3     768 3339.46     770 3382.19     772 3406.56     772 3435.16     772
 3459.85     774 3483.73     776 3495.74     776 3522.48     774 3537.29     774
 3547.17     776 3560.94     778 3578.58     780 3620.89     782 3662.59     784
 3675.56     786 3704.46     788 3720.55     790 3732.07     792 3771.86     794
 3799.23     794 3841.72     796
```

```
Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041     990    .033    1165    .041    1754    .027 2086.99    .041
 2342.92     .07 3207.77    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1754 2086.99            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  551.04  754.11     775       F
    2650    3342     770       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
       0  551.04     775  754.11  990.09     775 1164.51 1651.86     775
    2345  2411.1     751  2411.1    2650     770

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
 1753.99   754.8     749    1838     758   752.5    1923   759.5   753.5
    2008   758.5   752.5 2092.01   754.8     749

Downstream Bridge Cross Section Data
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     770   36.76     768   72.16     766  258.74     764  459.19     762
  532.63     760  593.49     758  671.08     758  682.46     758  745.07     756
     990     755    1165     755 1429.15     754 1595.56     752 1632.89     750
    1683   753.5 1753.99   754.8    1754   747.5    1759   747.5    1808     731
    1838     728    1866   718.5    1890     718    1901     714    1945     714
    1956     718    1980   718.5    2008     728    2038     731 2086.99   747.5
    2087     749 2087.67     749    2092     749 2092.01   754.8 2094.02   754.5
    2170     753 2186.98     752 2221.87     752 2342.92     751 2370.46     748
 2397.85     746 2435.01     744 2734.78     744 2742.31     744 2751.27     746
 2796.85     746 2902.44     744 2981.35     742 3031.77     740 3092.09     740
 3106.97     742 3135.01     744 3150.01     746 3159.94     748 3175.78     750
 3207.77     752 3237.76     752 3243.35     754 3248.07     756 3252.81     758
 3262.68     760 3281.88     762 3301.69     764 3315.61     766  3327.3     768
 3339.46     770 3382.19     772 3406.56     772 3435.16     772 3459.85     774
 3483.73     776 3495.74     776 3522.48     774 3537.29     774 3547.17     776
 3560.94     778 3578.58     780 3620.89     782 3662.59     784 3675.56     786
 3704.46     788 3720.55     790 3732.07     792 3771.86     794 3799.23     794
 3841.72     796

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041     990    .033    1165    .041    1754    .027 2086.99    .041
 2342.92     .07 3207.77    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1754 2086.99            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  551.04  754.11     775       F
    2650    3342     770       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
       0  551.04     775  754.11  990.09     775 1164.51 1651.86     775
    2345  2411.1     751  2411.1    2650     770

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2
```

```
Pier Data
Pier Station     Upstream=    1857    Downstream=    1857
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     720       3     754
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     720       3     754

Pier Data
Pier Station     Upstream=    1988    Downstream=    1988
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     720       3     754
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     720       3     754

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     736.63  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     736.43  * E.G. Elev (ft)         *     736.63  *     736.63  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     736.43  *     736.43  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     723.34  *     723.34  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      22.43  *      22.43  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.61  *       3.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3460.36  *    3460.36  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   31028.57  *   31028.57  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      13.50  *      13.50  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *     322.74  *     322.74  *
* Delta EG (ft)          *       0.00  * Conv. Total (cfs)      *  925978.8  *  925978.8  *
* Delta WS (ft)          *       0.00  * Top Width (ft)         *     256.25  *     256.25  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.61  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.12  *       0.12  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.44  *       0.44  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     741.16  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     740.90  * E.G. Elev (ft)         *     741.17  *     741.17  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     740.90  *     740.90  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     725.69  *     725.69  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.90  *      26.90  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.18  *       4.18  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4664.32  *    4664.32  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   50260.82  *   50260.82  *
```

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* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      16.49  *      16.49  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *     368.60  *     368.60  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *  1393935.0  *  1393935.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     282.78  *     282.78  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.18  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.15  *       0.15  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.65  *       0.65  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)          *     744.80  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     744.48  * E.G. Elev (ft)         *     744.81  *     744.81  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     744.47  *     744.47  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     727.73  *     727.73  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      30.47  *      30.47  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.66  *       4.66  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5713.61  *    5713.61  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   70109.55  *   70109.55  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      18.79  *      18.79  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *     405.32  *     405.32  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *  1834932.0  *  1834932.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     304.02  *     304.02  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.66  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.18  *       0.18  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.86  *       0.86  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     748.19  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     747.81  * E.G. Elev (ft)         *     748.20  *     748.20  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     747.81  *     747.81  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     730.05  *     730.05  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.81  *      33.81  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.06  *       5.06  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6761.07  *    6761.07  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   92403.59  *   92403.59  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      20.68  *      20.68  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *     443.18  *     443.18  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *  2290750.0  *  2290750.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     326.99  *     326.99  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.06  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.21  *       0.21  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.07  *       1.07  *
*********************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     753.20  * Element                *Inside BR US *Inside BR DS *
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* W.S. US. (ft)          *     752.77  * E.G. Elev (ft)         *     753.20  *     753.18  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     752.71  *     752.69  *
* Q Bridge (cfs)         *   45299.99  * Crit W.S. (ft)         *     732.35  *     732.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.71  *      38.69  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.45  *       5.45  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8354.71  *    8348.45  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  131841.00  *  131709.10  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      21.71  *      21.57  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *     932.72  *     929.41  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *  2356354.0  *  2361663.0  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     974.57  *     976.72  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       5.63  * C & E Loss (ft)        *       0.00  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.21  *       0.21  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.14  *       1.13  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     756.15  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.67  * E.G. Elev (ft)         *     756.13  *     756.10  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     755.52  *     755.49  *
* Q Bridge (cfs)         *   52116.48  * Crit W.S. (ft)         *     733.82  *     733.82  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.52  *      41.49  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.72  *       5.74  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9503.54  *    9485.39  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  159319.00  *  159060.20  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      15.07  *      15.07  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *    1443.35  *    1441.83  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  2150560.0  *  2150951.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *    1227.66  *    1226.18  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       6.43  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.26  *       0.26  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.51  *       1.51  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     757.91  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     757.38  * E.G. Elev (ft)         *     757.89  *     757.86  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     757.22  *     757.18  *
* Q Bridge (cfs)         *   56954.69  * Crit W.S. (ft)         *     735.13  *     735.13  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.22  *      43.18  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.92  *       5.93  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10646.79  *   10619.33  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  178598.20  *  178224.00  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      14.91  *      14.91  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *    1533.47  *    1531.43  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  2193556.0  *  2191256.0  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *    1362.07  *    1358.89  *
```

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* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       7.03  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.36  *       0.36  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.12  *       2.12  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*******************************************************************************************
* E.G. US. (ft)          *     760.89  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     760.33  * E.G. Elev (ft)         *     760.89  *     760.85  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     760.31  *     760.26  *
* Q Bridge (cfs)         *   58234.37  * Crit W.S. (ft)         *     736.96  *     736.96  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.31  *      46.26  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.74  *       5.76  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   13224.32  *   13183.46  *
* Weir Submerg           *             * Froude # Chl           *       0.18  *       0.18  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  216807.70  *  216278.70  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      14.16  *      14.12  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *    1765.58  *    1765.41  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  2517219.0  *  2506306.0  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *    1752.37  *    1751.95  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       7.19  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.43  *       0.43  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.44  *       2.46  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. US. (ft)          *     749.85  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     749.44  * E.G. Elev (ft)         *     749.86  *     749.86  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     749.43  *     749.43  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     731.07  *     731.07  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.43  *      35.43  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.25  *       5.25  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7289.60  *    7289.60  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  104686.70  *  104686.70  *
* Min El Weir Flow (ft)  *     750.78  * Hydr Depth (ft)        *      23.41  *      23.41  *
* Min El Prs (ft)        *     753.50  * W.P. Total (ft)        *     477.75  *     477.75  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *  2513512.0  *  2513512.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     311.37  *     311.37  *
* BR Open Area (sq ft)   *    8102.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.25  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.22  *       0.22  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.16  *       1.16  *
*******************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 5.002

INPUT
Description: COE River Station= 41437.71
Preliminary Model River Station
(miles)=4.99

17th Street Bridge. B12 (downstream). Top of
side rail modeled as top of bridge. Obstructions:buildings. Piers
are aligned with channel flow. Underwater channel shown on bridge
plans. Ineffective flow on left is a corridor with high ground
dowsntream which will block the water. Ineffective flow on right
is due to buildings and high ground upstream.

Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	770	36.76	768	72.16	766	258.74	764	459.19	762
532.63	760	593.49	758	671.08	758	682.46	758	745.07	756
990	755	1165	755	1429.15	754	1595.56	752	1632.89	750
1683	753.5	1753.99	754.8	1754	747.5	1759	747.5	1808	731
1838	728	1866	718.5	1890	718	1901	714	1945	714
1956	718	1980	718.5	2008	728	2038	731	2086.99	747.5
2087	749	2087.67	749	2092	749	2092.01	754.8	2094.02	754.5
2170	753	2186.98	752	2221.87	752	2342.92	751	2370.46	748
2397.85	746	2435.01	744	2734.78	744	2742.31	744	2751.27	746
2796.85	746	2902.44	744	2981.35	742	3031.77	740	3092.09	740
3106.97	742	3135.01	744	3150.01	746	3159.94	748	3175.78	750
3207.77	752	3237.76	752	3243.35	754	3248.07	756	3252.81	758
3262.68	760	3281.88	762	3301.69	764	3315.61	766	3327.3	768
3339.46	770	3382.19	772	3406.56	772	3435.16	772	3459.85	774
3483.73	776	3495.74	776	3522.48	774	3537.29	774	3547.17	776
3560.94	778	3578.58	780	3620.89	782	3662.59	784	3675.56	786
3704.46	788	3720.55	790	3732.07	792	3771.86	794	3799.23	794
3841.72	796								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	990	.033	1165	.041	1754	.027	2086.99	.041
2342.92	.07	3207.77	.041						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1754	2086.99	220	393	480	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
551.04	754.11	775	F
2650	3342	770	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	551.04	775	754.11	990.09	775	1164.51	1651.86	775
2345	2411.1	751	2411.1	2650	770			

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	736.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.027	
W.S. Elev (ft)	736.43	Reach Len. (ft)	220.00	393.00	480.00
Crit W.S. (ft)	723.34	Flow Area (sq ft)		3550.64	
E.G. Slope (ft/ft)	0.000131	Area (sq ft)		3550.64	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	262.25	Top Width (ft)		262.25	
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		3.52	
Max Chl Dpth (ft)	22.43	Hydr. Depth (ft)		13.54	
Conv. Total (cfs)	1091685.0	Conv. (cfs)		1091685.0	
Length Wtd. (ft)	393.00	Wetted Per. (ft)		268.89	
Min Ch El (ft)	714.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.38	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		1282.65	
C & E Loss (ft)	0.01	Cum SA (acres)		109.35	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	741.16	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.26	Wt. n-Val.		0.027		
W.S. Elev (ft)	740.90	Reach Len. (ft)	220.00	393.00	480.00	
Crit W.S. (ft)	725.63	Flow Area (sq ft)		4781.40		
E.G. Slope (ft/ft)	0.000135	Area (sq ft)		4781.40	67.32	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00		
Top Width (ft)	378.42	Top Width (ft)		288.78	89.63	
Vel Total (ft/s)	4.08	Avg. Vel. (ft/s)		4.08		
Max Chl Dpth (ft)	26.90	Hydr. Depth (ft)		16.56		
Conv. Total (cfs)	1678175.0	Conv. (cfs)		1678175.0		
Length Wtd. (ft)	393.00	Wetted Per. (ft)		296.88		
Min Ch El (ft)	714.00	Shear (lb/sq ft)		0.14		
Alpha	1.00	Stream Power (lb/ft s)		0.55		
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.44	1747.20	5.74	
C & E Loss (ft)	0.01	Cum SA (acres)	2.27	124.15	7.77	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	744.79	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.32	Wt. n-Val.		0.027		
W.S. Elev (ft)	744.47	Reach Len. (ft)	220.00	393.00	480.00	
Crit W.S. (ft)	727.58	Flow Area (sq ft)		5852.15		
E.G. Slope (ft/ft)	0.000141	Area (sq ft)		5852.15	705.44	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00		
Top Width (ft)	665.61	Top Width (ft)		310.02	355.59	
Vel Total (ft/s)	4.55	Avg. Vel. (ft/s)		4.55		
Max Chl Dpth (ft)	30.47	Hydr. Depth (ft)		18.88		
Conv. Total (cfs)	2238891.0	Conv. (cfs)		2238891.0		
Length Wtd. (ft)	393.00	Wetted Per. (ft)		319.29		
Min Ch El (ft)	714.00	Shear (lb/sq ft)		0.16		
Alpha	1.00	Stream Power (lb/ft s)		0.73		
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	14.56	2141.63	47.92	
C & E Loss (ft)	0.01	Cum SA (acres)	8.79	133.92	23.72	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	748.19	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.38	Wt. n-Val.		0.027	0.000	
W.S. Elev (ft)	747.81	Reach Len. (ft)	220.00	393.00	480.00	
Crit W.S. (ft)	729.84	Flow Area (sq ft)		6919.61	0.00	
E.G. Slope (ft/ft)	0.000147	Area (sq ft)	0.00	6919.61	2235.01	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	0.00	
Top Width (ft)	841.97	Top Width (ft)		332.99	508.98	
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)		4.94	0.00	
Max Chl Dpth (ft)	33.81	Hydr. Depth (ft)		20.78	0.16	
Conv. Total (cfs)	2820710.0	Conv. (cfs)		2820710.0	0.0	
Length Wtd. (ft)	393.23	Wetted Per. (ft)		343.25	0.29	
Min Ch El (ft)	714.00	Shear (lb/sq ft)		0.19		
Alpha	1.00	Stream Power (lb/ft s)		0.91		
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	50.19	2522.32	137.31	
C & E Loss (ft)	0.01	Cum SA (acres)	23.93	140.72	45.03	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	753.16	Element	Left OB	Channel	Right OB	

```
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.041  *   0.027  *   0.050  *
* W.S. Elev (ft)         *  752.73  * Reach Len. (ft)        *  220.00  *  393.00  *  480.00  *
* Crit W.S. (ft)         *  732.15  * Flow Area (sq ft)      *   14.12  * 8558.52  *  315.47  *
* E.G. Slope (ft/ft)     *0.000127  * Area (sq ft)           *   14.12  * 8558.52  * 5197.17  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    4.35  *45368.10  *  127.55  *
* Top Width (ft)         * 1184.40  * Top Width (ft)         *   20.10  *  332.99  *  831.31  *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *    0.31  *    5.30  *    0.40  *
* Max Chl Dpth (ft)      *   38.73  * Hydr. Depth (ft)       *    0.70  *   25.70  *    1.31  *
* Conv. Total (cfs)      *4031638.0  * Conv. (cfs)           *   385.4  *4019950.0  * 11301.9  *
* Length Wtd. (ft)       *  397.86  * Wetted Per. (ft)       *   26.78  *  343.25  *  248.66  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.00  *    0.20  *    0.01  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.00  *    1.05  *    0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  216.41  * 3086.10  *  392.98  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   98.25  *  145.82  *  105.92  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  756.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.039  *   0.027  *   0.047  *
* W.S. Elev (ft)         *  755.58  * Reach Len. (ft)        *  220.00  *  393.00  *  480.00  *
* Crit W.S. (ft)         *  733.58  * Flow Area (sq ft)      *  302.38  * 9509.20  * 1158.70  *
* E.G. Slope (ft/ft)     *0.000124  * Area (sq ft)           *  302.38  * 9509.20  * 7735.11  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  153.49  *53308.92  *  937.59  *
* Top Width (ft)         * 1530.75  * Top Width (ft)         *  276.56  *  332.99  *  921.20  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    0.51  *    5.61  *    0.81  *
* Max Chl Dpth (ft)      *   41.58  * Hydr. Depth (ft)       *    1.09  *   28.56  *    3.58  *
* Conv. Total (cfs)      *4889470.0  * Conv. (cfs)           * 13795.2  *4791404.0  * 84270.9  *
* Length Wtd. (ft)       *  399.12  * Wetted Per. (ft)       *  289.36  *  343.25  *  336.28  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.01  *    0.21  *    0.03  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.00  *    1.20  *    0.02  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  550.74  * 3477.15  *  737.45  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *  155.45  *  147.66  *  204.01  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  757.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.037  *   0.027  *   0.046  *
* W.S. Elev (ft)         *  757.28  * Reach Len. (ft)        *  220.00  *  393.00  *  480.00  *
* Crit W.S. (ft)         *  734.87  * Flow Area (sq ft)      *  771.08  *10073.54  * 1707.99  *
* E.G. Slope (ft/ft)     *0.000131  * Area (sq ft)           *  808.39  *10073.54  * 9299.72  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  688.63  *60452.35  * 1859.01  *
* Top Width (ft)         * 1583.82  * Top Width (ft)         *  325.62  *  332.99  *  925.21  *
* Vel Total (ft/s)       *    5.02  * Avg. Vel. (ft/s)       *    0.89  *    6.00  *    1.09  *
* Max Chl Dpth (ft)      *   43.28  * Hydr. Depth (ft)       *    2.79  *   30.25  *    5.27  *
* Conv. Total (cfs)      *5496931.0  * Conv. (cfs)           * 60085.2  *5274642.0  *162204.3  *
* Length Wtd. (ft)       *  399.26  * Wetted Per. (ft)       *  294.45  *  343.25  *  337.98  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.02  *    0.24  *    0.04  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.02  *    1.44  *    0.05  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  821.09  * 3718.40  * 1154.64  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  180.42  *  147.79  *  361.08  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.036  *   0.027  *   0.046  *
* W.S. Elev (ft)         *  760.28  * Reach Len. (ft)        *  220.00  *  393.00  *  480.00  *
* Crit W.S. (ft)         *  736.68  * Flow Area (sq ft)      * 1600.46  *11072.14  * 2679.97  *
* E.G. Slope (ft/ft)     *0.000128  * Area (sq ft)           * 2114.17  *11072.14  *12091.82  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2256.77  *69740.05  * 3903.18  *
* Top Width (ft)         * 1752.07  * Top Width (ft)         *  479.63  *  332.99  *  939.45  *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *    1.41  *    6.30  *    1.46  *
```

```
* Max Chl Dpth (ft)      *   46.28  * Hydr. Depth (ft)       *    5.79  *   33.25  *    8.27  *
* Conv. Total (cfs)      *6719987.0  * Conv. (cfs)           *199808.6  *6174602.0  *345577.0  *
* Length Wtd. (ft)       *  398.93  * Wetted Per. (ft)       *  303.44  *  343.25  *  340.98  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.04  *    0.26  *    0.06  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.06  *    1.62  *    0.09  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1371.41  * 4095.05  * 2209.52  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  220.48  *  148.17  *  541.57  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  749.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.              *   0.000  *   0.027  *   0.041  *
* W.S. Elev (ft)         *  749.43  * Reach Len. (ft)        *  220.00  *  393.00  *  480.00  *
* Crit W.S. (ft)         *  730.86  * Flow Area (sq ft)      *    0.00  * 7460.15  *    2.16  *
* E.G. Slope (ft/ft)     *0.000143  * Area (sq ft)           *    0.00  * 7460.15  * 3072.96  *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *    0.00  *38299.57  *    0.43  *
* Top Width (ft)         *  859.27  * Top Width (ft)         *          *  332.99  *  526.28  *
* Vel Total (ft/s)       *    5.13  * Avg. Vel. (ft/s)       *    0.01  *    5.13  *    0.20  *
* Max Chl Dpth (ft)      *   35.43  * Hydr. Depth (ft)       *    0.97  *   22.40  *    0.43  *
* Conv. Total (cfs)      *3197470.0  * Conv. (cfs)            *     0.0  *3197434.0  *    36.1  *
* Length Wtd. (ft)       *  393.59  * Wetted Per. (ft)       *    1.93  *  343.25  *    6.92  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.19  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.00  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   83.44  * 2716.20  *  203.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   38.50  *  143.23  *   56.75  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 4.928

INPUT
Description: COE River Station= 41830.91
Preliminary Model River Station
             (miles)=4.91

Obstructions are buildings except on the far
             right where no flow is assumed beyond I-435 embankment.
             Ineffective flow on left is a corridor with high ground dowsntream
             which will block the water.  Upstream constriction causes blockage
             on right bank
Station Elevation Data    num=      92
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     766   10.79     766  318.88     764  367.92     760  455.74     760
  463.83     760  518.16     758  534.73     756  561.62     756  571.21     756
     830     753  900.56     752    1120     752 1131.44     752  1164.5     752
 1204.51     752 1220.28     752 1447.92     750 1477.18     748 1485.77     746
 1494.46     744 1500.98     742 1507.01     740 1513.62     738 1518.62     736
 1525.15     734 1534.18     732  1545.7     730 1560.86     728 1567.07     726
 1574.04     724  1604.7  713.78 1689.79  713.78 1720.45     724 1729.93     726
 1741.01     728  1752.6     730 1762.08     732 1771.13     734 1777.67     736
 1782.94     738 1789.58     740 1795.21     742 1802.65     744 1809.62     746
 1976.01     746 1983.98     744 2161.63     742 2187.18     742 2395.27     744
 2433.51     750 2516.63     750 2526.82     744 2577.64     738 2779.51     738
 2789.83     740 2802.33     742  2814.1     744 2825.12     746 2835.57     748
 2875.72     752  2906.2     754 2929.79     754 2944.32     754 2954.32     756
 2984.67     758 3002.41     760 3017.29     762 3024.69     764 3032.79     766
 3039.92     766 3052.39     766 3074.87     768 3084.67     770 3143.77     770
 3154.77     770 3222.19     770 3230.12     770 3237.97     770  3261.3     768
 3275.34     766 3285.99     764 3297.55     764 3336.94     766 3510.54     770
 3530.95     772 3556.44     772 3556.99     772  3562.9     774 3578.72     776
 3598.06     778 3613.01     780

Manning's n Values        num=       7
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .041     830      .1    1120    .041 1477.18    .027 1809.62    .041
 1976.01     .07 2516.63    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1477.18 1809.62              430     545     540             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0   564.3     775       F
 1976.01    2627     750       F
    2627    3080     775       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
       0  374.49     775   564.3  831.06     775 1118.34 1369.71     775
    2520    3080     750    3230    3500     770

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.57  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  736.40  * Reach Len. (ft)        *  430.00  *  545.00  *  540.00  *
* Crit W.S. (ft)         *  721.72  * Flow Area (sq ft)      *          * 3739.24  *          *
* E.G. Slope (ft/ft)     *0.000109  * Area (sq ft)           *          * 3739.24  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  261.09  * Top Width (ft)         *          *  261.09  *          *
* Vel Total (ft/s)       *    3.34  * Avg. Vel. (ft/s)       *          *    3.34  *          *
* Max Chl Dpth (ft)      *   22.62  * Hydr. Depth (ft)       *          *   14.32  *          *
* Conv. Total (cfs)      *1194862.0  * Conv. (cfs)            *          *1194862.0  *          *
* Length Wtd. (ft)       *  545.00  * Wetted Per. (ft)       *          *  267.26  *          *
* Min Ch El (ft)         *  713.78  * Shear (lb/sq ft)       *          *    0.10  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.32  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *          * 1249.77  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *  106.99  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.10  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  740.86  * Reach Len. (ft)        *  430.00  *  545.00  *  540.00  *
* Crit W.S. (ft)         *  724.12  * Flow Area (sq ft)      *          * 4961.74  *          *
* E.G. Slope (ft/ft)     *0.000118  * Area (sq ft)           *          * 4961.74  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  287.59  * Top Width (ft)         *          *  287.59  *          *
* Vel Total (ft/s)       *    3.93  * Avg. Vel. (ft/s)       *          *    3.93  *          *
* Max Chl Dpth (ft)      *   27.08  * Hydr. Depth (ft)       *          *   17.25  *          *
* Conv. Total (cfs)      *1791589.0  * Conv. (cfs)            *          *1791589.0  *          *
* Length Wtd. (ft)       *  545.00  * Wetted Per. (ft)       *          *  295.24  *          *
* Min Ch El (ft)         *  713.78  * Shear (lb/sq ft)       *          *    0.12  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.49  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    1.44  * 1703.24  *    5.36  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *  121.55  *    7.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  744.43  * Reach Len. (ft)        *  430.00  *  545.00  *  540.00  *
* Crit W.S. (ft)         *  726.27  * Flow Area (sq ft)      *          * 6030.08  *          *
* E.G. Slope (ft/ft)     *0.000128  * Area (sq ft)           *          * 6030.08  *  616.45  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  727.38  * Top Width (ft)         *          *  311.59  *  415.79  *
* Vel Total (ft/s)       *    4.41  * Avg. Vel. (ft/s)       *          *    4.41  *          *
* Max Chl Dpth (ft)      *   30.65  * Hydr. Depth (ft)       *          *   19.35  *          *
* Conv. Total (cfs)      *2348565.0  * Conv. (cfs)            *          *2348565.0  *          *
* Length Wtd. (ft)       *  545.00  * Wetted Per. (ft)       *          *  320.29  *          *
* Min Ch El (ft)         *  713.78  * Shear (lb/sq ft)       *          *    0.15  *          *
```

```
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.67  *         *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   14.56  * 2088.03  *   40.64  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.79  *  131.12  *   19.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.027  *   0.041  *
* W.S. Elev (ft)         *  747.77  * Reach Len. (ft)        *  430.00  *  545.00  *  540.00  *
* Crit W.S. (ft)         *  728.26  * Flow Area (sq ft)      *          * 7107.45  *  294.50  *
* E.G. Slope (ft/ft)     *0.000132  * Area (sq ft)           *          * 7107.45  * 2349.26  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34020.73  *  179.27  *
* Top Width (ft)         *  941.13  * Top Width (ft)         *          *  331.45  *  609.68  *
* Vel Total (ft/s)       *    4.62  * Avg. Vel. (ft/s)       *          *    4.79  *    0.61  *
* Max Chl Dpth (ft)      *   33.99  * Hydr. Depth (ft)       *          *   21.44  *    1.77  *
* Conv. Total (cfs)      *2979477.0  * Conv. (cfs)           *          *2963860.0  * 15617.5  *
* Length Wtd. (ft)       *  544.98  * Wetted Per. (ft)       *          *  340.76  *  166.39  *
* Min Ch El (ft)         *  713.78  * Shear (lb/sq ft)       *          *    0.17  *    0.01  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *          *    0.82  *    0.01  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   50.19  * 2459.04  *  112.05  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.93  *  137.72  *   38.87  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.047  *   0.027  *   0.061  *
* W.S. Elev (ft)         *  752.79  * Reach Len. (ft)        *  430.00  *  545.00  *  540.00  *
* Crit W.S. (ft)         *  730.87  * Flow Area (sq ft)      *  497.66  * 8777.39  * 6011.47  *
* E.G. Slope (ft/ft)     *0.000090  * Area (sq ft)           *  497.66  * 8777.39  * 6691.01  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  226.42  *39858.27  * 5415.31  *
* Top Width (ft)         * 1791.88  * Top Width (ft)         *  381.24  *  332.44  * 1078.19  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)       *    0.45  *    4.54  *    0.90  *
* Max Chl Dpth (ft)      *   39.01  * Hydr. Depth (ft)       *    1.31  *   26.40  *    7.35  *
* Conv. Total (cfs)      *4800014.0  * Conv. (cfs)           * 23886.3  *4204841.0  *571287.3  *
* Length Wtd. (ft)       *  544.23  * Wetted Per. (ft)       *  384.22  *  341.77  *  820.64  *
* Min Ch El (ft)         *  713.78  * Shear (lb/sq ft)       *    0.01  *    0.14  *    0.04  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *    0.00  *    0.65  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  215.12  * 3007.90  *  327.48  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   97.23  *  142.81  *   95.40  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.061  *   0.027  *   0.060  *
* W.S. Elev (ft)         *  755.69  * Reach Len. (ft)        *  430.00  *  545.00  *  540.00  *
* Crit W.S. (ft)         *  732.51  * Flow Area (sq ft)      * 1639.95  * 9740.46  * 8379.40  *
* E.G. Slope (ft/ft)     *0.000080  * Area (sq ft)           * 1639.95  * 9740.46  * 9928.27  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  927.88  *44600.54  * 8871.58  *
* Top Width (ft)         * 1870.34  * Top Width (ft)         *  394.75  *  332.44  * 1143.15  *
* Vel Total (ft/s)       *    2.75  * Avg. Vel. (ft/s)       *    0.57  *    4.58  *    1.06  *
* Max Chl Dpth (ft)      *   41.91  * Hydr. Depth (ft)       *    4.15  *   29.30  *   10.25  *
* Conv. Total (cfs)      *6100496.0  * Conv. (cfs)           *104053.9  *5001570.0  *994871.6  *
* Length Wtd. (ft)       *  542.85  * Wetted Per. (ft)       *  406.23  *  341.77  *  820.64  *
* Min Ch El (ft)         *  713.78  * Shear (lb/sq ft)       *    0.02  *    0.14  *    0.05  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    0.01  *    0.65  *    0.05  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  545.84  * 3390.32  *  640.13  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  153.76  *  144.65  *  192.64  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	757.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.064	0.027	0.060
W.S. Elev (ft)	757.41	Reach Len. (ft)	430.00	545.00	540.00
Crit W.S. (ft)	733.96	Flow Area (sq ft)	2319.07	10312.39	9785.62
E.G. Slope (ft/ft)	0.000082	Area (sq ft)	2369.04	10312.39	11912.48
Q Total (cfs)	63000.00	Flow (cfs)	1564.07	49750.58	11685.35
Top Width (ft)	1934.56	Top Width (ft)	436.01	332.44	1166.11
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)	0.67	4.82	1.19
Max Chl Dpth (ft)	43.63	Hydr. Depth (ft)	5.87	31.02	11.97
Conv. Total (cfs)	6965437.0	Conv. (cfs)	172927.4	5500548.0	1291962.0
Length Wtd. (ft)	541.84	Wetted Per. (ft)	411.39	341.77	820.64
Min Ch El (ft)	713.78	Shear (lb/sq ft)	0.03	0.15	0.06
Alpha	2.36	Stream Power (lb/ft s)	0.02	0.74	0.07
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	813.07	3626.44	1037.77
C & E Loss (ft)	0.01	Cum SA (acres)	178.50	144.79	349.56

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	760.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.067	0.027	0.059
W.S. Elev (ft)	760.43	Reach Len. (ft)	430.00	545.00	540.00
Crit W.S. (ft)	735.83	Flow Area (sq ft)	3511.08	11316.24	12253.82
E.G. Slope (ft/ft)	0.000077	Area (sq ft)	3815.14	11316.24	15484.16
Q Total (cfs)	75900.00	Flow (cfs)	2848.73	56449.34	16601.94
Top Width (ft)	2112.99	Top Width (ft)	584.56	332.44	1195.99
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)	0.81	4.99	1.35
Max Chl Dpth (ft)	46.65	Hydr. Depth (ft)	8.89	34.04	14.99
Conv. Total (cfs)	8634300.0	Conv. (cfs)	324067.8	6421614.0	1888619.0
Length Wtd. (ft)	539.86	Wetted Per. (ft)	420.45	341.77	820.64
Min Ch El (ft)	713.78	Shear (lb/sq ft)	0.04	0.16	0.07
Alpha	2.41	Stream Power (lb/ft s)	0.03	0.80	0.10
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1356.44	3994.05	2057.58
C & E Loss (ft)	0.01	Cum SA (acres)	217.79	145.17	529.80

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	749.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.041	0.027	0.041
W.S. Elev (ft)	749.40	Reach Len. (ft)	430.00	545.00	540.00
Crit W.S. (ft)	729.31	Flow Area (sq ft)	14.38	7649.88	566.06
E.G. Slope (ft/ft)	0.000128	Area (sq ft)	14.38	7649.88	3354.38
Q Total (cfs)	38300.00	Flow (cfs)	4.64	37771.18	524.19
Top Width (ft)	975.38	Top Width (ft)	20.51	332.44	622.43
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)	0.32	4.94	0.93
Max Chl Dpth (ft)	35.62	Hydr. Depth (ft)	0.70	23.01	3.40
Conv. Total (cfs)	3390551.0	Conv. (cfs)	410.6	3343737.0	46404.2
Length Wtd. (ft)	544.92	Wetted Per. (ft)	20.56	341.77	166.39
Min Ch El (ft)	713.78	Shear (lb/sq ft)	0.01	0.18	0.03
Alpha	1.11	Stream Power (lb/ft s)	0.00	0.88	0.03
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	83.41	2648.04	168.11
C & E Loss (ft)	0.00	Cum SA (acres)	38.45	140.23	50.42

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 4.825

```
INPUT
Description: COE River Station= 42375.94
Preliminary Model River Station
             (miles)=4.81

FEMA XSEC G. Obstructions are buildings except on
             the far right where no flow is assumed beyond I-435 embankment.
             Ineffective flow on left is a corridor with high ground dowsntream
             which will block the water.
Station Elevation Data    num=      92
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     770      96     768   135.8     768  214.32     766  257.22     766
  334.79     764  400.56     762  443.58     762  506.64     762     870     757
 1134.27     752 1207.51     752 1251.11     752 1305.97     748 1319.51     746
  1324.8     744  1330.6     742 1332.82     740 1337.59     738 1342.65     736
 1348.36     734 1361.23     732  1376.7     730 1385.57     728 1395.41     726
 1403.57     724 1435.67   713.3 1521.16   713.3 1553.26     724 1561.19     726
 1568.09     728 1584.63     730 1598.34     732 1612.21     734  1617.3     736
 1620.55     738 1627.85     740 1635.61     742 1637.97     744 1648.94     746
 1658.94     748 1762.65     748 1769.49     744 1810.05     744 1821.11     746
 1832.11     750  2251.1     750 2441.57     752 2795.98     756 2824.87     758
 2875.11     758 2887.04     756 2889.82     756 2903.16     758 2952.98     758
 2968.47     756 2969.46     756 2976.94     758 2983.19     760 2988.36     762
 2993.42     764 2996.76     766 3000.04     768 3003.77     770 3007.19     772
 3010.99     774 3014.06     776 3017.03     778 3019.93     780 3025.81     782
 3039.33     784 3083.05     784 3169.49     782 3174.57     780 3177.56     778
 3181.05     776 3185.38     774 3188.89     772 3192.61     770 3200.51     768
 3207.63     766 3217.41     766 3225.12     768 3278.86     768  3287.3     766
 3296.63     766 3304.94     768    3311     770  3325.5     772 3416.72     774
 3503.09     776  3559.8     778

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041     870    .065 1319.51    .029 1648.94    .041 2441.57     .07
 2824.87    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1319.51 1648.94             490     432     370              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
     330  579.69     775       F
Blocked Obstructions     num=       9
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
       0     330     775  579.69   872.1     775    1763    1845     746
    1845    2260     775    2260    2470     752    2470    2670     775
    2875    2903     758    2953    2976     758    3075    3555     784

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  736.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.16  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)          *  736.34  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)          *  721.22  * Flow Area (sq ft)      *          * 3891.71  *          *
* E.G. Slope (ft/ft)      *0.000119  * Area (sq ft)           *          * 3891.71  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)          *  276.08  * Top Width (ft)         *          *  276.08  *          *
* Vel Total (ft/s)        *    3.21  * Avg. Vel. (ft/s)       *          *    3.21  *          *
* Max Chl Dpth (ft)       *   23.04  * Hydr. Depth (ft)        *          *   14.10  *          *
* Conv. Total (cfs)       *1146389.0  * Conv. (cfs)             *          *1146389.0  *          *
* Length Wtd. (ft)        *  432.00  * Wetted Per. (ft)       *          *  282.32  *          *
* Min Ch El (ft)          *  713.30  * Shear (lb/sq ft)       *          *    0.10  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.33  *          *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)   *          * 1202.03  *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *          *  103.63  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  741.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.22  * Wt. n-Val.             *          *   0.029  *          *
```

```
* W.S. Elev (ft)         *  740.81  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)         *  723.63  * Flow Area (sq ft)      *          * 5172.56  *          *
* E.G. Slope (ft/ft)     *0.000125  * Area (sq ft)           *          * 5172.56  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  299.06  * Top Width (ft)         *          *  299.06  *          *
* Vel Total (ft/s)       *    3.77  * Avg. Vel. (ft/s)       *          *    3.77  *          *
* Max Chl Dpth (ft)      *   27.51  * Hydr. Depth (ft)       *          *   17.30  *          *
* Conv. Total (cfs)      *1741203.0  * Conv. (cfs)            *          *1741203.0  *          *
* Length Wtd. (ft)       *  432.00  * Wetted Per. (ft)       *          *  307.18  *          *
* Min Ch El (ft)         *  713.30  * Shear (lb/sq ft)       *          *    0.13  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.50  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *    1.44  * 1639.85  *    5.36  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *  117.88  *    7.27  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  744.66  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *          *    0.029  *          *
* W.S. Elev (ft)         *  744.38  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)         *  725.76  * Flow Area (sq ft)      *          * 6270.02  *          *
* E.G. Slope (ft/ft)     *0.000133  * Area (sq ft)           *          * 6270.02  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  316.25  * Top Width (ft)         *          *  316.25  *          *
* Vel Total (ft/s)       *    4.24  * Avg. Vel. (ft/s)       *          *    4.24  *          *
* Max Chl Dpth (ft)      *   31.08  * Hydr. Depth (ft)       *          *   19.83  *          *
* Conv. Total (cfs)      *2305536.0  * Conv. (cfs)            *          *2305536.0  *          *
* Length Wtd. (ft)       *  432.00  * Wetted Per. (ft)       *          *  326.14  *          *
* Min Ch El (ft)         *  713.30  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.68  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   14.56  * 2011.08  *   36.82  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.79  *  127.19  *   16.89  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  748.04  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.065  *    0.029  *   0.041  *
* W.S. Elev (ft)         *  747.71  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)         *  727.71  * Flow Area (sq ft)      *    9.91  * 7357.07  *  108.03  *
* E.G. Slope (ft/ft)     *0.000136  * Area (sq ft)           *    9.91  * 7357.07  *  108.03  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *    2.36  *34136.98  *   60.65  *
* Top Width (ft)         *  412.24  * Top Width (ft)         *   11.58  *  329.43  *   71.23  *
* Vel Total (ft/s)       *    4.58  * Avg. Vel. (ft/s)       *    0.24  *    4.64  *    0.56  *
* Max Chl Dpth (ft)      *   34.41  * Hydr. Depth (ft)       *    0.86  *   22.33  *    1.52  *
* Conv. Total (cfs)      *2933949.0  * Conv. (cfs)            *   202.7  *2928543.0  *  5203.4  *
* Length Wtd. (ft)       *  431.90  * Wetted Per. (ft)       *   11.71  *  339.77  *   72.16  *
* Min Ch El (ft)         *  713.30  * Shear (lb/sq ft)       *    0.01  *    0.18  *    0.01  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.00  *    0.85  *    0.01  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   50.14  * 2368.55  *   96.82  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   23.87  *  133.59  *   34.65  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  753.01  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.065  *    0.029  *   0.041  *
* W.S. Elev (ft)         *  752.65  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)         *  730.39  * Flow Area (sq ft)      *  308.07  * 8982.68  * 1139.64  *
* E.G. Slope (ft/ft)     *0.000117  * Area (sq ft)           *  308.07  * 8982.68  * 1139.64  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   95.49  *44205.55  * 1198.96  *
* Top Width (ft)         *  954.86  * Top Width (ft)         *  219.37  *  329.43  *  406.06  *
* Vel Total (ft/s)       *    4.36  * Avg. Vel. (ft/s)       *    0.31  *    4.92  *    1.05  *
* Max Chl Dpth (ft)      *   39.35  * Hydr. Depth (ft)       *    1.40  *   27.27  *    2.81  *
* Conv. Total (cfs)      *4204247.0  * Conv. (cfs)            *  8823.7  *4084639.0  *110784.8  *
* Length Wtd. (ft)       *  429.94  * Wetted Per. (ft)       *  219.67  *  339.77  *  411.12  *
```

```
* Min Ch El (ft)         *  713.30  * Shear (lb/sq ft)       *    0.01  *    0.19  *    0.02  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    0.00  *    0.95  *    0.02  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  211.14  * 2896.80  *  278.94  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   94.27  *  138.67  *   86.20  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.              *   0.065  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  755.52  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)         *  732.13  * Flow Area (sq ft)      * 1155.53  * 9928.31  * 2344.22  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           * 1155.53  * 9928.31  * 2344.22  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  593.18  *50852.48  * 2954.34  *
* Top Width (ft)         * 1189.70  * Top Width (ft)         *  371.09  *  329.43  *  489.18  *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *    0.51  *    5.12  *    1.26  *
* Max Chl Dpth (ft)      *   42.22  * Hydr. Depth (ft)       *    3.11  *   30.14  *    4.79  *
* Conv. Total (cfs)      *5162843.0  * Conv. (cfs)           * 56296.0  *4826165.0  *280382.6  *
* Length Wtd. (ft)       *  428.57  * Wetted Per. (ft)       *  371.42  *  339.77  *  503.80  *
* Min Ch El (ft)         *  713.30  * Shear (lb/sq ft)       *    0.02  *    0.20  *    0.03  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *    0.01  *    1.04  *    0.04  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  532.04  * 3267.27  *  564.06  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  149.98  *  140.51  *  182.52  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *   0.065  *   0.029  *   0.042  *
* W.S. Elev (ft)         *  757.21  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)         *  733.70  * Flow Area (sq ft)      * 1859.09  *10486.91  * 3246.63  *
* E.G. Slope (ft/ft)     *0.000117  * Area (sq ft)           * 1859.09  *10486.91  * 3246.63  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1188.20  *57241.79  * 4570.02  *
* Top Width (ft)         * 1326.39  * Top Width (ft)         *  447.41  *  329.43  *  549.55  *
* Vel Total (ft/s)       *    4.04  * Avg. Vel. (ft/s)       *    0.64  *    5.46  *    1.41  *
* Max Chl Dpth (ft)      *   43.91  * Hydr. Depth (ft)       *    4.16  *   31.83  *    5.91  *
* Conv. Total (cfs)      *5819026.0  * Conv. (cfs)           *109748.3  *5287166.0  *422112.3  *
* Length Wtd. (ft)       *  427.77  * Wetted Per. (ft)       *  448.00  *  339.77  *  570.99  *
* Min Ch El (ft)         *  713.30  * Shear (lb/sq ft)       *    0.03  *    0.23  *    0.04  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.02  *    1.23  *    0.06  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  792.20  * 3496.32  *  943.80  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  174.14  *  140.65  *  338.93  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.              *   0.065  *   0.029  *   0.043  *
* W.S. Elev (ft)         *  760.23  * Reach Len. (ft)        *  490.00  *  432.00  *  370.00  *
* Crit W.S. (ft)         *  735.48  * Flow Area (sq ft)      * 3210.42  *11481.90  * 5283.70  *
* E.G. Slope (ft/ft)     *0.000111  * Area (sq ft)           * 3210.42  *11481.90  * 5283.70  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2867.24  *64924.93  * 8107.82  *
* Top Width (ft)         * 1496.69  * Top Width (ft)         *  447.41  *  329.43  *  719.85  *
* Vel Total (ft/s)       *    3.80  * Avg. Vel. (ft/s)       *    0.89  *    5.65  *    1.53  *
* Max Chl Dpth (ft)      *   46.93  * Hydr. Depth (ft)       *    7.18  *   34.85  *    7.34  *
* Conv. Total (cfs)      *7188914.0  * Conv. (cfs)           *271572.6  *6149404.0  *767937.3  *
* Length Wtd. (ft)       *  426.51  * Wetted Per. (ft)       *  451.02  *  339.77  *  754.07  *
* Min Ch El (ft)         *  713.30  * Shear (lb/sq ft)       *    0.05  *    0.24  *    0.05  *
* Alpha                  *    1.91  * Stream Power (lb/ft s) *    0.04  *    1.33  *    0.07  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 1321.76  * 3851.43  * 1928.86  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  212.70  *  141.03  *  517.93  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	749.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.065	0.029	0.041
W.S. Elev (ft)	749.34	Reach Len. (ft)	490.00	432.00	370.00
Crit W.S. (ft)	728.75	Flow Area (sq ft)	44.05	7894.20	369.85
E.G. Slope (ft/ft)	0.000133	Area (sq ft)	44.05	7894.20	369.85
Q Total (cfs)	38300.00	Flow (cfs)	14.35	38037.90	247.75
Top Width (ft)	542.73	Top Width (ft)	31.94	329.43	181.36
Vel Total (ft/s)	4.61	Avg. Vel. (ft/s)	0.33	4.82	0.67
Max Chl Dpth (ft)	36.04	Hydr. Depth (ft)	1.38	23.96	2.04
Conv. Total (cfs)	3316191.0	Conv. (cfs)	1242.6	3293497.0	21451.0
Length Wtd. (ft)	431.43	Wetted Per. (ft)	32.14	339.77	182.69
Min Ch El (ft)	713.30	Shear (lb/sq ft)	0.01	0.19	0.02
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.93	0.01
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	83.12	2550.80	145.03
C & E Loss (ft)	0.00	Cum SA (acres)	38.19	136.09	45.44

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 4.743

INPUT
Description: COE River Station= 42808.53
Preliminary Model River Station
(miles)=4.73

Truman Rd. Bridge. B11 (upstream). Obstructions
are buildings except on the far right where no flow is assumed
beyond I-435 embankment. Ineffective flow on left is a corridor
with high ground dowsntream which will block the water.

Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	788	32.91	786	39.16	784	46.28	782	54.59	780
63.93	778	93.24	776	126.71	774	198.47	772	238.6	770
344.19	768	457.65	766	525.81	764	526.09	764	662.38	764
789.6	762	928.09	760	995.27	760	1096.07	760	1102.44	758
1112.88	756	1308	755	1403.55	754	1470.63	752	1491.05	752
1504.59	752	1535.81	752	1543.09	752	1549.37	752	1556.44	752
1562	752	1630	730	1660	727	1702	713	1752	713
1767	718	1802.3	718.5	1830.4	727.9	1862	731	1905	745
1913	747	1923	747.6	1924.18	747	1966.92	746.5	1982.12	746.5
2190	747.7	2190.01	767	2240	764	2282	762	2328	760
2370	758	2431	756	2535	754	2678	752.9	2855	754
3014	756	3155	758	3239.96	760	3243.78	762	3246.92	764
3250.16	766	3253.04	768	3257.08	770	3261.89	772	3266.81	774
3272.18	776	3277.54	778	3282.21	780	3287.04	782	3293.1	784
3345.59	784	3376.4	784	3426.99	784	3431.37	782	3435.95	780
3440.29	778	3445.58	776	3450.98	774	3454.65	772	3460.94	770
3464.53	768	3468.57	766	3475.99	766	3486.24	768	3519.22	770
3525.35	770	3533.67	768	3544.19	766	3569.92	766	3584.5	768
3606.9	770	3627.62	772	3644.38	774	3659.55	776	3676.94	778
3724.92	780	3726.9	782	3728.34	784	3731.4	786	3733.13	788
3735.89	790	3738.12	792	3738.38	794	3741.06	796	3742.45	798
3742.96	800	3750.79	802	3777.18	804	3780.44	806	3783.65	808
3786.28	810	3789.98	812	3793.13	814	3796.08	816	3798.7	818
3800.98	820	3802.03	822	3805.38	824	3808.23	826	3810.13	828
3813.2	830	3815.97	832	3821.62	834	3829.03	836	3835.68	838

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1308	.033	1562	.029	1923	.041

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1562	1923	63	64	63	.1	.3

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1310     770       F
    2985 3835.68     775       F
Blocked Obstructions     num=       7
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
      50     463     785     720     800     770     890     937     770
  1122.7    1310     770    2195    2510     775    2870    2905     775
    3370    3670     784

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  736.27  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  722.44  * Flow Area (sq ft)      *          * 3714.46  *          *
* E.G. Slope (ft/ft)     *0.000134  * Area (sq ft)           *          * 3714.46  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  267.58  * Top Width (ft)         *          *  267.58  *          *
* Vel Total (ft/s)       *    3.37  * Avg. Vel. (ft/s)       *          *    3.37  *          *
* Max Chl Dpth (ft)      *   23.27  * Hydr. Depth (ft)       *          *   13.88  *          *
* Conv. Total (cfs)      *1081211.0  * Conv. (cfs)            *          *1081211.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  274.33  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *          *    0.11  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.38  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          * 1164.31  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *  100.93  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  740.73  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  724.76  * Flow Area (sq ft)      *          * 4968.50  *          *
* E.G. Slope (ft/ft)     *0.000141  * Area (sq ft)           *          * 4968.50  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  295.05  * Top Width (ft)         *          *  295.05  *          *
* Vel Total (ft/s)       *    3.92  * Avg. Vel. (ft/s)       *          *    3.92  *          *
* Max Chl Dpth (ft)      *   27.73  * Hydr. Depth (ft)       *          *   16.84  *          *
* Conv. Total (cfs)      *1642403.0  * Conv. (cfs)            *          *1642403.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  303.21  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.57  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  * 1589.56  *    5.36  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *  114.93  *    7.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.60  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  744.30  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  726.74  * Flow Area (sq ft)      *          * 6059.89  *          *
* E.G. Slope (ft/ft)     *0.000149  * Area (sq ft)           *          * 6059.89  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  317.03  * Top Width (ft)         *          *  317.03  *          *
* Vel Total (ft/s)       *    4.39  * Avg. Vel. (ft/s)       *          *    4.39  *          *
* Max Chl Dpth (ft)      *   31.30  * Hydr. Depth (ft)       *          *   19.11  *          *
* Conv. Total (cfs)      *2177458.0  * Conv. (cfs)            *          *2177458.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  326.31  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.76  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  * 1949.94  *   36.82  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.79  *  124.05  *   16.89  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	747.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.029	0.041
W.S. Elev (ft)	747.63	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	728.97	Flow Area (sq ft)		7155.45	164.88
E.G. Slope (ft/ft)	0.000160	Area (sq ft)		7155.45	164.88
Q Total (cfs)	34200.00	Flow (cfs)		34143.45	56.55
Top Width (ft)	601.74	Top Width (ft)		347.48	254.26
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)		4.77	0.34
Max Chl Dpth (ft)	34.63	Hydr. Depth (ft)		20.59	0.65
Conv. Total (cfs)	2706398.0	Conv. (cfs)		2701923.0	4474.9
Length Wtd. (ft)	1.00	Wetted Per. (ft)		357.67	254.41
Min Ch El (ft)	713.00	Shear (lb/sq ft)		0.20	0.01
Alpha	1.04	Stream Power (lb/ft s)		0.95	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	50.08	2296.59	95.66
C & E Loss (ft)		Cum SA (acres)	23.81	130.23	33.27

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	752.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.033	0.029	0.041
W.S. Elev (ft)	752.60	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	731.39	Flow Area (sq ft)	60.85	8921.30	1492.33
E.G. Slope (ft/ft)	0.000131	Area (sq ft)	60.85	8921.30	1492.33
Q Total (cfs)	45500.00	Flow (cfs)	20.96	43551.32	1927.72
Top Width (ft)	739.49	Top Width (ft)	111.49	361.00	267.00
Vel Total (ft/s)	4.34	Avg. Vel. (ft/s)	0.34	4.88	1.29
Max Chl Dpth (ft)	39.60	Hydr. Depth (ft)	0.55	24.71	5.59
Conv. Total (cfs)	3972433.0	Conv. (cfs)	1829.8	3802301.0	168302.1
Length Wtd. (ft)	1.00	Wetted Per. (ft)	111.50	371.87	271.86
Min Ch El (ft)	713.00	Shear (lb/sq ft)	0.00	0.20	0.04
Alpha	1.21	Stream Power (lb/ft s)	0.00	0.96	0.06
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	209.07	2808.02	267.76
C & E Loss (ft)	0.02	Cum SA (acres)	92.41	135.25	83.34

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	755.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.033	0.029	0.041
W.S. Elev (ft)	755.48	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	732.84	Flow Area (sq ft)	577.98	9962.44	2994.23
E.G. Slope (ft/ft)	0.000119	Area (sq ft)	577.98	9962.44	2994.23
Q Total (cfs)	54400.00	Flow (cfs)	492.76	49827.25	4079.98
Top Width (ft)	1307.98	Top Width (ft)	252.00	361.00	694.98
Vel Total (ft/s)	4.02	Avg. Vel. (ft/s)	0.85	5.00	1.36
Max Chl Dpth (ft)	42.48	Hydr. Depth (ft)	2.29	27.60	4.31
Conv. Total (cfs)	4989698.0	Conv. (cfs)	45197.5	4570275.0	374225.6
Length Wtd. (ft)	1.00	Wetted Per. (ft)	252.54	371.87	706.30
Min Ch El (ft)	713.00	Shear (lb/sq ft)	0.02	0.20	0.03
Alpha	1.43	Stream Power (lb/ft s)	0.01	0.99	0.04
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	522.29	3168.64	541.39
C & E Loss (ft)	0.01	Cum SA (acres)	146.47	137.09	177.49

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	757.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.033	0.029	0.041

```
* W.S. Elev (ft)         *  757.19  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  734.12  * Flow Area (sq ft)      * 1008.24  *10578.81  * 4200.45  *
* E.G. Slope (ft/ft)     *0.000121  * Area (sq ft)           * 1023.89  *10578.81  * 4290.32  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1248.68  *55453.20  * 6298.11  *
* Top Width (ft)         * 1449.03  * Top Width (ft)         *  268.04  *  361.00  *  819.99  *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)       *    1.24  *    5.24  *    1.50  *
* Max Chl Dpth (ft)      *   44.19  * Hydr. Depth (ft)       *    4.00  *   29.30  *    5.94  *
* Conv. Total (cfs)      *5738627.0  * Conv. (cfs)           *113741.6  *5051194.0  *573690.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  254.25  *  371.87  *  724.86  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.03  *    0.21  *    0.04  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.04  *    1.12  *    0.07  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  775.98  * 3391.86  *  911.79  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  170.12  *  137.23  *  333.11  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.033  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  760.23  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.94  * Flow Area (sq ft)      * 1773.70  *11675.36  * 6348.01  *
* E.G. Slope (ft/ft)     *0.000109  * Area (sq ft)           * 1893.42  *11675.36  * 7035.67  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3015.46  *62057.88  *10826.66  *
* Top Width (ft)         * 1761.10  * Top Width (ft)         *  437.70  *  361.00  *  962.40  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    1.70  *    5.32  *    1.71  *
* Max Chl Dpth (ft)      *   47.23  * Hydr. Depth (ft)       *    7.04  *   32.34  *    8.98  *
* Conv. Total (cfs)      *7281620.0  * Conv. (cfs)           *289294.2  *5953649.0  *1038677.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  257.28  *  371.87  *  737.27  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.05  *    0.21  *    0.06  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.08  *    1.13  *    0.10  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1293.06  * 3736.60  * 1876.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  207.72  *  137.60  *  510.78  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  749.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  749.27  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  730.00  * Flow Area (sq ft)      *          * 7730.54  *  603.09  *
* E.G. Slope (ft/ft)     *0.000155  * Area (sq ft)           *          * 7730.54  *  603.09  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *37834.02  *  465.98  *
* Top Width (ft)         *  619.56  * Top Width (ft)         *          *  352.56  *  267.00  *
* Vel Total (ft/s)       *    4.60  * Avg. Vel. (ft/s)       *          *    4.89  *    0.77  *
* Max Chl Dpth (ft)      *   36.27  * Hydr. Depth (ft)       *          *   21.93  *    2.26  *
* Conv. Total (cfs)      *3080739.0  * Conv. (cfs)           *          *3043258.0  * 37481.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  363.00  *  268.56  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *          *    0.21  *    0.02  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *          *    1.01  *    0.02  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   82.87  * 2473.33  *  140.90  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   38.01  *  132.71  *   43.53  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 4.737

INPUT
Description: Bridge B11.  Truman Road Bridge.  Spacing and width of piers have
```

been adjusted to account for bridge skew. Top of side rail was modeled as top of deck. No plans were available for bridge on left overbank, so photos from the field investigation were used. Bridge deck elevations were taken from aerial mapping, and low chord was approximated. These approximations have very little affect on the results of the model since the water never reaches much of the left overbank.

Distance from Upstream XS = 1
Deck/Roadway Width = 62
Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates
num= 12

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	797	789	95	796.5	788.5	825	792.7	784.7
1495	786	777	1590	784	773	1745	783	772
1840	781	772	1910	780	771	1980	777	768
2050	773	764	2120	770	761	2190.01	767	758

Upstream Bridge Cross Section Data
Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	788	32.91	786	39.16	784	46.28	782	54.59	780
63.93	778	93.24	776	126.71	774	198.47	772	238.6	770
344.19	768	457.65	766	525.81	764	526.09	764	662.38	764
789.6	762	928.09	760	995.27	760	1096.07	760	1102.44	758
1112.88	756	1308	755	1403.55	754	1470.63	752	1491.05	752
1504.59	752	1535.81	752	1543.09	752	1549.37	752	1556.44	752
1562	752	1630	730	1660	727	1702	713	1752	713
1767	718	1802.3	718.5	1830.4	727.9	1862	731	1905	745
1913	747	1923	747.6	1924.18	747	1966.92	746.5	1982.12	746.5
2190	747.7	2190.01	767	2240	764	2282	762	2328	760
2370	758	2431	756	2535	754	2678	752.9	2855	754
3014	756	3155	758	3239.96	760	3243.78	762	3246.92	764
3250.16	766	3253.04	768	3257.08	770	3261.89	772	3266.81	774
3272.18	776	3277.54	778	3282.21	780	3287.04	782	3293.1	784
3345.59	784	3376.4	784	3426.99	784	3431.37	782	3435.95	780
3440.29	778	3445.58	776	3450.98	774	3454.65	772	3460.94	770
3464.53	768	3468.57	766	3475.99	766	3486.24	768	3519.22	770
3525.35	770	3533.67	768	3544.19	766	3569.92	766	3584.5	768
3606.9	770	3627.62	772	3644.38	774	3659.55	776	3676.94	778
3724.92	780	3726.9	782	3728.34	784	3731.4	786	3733.13	788
3735.89	790	3738.12	792	3738.38	794	3741.06	796	3742.45	798
3742.96	800	3750.79	802	3777.18	804	3780.44	806	3783.65	808
3786.28	810	3789.98	812	3793.13	814	3796.08	816	3798.7	818
3800.98	820	3802.03	822	3805.38	824	3808.23	826	3810.13	828
3813.2	830	3815.97	832	3821.62	834	3829.03	836	3835.68	838

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1308	.033	1562	.029	1923	.041

Bank Sta: Left Right Coeff Contr. Expan.
1562 1923 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1310	770	F
2985	3835.68	775	F

Blocked Obstructions num= 7

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
50	463	785	720	800	770	890	937	770
1122.7	1310	770	2195	2510	775	2870	2905	775
3370	3670	784						

Downstream Deck/Roadway Coordinates
num= 12

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	797	789	95	796.5	788.5	825	792.7	784.7
1495	786	777	1590	784	773	1745	783	772
1840	781	772	1910	780	771	1980	777	768
2050	773	764	2120	770	761	2190.01	767	758

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=     125
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     788   32.91     786   39.16     784   46.28     782   54.59     780
   63.93     778   93.24     776  126.71     774  198.47     772   238.6     770
  344.19     768  457.65     766  525.81     764  526.09     764  662.38     764
   789.6     762  928.09     760  995.27     760 1096.07     760 1102.44     758
 1112.88     756    1308     755 1403.55     754 1470.63     752 1491.05     752
 1504.59     752 1535.81     752 1543.09     752 1549.37     752 1556.44     752
    1562     752    1630     730    1660     727    1702     713    1752     713
    1767     718  1802.3   718.5  1830.4   727.9    1862     731    1905     745
    1913     747    1923   747.6 1924.18     747 1966.92   746.5 1982.12   746.5
    2190   747.7 2190.01     767    2240     764    2282     762    2328     760
    2370     758    2431     756    2535     754    2678   752.9    2855     754
    3014     756    3155     758 3239.96     760 3243.78     762 3246.92     764
 3250.16     766 3253.04     768 3257.08     770 3261.89     772 3266.81     774
 3272.18     776 3277.54     778 3282.21     780 3287.04     782  3293.1     784
 3345.59     784  3376.4     784 3426.99     784 3431.37     782 3435.95     780
 3440.29     778 3445.58     776 3450.98     774 3454.65     772 3460.94     770
 3464.53     768 3468.57     766 3475.99     766 3486.24     768 3519.22     770
 3525.35     770 3533.67     768 3544.19     766 3569.92     766  3584.5     768
  3606.9     770 3627.62     772 3644.38     774 3659.55     776 3676.94     778
 3724.92     780  3726.9     782 3728.34     784  3731.4     786 3733.13     788
 3735.89     790 3738.12     792 3738.38     794 3741.06     796 3742.45     798
 3742.96     800 3750.79     802 3777.18     804 3780.44     806 3783.65     808
 3786.28     810 3789.98     812 3793.13     814 3796.08     816  3798.7     818
 3800.98     820 3802.03     822 3805.38     824 3808.23     826 3810.13     828
  3813.2     830 3815.97     832 3821.62     834 3829.03     836 3835.68     838

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
       0    .041    1308    .033    1562    .029    1923    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1562    1923             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1310     770        F
    2985 3835.68     775        F
Blocked Obstructions     num=       7
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
      50     463     785     720     800     770     890     937     770
  1122.7    1310     770    2195    2510     775    2870    2905     775
    3370    3670     784

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  23

Pier Data
Pier Station     Upstream=     165    Downstream=     165
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     255    Downstream=     255
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     345    Downstream=     345
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     435    Downstream=     435
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     525    Downstream=     525
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     615    Downstream=     615
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     705    Downstream=     705
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     795    Downstream=     795
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     885    Downstream=     885
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
```

```
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=     975    Downstream=     975
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=    1065    Downstream=    1065
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=    1155    Downstream=    1155
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=    1245    Downstream=    1245
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=    1335    Downstream=    1335
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream=    1425    Downstream=    1425
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.5     750     4.5     795

Pier Data
Pier Station     Upstream= 1514.75    Downstream= 1514.75
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
```

```
      10     750      10     795
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
      10     750      10     795

Pier Data
Pier Station     Upstream=  1611.7    Downstream=  1611.7
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
      17     730   14.25   773.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
      17     730   14.25   773.5

Pier Data
Pier Station     Upstream=    1746    Downstream=    1746
Upstream     num=        5
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
      37     710      37     725      22   730.5      15  730.51   13.25     772
Downstream     num=        5
    Width   Elev    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*******************************************************************************
      37     710      37     725      22   730.5      15  730.51   13.25     772

Pier Data
Pier Station     Upstream=  1865.5    Downstream=  1865.5
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
      14     730      14     764   12.75  764.01   12.75     772
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
      14     730      14     764   12.75  764.01   12.75     772

Pier Data
Pier Station     Upstream=    1932    Downstream=    1932
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
      14     745      14     771
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
      14     745      14     771

Pier Data
Pier Station     Upstream=    2002    Downstream=    2002
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
      14     745      14     771
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
      14     745      14     771

Pier Data
Pier Station     Upstream=    2072    Downstream=    2072
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
      14     745      14     771
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
      14     745      14     771

Pier Data
Pier Station     Upstream=    2142    Downstream=    2142
Upstream     num=        2
    Width   Elev    Width   Elev
```

```
********************************
      14     745      14     771
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
      14     745      14     771

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =      .5
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =     772

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     736.45  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     736.27  * E.G. Elev (ft)         *     736.50  *     736.50  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     736.22  *     736.22  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     724.91  *     724.91  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.22  *      23.22  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.21  *       4.21  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2966.51  *    2966.51  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   25388.46  *   25388.46  *
* Min El Weir Flow (ft)  *     752.91  * Hydr Depth (ft)        *      12.94  *      12.94  *
* Min El Prs (ft)        *     772.00  * W.P. Total (ft)        *     279.23  *     279.23  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *   734577.3  *   734577.3  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *     229.29  *     229.29  *
* BR Open Area (sq ft)   *   39025.03  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.21  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.19  *       0.19  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.81  *       0.81  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     740.97  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     740.73  * E.G. Elev (ft)         *     741.03  *     741.03  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     740.67  *     740.67  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     727.77  *     727.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.67  *      27.67  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.85  *       4.85  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4023.23  *    4023.23  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   42184.57  *   42184.57  *
* Min El Weir Flow (ft)  *     752.91  * Hydr Depth (ft)        *      16.11  *      16.11  *
* Min El Prs (ft)        *     772.00  * W.P. Total (ft)        *     324.67  *     324.67  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  1103896.0  *  1103896.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     249.77  *     249.77  *
* BR Open Area (sq ft)   *   39025.03  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.85  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.24  *       0.24  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.17  *       1.17  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	744.60	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	744.30	E.G. Elev (ft)	744.67	744.67
Q Total (cfs)	26600.00	W.S. Elev (ft)	744.22	744.22
Q Bridge (cfs)	26600.00	Crit W.S. (ft)	730.28	730.28
Q Weir (cfs)		Max Chl Dpth (ft)	31.22	31.22
Weir Sta Lft (ft)		Vel Total (ft/s)	5.37	5.37
Weir Sta Rgt (ft)		Flow Area (sq ft)	4950.13	4950.13
Weir Submerg		Froude # Chl	0.22	0.22
Weir Max Depth (ft)		Specif Force (cu ft)	59604.43	59604.43
Min El Weir Flow (ft)	752.91	Hydr Depth (ft)	18.20	18.20
Min El Prs (ft)	772.00	W.P. Total (ft)	369.01	369.01
Delta EG (ft)	0.07	Conv. Total (cfs)	1431974.0	1431974.0
Delta WS (ft)	0.08	Top Width (ft)	272.04	272.04
BR Open Area (sq ft)	39025.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.37	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.29	0.29
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.55	1.55

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	747.98	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	747.63	E.G. Elev (ft)	748.05	748.05
Q Total (cfs)	34200.00	W.S. Elev (ft)	747.53	747.53
Q Bridge (cfs)	34200.00	Crit W.S. (ft)	731.90	731.90
Q Weir (cfs)		Max Chl Dpth (ft)	34.53	34.53
Weir Sta Lft (ft)		Vel Total (ft/s)	5.70	5.70
Weir Sta Rgt (ft)		Flow Area (sq ft)	5998.66	5998.66
Weir Submerg		Froude # Chl	0.23	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	79244.05	79244.05
Min El Weir Flow (ft)	752.91	Hydr Depth (ft)	12.43	12.43
Min El Prs (ft)	772.00	W.P. Total (ft)	604.36	604.36
Delta EG (ft)	0.10	Conv. Total (cfs)	1759821.0	1759821.0
Delta WS (ft)	0.10	Top Width (ft)	482.58	482.58
BR Open Area (sq ft)	39025.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.70	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.23	0.23
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.33	1.33

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	752.96	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	752.60	E.G. Elev (ft)	752.94	752.92
Q Total (cfs)	45500.00	W.S. Elev (ft)	752.43	752.41
Q Bridge (cfs)	45500.00	Crit W.S. (ft)	733.86	733.86
Q Weir (cfs)		Max Chl Dpth (ft)	39.43	39.41
Weir Sta Lft (ft)		Vel Total (ft/s)	5.30	5.30
Weir Sta Rgt (ft)		Flow Area (sq ft)	8590.97	8577.83
Weir Submerg		Froude # Chl	0.21	0.21
Weir Max Depth (ft)		Specif Force (cu ft)	116749.60	116579.20
Min El Weir Flow (ft)	752.91	Hydr Depth (ft)	13.77	13.76
Min El Prs (ft)	772.00	W.P. Total (ft)	820.14	819.10
Delta EG (ft)	0.08	Conv. Total (cfs)	2520817.0	2516875.0
Delta WS (ft)	0.09	Top Width (ft)	624.05	623.34
BR Open Area (sq ft)	39025.03	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	5.30	C & E Loss (ft)	0.00	0.05
Coef of Q		Shear Total (lb/sq ft)	0.21	0.21
Br Sel Method	Energy only	Power Total (lb/ft s)	1.13	1.13

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Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     755.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.48  * E.G. Elev (ft)         *     755.83  *     755.81  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     755.33  *     755.31  *
* Q Bridge (cfs)         *   53797.05  * Crit W.S. (ft)         *     735.26  *     735.26  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      42.33  *      42.31  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.84  *       4.85  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   11247.21  *   11224.30  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  146396.10  *  146192.30  *
* Min El Weir Flow (ft)  *     752.91  * Hydr Depth (ft)        *       9.55  *       9.55  *
* Min El Prs (ft)        *     772.00  * W.P. Total (ft)        *    1430.87  *    1428.84  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  3147331.0  *  3142363.0  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *    1177.31  *    1175.76  *
* BR Open Area (sq ft)   *   39025.03  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       5.09  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.15  *       0.15  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.71  *       0.71  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     757.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     757.19  * E.G. Elev (ft)         *     757.56  *     757.54  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     757.05  *     757.03  *
* Q Bridge (cfs)         *   61030.43  * Crit W.S. (ft)         *     736.60  *     736.60  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      44.05  *      44.03  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.73  *       4.74  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   13307.73  *   13283.96  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  168994.10  *  168749.20  *
* Min El Weir Flow (ft)  *     752.91  * Hydr Depth (ft)        *      11.07  *      11.05  *
* Min El Prs (ft)        *     772.00  * W.P. Total (ft)        *    1497.98  *    1497.50  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  3625927.0  *  3620041.0  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *    1319.91  *    1318.41  *
* BR Open Area (sq ft)   *   39025.03  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       5.14  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.17  *       0.17  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.79  *       0.80  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	760.60	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	760.23	E.G. Elev (ft)	760.59	760.57
Q Total (cfs)	75900.00	W.S. Elev (ft)	760.12	760.10
Q Bridge (cfs)	70362.73	Crit W.S. (ft)	738.45	738.45
Q Weir (cfs)		Max Chl Dpth (ft)	47.12	47.10
Weir Sta Lft (ft)		Vel Total (ft/s)	4.48	4.48
Weir Sta Rgt (ft)		Flow Area (sq ft)	16945.39	16924.91
Weir Submerg		Froude # Chl	0.11	0.12
Weir Max Depth (ft)		Specif Force (cu ft)	217024.10	216741.50
Min El Weir Flow (ft)	752.91	Hydr Depth (ft)	14.59	14.58
Min El Prs (ft)	772.00	W.P. Total (ft)	1613.34	1612.94
Delta EG (ft)	0.06	Conv. Total (cfs)	4602231.0	4596142.0
Delta WS (ft)	0.06	Top Width (ft)	1593.03	1593.00
BR Open Area (sq ft)	39025.03	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	4.97	C & E Loss (ft)	0.00	0.03
Coef of Q		Shear Total (lb/sq ft)	0.18	0.18
Br Sel Method	Energy only	Power Total (lb/ft s)	0.80	0.80

Warning: The pure energy/weir calculations did not converge within the given number of iterations.
Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	749.64	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	749.27	E.G. Elev (ft)	749.71	749.71
Q Total (cfs)	38300.00	W.S. Elev (ft)	749.18	749.18
Q Bridge (cfs)	38300.00	Crit W.S. (ft)	732.65	732.65
Q Weir (cfs)		Max Chl Dpth (ft)	36.17	36.17
Weir Sta Lft (ft)		Vel Total (ft/s)	5.59	5.59
Weir Sta Rgt (ft)		Flow Area (sq ft)	6847.64	6847.64
Weir Submerg		Froude # Chl	0.23	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	90637.45	90637.45
Min El Weir Flow (ft)	752.91	Hydr Depth (ft)	13.19	13.19
Min El Prs (ft)	772.00	W.P. Total (ft)	665.77	665.77
Delta EG (ft)	0.09	Conv. Total (cfs)	1989571.0	1989571.0
Delta WS (ft)	0.09	Top Width (ft)	519.27	519.27
BR Open Area (sq ft)	39025.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.59	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.24	0.24
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.33	1.33

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 4.731

INPUT
Description: COE River Station= 42871.81
Preliminary Model River Station
(miles)=4.71

Truman Rd. B11 (downstream). Top of side rail
modeled as top of bridge.Obstructions are buildings except on the
far right where no flow is assumed beyond I-435 embankment. Pier
width increased due to bridge skew. Under-water taken from bridge
plans. Bridge deck over left overbank taken from spot elevations
on mapping. Low chord elevation estimated over left bank

Piers in
left overbank were measured in the field.

Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	788	32.91	786	39.16	784	46.28	782	54.59	780
63.93	778	93.24	776	126.71	774	198.47	772	238.6	770
344.19	768	457.65	766	525.81	764	526.09	764	662.38	764
789.6	762	928.09	760	995.27	760	1096.07	760	1102.44	758
1112.88	756	1308	755	1403.55	754	1470.63	752	1491.05	752
1504.59	752	1535.81	752	1543.09	752	1549.37	752	1556.44	752
1562	752	1630	730	1660	727	1702	713	1752	713
1767	718	1802.3	718.5	1830.4	727.9	1862	731	1905	745
1913	747	1923	747.6	1924.18	747	1966.92	746.5	1982.12	746.5
2190	747.7	2190.01	767	2240	764	2282	762	2328	760
2370	758	2431	756	2535	754	2678	752.9	2855	754
3014	756	3155	758	3239.96	760	3243.78	762	3246.92	764
3250.16	766	3253.04	768	3257.08	770	3261.89	772	3266.81	774
3272.18	776	3277.54	778	3282.21	780	3287.04	782	3293.1	784
3345.59	784	3376.4	784	3426.99	784	3431.37	782	3435.95	780
3440.29	778	3445.58	776	3450.98	774	3454.65	772	3460.94	770
3464.53	768	3468.57	766	3475.99	766	3486.24	768	3519.22	770
3525.35	770	3533.67	768	3544.19	766	3569.92	766	3584.5	768
3606.9	770	3627.62	772	3644.38	774	3659.55	776	3676.94	778
3724.92	780	3726.9	782	3728.34	784	3731.4	786	3733.13	788
3735.89	790	3738.12	792	3738.38	794	3741.06	796	3742.45	798
3742.96	800	3750.79	802	3777.18	804	3780.44	806	3783.65	808
3786.28	810	3789.98	812	3793.13	814	3796.08	816	3798.7	818
3800.98	820	3802.03	822	3805.38	824	3808.23	826	3810.13	828
3813.2	830	3815.97	832	3821.62	834	3829.03	836	3835.68	838

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1308	.033	1562	.029	1923	.041

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1562	1923	570	409	250	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1310	770	F
2985	3835.68	775	F

Blocked Obstructions num= 7

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
50	463	785	720	800	770	890	937	770
1122.7	1310	770	2195	2510	775	2870	2905	775
3370	3670	784						

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	736.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.029	
W.S. Elev (ft)	736.22	Reach Len. (ft)	570.00	409.00	250.00
Crit W.S. (ft)	722.44	Flow Area (sq ft)		3701.71	
E.G. Slope (ft/ft)	0.000135	Area (sq ft)		3701.71	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	267.29	Top Width (ft)		267.29	
Vel Total (ft/s)	3.38	Avg. Vel. (ft/s)		3.38	
Max Chl Dpth (ft)	23.22	Hydr. Depth (ft)		13.85	
Conv. Total (cfs)	1075841.0	Conv. (cfs)		1075841.0	
Length Wtd. (ft)	409.00	Wetted Per. (ft)		274.02	
Min Ch El (ft)	713.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.38	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		1159.94	
C & E Loss (ft)	0.01	Cum SA (acres)		100.59	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	740.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.029	
W.S. Elev (ft)	740.67	Reach Len. (ft)	570.00	409.00	250.00

```
* Crit W.S. (ft)         *  724.76  * Flow Area (sq ft)      *          * 4950.29  *          *
* E.G. Slope (ft/ft)     *0.000142  * Area (sq ft)           *          * 4950.29  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  294.67  * Top Width (ft)         *          *  294.67  *          *
* Vel Total (ft/s)       *    3.94  * Avg. Vel. (ft/s)       *          *    3.94  *          *
* Max Chl Dpth (ft)      *   27.67  * Hydr. Depth (ft)       *          *   16.80  *          *
* Conv. Total (cfs)      *1633818.0  * Conv. (cfs)            *          *1633818.0  *          *
* Length Wtd. (ft)       *  409.00  * Wetted Per. (ft)       *          *  302.81  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.57  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    1.44  * 1583.63  *    5.36  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *  114.56  *    7.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.52  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  744.22  * Reach Len. (ft)        *  570.00  *  409.00  *  250.00  *
* Crit W.S. (ft)         *  726.74  * Flow Area (sq ft)      *          * 6036.03  *          *
* E.G. Slope (ft/ft)     *0.000151  * Area (sq ft)           *          * 6036.03  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  316.56  * Top Width (ft)         *          *  316.56  *          *
* Vel Total (ft/s)       *    4.41  * Avg. Vel. (ft/s)       *          *    4.41  *          *
* Max Chl Dpth (ft)      *   31.22  * Hydr. Depth (ft)       *          *   19.07  *          *
* Conv. Total (cfs)      *2165347.0  * Conv. (cfs)            *          *2165347.0  *          *
* Length Wtd. (ft)       *  409.00  * Wetted Per. (ft)       *          *  325.82  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.77  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   14.56  * 1942.65  *   36.82  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.79  *  123.65  *   16.89  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.88  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  747.53  * Reach Len. (ft)        *  570.00  *  409.00  *  250.00  *
* Crit W.S. (ft)         *  728.97  * Flow Area (sq ft)      *          * 7120.79  *  140.34  *
* E.G. Slope (ft/ft)     *0.000161  * Area (sq ft)           *          * 7120.79  *  140.34  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34154.42  *   45.58  *
* Top Width (ft)         *  582.76  * Top Width (ft)         *          *  345.95  *  236.81  *
* Vel Total (ft/s)       *    4.71  * Avg. Vel. (ft/s)       *          *    4.80  *    0.32  *
* Max Chl Dpth (ft)      *   34.53  * Hydr. Depth (ft)       *          *   20.58  *    0.59  *
* Conv. Total (cfs)      *2691508.0  * Conv. (cfs)            *          *2687921.0  *  3587.3  *
* Length Wtd. (ft)       *  408.38  * Wetted Per. (ft)       *          *  356.12  *  236.94  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *          *    0.20  *    0.01  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *          *    0.97  *    0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   50.08  * 2287.91  *   95.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.81  *  129.78  *   33.00  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.87  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.033  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  752.51  * Reach Len. (ft)        *  570.00  *  409.00  *  250.00  *
* Crit W.S. (ft)         *  731.39  * Flow Area (sq ft)      *   51.43  * 8890.39  * 1469.46  *
* E.G. Slope (ft/ft)     *0.000133  * Area (sq ft)           *   51.43  * 8890.39  * 1469.46  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   16.22  *43592.35  * 1891.43  *
* Top Width (ft)         *  736.62  * Top Width (ft)         *  108.62  *  361.00  *  267.00  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    0.32  *    4.90  *    1.29  *
* Max Chl Dpth (ft)      *   39.51  * Hydr. Depth (ft)       *    0.47  *   24.63  *    5.50  *
* Conv. Total (cfs)      *3945801.0  * Conv. (cfs)            *  1406.5  *3780368.0  *164026.5  *
* Length Wtd. (ft)       *  401.72  * Wetted Per. (ft)       *  108.63  *  371.87  *  271.86  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.00  *    0.20  *    0.04  *
```

```
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.00  *    0.97  *    0.06  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  209.01  * 2797.10  *  266.08  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   92.27  *  134.78  *   83.03  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  755.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.033  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  755.41  * Reach Len. (ft)        *  570.00  *  409.00  *  250.00  *
* Crit W.S. (ft)         *  732.84  * Flow Area (sq ft)      *  558.41  * 9934.42  * 2940.51  *
* E.G. Slope (ft/ft)     *0.000120  * Area (sq ft)           *  558.41  * 9934.42  * 2940.51  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  468.32  *49907.34  * 4024.34  *
* Top Width (ft)         * 1301.81  * Top Width (ft)         *  252.00  *  361.00  *  688.81  *
* Vel Total (ft/s)       *    4.05  * Avg. Vel. (ft/s)       *    0.84  *    5.02  *    1.37  *
* Max Chl Dpth (ft)      *   42.41  * Hydr. Depth (ft)       *    2.22  *   27.52  *    4.27  *
* Conv. Total (cfs)      *4958355.0  * Conv. (cfs)            * 42685.3  *4548866.0  *366803.0  *
* Length Wtd. (ft)       *  396.70  * Wetted Per. (ft)       *  252.46  *  371.87  *  699.42  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.02  *    0.20  *    0.03  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    0.01  *    1.01  *    0.04  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  521.57  * 3156.37  *  537.83  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  146.13  *  136.62  *  176.57  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.033  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  757.12  * Reach Len. (ft)        *  570.00  *  409.00  *  250.00  *
* Crit W.S. (ft)         *  734.12  * Flow Area (sq ft)      *  989.52  *10552.00  * 4147.94  *
* E.G. Slope (ft/ft)     *0.000122  * Area (sq ft)           * 1004.00  *10552.00  * 4229.61  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1217.86  *55553.88  * 6228.27  *
* Top Width (ft)         * 1443.41  * Top Width (ft)         *  267.65  *  361.00  *  814.76  *
* Vel Total (ft/s)       *    4.02  * Avg. Vel. (ft/s)       *    1.23  *    5.26  *    1.50  *
* Max Chl Dpth (ft)      *   44.12  * Hydr. Depth (ft)       *    3.93  *   29.23  *    5.87  *
* Conv. Total (cfs)      *5704049.0  * Conv. (cfs)            *110265.4  *5029873.0  *563910.1  *
* Length Wtd. (ft)       *  393.71  * Wetted Per. (ft)       *  254.17  *  371.87  *  724.64  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.03  *    0.22  *    0.04  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.04  *    1.14  *    0.07  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  774.65  * 3378.78  *  906.49  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  169.75  *  136.76  *  332.00  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.033  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  760.17  * Reach Len. (ft)        *  570.00  *  409.00  *  250.00  *
* Crit W.S. (ft)         *  735.94  * Flow Area (sq ft)      * 1758.51  *11653.59  * 6305.38  *
* E.G. Slope (ft/ft)     *0.000110  * Area (sq ft)           * 1867.03  *11653.59  * 6977.63  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2986.25  *62141.12  *10772.63  *
* Top Width (ft)         * 1760.99  * Top Width (ft)         *  437.70  *  361.00  *  962.29  *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)       *    1.70  *    5.33  *    1.71  *
* Max Chl Dpth (ft)      *   47.17  * Hydr. Depth (ft)       *    6.98  *   32.28  *    8.92  *
* Conv. Total (cfs)      *7249283.0  * Conv. (cfs)            *285219.7  *5935159.0  *1028904.0  *
* Length Wtd. (ft)       *  389.07  * Wetted Per. (ft)       *  257.22  *  371.87  *  736.62  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.05  *    0.21  *    0.06  *
* Alpha                  *    1.61  * Stream Power (lb/ft s) *    0.08  *    1.14  *    0.10  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   * 1290.55  * 3722.09  * 1867.51  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  207.12  *  137.13  *  509.51  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	749.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.029	0.041
W.S. Elev (ft)	749.18	Reach Len. (ft)	570.00	409.00	250.00
Crit W.S. (ft)	730.00	Flow Area (sq ft)		7697.24	577.86
E.G. Slope (ft/ft)	0.000157	Area (sq ft)		7697.24	577.86
Q Total (cfs)	38300.00	Flow (cfs)		37862.84	437.16
Top Width (ft)	619.27	Top Width (ft)		352.27	267.00
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)		4.92	0.76
Max Chl Dpth (ft)	36.17	Hydr. Depth (ft)		21.85	2.16
Conv. Total (cfs)	3058052.0	Conv. (cfs)		3023147.0	34905.2
Length Wtd. (ft)	406.98	Wetted Per. (ft)		362.70	268.56
Min Ch El (ft)	713.00	Shear (lb/sq ft)		0.21	0.02
Alpha	1.12	Stream Power (lb/ft s)		1.02	0.02
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	82.87	2463.90	140.22
C & E Loss (ft)	0.01	Cum SA (acres)	38.01	132.25	43.22

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 4.653

INPUT
Description: COE River Station= 43280.86
Preliminary Model River Station
(miles)=4.64

Obstructions are buildings except on the far right
where no flow is assumed beyond I-435 embankment. Ineffective
flow on left is a corridor with high ground dowsntream which will
block the water.

Station Elevation Data num= 116

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	772	54.34	770	118.41	768	268.44	766	362.99	764
476.92	762	492.53	762	530.33	762	596.01	760	630.82	760
635.29	762	708.17	764	914.92	764	1175.88	762	1375	759
1413.28	756	1428.63	754	1495	753.5	1733.55	752	1754.49	750
1760.27	748	1767.56	746	1773.31	744	1779.32	742	1786.37	740
1793.96	738	1816.34	736	1827.56	734	1833.82	732	1840.23	730
1846.87	728	1851.85	726	1858.3	724	1885.66	714.88	1960.16	714.88
1987.52	724	1993.88	726	2000.86	728	2005.33	730	2012.41	732
2018.52	734	2056.02	736	2059.92	738	2066.73	740	2071.84	742
2081.98	744	2185.5	746	2232.66	748	2256.55	748	2269.15	748
2379.42	750	2451.28	752	2688.78	752	2806.29	752	2900.29	754
3029.81	754	3114.09	754	3128.29	756	3190.59	756	3206.24	754
3208.98	754	3217.05	756	3226.93	758	3234.72	760	3239.65	762
3245.96	764	3251.05	766	3254.22	768	3259.43	770	3264.58	772
3269.51	774	3273.74	776	3277.45	778	3338.81	778	3349.59	778
3396.74	780	3406	780	3415.31	778	3421.86	776	3440.62	776
3461.73	776	3468.43	774	3475.29	772	3481.81	770	3506.27	770
3518.23	772	3531.37	774	3557.98	774	3574.18	774	3579.99	776
3587.5	778	3593.8	780	3601.91	782	3609.15	784	3616.77	786
3620.59	788	3622.56	790	3627.5	792	3631.98	794	3634.73	796
3638.58	798	3642.62	800	3647.52	802	3651.35	804	3658.44	806
3662.54	808	3667.35	810	3672.45	812	3676.76	814	3681.34	816
3701.37	824	3705.81	826	3726.61	834	3730.95	836	3757.07	844
3855.54	846								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1375	.03	1495	.041	1733.55	.029	2081.98	.041
2451.28	.07	3114.09	.041						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1733.55	2081.98	600	701	600	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent

```
       0     685     780       F
    2383    2580     780       F
    3100    3300     780       F
Blocked Obstructions      num=       4
   Sta L    Sta R     Elev   Sta L    Sta R    Elev   Sta L    Sta R    Elev
*************************************************************************
       0  231.75     780     685    1375     780 1492.83  1699.5     780
    3400    3590     780

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)          *  736.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.28  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)          *  736.04  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)          *  723.35  * Flow Area (sq ft)      *          * 2969.84  *          *
* E.G. Slope (ft/ft)      *0.000245  * Area (sq ft)           *          * 2969.84  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  240.26  * Top Width (ft)         *          *  240.26  *          *
* Vel Total (ft/s)        *    4.21  * Avg. Vel. (ft/s)       *          *    4.21  *          *
* Max Chl Dpth (ft)       *   21.16  * Hydr. Depth (ft)       *          *   12.36  *          *
* Conv. Total (cfs)       *799341.6  * Conv. (cfs)            *          *799341.6  *          *
* Length Wtd. (ft)        *  701.00  * Wetted Per. (ft)       *          *  246.68  *          *
* Min Ch El (ft)          *  714.88  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.77  *          *
* Frctn Loss (ft)         *    0.15  * Cum Volume (acre-ft)   *          * 1128.62  *          *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *          *   98.21  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)          *  740.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.34  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)          *  740.48  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)          *  725.91  * Flow Area (sq ft)      *          * 4146.71  *          *
* E.G. Slope (ft/ft)      *0.000244  * Area (sq ft)           *          * 4146.71  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)          *  283.28  * Top Width (ft)         *          *  283.28  *          *
* Vel Total (ft/s)        *    4.70  * Avg. Vel. (ft/s)       *          *    4.70  *          *
* Max Chl Dpth (ft)       *   25.60  * Hydr. Depth (ft)       *          *   14.64  *          *
* Conv. Total (cfs)       *1248949.0  * Conv. (cfs)            *          *1248949.0  *          *
* Length Wtd. (ft)        *  701.00  * Wetted Per. (ft)       *          *  290.96  *          *
* Min Ch El (ft)          *  714.88  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.02  *          *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)   *    1.44  * 1540.92  *    5.36  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    2.27  *  111.85  *    7.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)          *  744.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.41  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)          *  744.03  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)          *  728.05  * Flow Area (sq ft)      *          * 5193.86  *    0.02  *
* E.G. Slope (ft/ft)      *0.000241  * Area (sq ft)           *          * 5193.86  *    0.02  *
* Q Total (cfs)           *26600.00  * Flow (cfs)             *          *26600.00  *    0.00  *
* Top Width (ft)          *  310.20  * Top Width (ft)         *          *  308.75  *    1.45  *
* Vel Total (ft/s)        *    5.12  * Avg. Vel. (ft/s)       *          *    5.12  *    0.03  *
* Max Chl Dpth (ft)       *   29.15  * Hydr. Depth (ft)       *          *   16.82  *    0.01  *
* Conv. Total (cfs)       *1715130.0  * Conv. (cfs)            *          *1715130.0  *     0.0  *
* Length Wtd. (ft)        *  701.00  * Wetted Per. (ft)       *          *  317.45  *    1.45  *
* Min Ch El (ft)          *  714.88  * Shear (lb/sq ft)       *          *    0.25  *    0.00  *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.26  *    0.00  *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)   *   14.56  * 1889.92  *   36.82  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    8.79  *  120.71  *   16.88  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)          *  747.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.46  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)          *  747.34  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)          *  730.01  * Flow Area (sq ft)      *          * 6232.09  *  263.06  *
* E.G. Slope (ft/ft)      *0.000224  * Area (sq ft)           *          * 6232.09  *  263.06  *
* Q Total (cfs)           *34200.00  * Flow (cfs)             *          *33977.63  *  222.37  *
* Top Width (ft)          *  454.35  * Top Width (ft)         *          *  319.29  *  135.06  *
* Vel Total (ft/s)        *    5.27  * Avg. Vel. (ft/s)       *          *    5.45  *    0.85  *
* Max Chl Dpth (ft)       *   32.46  * Hydr. Depth (ft)       *          *   19.52  *    1.95  *
* Conv. Total (cfs)       *2286240.0  * Conv. (cfs)           *          *2271374.0  * 14865.5  *
* Length Wtd. (ft)        *  700.67  * Wetted Per. (ft)       *          *  328.51  *  135.10  *
* Min Ch El (ft)          *  714.88  * Shear (lb/sq ft)       *          *    0.27  *    0.03  *
* Alpha                   *    1.07  * Stream Power (lb/ft s) *          *    1.44  *    0.02  *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)   *   50.08  * 2225.22  *   94.34  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   23.81  *  126.66  *   31.93  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  752.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)          *  752.36  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)          *  732.64  * Flow Area (sq ft)      *    8.57  * 7894.62  * 1636.46  *
* E.G. Slope (ft/ft)      *0.000185  * Area (sq ft)           *    8.57  * 7894.62  * 1772.04  *
* Q Total (cfs)           *45500.00  * Flow (cfs)             *    1.68  *43205.45  * 2292.88  *
* Top Width (ft)          * 1123.66  * Top Width (ft)         *   34.05  *  348.43  *  741.18  *
* Vel Total (ft/s)        *    4.77  * Avg. Vel. (ft/s)       *    0.20  *    5.47  *    1.40  *
* Max Chl Dpth (ft)       *   37.48  * Hydr. Depth (ft)       *    0.25  *   22.66  *    3.01  *
* Conv. Total (cfs)       *3348886.0  * Conv. (cfs)           *   123.6  *3180002.0  *168759.9  *
* Length Wtd. (ft)        *  698.08  * Wetted Per. (ft)       *   34.20  *  358.16  *  544.26  *
* Min Ch El (ft)          *  714.88  * Shear (lb/sq ft)       *    0.00  *    0.25  *    0.03  *
* Alpha                   *    1.25  * Stream Power (lb/ft s) *    0.00  *    1.39  *    0.05  *
* Frctn Loss (ft)         *    0.13  * Cum Volume (acre-ft)   *  208.62  * 2718.30  *  256.78  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   91.33  *  131.45  *   80.14  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  755.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.43  * Wt. n-Val.             *   0.036  *   0.029  *   0.044  *
* W.S. Elev (ft)          *  755.28  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)          *  734.76  * Flow Area (sq ft)      *  211.63  * 8911.16  * 3640.74  *
* E.G. Slope (ft/ft)      *0.000160  * Area (sq ft)           *  211.63  * 8911.16  * 4387.98  *
* Q Total (cfs)           *54400.00  * Flow (cfs)             *  180.66  *49170.52  * 5048.82  *
* Top Width (ft)          * 1515.53  * Top Width (ft)         *  108.05  *  348.43  * 1059.05  *
* Vel Total (ft/s)        *    4.26  * Avg. Vel. (ft/s)       *    0.85  *    5.52  *    1.39  *
* Max Chl Dpth (ft)       *   40.40  * Hydr. Depth (ft)       *    1.96  *   25.58  *    4.43  *
* Conv. Total (cfs)       *4305199.0  * Conv. (cfs)           * 14297.2  *3891340.0  *399562.0  *
* Length Wtd. (ft)        *  694.47  * Wetted Per. (ft)       *  112.95  *  358.16  *  821.12  *
* Min Ch El (ft)          *  714.88  * Shear (lb/sq ft)       *    0.02  *    0.25  *    0.04  *
* Alpha                   *    1.52  * Stream Power (lb/ft s) *    0.02  *    1.37  *    0.06  *
* Frctn Loss (ft)         *    0.11  * Cum Volume (acre-ft)   *  516.53  * 3067.89  *  516.80  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *  143.77  *  133.29  *  171.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  757.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.46  * Wt. n-Val.             *   0.035  *   0.029  *   0.046  *
* W.S. Elev (ft)          *  756.98  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)          *  736.71  * Flow Area (sq ft)      *  409.61  * 9505.64  * 5041.54  *
* E.G. Slope (ft/ft)      *0.000161  * Area (sq ft)           *  409.61  * 9505.64  * 6276.95  *
* Q Total (cfs)           *63000.00  * Flow (cfs)             *  485.76  *54903.77  * 7610.48  *
* Top Width (ft)          * 1614.49  * Top Width (ft)         *  126.14  *  348.43  * 1139.92  *
* Vel Total (ft/s)        *    4.21  * Avg. Vel. (ft/s)       *    1.19  *    5.78  *    1.51  *
```

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* Max Chl Dpth (ft)      *   42.10  * Hydr. Depth (ft)       *    3.25  *   27.28  *    6.14  *
* Conv. Total (cfs)      *4972592.0  * Conv. (cfs)            * 38341.0  *4333556.0  *600695.1  *
* Length Wtd. (ft)       *  691.60  * Wetted Per. (ft)       *  134.54  *  358.16  *  821.12  *
* Min Ch El (ft)         *  714.88  * Shear (lb/sq ft)       *    0.03  *    0.27  *    0.06  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *    0.04  *    1.54  *    0.09  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  765.40  * 3284.62  *  876.34  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  167.17  *  133.43  *  326.39  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  760.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.              *   0.033  *   0.029  *   0.049  *
* W.S. Elev (ft)         *  760.04  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)         *  738.68  * Flow Area (sq ft)      *  848.04  *10571.03  * 7551.96  *
* E.G. Slope (ft/ft)     *0.000143  * Area (sq ft)           *  849.47  *10571.03  * 9783.39  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              * 1353.32  *61902.13  *12644.55  *
* Top Width (ft)         * 1689.37  * Top Width (ft)         *  188.10  *  348.43  * 1152.84  *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *    1.60  *    5.86  *    1.67  *
* Max Chl Dpth (ft)      *   45.16  * Hydr. Depth (ft)       *    5.58  *   30.34  *    9.20  *
* Conv. Total (cfs)      *6342694.0  * Conv. (cfs)            *113092.4  *5172942.0  *1056660.0  *
* Length Wtd. (ft)       *  686.34  * Wetted Per. (ft)       *  167.52  *  358.16  *  821.12  *
* Min Ch El (ft)         *  714.88  * Shear (lb/sq ft)       *    0.05  *    0.26  *    0.08  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.07  *    1.55  *    0.14  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1272.78  * 3617.75  * 1819.41  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  203.03  *  133.80  *  503.44  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  749.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.              *         *   0.029  *   0.041  *
* W.S. Elev (ft)         *  748.98  * Reach Len. (ft)        *  600.00  *  701.00  *  600.00  *
* Crit W.S. (ft)         *  731.02  * Flow Area (sq ft)      *          * 6762.38  *  568.56  *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           *          * 6762.38  *  568.56  *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *37764.92  *  535.08  *
* Top Width (ft)         *  565.97  * Top Width (ft)         *          *  324.55  *  241.42  *
* Vel Total (ft/s)       *    5.22  * Avg. Vel. (ft/s)       *          *    5.58  *    0.94  *
* Max Chl Dpth (ft)      *   34.10  * Hydr. Depth (ft)       *          *   20.84  *    2.36  *
* Conv. Total (cfs)      *2610296.0  * Conv. (cfs)            *          *2573828.0  * 36467.8  *
* Length Wtd. (ft)       *  700.28  * Wetted Per. (ft)       *          *  334.02  *  241.49  *
* Min Ch El (ft)         *  714.88  * Shear (lb/sq ft)       *          *    0.27  *    0.03  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *          *    1.52  *    0.03  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *   82.87  * 2396.02  *  136.93  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   38.01  *  129.08  *   41.76  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 4.521

INPUT
Description: COE River Station= 43982.02
Preliminary Model River Station
             (miles)=4.51

Obstructions are buildings except on the far
             right where no flow is assumed beyond I-435 embankment.
             Ineffective flow on left is a corridor with high ground dowsntream
             which will block the water.
Station Elevation Data    num=     114
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
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```
       0     772   37.42     770    73.4     768  146.15     766  268.55     764
  420.04     762  462.32     760  470.49     760  516.12     760  691.47     758
 1035.75     760 1073.65     760 1100.44     760 1242.64     760 1277.23     760
    1450     755 1471.38     754 1536.68     752 1558.22     752 1569.78     754
    1580     754 2111.04     750 2240.35     748 2254.31     748 2292.42     746
 2303.55     744 2314.31     742 2323.12     740 2334.37     738 2343.87     736
 2355.21     734 2366.59     732 2378.01     730 2390.32     728 2394.64     726
 2399.36     724  2407.1     722 2429.33  714.59 2509.43  714.59 2531.66     722
  2537.6     724 2544.07     726 2550.64     728 2558.04     730 2567.96     732
 2578.34     734 2594.94     736 2605.58     738 2612.57     740 2619.83     742
 2627.91     744 2636.56     746 2644.35     748  2658.3     750 2666.11     752
    2679     752 2693.25     750  2703.3     748 2714.74     748 2741.22     750
 2795.45     752 2899.11     754 3137.78     754 3180.71     754 3191.79     756
 3216.96     758 3227.47     758 3248.77     756 3249.77     756 3266.73     758
 3304.83     758 3318.77     758  3322.5     760  3326.8     762 3331.05     764
 3335.36     766 3341.75     768 3345.01     770 3396.59     770 3431.53     770
 3466.14     770 3499.08     768 3509.13     766  3520.4     764 3530.06     762
 3544.03     762  3553.2     764 3562.08     766 3572.34     768 3581.87     770
 3604.93     772 3612.62     774 3620.84     776 3628.77     778 3637.32     780
  3646.7     782 3658.24     784 3734.26     784 3834.03     782 3872.46     782
 3882.32     784 3884.57     786 3887.61     786 3889.87     784  3934.1     784
  3944.1     786  3955.8     788 3965.44     790 3974.32     792 3979.33     794
 3984.04     796 3992.77     798 3996.35     800 4005.73     802

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041    1450    .055    1580    .041 2111.04      .2 2240.35    .041
 2254.31    .029 2666.11    .041 2795.45     .07 3191.79    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2254.31 2666.11              107     289     321              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0     551     775       F
Blocked Obstructions     num=       7
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
       0   154.5     780     551 1451.79     775    1470    1570     754
    1580  1987.9     775    2680    2800     752    3228    3267     758
    3460    3580     770

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  735.92  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  722.79  * Flow Area (sq ft)      *          * 3218.86  *          *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           *          * 3218.86  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  249.95  * Top Width (ft)         *          *  249.95  *          *
* Vel Total (ft/s)       *    3.88  * Avg. Vel. (ft/s)       *          *    3.88  *          *
* Max Chl Dpth (ft)      *   21.33  * Hydr. Depth (ft)       *          *   12.88  *          *
* Conv. Total (cfs)      *892200.3  * Conv. (cfs)            *          *892200.3  *          *
* Length Wtd. (ft)       *  289.00  * Wetted Per. (ft)       *          *  255.83  *          *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.60  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          * 1078.82  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *   94.27  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  740.35  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  725.24  * Flow Area (sq ft)      *          * 4424.93  *          *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           *          * 4424.93  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  292.30  * Top Width (ft)         *          *  292.30  *          *
* Vel Total (ft/s)       *    4.41  * Avg. Vel. (ft/s)       *          *    4.41  *          *
* Max Chl Dpth (ft)      *   25.76  * Hydr. Depth (ft)       *          *   15.14  *          *
* Conv. Total (cfs)      *1366264.0  * Conv. (cfs)            *          *1366264.0  *          *
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* Length Wtd. (ft)       *  289.00  * Wetted Per. (ft)       *           *  299.13  *           *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *           *    0.19  *           *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    0.83  *           *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *    1.44  * 1471.95  *    5.36  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *  107.22  *    7.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.              *          *    0.029  *          *
* W.S. Elev (ft)         *  743.90  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  727.33  * Flow Area (sq ft)      *          * 5515.49  *          *
* E.G. Slope (ft/ft)     *0.000208  * Area (sq ft)           *          * 5515.49  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  323.45  * Top Width (ft)         *          *  323.45  *          *
* Vel Total (ft/s)       *    4.82  * Avg. Vel. (ft/s)       *          *    4.82  *          *
* Max Chl Dpth (ft)      *   29.31  * Hydr. Depth (ft)       *          *   17.05  *          *
* Conv. Total (cfs)      *1843309.0  * Conv. (cfs)            *          *1843309.0  *          *
* Length Wtd. (ft)       *  289.00  * Wetted Per. (ft)       *          *  331.10  *          *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.04  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   14.56  * 1803.75  *   36.82  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.79  *  115.62  *   16.87  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.              *          *   0.029  *          *
* W.S. Elev (ft)         *  747.21  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  729.39  * Flow Area (sq ft)      *          * 6650.23  *          *
* E.G. Slope (ft/ft)     *0.000222  * Area (sq ft)           *          * 6650.23  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  372.02  * Top Width (ft)         *          *  372.02  *          *
* Vel Total (ft/s)       *    5.14  * Avg. Vel. (ft/s)       *          *    5.14  *          *
* Max Chl Dpth (ft)      *   32.62  * Hydr. Depth (ft)       *          *   17.88  *          *
* Conv. Total (cfs)      *2295738.0  * Conv. (cfs)            *          *2295738.0  *          *
* Length Wtd. (ft)       *  289.00  * Wetted Per. (ft)       *          *  380.28  *          *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.25  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   50.08  * 2121.57  *   92.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   23.81  *  121.10  *   31.00  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *   0.086  *   0.029  *   0.042  *
* W.S. Elev (ft)         *  752.25  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  732.07  * Flow Area (sq ft)      *  698.78  * 8660.99  *   33.62  *
* E.G. Slope (ft/ft)     *0.000184  * Area (sq ft)           *  698.78  * 8660.99  *   33.62  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  326.44  *45167.25  *    6.31  *
* Top Width (ft)         *  820.36  * Top Width (ft)         *  266.41  *  411.80  *  142.15  *
* Vel Total (ft/s)       *    4.84  * Avg. Vel. (ft/s)       *    0.47  *    5.22  *    0.19  *
* Max Chl Dpth (ft)      *   37.66  * Hydr. Depth (ft)       *    2.62  *   21.03  *    0.24  *
* Conv. Total (cfs)      *3358680.0  * Conv. (cfs)            * 24096.5  *3334118.0  *   465.9  *
* Length Wtd. (ft)       *  288.43  * Wetted Per. (ft)       *  267.75  *  420.57  *  142.30  *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *    0.03  *    0.24  *    0.00  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *    0.01  *    1.23  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  203.75  * 2585.09  *  244.34  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   89.26  *  125.34  *   74.06  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  755.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.075  *   0.029  *   0.050  *
* W.S. Elev (ft)         *  755.17  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  733.86  * Flow Area (sq ft)      * 1617.30  * 9863.39  *  966.72  *
* E.G. Slope (ft/ft)     *0.000161  * Area (sq ft)           * 1617.30  * 9863.39  *  966.72  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1206.95  *52596.70  *  596.35  *
* Top Width (ft)         * 1327.49  * Top Width (ft)         *  394.62  *  411.80  *  521.06  *
* Vel Total (ft/s)       *    4.37  * Avg. Vel. (ft/s)       *    0.75  *    5.33  *    0.62  *
* Max Chl Dpth (ft)      *   40.58  * Hydr. Depth (ft)       *    4.10  *   23.95  *    1.86  *
* Conv. Total (cfs)      *4282716.0  * Conv. (cfs)           * 95018.6  *4140748.0  * 46948.5  *
* Length Wtd. (ft)       *  286.08  * Wetted Per. (ft)       *  400.32  *  420.57  *  521.34  *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *    0.04  *    0.24  *    0.02  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.03  *    1.26  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  503.93  * 2916.83  *  479.92  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  140.31  *  127.17  *  160.67  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  757.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.072  *   0.029  *   0.054  *
* W.S. Elev (ft)         *  756.86  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  735.49  * Flow Area (sq ft)      * 2286.43  *10561.64  * 1860.83  *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           * 2286.43  *10561.64  * 1860.83  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2087.35  *59367.32  * 1545.33  *
* Top Width (ft)         * 1342.96  * Top Width (ft)         *  394.62  *  411.80  *  536.54  *
* Vel Total (ft/s)       *    4.28  * Avg. Vel. (ft/s)       *    0.91  *    5.62  *    0.83  *
* Max Chl Dpth (ft)      *   42.27  * Hydr. Depth (ft)       *    5.79  *   25.65  *    3.47  *
* Conv. Total (cfs)      *4924712.0  * Conv. (cfs)           *163167.9  *4640746.0  *120798.8  *
* Length Wtd. (ft)       *  283.42  * Wetted Per. (ft)       *  405.40  *  420.57  *  536.92  *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *    0.06  *    0.26  *    0.04  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.05  *    1.44  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  746.83  * 3123.15  *  820.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  163.59  *  127.31  *  314.85  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  760.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.46  * Wt. n-Val.             *   0.069  *   0.029  *   0.056  *
* W.S. Elev (ft)         *  759.92  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  737.51  * Flow Area (sq ft)      * 3493.56  *11821.32  * 3736.81  *
* E.G. Slope (ft/ft)     *0.000147  * Area (sq ft)           * 3498.03  *11821.32  * 3736.81  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3945.51  *67864.98  * 4089.50  *
* Top Width (ft)         * 1490.67  * Top Width (ft)         *  422.62  *  411.80  *  656.24  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *    1.13  *    5.74  *    1.09  *
* Max Chl Dpth (ft)      *   45.33  * Hydr. Depth (ft)       *    8.85  *   28.71  *    5.69  *
* Conv. Total (cfs)      *6262408.0  * Conv. (cfs)           *325539.0  *5599450.0  *337419.4  *
* Length Wtd. (ft)       *  278.08  * Wetted Per. (ft)       *  414.58  *  420.57  *  657.21  *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)       *    0.08  *    0.26  *    0.05  *
* Alpha                  *    1.86  * Stream Power (lb/ft s) *    0.09  *    1.48  *    0.06  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1242.83  * 3437.57  * 1726.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  198.82  *  127.69  *  490.98  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  749.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.074  *   0.029  *          *
* W.S. Elev (ft)         *  748.87  * Reach Len. (ft)        *  107.00  *  289.00  *  321.00  *
* Crit W.S. (ft)         *  730.42  * Flow Area (sq ft)      *   36.27  * 7289.44  *          *
* E.G. Slope (ft/ft)     *0.000222  * Area (sq ft)           *   36.27  * 7289.44  *          *
```

```
* Q Total (cfs)          *38300.00  * Flow (cfs)              *    7.46  *38292.54  *          *
* Top Width (ft)         *  465.97  * Top Width (ft)          *   69.89  *  396.07  *          *
* Vel Total (ft/s)       *    5.23  * Avg. Vel. (ft/s)        *    0.21  *    5.25  *          *
* Max Chl Dpth (ft)      *   34.28  * Hydr. Depth (ft)        *    0.52  *   18.40  *          *
* Conv. Total (cfs)      *2567724.0  * Conv. (cfs)             *   500.2  *2567224.0  *          *
* Length Wtd. (ft)       *  288.98  * Wetted Per. (ft)        *   69.90  *  404.52  *          *
* Min Ch El (ft)         *  714.59  * Shear (lb/sq ft)        *    0.01  *    0.25  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    1.31  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *   82.62  * 2282.95  *  133.02  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   37.53  *  123.28  *   40.10  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 4.466

INPUT
Description: COE River Station= 44270.95
Preliminary Model River Station
             (miles)=4.45

12th Street Bridge.  B10A (upstream).
             Obstructions are buildings except on the far right where no flow
             is assumed beyond I-435 embankment.   Ineffective flow on left is
             a corridor with high ground dowsntream which will block the water.
Station Elevation Data    num=     122
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     780     126     778     159     776     225     774     410     766
     537     764     711     762     723     760     736     760     752     760
     768     760     805     760     815     758    1012     758    1560     758
 1599.94755.5757    1800     752    1830     752    1838     752    1879     752
    1891     754    2071     754    2499     750    2635     750    2639     752
    2648     754    2658     756    2692     758    2713     758    2735     756
  2745.5     753 2757.49     748 2764.61     746  2772.9     744 2779.99     742
    2781     740 2791.34     740    2797     740    2861   719.4    2886   719.4
  2894.6     714  2953.4     714    2962   719.4    2987   719.4    3051     740
 3055.72     740    3067     740 3074.58     744 3082.47     746 3087.84     747
 3095.05     747  3102.2     748 3110.32     748 3148.24     750    3193     750
 3193.01     761 3193.02     761    3248     760    3422     760    3436     758
    3441     756    3448     754    3539     754    3546     756    3553     758
    3557     760    3560     762    3564     764    3569     766    3607     766
    3634     764    3645     764    3693     764    3717     762    3724     760
    3731     758    3753     758    3758     760    3761     762    3765     764
    3769     766    3774     768    3779     770    3783     772    3804     774
    3831     774    3864     776    3879     778    3887     780    3894     782
    3900     784    3907     786    3939     788    3950     790    3955     792
    3960     794    3963     796    3966     798    3969     800    3971     802
    3974     804    3978     806    3982     808    3986     810    3990     812
    3994     814    3999     816    4003     818    4008     820    4013     822
    4017     824    4022     826    4027     828    4034     830    4039     832
    4045     834    4051     836    4084     838    4096     840    4105     842
    4117     842    4165     842

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041 1599.94    .055    1891    .041  2745.5    .029  3102.2    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2745.5  3102.2               36      36      36              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     805     780        F
Blocked Obstructions     num=       7
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
       0  283.25     790     805    1600     780    1891    2280     775
    3320    3600     760    3607    3838     768    1662    1900     753
    2175    2650     753
```

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	736.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.029	
W.S. Elev (ft)	735.87	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	723.29	Flow Area (sq ft)		3282.89	
E.G. Slope (ft/ft)	0.000166	Area (sq ft)		3282.89	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	228.36	Top Width (ft)		228.36	
Vel Total (ft/s)	3.81	Avg. Vel. (ft/s)		3.81	
Max Chl Dpth (ft)	21.87	Hydr. Depth (ft)		14.38	
Conv. Total (cfs)	971164.1	Conv. (cfs)		971164.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		236.65	
Min Ch El (ft)	714.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.55	
Frctn Loss (ft)		Cum Volume (acre-ft)		1057.25	
C & E Loss (ft)		Cum SA (acres)		92.68	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	740.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.029	
W.S. Elev (ft)	740.28	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	725.49	Flow Area (sq ft)		4359.35	
E.G. Slope (ft/ft)	0.000212	Area (sq ft)		4359.35	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	286.68	Top Width (ft)		286.68	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	26.28	Hydr. Depth (ft)		15.21	
Conv. Total (cfs)	1340537.0	Conv. (cfs)		1340537.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		296.50	
Min Ch El (ft)	714.00	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.87	
Frctn Loss (ft)		Cum Volume (acre-ft)	1.44	1442.81	5.36
C & E Loss (ft)		Cum SA (acres)	2.27	105.30	7.27

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	744.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.029	
W.S. Elev (ft)	743.83	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	727.40	Flow Area (sq ft)		5394.66	
E.G. Slope (ft/ft)	0.000208	Area (sq ft)		5394.66	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	300.73	Top Width (ft)		300.73	
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)		4.93	
Max Chl Dpth (ft)	29.83	Hydr. Depth (ft)		17.94	
Conv. Total (cfs)	1845370.0	Conv. (cfs)		1845370.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		312.74	
Min Ch El (ft)	714.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.10	
Frctn Loss (ft)		Cum Volume (acre-ft)	14.56	1767.56	36.82
C & E Loss (ft)		Cum SA (acres)	8.79	113.55	16.87

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	747.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.029	
W.S. Elev (ft)	747.12	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	729.19	Flow Area (sq ft)		6429.01	
E.G. Slope (ft/ft)	0.000221	Area (sq ft)		6429.01	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	
Top Width (ft)	335.28	Top Width (ft)		335.28	
Vel Total (ft/s)	5.32	Avg. Vel. (ft/s)		5.32	

```
* Max Chl Dpth (ft)      *   33.12  * Hydr. Depth (ft)       *          *   19.18  *          *
* Conv. Total (cfs)      *2301652.0  * Conv. (cfs)            *          *2301652.0  *          *
* Length Wtd. (ft)       *    2.00  * Wetted Per. (ft)       *          *  348.09  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.35  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   50.08  * 2078.18  *   92.53  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   23.81  *  118.75  *   31.00  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  752.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  752.13  * Reach Len. (ft)        *    2.00  *    2.00  *    2.00  *
* Crit W.S. (ft)         *  731.53  * Flow Area (sq ft)      *          * 8173.86  *  247.90  *
* E.G. Slope (ft/ft)     *0.000187  * Area (sq ft)           *          * 8173.86  *  247.90  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45263.57  *  236.43  *
* Top Width (ft)         *  445.42  * Top Width (ft)          *          *  354.62  *   90.80  *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)        *          *    5.54  *    0.95  *
* Max Chl Dpth (ft)      *   38.13  * Hydr. Depth (ft)        *          *   23.05  *    2.73  *
* Conv. Total (cfs)      *3323940.0  * Conv. (cfs)            *          *3306668.0  * 17272.3  *
* Length Wtd. (ft)       *    2.00  * Wetted Per. (ft)        *          *  368.45  *   93.00  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.26  *    0.03  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *          *    1.44  *    0.03  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  202.89  * 2529.24  *  243.31  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   88.94  *  122.79  *   73.20  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  755.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.045  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  755.04  * Reach Len. (ft)        *    2.00  *    2.00  *    2.00  *
* Crit W.S. (ft)         *  733.18  * Flow Area (sq ft)      * 1172.31  * 9210.01  *  511.90  *
* E.G. Slope (ft/ft)     *0.000173  * Area (sq ft)           * 1172.31  * 9210.01  *  511.90  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *  771.94  *52882.56  *  745.50  *
* Top Width (ft)         * 1089.00  * Top Width (ft)          *  641.50  *  356.70  *   90.80  *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)        *    0.66  *    5.74  *    1.46  *
* Max Chl Dpth (ft)      *   41.04  * Hydr. Depth (ft)        *    1.83  *   25.82  *    5.64  *
* Conv. Total (cfs)      *4133348.0  * Conv. (cfs)            * 58652.7  *4018052.0  * 56643.5  *
* Length Wtd. (ft)       *    2.00  * Wetted Per. (ft)        *  645.18  *  370.70  *   95.95  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.02  *    0.27  *    0.06  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    0.01  *    1.54  *    0.08  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  500.51  * 2853.56  *  474.47  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  139.04  *  124.63  *  158.42  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.045  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  756.73  * Reach Len. (ft)        *    2.00  *    2.00  *    2.00  *
* Crit W.S. (ft)         *  734.67  * Flow Area (sq ft)      * 2312.73  * 9811.03  *  664.90  *
* E.G. Slope (ft/ft)     *0.000178  * Area (sq ft)           * 2312.73  * 9811.03  *  664.90  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              * 2251.73  *59592.06  * 1156.21  *
* Top Width (ft)         * 1147.33  * Top Width (ft)          *  699.83  *  356.70  *   90.81  *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)        *    0.97  *    6.07  *    1.74  *
* Max Chl Dpth (ft)      *   42.73  * Hydr. Depth (ft)        *    3.30  *   27.51  *    7.32  *
* Conv. Total (cfs)      *4719816.0  * Conv. (cfs)            *168694.2  *4464501.0  * 86620.6  *
* Length Wtd. (ft)       *    2.00  * Wetted Per. (ft)        *  708.32  *  370.70  *   97.56  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.04  *    0.29  *    0.08  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.04  *    1.79  *    0.13  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  741.19  * 3055.57  *  810.99  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  162.24  *  124.76  *  312.53  *
```

```
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  760.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *   0.046  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  759.79  * Reach Len. (ft)        *    2.00  *    2.00  *    2.00  *
* Crit W.S. (ft)         *  736.70  * Flow Area (sq ft)      * 4582.39  *10904.53  *  943.28  *
* E.G. Slope (ft/ft)     *0.000162  * Area (sq ft)           * 4582.39  *10904.53  *  943.28  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6225.15  *67739.69  * 1935.16  *
* Top Width (ft)         * 1204.01  * Top Width (ft)         *  756.50  *  356.70  *   90.81  *
* Vel Total (ft/s)       *    4.62  * Avg. Vel. (ft/s)       *    1.36  *    6.21  *    2.05  *
* Max Chl Dpth (ft)      *   45.79  * Hydr. Depth (ft)       *    6.06  *   30.57  *   10.39  *
* Conv. Total (cfs)      *5965666.0  * Conv. (cfs)            *489290.4  *5324273.0  *152101.9  *
* Length Wtd. (ft)       *    2.00  * Wetted Per. (ft)       *  774.28  *  370.70  *  100.51  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.06  *    0.30  *    0.09  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.08  *    1.85  *    0.19  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   * 1232.91  * 3362.19  * 1709.05  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  197.37  *  125.14  *  488.23  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  749.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  748.76  * Reach Len. (ft)        *    2.00  *    2.00  *    2.00  *
* Crit W.S. (ft)         *  730.07  * Flow Area (sq ft)      *          * 6991.17  *   11.65  *
* E.G. Slope (ft/ft)     *0.000219  * Area (sq ft)           *          * 6991.17  *   11.65  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38295.98  *    4.02  *
* Top Width (ft)         *  369.06  * Top Width (ft)         *          *  346.53  *   22.53  *
* Vel Total (ft/s)       *    5.47  * Avg. Vel. (ft/s)       *          *    5.48  *    0.35  *
* Max Chl Dpth (ft)      *   34.76  * Hydr. Depth (ft)       *          *   20.17  *    0.52  *
* Conv. Total (cfs)      *2589874.0  * Conv. (cfs)            *          *2589602.0  *   271.8  *
* Length Wtd. (ft)       *    2.00  * Wetted Per. (ft)       *          *  359.68  *   22.55  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.27  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.45  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   82.58  * 2235.58  *  132.97  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   37.44  *  120.81  *   40.02  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 4.462

INPUT
Description: Bridge B10A.  12th Street Bridge.  Bridge has been normalized to
             the channel from 23 degrees skew.  Piers were aligned with channel
             flow.  The top of side rail was modeled as the top of deck.
Distance from Upstream XS =       2
Deck/Roadway Width        =      32
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    2692     758          2745.48     761     753 2745.49     765     753
  2745.5     765     753  3002.3     770     758 3098.48  767.48     756
 3098.49  767.48   758.6    3193     765     757 3193.01     765     757
 3193.02     761     757
```

Upstream Bridge Cross Section Data
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780	126	778	159	776	225	774	410	766
537	764	711	762	723	760	736	760	752	760
768	760	805	760	815	758	1012	758	1560	758
1599.94	755.5	1757	752	1800	752	1830	752	1838	752
1879	752	1891	754	2071	754	2499	750	2635	750
2639	752	2648	754	2658	756	2692	758	2713	758
2735	756	2745.5	753	2757.49	748	2764.61	746	2772.9	744
2779.99	742	2781	740	2791.34	740	2797	740	2861	719.4
2886	719.4	2894.6	714	2953.4	714	2962	719.4	2987	719.4
3051	740	3055.72	740	3067	740	3074.58	744	3082.47	746
3087.84	747	3095.05	747	3102.2	748	3110.32	748	3148.24	750
3193	750	3193.01	761	3193.02	761	3248	760	3422	760
3436	758	3441	756	3448	754	3539	754	3546	756
3553	758	3557	760	3560	762	3564	764	3569	766
3607	766	3634	764	3645	764	3693	764	3717	762
3724	760	3731	758	3753	758	3758	760	3761	762
3765	764	3769	766	3774	768	3779	770	3783	772
3804	774	3831	774	3864	776	3879	778	3887	780
3894	782	3900	784	3907	786	3939	788	3950	790
3955	792	3960	794	3963	796	3966	798	3969	800
3971	802	3974	804	3978	806	3982	808	3986	810
3990	812	3994	814	3999	816	4003	818	4008	820
4013	822	4017	824	4022	826	4027	828	4034	830
4039	832	4045	834	4051	836	4084	838	4096	840
4105	842	4117	842	4165	842				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1599.94	.055	1891	.041	2745.5	.029	3102.2	.041

Bank Sta: Left Right Coeff Contr. Expan.
2745.5 3102.2 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	805	780	F

Blocked Obstructions num= 7

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	283.25	790	805	1600	780	1891	2280	775
3320	3600	760	3607	3838	768	1662	1900	753
2175	2650	753						

Downstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2692	758		2745.48	761	753	2745.49	765	753
2745.5	765	753	3002.3	770	758	3098.48	767.48	756
3098.49	767.48	758.6	3193	765	757	3193.01	765	757
3193.02	761	757						

Downstream Bridge Cross Section Data
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780	126	778	159	776	225	774	410	766
537	764	711	762	723	760	736	760	752	760
768	760	805	760	815	758	1012	758	1560	758
1599.94	755.5	1757	752	1800	752	1830	752	1838	752
1879	752	1891	754	2071	754	2499	750	2635	750
2639	752	2648	754	2658	756	2692	758	2713	758
2735	756	2745.5	753	2757.49	748	2764.61	746	2772.9	744
2779.99	742	2781	740	2791.34	740	2797	740	2861	719.4
2886	719.4	2894.6	714	2953.4	714	2962	719.4	2987	719.4
3051	740	3055.72	740	3067	740	3074.58	744	3082.47	746
3087.84	747	3095.05	747	3102.2	748	3110.32	748	3148.24	750
3193	750	3193.01	761	3193.02	761	3248	760	3422	760
3436	758	3441	756	3448	754	3539	754	3546	756
3553	758	3557	760	3560	762	3564	764	3569	766
3607	766	3634	764	3645	764	3693	764	3717	762
3724	760

```
    3731     758    3753     758    3758     760    3761     762    3765     764
    3769     766    3774     768    3779     770    3783     772    3804     774
    3831     774    3864     776    3879     778    3887     780    3894     782
    3900     784    3907     786    3939     788    3950     790    3955     792
    3960     794    3963     796    3966     798    3969     800    3971     802
    3974     804    3978     806    3982     808    3986     810    3990     812
    3994     814    3999     816    4003     818    4008     820    4013     822
    4017     824    4022     826    4027     828    4034     830    4039     832
    4045     834    4051     836    4084     838    4096     840    4105     842
    4117     842    4165     842

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041 1599.94    .055    1891    .041    2499     .15    2658    .041
  2745.5    .029  3102.2    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
        2745.5  3102.2          .1        .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0     805     780       F
Blocked Obstructions     num=       7
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
       0  283.25     790     805    1600     780    1891    2280     775
    3320    3600     760    3607    3838     768    1720    1900     753
    2160    2660     753

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=  2848.9    Downstream=  2848.9
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     720       8     760
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     720       8     760

Pier Data
Pier Station     Upstream=  3002.3    Downstream=  3002.3
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     720       8     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     720       8     765

Pier Data
Pier Station     Upstream=  3102.5    Downstream=  3102.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     720       8     775
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       8     720       8     775

Pier Data
Pier Station     Upstream=  3149.6    Downstream=  3149.6
Upstream     num=       2
    Width   Elev    Width   Elev
```

```
********************************
       8     720       8     765
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       8     720       8     765

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =     .95
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     736.10  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     735.87  * E.G. Elev (ft)         *     736.12  *     736.12  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     735.86  *     735.86  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     723.24  *     723.24  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.86  *      21.86  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.05  *       4.05  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3087.14  *    3087.14  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   29026.53  *   29026.53  *
* Min El Weir Flow (ft)  *     753.01  * Hydr Depth (ft)        *      14.54  *      14.54  *
* Min El Prs (ft)        *     758.60  * W.P. Total (ft)        *     267.96  *     267.96  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)       *   806882.8  *   806882.8  *
* Delta WS (ft)          *       0.01  * Top Width (ft)          *     212.28  *     212.28  *
* BR Open Area (sq ft)   *    9618.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.05  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.17  *       0.17  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       0.70  *       0.70  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     740.60  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     740.28  * E.G. Elev (ft)         *     740.62  *     740.62  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     740.26  *     740.26  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     725.40  *     725.40  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.26  *      26.26  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.77  *       4.77  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4090.35  *    4090.35  *
* Weir Submerg           *             * Froude # Chl           *       0.22  *       0.22  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   46081.18  *   46081.18  *
* Min El Weir Flow (ft)  *     753.01  * Hydr Depth (ft)        *      15.11  *      15.11  *
* Min El Prs (ft)        *     758.60  * W.P. Total (ft)        *     345.45  *     345.45  *
* Delta EG (ft)          *       0.02  * Conv. Total (cfs)       *  1088787.0  *  1088787.0  *
* Delta WS (ft)          *       0.02  * Top Width (ft)          *     270.63  *     270.63  *
* BR Open Area (sq ft)   *    9618.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.77  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.24  *       0.24  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.13  *       1.13  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	744.20	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	743.83	E.G. Elev (ft)	744.23	744.23
Q Total (cfs)	26600.00	W.S. Elev (ft)	743.80	743.80
Q Bridge (cfs)	26600.00	Crit W.S. (ft)	727.44	727.44
Q Weir (cfs)		Max Chl Dpth (ft)	29.80	29.80
Weir Sta Lft (ft)		Vel Total (ft/s)	5.25	5.25
Weir Sta Rgt (ft)		Flow Area (sq ft)	5067.56	5067.56
Weir Submerg		Froude # Chl	0.22	0.22
Weir Max Depth (ft)		Specif Force (cu ft)	63712.00	63712.00
Min El Weir Flow (ft)	753.01	Hydr Depth (ft)	17.81	17.81
Min El Prs (ft)	758.60	W.P. Total (ft)	375.76	375.76
Delta EG (ft)	0.02	Conv. Total (cfs)	1471155.0	1471155.0
Delta WS (ft)	0.02	Top Width (ft)	284.60	284.60
BR Open Area (sq ft)	9618.87	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.25	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.28	0.28
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.44	1.44

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	747.56	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	747.12	E.G. Elev (ft)	747.59	747.59
Q Total (cfs)	34200.00	W.S. Elev (ft)	747.09	747.09
Q Bridge (cfs)	34200.00	Crit W.S. (ft)	729.38	729.38
Q Weir (cfs)		Max Chl Dpth (ft)	33.09	33.09
Weir Sta Lft (ft)		Vel Total (ft/s)	5.66	5.66
Weir Sta Rgt (ft)		Flow Area (sq ft)	6047.04	6047.04
Weir Submerg		Froude # Chl	0.23	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	83638.48	83638.48
Min El Weir Flow (ft)	753.01	Hydr Depth (ft)	18.96	18.96
Min El Prs (ft)	758.60	W.P. Total (ft)	424.10	424.10
Delta EG (ft)	0.03	Conv. Total (cfs)	1821888.0	1821888.0
Delta WS (ft)	0.03	Top Width (ft)	318.97	318.97
BR Open Area (sq ft)	9618.87	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.66	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.31	0.31
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.77	1.77

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	752.61	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	752.13	E.G. Elev (ft)	752.64	752.64
Q Total (cfs)	45500.00	W.S. Elev (ft)	752.10	752.10
Q Bridge (cfs)	45500.00	Crit W.S. (ft)	731.91	731.91
Q Weir (cfs)		Max Chl Dpth (ft)	38.10	38.10
Weir Sta Lft (ft)		Vel Total (ft/s)	5.76	5.76
Weir Sta Rgt (ft)		Flow Area (sq ft)	7904.38	7904.38
Weir Submerg		Froude # Chl	0.22	0.22
Weir Max Depth (ft)		Specif Force (cu ft)	120612.50	120612.50
Min El Weir Flow (ft)	753.01	Hydr Depth (ft)	19.12	19.12
Min El Prs (ft)	758.60	W.P. Total (ft)	554.85	554.85
Delta EG (ft)	0.03	Conv. Total (cfs)	2571372.0	2571372.0
Delta WS (ft)	0.03	Top Width (ft)	413.35	413.35
BR Open Area (sq ft)	9618.87	Frctn Loss (ft)		
BR Open Vel (ft/s)	5.76	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.28	0.28
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.60	1.60

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	755.54	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	755.04	E.G. Elev (ft)	755.53	755.52
Q Total (cfs)	54400.00	W.S. Elev (ft)	754.97	754.95
Q Bridge (cfs)	53306.96	Crit W.S. (ft)	733.66	733.66
Q Weir (cfs)		Max Chl Dpth (ft)	40.97	40.95
Weir Sta Lft (ft)		Vel Total (ft/s)	5.38	5.39
Weir Sta Rgt (ft)		Flow Area (sq ft)	10113.64	10092.98
Weir Submerg		Froude # Chl	0.20	0.20
Weir Max Depth (ft)		Specif Force (cu ft)	147759.50	147626.70
Min El Weir Flow (ft)	753.01	Hydr Depth (ft)	10.69	10.68
Min El Prs (ft)	758.60	W.P. Total (ft)	1315.45	1313.92
Delta EG (ft)	0.04	Conv. Total (cfs)	2730504.0	2715166.0
Delta WS (ft)	0.05	Top Width (ft)	946.01	944.68
BR Open Area (sq ft)	9618.87	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	5.93	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.19	0.19
Br Sel Method	Energy only	Power Total (lb/ft s)	1.02	1.04

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	757.27	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	756.73	E.G. Elev (ft)	757.26	757.24
Q Total (cfs)	63000.00	W.S. Elev (ft)	756.66	756.61
Q Bridge (cfs)	59224.72	Crit W.S. (ft)	735.22	735.22
Q Weir (cfs)		Max Chl Dpth (ft)	42.66	42.61
Weir Sta Lft (ft)		Vel Total (ft/s)	5.39	5.41
Weir Sta Rgt (ft)		Flow Area (sq ft)	11693.62	11654.24
Weir Submerg		Froude # Chl	0.20	0.20
Weir Max Depth (ft)		Specif Force (cu ft)	168080.30	167817.30
Min El Weir Flow (ft)	753.01	Hydr Depth (ft)	13.22	13.12
Min El Prs (ft)	758.60	W.P. Total (ft)	1494.75	1489.17
Delta EG (ft)	0.05	Conv. Total (cfs)	2704227.0	2676734.0
Delta WS (ft)	0.06	Top Width (ft)	884.36	888.02
BR Open Area (sq ft)	9618.87	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	6.27	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.27	0.27
Br Sel Method	Energy only	Power Total (lb/ft s)	1.43	1.46

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	760.33	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	759.79	E.G. Elev (ft)	760.32	760.29
Q Total (cfs)	75900.00	W.S. Elev (ft)	759.70	759.62
Q Bridge (cfs)	63145.70	Crit W.S. (ft)	737.36	737.36
Q Weir (cfs)		Max Chl Dpth (ft)	45.70	45.62
Weir Sta Lft (ft)		Vel Total (ft/s)	5.42	5.44
Weir Sta Rgt (ft)		Flow Area (sq ft)	14009.17	13947.74

```
* Weir Submerg           *             * Froude # Chl           *        0.19  *        0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   209793.30  *   209189.00  *
* Min El Weir Flow (ft)  *     753.01  * Hydr Depth (ft)        *       19.10  *       19.06  *
* Min El Prs (ft)        *     758.60  * W.P. Total (ft)        *     1772.08  *     1770.33  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  2760285.0  *  2670448.0  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *      733.33  *      731.84  *
* BR Open Area (sq ft)   *    9618.87  * Frctn Loss (ft)        *        0.03  *        0.00  *
* BR Open Vel (ft/s)     *       6.56  * C & E Loss (ft)        *        0.01  *        0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *        0.37  *        0.40  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *        2.02  *        2.16  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     749.23  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     748.76  * E.G. Elev (ft)         *     749.26  *     749.26  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     748.73  *     748.73  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     730.35  *     730.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      34.73  *      34.73  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.82  *       5.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6586.00  *    6586.00  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *       0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   94899.25  *   94899.25  *
* Min El Weir Flow (ft)  *     753.01  * Hydr Depth (ft)        *      19.12  *      19.12  *
* Min El Prs (ft)        *     758.60  * W.P. Total (ft)        *     458.38  *     458.38  *
* Delta EG (ft)          *       0.03  * Conv. Total (cfs)      *  2045722.0  *  2045722.0  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     344.41  *     344.41  *
* BR Open Area (sq ft)   *    9618.87  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.82  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.31  *       0.31  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.83  *       1.83  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 4.459

INPUT
Description: COE River Station= 44306.72
Preliminary Model River Station
             (miles)=4.44

12th Street Bridge.  B10A (downstream).
             Normalized to channel flow from  23 degree skew. Top of side rail
             modeled for top of bridge. Piers are aligned with channel flow.
             Underwater channel shown on bridge plans.  Obstructions are
             buildings except on the far right where no flow is assumed beyond
             I-435 embankment.   Ineffective flow on left is a corridor with
             high ground dowsntream which will block the water.
Station Elevation Data    num=     122
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      780     126      778     159      776     225      774     410      766
     537      764     711      762     723      760     736      760     752      760
     768      760     805      760     815      758    1012      758    1560      758
 1599.94755.5757    1800      752    1830      752    1838      752    1879      752
    1891      754    2071      754    2499      750    2635      750    2639      752
    2648      754    2658      756    2692      758    2713      758    2735      756
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  2745.5     753 2757.49     748 2764.61     746  2772.9     744 2779.99     742
    2781     740 2791.34     740    2797     740    2861   719.4    2886   719.4
  2894.6     714  2953.4     714    2962   719.4    2987   719.4    3051     740
 3055.72     740    3067     740 3074.58     744 3082.47     746 3087.84     747
 3095.05     747  3102.2     748 3110.32     748 3148.24     750    3193     750
 3193.01     761 3193.02     761    3248     760    3422     760    3436     758
    3441     756    3448     754    3539     754    3546     756    3553     758
    3557     760    3560     762    3564     764    3569     766    3607     766
    3634     764    3645     764    3693     764    3717     762    3724     760
    3731     758    3753     758    3758     760    3761     762    3765     764
    3769     766    3774     768    3779     770    3783     772    3804     774
    3831     774    3864     776    3879     778    3887     780    3894     782
    3900     784    3907     786    3939     788    3950     790    3955     792
    3960     794    3963     796    3966     798    3969     800    3971     802
    3974     804    3978     806    3982     808    3986     810    3990     812
    3994     814    3999     816    4003     818    4008     820    4013     822
    4017     824    4022     826    4027     828    4034     830    4039     832
    4045     834    4051     836    4084     838    4096     840    4105     842
    4117     842    4165     842

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041 1599.94    .055    1891    .041    2499     .15    2658    .041
  2745.5    .029  3102.2    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        2745.5  3102.2              130     262     290             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     805     780       F
Blocked Obstructions     num=       7
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
       0  283.25     790     805    1600     780    1891    2280     775
    3320    3600     760    3607    3838     768    1720    1900     753
    2160    2660     753

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.09  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.            *          *   0.029  *          *
* W.S. Elev (ft)         *  735.86  * Reach Len. (ft)       *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  723.29  * Flow Area (sq ft)     *          * 3279.96  *          *
* E.G. Slope (ft/ft)     *0.000166  * Area (sq ft)          *          * 3279.96  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)            *          *12500.00  *          *
* Top Width (ft)         *  228.28  * Top Width (ft)        *          *  228.28  *          *
* Vel Total (ft/s)       *    3.81  * Avg. Vel. (ft/s)      *          *    3.81  *          *
* Max Chl Dpth (ft)      *   21.86  * Hydr. Depth (ft)      *          *   14.37  *          *
* Conv. Total (cfs)      *969948.9  * Conv. (cfs)           *          *969948.9  *          *
* Length Wtd. (ft)       *  262.00  * Wetted Per. (ft)      *          *  236.56  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)      *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.55  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          * 1054.69  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *   92.50  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.            *          *   0.029  *          *
* W.S. Elev (ft)         *  740.26  * Reach Len. (ft)       *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  725.49  * Flow Area (sq ft)     *          * 4353.63  *          *
* E.G. Slope (ft/ft)     *0.000212  * Area (sq ft)          *          * 4353.63  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)            *          *19500.00  *          *
* Top Width (ft)         *  286.63  * Top Width (ft)        *          *  286.63  *          *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)      *          *    4.48  *          *
* Max Chl Dpth (ft)      *   26.26  * Hydr. Depth (ft)      *          *   15.19  *          *
* Conv. Total (cfs)      *1337802.0  * Conv. (cfs)           *          *1337802.0  *          *
* Length Wtd. (ft)       *  262.04  * Wetted Per. (ft)      *          *  296.44  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)      *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.87  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.44  * 1439.42  *    5.36  *
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* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *  105.07  *    7.27  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.18  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  743.80  * Reach Len. (ft)        *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  727.40  * Flow Area (sq ft)      *          * 5387.43  *          *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           *          * 5387.43  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  300.60  * Top Width (ft)         *          *  300.60  *          *
* Vel Total (ft/s)       *    4.94  * Avg. Vel. (ft/s)       *          *    4.94  *          *
* Max Chl Dpth (ft)      *   29.80  * Hydr. Depth (ft)       *          *   17.92  *          *
* Conv. Total (cfs)      *1841800.0  * Conv. (cfs)            *          *1841800.0  *          *
* Length Wtd. (ft)       *  262.31  * Wetted Per. (ft)       *          *  312.60  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.11  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   14.56  * 1763.36  *   36.82  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.79  *  113.32  *   16.87  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.53  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  747.09  * Reach Len. (ft)        *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  729.19  * Flow Area (sq ft)      *          * 6419.54  *          *
* E.G. Slope (ft/ft)     *0.000222  * Area (sq ft)           *          * 6419.54  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  334.97  * Top Width (ft)         *          *  334.97  *          *
* Vel Total (ft/s)       *    5.33  * Avg. Vel. (ft/s)       *          *    5.33  *          *
* Max Chl Dpth (ft)      *   33.09  * Hydr. Depth (ft)       *          *   19.16  *          *
* Conv. Total (cfs)      *2297362.0  * Conv. (cfs)            *          *2297362.0  *          *
* Length Wtd. (ft)       *  262.67  * Wetted Per. (ft)       *          *  347.79  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.36  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   50.08  * 2073.17  *   92.53  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   23.81  *  118.49  *   31.00  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  752.10  * Reach Len. (ft)        *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  731.53  * Flow Area (sq ft)      *          * 8162.78  *  245.06  *
* E.G. Slope (ft/ft)     *0.000188  * Area (sq ft)           *          * 8162.78  *  245.06  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45267.55  *  232.45  *
* Top Width (ft)         *  445.35  * Top Width (ft)         *          *  354.55  *   90.80  *
* Vel Total (ft/s)       *    5.41  * Avg. Vel. (ft/s)       *          *    5.55  *    0.95  *
* Max Chl Dpth (ft)      *   38.10  * Hydr. Depth (ft)       *          *   23.02  *    2.70  *
* Conv. Total (cfs)      *3316629.0  * Conv. (cfs)            *          *3299685.0  * 16944.1  *
* Length Wtd. (ft)       *  262.17  * Wetted Per. (ft)       *          *  368.37  *   93.00  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *          *    0.26  *    0.03  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *          *    1.44  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  202.89  * 2522.86  *  243.13  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   88.94  *  122.52  *   73.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.50  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.057  *   0.029  *   0.041  *
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```
* W.S. Elev (ft)         *  754.99  * Reach Len. (ft)        *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  733.18  * Flow Area (sq ft)      * 1141.41  * 9192.79  *  507.51  *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           * 1141.41  * 9192.79  *  507.51  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  585.31  *53074.83  *  739.86  *
* Top Width (ft)         * 1085.89  * Top Width (ft)         *  638.38  *  356.70  *   90.80  *
* Vel Total (ft/s)       *    5.02  * Avg. Vel. (ft/s)       *    0.51  *    5.77  *    1.46  *
* Max Chl Dpth (ft)      *   40.99  * Hydr. Depth (ft)       *    1.79  *   25.77  *    5.59  *
* Conv. Total (cfs)      *4105549.0  * Conv. (cfs)           * 44172.8  *4005539.0  * 55837.3  *
* Length Wtd. (ft)       *  259.34  * Wetted Per. (ft)       *  641.96  *  370.70  *   95.95  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.02  *    0.27  *    0.06  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    0.01  *    1.57  *    0.08  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  499.58  * 2846.45  *  474.11  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  138.52  *  124.42  *  158.35  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.057  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  756.66  * Reach Len. (ft)        *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  734.67  * Flow Area (sq ft)      * 2267.47  * 9787.93  *  659.02  *
* E.G. Slope (ft/ft)     *0.000182  * Area (sq ft)           * 2267.47  * 9787.93  *  659.02  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1773.45  *60073.61  * 1152.94  *
* Top Width (ft)         * 1145.52  * Top Width (ft)         *  698.01  *  356.70  *   90.81  *
* Vel Total (ft/s)       *    4.96  * Avg. Vel. (ft/s)       *    0.78  *    6.14  *    1.75  *
* Max Chl Dpth (ft)      *   42.66  * Hydr. Depth (ft)       *    3.25  *   27.44  *    7.26  *
* Conv. Total (cfs)      *4663624.0  * Conv. (cfs)           *131281.2  *4446995.0  * 85347.5  *
* Length Wtd. (ft)       *  256.49  * Wetted Per. (ft)       *  706.31  *  370.70  *   97.56  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.04  *    0.30  *    0.08  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.03  *    1.85  *    0.13  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  739.34  * 3048.19  *  810.51  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  161.68  *  124.65  *  312.47  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.057  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  759.69  * Reach Len. (ft)        *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  736.70  * Flow Area (sq ft)      * 4506.06  *10868.54  *  934.12  *
* E.G. Slope (ft/ft)     *0.000169  * Area (sq ft)           * 4506.06  *10868.54  *  934.12  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 5098.57  *68855.44  * 1945.99  *
* Top Width (ft)         * 1204.01  * Top Width (ft)         *  756.50  *  356.70  *   90.81  *
* Vel Total (ft/s)       *    4.65  * Avg. Vel. (ft/s)       *    1.13  *    6.34  *    2.08  *
* Max Chl Dpth (ft)      *   45.69  * Hydr. Depth (ft)       *    5.96  *   30.47  *   10.29  *
* Conv. Total (cfs)      *5836750.0  * Conv. (cfs)           *392082.7  *5295020.0  *149647.6  *
* Length Wtd. (ft)       *  250.81  * Wetted Per. (ft)       *  773.98  *  370.70  *  100.51  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.06  *    0.31  *    0.10  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.07  *    1.96  *    0.20  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   * 1229.30  * 3354.69  * 1708.50  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  196.77  *  125.12  *  488.22  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  749.20  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  748.73  * Reach Len. (ft)        *  130.00  *  262.00  *  290.00  *
* Crit W.S. (ft)         *  730.07  * Flow Area (sq ft)      *          * 6980.54  *   10.97  *
* E.G. Slope (ft/ft)     *0.000220  * Area (sq ft)           *          * 6980.54  *   10.97  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38296.29  *    3.71  *
* Top Width (ft)         *  368.41  * Top Width (ft)         *          *  346.46  *   21.95  *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *          *    5.49  *    0.34  *
* Max Chl Dpth (ft)      *   34.73  * Hydr. Depth (ft)       *          *   20.15  *    0.50  *
```

```
* Conv. Total (cfs)      *2583670.0  * Conv. (cfs)            *          *2583420.0  *   250.1  *
* Length Wtd. (ft)       *  262.77  * Wetted Per. (ft)        *          *  359.60  *   21.97  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)        *          *    0.27  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.46  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)    *   82.58  * 2230.13  *  132.97  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   37.44  *  120.54  *   40.00  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 4.409

INPUT
Description: COE River Station=44568.77
Preliminary Model River Station
             (miles)=4.39

FEMA XSEC F.  Obstructions are buildings except on
             the far right where no flow is assumed beyond I-435 embankment.
             Ineffective flow on left is a corridor with high ground dowsntream
             which will block the water.
Station Elevation Data    num=     129
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     780   32.86     778    79.2     776  120.22     774  170.19     772
  259.95     770  277.08     768   320.8     766  401.71     764  751.19     758
  846.78     758 1027.23     756    1770     753    2270     752 2390.45     752
 2453.13     752 2471.18     752 2501.69     752 2542.98     752 2565.32     752
 2628.73     750 2905.49     748 2936.69     748 2955.26     750 2992.96     748
 2999.44     746 3005.05     746 3021.48     746 3032.35     744 3038.51     742
 3045.66     740 3051.36     738 3059.19     736  3067.3     734 3075.57     732
 3085.34     730 3090.64     728 3096.84     726 3099.18     724 3104.47     722
 3124.47     714 3214.47     714 3232.79     722 3235.51     724 3236.93     726
 3242.08     728 3246.42     730 3251.57     732 3256.81     734  3265.6     736
 3275.65     738 3352.84     740 3392.22     742 3411.45     744  3426.4     746
 3430.81     748 3438.15     750  3444.4     752 3447.41     754 3450.65     756
  3456.1     758 3468.13     760 3479.52     760 3509.36     758 3516.36     756
 3525.93     754 3540.49     752 3549.27     750 3621.84     752 3628.47     754
 3635.44     756 3644.03     758 3648.77     760 3653.27     762 3658.35     764
 3677.04     764 3711.21     762 3741.46     762 3759.29     762 3808.16     758
 3820.69     756 3824.15     756 3830.88     758 3836.68     760  3843.5     762
 3848.88     764 3851.78     766 3857.24     768 3860.89     770 3864.58     772
 3868.51     774 3872.95     776 3876.07     778 3964.32     782 3997.33     784
 4033.33     786 4070.43     788 4096.29     790  4098.1     792 4103.09     794
 4105.97     798 4106.41     796 4107.39     802 4107.69     800 4108.55     804
 4110.02     806 4114.91     808  4119.5     810 4123.22     812 4125.56     814
 4130.72     816  4133.2     818 4136.78     820 4140.36     822 4143.95     824
 4147.54     826 4152.72     828 4154.71     830 4174.68     832 4189.91     834
 4209.65     836 4225.33     838 4243.35     840 4258.34     842 4275.22     844
  4286.3     846 4303.51     848 4316.79     850 4329.04     852

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041    1770     .06    2270    .041 2565.32     .15 2905.49    .041
 3021.48    .029 3275.65    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3021.48 3275.65              290     511     600             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     772     780       F
Blocked Obstructions      num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
  561.35   607.7     775     772    1770     780    2266    2472     775
    3475    3650     760    3665    3850     764

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  736.04  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.26  * Wt. n-Val.              *          *   0.029  *          *
* W.S. Elev (ft)         *  735.78  * Reach Len. (ft)         *  290.00  *  511.00  *  600.00  *
* Crit W.S. (ft)         *  721.84  * Flow Area (sq ft)       *          * 3072.02  *          *
* E.G. Slope (ft/ft)     *0.000180  * Area (sq ft)            *          * 3072.02  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  204.56  * Top Width (ft)          *          *  204.56  *          *
* Vel Total (ft/s)       *    4.07  * Avg. Vel. (ft/s)        *          *    4.07  *          *
* Max Chl Dpth (ft)      *   21.78  * Hydr. Depth (ft)        *          *   15.02  *          *
* Conv. Total (cfs)      *930721.1  * Conv. (cfs)             *          *930721.1  *          *
* Length Wtd. (ft)       *  511.00  * Wetted Per. (ft)        *          *  213.66  *          *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)        *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    0.66  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)     *          * 1035.59  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)           *          *   91.20  *          *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

```
*****************************************************************************************************
* E.G. Elev (ft)         *  740.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.              *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  740.16  * Reach Len. (ft)         *  290.00  *  511.00  *  600.00  *
* Crit W.S. (ft)         *  724.27  * Flow Area (sq ft)       *          * 4038.02  *   89.55  *
* E.G. Slope (ft/ft)     *0.000206  * Area (sq ft)            *          * 4038.02  *   89.55  *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19449.97  *   50.03  *
* Top Width (ft)         *  310.83  * Top Width (ft)          *          *  230.55  *   80.28  *
* Vel Total (ft/s)       *    4.72  * Avg. Vel. (ft/s)        *          *    4.82  *    0.56  *
* Max Chl Dpth (ft)      *   26.16  * Hydr. Depth (ft)        *          *   17.51  *    1.12  *
* Conv. Total (cfs)      *1360103.0  * Conv. (cfs)            *          *1356613.0  *  3489.6  *
* Length Wtd. (ft)       *  511.11  * Wetted Per. (ft)        *          *  240.51  *   80.31  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)        *          *    0.22  *    0.01  *
* Alpha                  *    1.04  * Stream Power (lb/ft s)   *          *    1.04  *    0.01  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)     *    1.44  * 1414.18  *    5.07  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)           *    2.27  *  103.52  *    7.00  *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************************
* E.G. Elev (ft)         *  744.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.              *          *   0.029  *   0.041  *
* W.S. Elev (ft)         *  743.69  * Reach Len. (ft)         *  290.00  *  511.00  *  600.00  *
* Crit W.S. (ft)         *  726.34  * Flow Area (sq ft)       *          * 4873.43  *  481.27  *
* E.G. Slope (ft/ft)     *0.000210  * Area (sq ft)            *          * 4873.43  *  481.27  *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26004.36  *  595.64  *
* Top Width (ft)         *  375.13  * Top Width (ft)          *          *  242.34  *  132.79  *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)        *          *    5.34  *    1.24  *
* Max Chl Dpth (ft)      *   29.69  * Hydr. Depth (ft)        *          *   20.11  *    3.62  *
* Conv. Total (cfs)      *1836351.0  * Conv. (cfs)            *          *1795230.0  * 41120.8  *
* Length Wtd. (ft)       *  512.00  * Wetted Per. (ft)        *          *  252.81  *  132.95  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)        *          *    0.25  *    0.05  *
* Alpha                  *    1.13  * Stream Power (lb/ft s)   *          *    1.35  *    0.06  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)     *   14.56  * 1732.50  *   35.21  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)           *    8.79  *  111.69  *   16.43  *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************************
* E.G. Elev (ft)         *  747.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.              *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  746.99  * Reach Len. (ft)         *  290.00  *  511.00  *  600.00  *
* Crit W.S. (ft)         *  728.47  * Flow Area (sq ft)       *   23.39  * 5698.42  *  960.11  *
* E.G. Slope (ft/ft)     *0.000207  * Area (sq ft)            *   23.39  * 5698.42  *  960.11  *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *   11.55  *32488.91  * 1699.54  *
* Top Width (ft)         *  432.35  * Top Width (ft)          *   25.25  *  254.17  *  152.93  *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)        *    0.49  *    5.70  *    1.77  *
* Max Chl Dpth (ft)      *   32.99  * Hydr. Depth (ft)        *    0.93  *   22.42  *    6.28  *
* Conv. Total (cfs)      *2377447.0  * Conv. (cfs)            *   802.7  *2258499.0  *118145.2  *
* Length Wtd. (ft)       *  513.17  * Wetted Per. (ft)        *   25.40  *  264.88  *  153.46  *
```

```
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.01  *    0.28  *    0.08  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.01  *    1.58  *    0.14  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *   50.05  * 2036.72  *   89.33  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   23.77  *  116.72  *   30.49  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.073  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  752.05  * Reach Len. (ft)        *  290.00  *  511.00  *  600.00  *
* Crit W.S. (ft)         *  731.23  * Flow Area (sq ft)      * 1379.57  * 6984.53  * 1773.05  *
* E.G. Slope (ft/ft)     *0.000166  * Area (sq ft)           * 1379.57  * 6984.53  * 1773.05  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  767.71  *40788.53  * 3943.76  *
* Top Width (ft)         *  993.23  * Top Width (ft)          *  570.23  *  254.17  *  168.82  *
* Vel Total (ft/s)       *    4.49  * Avg. Vel. (ft/s)       *    0.56  *    5.84  *    2.22  *
* Max Chl Dpth (ft)      *   38.05  * Hydr. Depth (ft)       *    2.42  *   27.48  *   10.50  *
* Conv. Total (cfs)      *3536701.0  * Conv. (cfs)           * 59673.8  *3170480.0  *306547.3  *
* Length Wtd. (ft)       *  509.68  * Wetted Per. (ft)       *  570.82  *  264.88  *  170.17  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.02  *    0.27  *    0.11  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    0.01  *    1.59  *    0.24  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  200.83  * 2477.31  *  236.41  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   88.09  *  120.69  *   72.27  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.072  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  754.97  * Reach Len. (ft)        *  290.00  *  511.00  *  600.00  *
* Crit W.S. (ft)         *  733.19  * Flow Area (sq ft)      * 4211.09  * 7727.82  * 2273.24  *
* E.G. Slope (ft/ft)     *0.000150  * Area (sq ft)           * 4211.09  * 7727.82  * 2273.24  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2941.05  *45901.60  * 5557.35  *
* Top Width (ft)         * 1472.99  * Top Width (ft)          * 1045.48  *  254.17  *  173.34  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    0.70  *    5.94  *    2.44  *
* Max Chl Dpth (ft)      *   40.97  * Hydr. Depth (ft)       *    4.03  *   30.40  *   13.11  *
* Conv. Total (cfs)      *4447291.0  * Conv. (cfs)           *240435.8  *3752532.0  *454322.4  *
* Length Wtd. (ft)       *  499.13  * Wetted Per. (ft)       * 1053.90  *  264.88  *  175.54  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.04  *    0.27  *    0.12  *
* Alpha                  *    2.08  * Stream Power (lb/ft s) *    0.03  *    1.62  *    0.30  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  491.60  * 2795.57  *  464.85  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  136.01  *  122.59  *  157.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.071  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  756.66  * Reach Len. (ft)        *  290.00  *  511.00  *  600.00  *
* Crit W.S. (ft)         *  734.93  * Flow Area (sq ft)      * 5969.91  * 8155.41  * 2567.38  *
* E.G. Slope (ft/ft)     *0.000154  * Area (sq ft)           * 5969.91  * 8155.41  * 2567.38  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 5176.51  *51008.29  * 6815.20  *
* Top Width (ft)         * 1476.44  * Top Width (ft)          * 1045.48  *  254.17  *  176.79  *
* Vel Total (ft/s)       *    3.77  * Avg. Vel. (ft/s)       *    0.87  *    6.25  *    2.65  *
* Max Chl Dpth (ft)      *   42.66  * Hydr. Depth (ft)       *    5.71  *   32.09  *   14.52  *
* Conv. Total (cfs)      *5069976.0  * Conv. (cfs)           *416583.8  *4104934.0  *548458.6  *
* Length Wtd. (ft)       *  492.34  * Wetted Per. (ft)       * 1058.94  *  264.88  *  179.40  *
* Min Ch El (ft)         *  714.00  * Shear (lb/sq ft)       *    0.05  *    0.30  *    0.14  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *    0.05  *    1.86  *    0.37  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  727.05  * 2994.22  *  799.77  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  159.08  *  122.81  *  311.58  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
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water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	760.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.070	0.029	0.041
W.S. Elev (ft)	759.70	Reach Len. (ft)	290.00	511.00	600.00
Crit W.S. (ft)	737.28	Flow Area (sq ft)	9154.02	8929.51	3123.21
E.G. Slope (ft/ft)	0.000144	Area (sq ft)	9273.78	8929.51	3123.21
Q Total (cfs)	75900.00	Flow (cfs)	10018.07	57223.21	8658.72
Top Width (ft)	1610.27	Top Width (ft)	1165.42	254.17	190.69
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)	1.09	6.41	2.77
Max Chl Dpth (ft)	45.70	Hydr. Depth (ft)	8.76	35.13	16.38
Conv. Total (cfs)	6333036.0	Conv. (cfs)	835899.9	4774659.0	722476.9
Length Wtd. (ft)	480.94	Wetted Per. (ft)	1068.08	264.88	193.68
Min Ch El (ft)	714.00	Shear (lb/sq ft)	0.08	0.30	0.14
Alpha	2.50	Stream Power (lb/ft s)	0.08	1.94	0.40
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	1208.74	3295.15	1694.99
C & E Loss (ft)	0.04	Cum SA (acres)	193.90	123.28	487.29

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	749.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.044	0.029	0.041
W.S. Elev (ft)	748.64	Reach Len. (ft)	290.00	511.00	600.00
Crit W.S. (ft)	729.48	Flow Area (sq ft)	122.31	6117.06	1215.29
E.G. Slope (ft/ft)	0.000199	Area (sq ft)	122.31	6117.06	1215.29
Q Total (cfs)	38300.00	Flow (cfs)	63.93	35820.75	2415.32
Top Width (ft)	577.38	Top Width (ft)	165.71	254.17	157.50
Vel Total (ft/s)	5.14	Avg. Vel. (ft/s)	0.52	5.86	1.99
Max Chl Dpth (ft)	34.64	Hydr. Depth (ft)	0.74	24.07	7.72
Conv. Total (cfs)	2717677.0	Conv. (cfs)	4536.1	2541756.0	171385.4
Length Wtd. (ft)	513.61	Wetted Per. (ft)	166.07	264.88	158.33
Min Ch El (ft)	714.00	Shear (lb/sq ft)	0.01	0.29	0.10
Alpha	1.22	Stream Power (lb/ft s)	0.00	1.68	0.19
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	82.39	2190.74	128.89
C & E Loss (ft)	0.01	Cum SA (acres)	37.20	118.74	39.41

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 4.313

INPUT
Description: COE River Station= 45079.47
Preliminary Model River Station (miles)=4.29

Obstructions are buildings. Ineffective flow on left is a corridor with high ground dowsntream which will block the water.

Station Elevation Data num= 106

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	778	52.06	776	97.39	774	127.98	772	158.12	770
184.25	768	262.47	766	295.28	764	403.08	762	528.66	760
692.43	758	715.73	756	755.87	756	785.86	756	1190.08	754
1294.07	752	1332.87	750	1777.19	754	1779.57	752	1870.25	750
1872	750	1906.25	750	1938.94	750	1959.89	750	2115	751
2608.96	752	2694.36	750	2695.81	750	2727.02	750	2736.9	750
2806.08	750	2861.44	750	2887.97	750	3144.76	748	3151.79	746
3159.96	744	3169.7	742	3176.84	740	3185.71	738	3196.33	736
3210.18	734	3237.45	732	3260.29	730	3266.25	728	3272.56	726
3278.33	724	3287.32	722	3305	713.6	3375	713.6	3391.63	722
3397.79	724	3401.84	726	3402.71	728	3407.35	730	3413.14	732

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 3417.11     734 3427.41     736 3436.71     738  3447.3     740 3475.58     742
 3519.32     744 3533.02     746 3542.62     748 3554.53     750 3567.88     752
 3572.48     754 3575.32     756 3578.94     758 3583.63     760 3587.82     762
 3592.65     764 3600.67     766 3647.86     766 3675.85     766 3738.77     768
 3746.79     768 3786.52     768 3859.81     770 3859.83     770 3868.73     770
 3873.05     772 3877.93     774 3881.37     776 3899.26     782 3909.32     784
 3919.35     786 3928.28     786 3943.87     786  3980.5     788 3994.02     790
 3999.89     792 4002.01     794 4003.76     796 4013.93     798 4019.84     800
 4029.12     802 4038.53     804 4043.27     806 4105.92     806 4126.88     804
 4135.04     802 4144.91     800 4155.15     798 4175.98     796 4180.53     794
 4185.26     792

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .041    1872    .048    2115    .041 3144.76    .029 3554.53    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      3144.76 3554.53             510     656     695              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0     735     775       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************
     309   504.7     775     735  1874.6     780  2111.5    2575     775

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  735.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.31  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)          *  735.61  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)          *  722.75  * Flow Area (sq ft)      *          * 2808.78  *          *
* E.G. Slope (ft/ft)      *0.000276  * Area (sq ft)           *          * 2808.78  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)          *  226.41  * Top Width (ft)         *          *  226.41  *          *
* Vel Total (ft/s)        *    4.45  * Avg. Vel. (ft/s)       *          *    4.45  *          *
* Max Chl Dpth (ft)       *   22.01  * Hydr. Depth (ft)       *          *   12.41  *          *
* Conv. Total (cfs)       *751814.1  * Conv. (cfs)             *          *751814.1  *          *
* Length Wtd. (ft)        *  656.00  * Wetted Per. (ft)       *          *  235.25  *          *
* Min Ch El (ft)          *  713.60  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.92  *          *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)   *          * 1001.10  *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *          *   88.67  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  740.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.39  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)          *  740.00  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)          *  725.54  * Flow Area (sq ft)      *          * 3901.55  *          *
* E.G. Slope (ft/ft)      *0.000284  * Area (sq ft)           *          * 3901.55  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)          *  270.51  * Top Width (ft)         *          *  270.51  *          *
* Vel Total (ft/s)        *    5.00  * Avg. Vel. (ft/s)       *          *    5.00  *          *
* Max Chl Dpth (ft)       *   26.40  * Hydr. Depth (ft)       *          *   14.42  *          *
* Conv. Total (cfs)       *1156977.0  * Conv. (cfs)            *          *1156977.0  *          *
* Length Wtd. (ft)        *  656.00  * Wetted Per. (ft)       *          *  280.22  *          *
* Min Ch El (ft)          *  713.60  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.23  *          *
* Frctn Loss (ft)         *    0.18  * Cum Volume (acre-ft)   *    1.44  * 1367.61  *    4.45  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    2.27  *  100.58  *    6.45  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)          *  743.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.44  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)          *  743.54  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
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* Crit W.S. (ft)         *  727.78  * Flow Area (sq ft)      *          * 4981.27  *          *
* E.G. Slope (ft/ft)     *0.000324  * Area (sq ft)           *          * 4981.27  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  347.17  * Top Width (ft)         *          *  347.17  *          *
* Vel Total (ft/s)       *    5.34  * Avg. Vel. (ft/s)       *          *    5.34  *          *
* Max Chl Dpth (ft)      *   29.94  * Hydr. Depth (ft)       *          *   14.35  *          *
* Conv. Total (cfs)      *1478139.0  * Conv. (cfs)            *          *1478139.0  *          *
* Length Wtd. (ft)       *  656.00  * Wetted Per. (ft)       *          *  357.41  *          *
* Min Ch El (ft)         *  713.60  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.50  *          *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *   14.56  * 1674.70  *   31.90  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.79  *  108.23  *   15.52  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *    0.029  *          *
* W.S. Elev (ft)         *  746.87  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)         *  729.97  * Flow Area (sq ft)      *          * 6218.54  *          *
* E.G. Slope (ft/ft)     *0.000296  * Area (sq ft)           *          * 6218.54  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  388.48  * Top Width (ft)         *          *  388.48  *          *
* Vel Total (ft/s)       *    5.50  * Avg. Vel. (ft/s)       *          *    5.50  *          *
* Max Chl Dpth (ft)      *   33.27  * Hydr. Depth (ft)       *          *   16.01  *          *
* Conv. Total (cfs)      *1986782.0  * Conv. (cfs)            *          *1986782.0  *          *
* Length Wtd. (ft)       *  656.00  * Wetted Per. (ft)       *          *  399.38  *          *
* Min Ch El (ft)         *  713.60  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.58  *          *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *   49.97  * 1966.82  *   82.72  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.68  *  112.95  *   29.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.042  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  751.99  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)         *  733.35  * Flow Area (sq ft)      * 1639.20  * 8286.85  *   13.27  *
* E.G. Slope (ft/ft)     *0.000203  * Area (sq ft)           * 1639.20  * 8286.85  *   13.27  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1367.73  *44125.47  *    6.79  *
* Top Width (ft)         * 1226.63  * Top Width (ft)         *  803.55  *  409.77  *   13.31  *
* Vel Total (ft/s)       *    4.58  * Avg. Vel. (ft/s)       *    0.83  *    5.32  *    0.51  *
* Max Chl Dpth (ft)      *   38.39  * Hydr. Depth (ft)       *    2.04  *   20.22  *    1.00  *
* Conv. Total (cfs)      *3191303.0  * Conv. (cfs)            * 95930.7  *3094896.0  *   476.5  *
* Length Wtd. (ft)       *  651.64  * Wetted Per. (ft)       *  806.66  *  421.11  *   13.46  *
* Min Ch El (ft)         *  713.60  * Shear (lb/sq ft)       *    0.03  *    0.25  *    0.01  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.02  *    1.33  *    0.01  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *  190.78  * 2387.73  *  224.11  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   83.51  *  116.79  *   71.01  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.34  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.043  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  754.96  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)         *  735.30  * Flow Area (sq ft)      * 4033.52  * 9503.13  *   62.58  *
* E.G. Slope (ft/ft)     *0.000160  * Area (sq ft)           * 4033.52  * 9503.13  *   62.58  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 5163.32  *49175.70  *   60.99  *
* Top Width (ft)         * 1235.75  * Top Width (ft)         *  806.66  *  409.77  *   19.32  *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *    1.28  *    5.17  *    0.97  *
* Max Chl Dpth (ft)      *   41.36  * Hydr. Depth (ft)       *    5.00  *   23.19  *    3.24  *
* Conv. Total (cfs)      *4301531.0  * Conv. (cfs)            *408275.2  *3888434.0  *  4822.3  *
* Length Wtd. (ft)       *  644.26  * Wetted Per. (ft)       *  818.67  *  421.11  *   20.19  *
* Min Ch El (ft)         *  713.60  * Shear (lb/sq ft)       *    0.05  *    0.23  *    0.03  *
```

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* Alpha                  *    1.52  * Stream Power (lb/ft s) *    0.06  *    1.17  *    0.03  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *  464.15  * 2694.50  *  448.77  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  129.84  *  118.69  *  156.14  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.043  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  756.66  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)         *  736.83  * Flow Area (sq ft)      * 5402.19  *10198.39  *   97.49  *
* E.G. Slope (ft/ft)     *0.000156  * Area (sq ft)           * 5417.42  *10198.39  *   97.49  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 8252.22  *54633.36  *  114.41  *
* Top Width (ft)         * 1265.36  * Top Width (ft)         *  833.61  *  409.77  *   21.98  *
* Vel Total (ft/s)       *    4.01  * Avg. Vel. (ft/s)       *    1.53  *    5.36  *    1.17  *
* Max Chl Dpth (ft)      *   43.06  * Hydr. Depth (ft)       *    6.70  *   24.89  *    4.43  *
* Conv. Total (cfs)      *5043894.0  * Conv. (cfs)           *660687.9  *4374046.0  *  9160.2  *
* Length Wtd. (ft)       *  640.22  * Wetted Per. (ft)       *  823.76  *  421.11  *   23.35  *
* Min Ch El (ft)         *  713.60  * Shear (lb/sq ft)       *    0.06  *    0.24  *    0.04  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.10  *    1.26  *    0.05  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *  689.15  * 2886.57  *  781.42  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  152.82  *  118.92  *  310.21  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  760.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *   0.043  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  759.72  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)         *  738.83  * Flow Area (sq ft)      * 7873.57  *11453.81  *  174.12  *
* E.G. Slope (ft/ft)     *0.000134  * Area (sq ft)           * 8130.28  *11453.81  *  174.12  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *14213.10  *61453.60  *  233.30  *
* Top Width (ft)         * 1428.53  * Top Width (ft)         *  990.30  *  409.77  *   28.45  *
* Vel Total (ft/s)       *    3.89  * Avg. Vel. (ft/s)       *    1.81  *    5.37  *    1.34  *
* Max Chl Dpth (ft)      *   46.12  * Hydr. Depth (ft)       *    9.76  *   27.95  *    6.12  *
* Conv. Total (cfs)      *6555538.0  * Conv. (cfs)           *1227596.0  *5307792.0  * 20150.7  *
* Length Wtd. (ft)       *  633.87  * Wetted Per. (ft)       *  832.95  *  421.11  *   30.52  *
* Min Ch El (ft)         *  713.60  * Shear (lb/sq ft)       *    0.08  *    0.23  *    0.05  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *    0.14  *    1.22  *    0.06  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   * 1150.80  * 3175.59  * 1672.28  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  186.72  *  119.39  *  485.78  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  749.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *   0.041  *   0.029  *          *
* W.S. Elev (ft)         *  748.53  * Reach Len. (ft)        *  510.00  *  656.00  *  695.00  *
* Crit W.S. (ft)         *  731.35  * Flow Area (sq ft)      *   18.09  * 6874.09  *          *
* E.G. Slope (ft/ft)     *0.000277  * Area (sq ft)           *   18.09  * 6874.09  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    4.51  *38295.49  *          *
* Top Width (ft)         *  469.18  * Top Width (ft)         *   68.16  *  401.02  *          *
* Vel Total (ft/s)       *    5.56  * Avg. Vel. (ft/s)       *    0.25  *    5.57  *          *
* Max Chl Dpth (ft)      *   34.93  * Hydr. Depth (ft)       *    0.27  *   17.14  *          *
* Conv. Total (cfs)      *2299169.0  * Conv. (cfs)           *   270.7  *2298898.0  *          *
* Length Wtd. (ft)       *  655.87  * Wetted Per. (ft)       *   68.16  *  412.24  *          *
* Min Ch El (ft)         *  713.60  * Shear (lb/sq ft)       *    0.00  *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.61  *          *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *   81.93  * 2114.54  *  120.52  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   36.42  *  114.89  *   38.32  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 4.188

INPUT
Description: COE River Station= 45735.62
Preliminary Model River Station
(miles)=4.18

Obstructions are buildings. Ineffective flow on
left is a corridor with high ground dowsntream which will block
the water.

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	780	45.62	778	58.79	776	70.11	774	94.11	772
148.08	770	158.86	768	191.91	766	374.16	764	435.22	762
530.11	760	773.65	756	783.15	756	822.97	756	844.18	754
947.64	752	1409.83	752	2021.01	754	2035	753	2047.95	752
2054.19	750	2083.26	750	2200	750	3201.7	748	3310.03	746
3317.51	744	3324.99	742	3333.6	740	3339.64	738	3346.58	736
3353.93	734	3363.43	732	3372.54	730	3384	728	3396.57	726
3406.75	724	3416.42	722	3425	713.2	3505	713.2	3518.29	722
3524.92	724	3529.96	726	3532.62	728	3536.64	730	3540.91	732
3545.27	734	3552.2	736	3560.61	738	3566.59	740	3572.31	742
3577.81	744	3583.25	746	3589.59	748	3595.61	750	3624.82	752
3733.12	754	3743.1	756	3752.77	758	3761.59	760	3771.43	762
3784.3	764	3794.71	766	3812.23	768	3830.19	770	3877.03	772
3925.85	774	3965.42	776	3978.26	778	3995.8	780	4008.56	782
4020.68	784	4028.96	786	4150.88	786	4151.37	786		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	2035	.04	2200	.041	3310.03	.029	3595.61	.041

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3310.03 3595.61 850 865 945 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1120	775	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
257.5	669.5	775	1120	2034.25	780	2199.05	3110.6	775

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	735.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.029	
W.S. Elev (ft)	735.46	Reach Len. (ft)	850.00	865.00	945.00
Crit W.S. (ft)	721.90	Flow Area (sq ft)		2863.47	
E.G. Slope (ft/ft)	0.000226	Area (sq ft)		2863.47	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	201.75	Top Width (ft)		201.75	
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)		4.37	
Max Chl Dpth (ft)	22.26	Hydr. Depth (ft)		14.19	
Conv. Total (cfs)	831190.4	Conv. (cfs)		831190.4	
Length Wtd. (ft)	865.00	Wetted Per. (ft)		212.36	
Min Ch El (ft)	713.20	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.83	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		958.39	
C & E Loss (ft)	0.01	Cum SA (acres)		85.45	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	740.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.029	
W.S. Elev (ft)	739.81	Reach Len. (ft)	850.00	865.00	945.00

```
* Crit W.S. (ft)         *  725.00  * Flow Area (sq ft)      *          * 3809.22  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 3809.22  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  231.82  * Top Width (ft)         *          *  231.82  *          *
* Vel Total (ft/s)       *    5.12  * Avg. Vel. (ft/s)       *          *    5.12  *          *
* Max Chl Dpth (ft)      *   26.61  * Hydr. Depth (ft)       *          *   16.43  *          *
* Conv. Total (cfs)      *1220219.0  * Conv. (cfs)            *          *1220219.0  *          *
* Length Wtd. (ft)       *  865.00  * Wetted Per. (ft)       *          *  243.69  *          *
* Min Ch El (ft)         *  713.20  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.28  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *    1.44  * 1309.55  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *   96.80  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *    0.029  *          *
* W.S. Elev (ft)         *  743.28  * Reach Len. (ft)        *  850.00  *  865.00  *  945.00  *
* Crit W.S. (ft)         *  727.41  * Flow Area (sq ft)      *          * 4655.99  *          *
* E.G. Slope (ft/ft)     *0.000277  * Area (sq ft)           *          * 4655.99  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  255.61  * Top Width (ft)         *          *  255.61  *          *
* Vel Total (ft/s)       *    5.71  * Avg. Vel. (ft/s)       *          *    5.71  *          *
* Max Chl Dpth (ft)      *   30.08  * Hydr. Depth (ft)       *          *   18.22  *          *
* Conv. Total (cfs)      *1598283.0  * Conv. (cfs)            *          *1598283.0  *          *
* Length Wtd. (ft)       *  865.00  * Wetted Per. (ft)       *          *  268.50  *          *
* Min Ch El (ft)         *  713.20  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.71  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *   14.56  * 1602.13  *   31.90  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.79  *  103.69  *   15.52  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *   0.041  *   0.029  *          *
* W.S. Elev (ft)         *  746.54  * Reach Len. (ft)        *  850.00  *  865.00  *  945.00  *
* Crit W.S. (ft)         *  729.62  * Flow Area (sq ft)      *    8.00  * 5524.89  *          *
* E.G. Slope (ft/ft)     *0.000285  * Area (sq ft)           *    8.00  * 5524.89  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *    2.05  *34197.95  *          *
* Top Width (ft)         *  304.38  * Top Width (ft)         *   29.44  *  274.94  *          *
* Vel Total (ft/s)       *    6.18  * Avg. Vel. (ft/s)       *    0.26  *    6.19  *          *
* Max Chl Dpth (ft)      *   33.34  * Hydr. Depth (ft)       *    0.27  *   20.09  *          *
* Conv. Total (cfs)      *2025225.0  * Conv. (cfs)            *   121.6  *2025103.0  *          *
* Length Wtd. (ft)       *  865.00  * Wetted Per. (ft)       *   29.44  *  288.76  *          *
* Min Ch El (ft)         *  713.20  * Shear (lb/sq ft)       *    0.00  *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    2.11  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *   49.92  * 1878.40  *   82.72  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.51  *  107.95  *   29.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  751.66  * Reach Len. (ft)        *  850.00  *  865.00  *  945.00  *
* Crit W.S. (ft)         *  732.30  * Flow Area (sq ft)      * 1073.93  * 6967.25  *   20.07  *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           * 1073.93  * 6967.25  *   20.07  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1356.42  *44133.85  *    9.73  *
* Top Width (ft)         *  659.25  * Top Width (ft)         *  349.46  *  285.58  *   24.21  *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)       *    1.26  *    6.33  *    0.48  *
* Max Chl Dpth (ft)      *   38.46  * Hydr. Depth (ft)       *    3.07  *   24.40  *    0.83  *
* Conv. Total (cfs)      *2996265.0  * Conv. (cfs)            * 89322.8  *2906302.0  *   640.7  *
* Length Wtd. (ft)       *  864.95  * Wetted Per. (ft)       *  354.87  *  299.94  *   24.27  *
* Min Ch El (ft)         *  713.20  * Shear (lb/sq ft)       *    0.04  *    0.33  *    0.01  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.06  *    2.12  *    0.01  *
```

```
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *  174.90  * 2272.87  *  223.84  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   76.76  *  111.56  *   70.71  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  755.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  754.59  * Reach Len. (ft)        *  850.00  *  865.00  *  945.00  *
* Crit W.S. (ft)         *  734.16  * Flow Area (sq ft)      * 2131.51  * 7805.97  *  278.58  *
* E.G. Slope (ft/ft)     *0.000207  * Area (sq ft)           * 2745.57  * 7805.97  *  278.58  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 3666.05  *50504.97  *  228.98  *
* Top Width (ft)         * 1072.41  * Top Width (ft)         *  646.36  *  285.58  *  140.48  *
* Vel Total (ft/s)       *    5.32  * Avg. Vel. (ft/s)       *    1.72  *    6.47  *    0.82  *
* Max Chl Dpth (ft)      *   41.39  * Hydr. Depth (ft)       *    5.85  *   27.33  *    1.98  *
* Conv. Total (cfs)      *3783389.0  * Conv. (cfs)            *254964.9  *3512499.0  * 15925.0  *
* Length Wtd. (ft)       *  865.50  * Wetted Per. (ft)       *  377.15  *  299.94  *  140.62  *
* Min Ch El (ft)         *  713.20  * Shear (lb/sq ft)       *    0.07  *    0.34  *    0.03  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.13  *    2.17  *    0.02  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *  424.47  * 2564.17  *  446.05  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  121.33  *  113.46  *  154.87  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  756.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.67  * Wt. n-Val.             *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  756.24  * Reach Len. (ft)        *  850.00  *  865.00  *  945.00  *
* Crit W.S. (ft)         *  735.80  * Flow Area (sq ft)      * 2731.17  * 8276.13  *  516.61  *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           * 3837.42  * 8276.13  *  516.61  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 5560.65  *56809.99  *  629.36  *
* Top Width (ft)         * 1159.49  * Top Width (ft)         *  725.25  *  285.58  *  148.66  *
* Vel Total (ft/s)       *    5.47  * Avg. Vel. (ft/s)       *    2.04  *    6.86  *    1.22  *
* Max Chl Dpth (ft)      *   43.04  * Hydr. Depth (ft)       *    7.50  *   28.98  *    3.48  *
* Conv. Total (cfs)      *4294047.0  * Conv. (cfs)            *379011.0  *3872139.0  * 42897.0  *
* Length Wtd. (ft)       *  865.95  * Wetted Per. (ft)       *  382.09  *  299.94  *  148.97  *
* Min Ch El (ft)         *  713.20  * Shear (lb/sq ft)       *    0.10  *    0.37  *    0.05  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.20  *    2.55  *    0.06  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *  634.97  * 2747.46  *  776.52  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  143.70  *  113.68  *  308.85  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  759.28  * Reach Len. (ft)        *  850.00  *  865.00  *  945.00  *
* Crit W.S. (ft)         *  738.04  * Flow Area (sq ft)      * 3837.77  * 9143.79  *  990.22  *
* E.G. Slope (ft/ft)     *0.000201  * Area (sq ft)           * 6246.99  * 9143.79  *  990.22  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 9306.69  *64900.27  * 1693.05  *
* Top Width (ft)         * 1263.11  * Top Width (ft)         *  814.73  *  285.58  *  162.80  *
* Vel Total (ft/s)       *    5.43  * Avg. Vel. (ft/s)       *    2.43  *    7.10  *    1.71  *
* Max Chl Dpth (ft)      *   46.08  * Hydr. Depth (ft)       *   10.54  *   32.02  *    6.08  *
* Conv. Total (cfs)      *5347004.0  * Conv. (cfs)            *655637.6  *4572095.0  *119271.7  *
* Length Wtd. (ft)       *  866.84  * Wetted Per. (ft)       *  391.20  *  299.94  *  163.43  *
* Min Ch El (ft)         *  713.20  * Shear (lb/sq ft)       *    0.12  *    0.38  *    0.08  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.30  *    2.72  *    0.13  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   * 1066.64  * 3020.49  * 1662.99  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  176.15  *  114.15  *  484.25  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	748.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.041	0.029	
W.S. Elev (ft)	748.18	Reach Len. (ft)	850.00	865.00	945.00
Crit W.S. (ft)	730.64	Flow Area (sq ft)	136.04	5979.20	
E.G. Slope (ft/ft)	0.000281	Area (sq ft)	136.04	5979.20	
Q Total (cfs)	38300.00	Flow (cfs)	64.17	38235.83	
Top Width (ft)	478.83	Top Width (ft)	198.73	280.10	
Vel Total (ft/s)	6.26	Avg. Vel. (ft/s)	0.47	6.39	
Max Chl Dpth (ft)	34.98	Hydr. Depth (ft)	0.68	21.35	
Conv. Total (cfs)	2285584.0	Conv. (cfs)	3829.3	2281755.0	
Length Wtd. (ft)	864.99	Wetted Per. (ft)	198.75	294.17	
Min Ch El (ft)	713.20	Shear (lb/sq ft)	0.01	0.36	
Alpha	1.04	Stream Power (lb/ft s)	0.01	2.28	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	81.02	2017.75	120.52
C & E Loss (ft)	0.01	Cum SA (acres)	34.85	109.77	38.32

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 4.024

INPUT
Description: COE River Station= 46600.95
Preliminary Model River Station
(miles)=4.01

FEMA XSEC E. Obstructions are buildings.
Ineffective flow on left is a corridor with high ground dowsntream
which will block the water.
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	778	23.22	776	46.61	774	62.87	772	73.97	770
84.18	768	94.66	766	579.66	756	791.35	754	830.37	752
1426.9	752	2060	752	2101.85	752	2133.04	750	2154.49	750
2210.77	750	2230.74	750	2268	750	2946.11	752	3090.17	750
3135.76	748	3153.15	746	3160.16	744	3165.17	742	3187.35	740
3196.9	738	3209.21	736	3220.03	734	3230.82	732	3245.79	730
3258.14	728	3265.94	726	3274.34	724	3284.56	722	3295	713
3362	713	3373.36	722	3377.15	724	3382.24	726	3385.87	728
3390.77	730	3394.88	732	3399.34	734	3406.51	736	3410.59	738
3416.5	740	3422.45	742	3428.8	744	3434.74	746	3440.55	748
3446.39	750	3493.73	750	3495.17	750	3655.71	748	3663.68	748
3671.48	750	3677.95	752	3685.47	754	3692.49	756	3698.37	758
3705.31	760	3718.35	762	3729.7	764	3736.63	766	3741.98	768
3744.7	770	3751.04	772	3758.29	774	3765.3	776	3770.45	778
3777.43	780	3995.7	782	4001.81	782	4016.06	782	4019.29	784
4028.66	786	4032.33	788	4038.04	790	4042.35	792	4046.45	794
4050.15	796	4072.41	796						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	2060	.048	2268	.041	3135.76	.029	3446.39	.041

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3135.76 3446.39 223 608 716 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1155	775	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
154.5	628.3	775	1155	2060	780	2266	2909.75	775
3490	3672	750						

CROSS SECTION OUTPUT Profile #2-yr

```
* E.G. Elev (ft)         *  735.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  735.12  * Reach Len. (ft)        *  223.00  *  608.00  *  716.00  *
* Crit W.S. (ft)         *  722.73  * Flow Area (sq ft)      *          * 2486.74  *          *
* E.G. Slope (ft/ft)     *0.000334  * Area (sq ft)           *          * 2486.74  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  189.35  * Top Width (ft)          *          *  189.35  *          *
* Vel Total (ft/s)       *    5.03  * Avg. Vel. (ft/s)        *          *    5.03  *          *
* Max Chl Dpth (ft)      *   22.12  * Hydr. Depth (ft)        *          *   13.13  *          *
* Conv. Total (cfs)      *684053.6  * Conv. (cfs)             *          *684053.6  *          *
* Length Wtd. (ft)       *  608.00  * Wetted Per. (ft)        *          *  199.91  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)        *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.30  *          *
* Frctn Loss (ft)        *    0.22  * Cum Volume (acre-ft)    *          *  905.26  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *   81.57  *          *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  739.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  739.42  * Reach Len. (ft)        *  223.00  *  608.00  *  716.00  *
* Crit W.S. (ft)         *  726.01  * Flow Area (sq ft)      *          * 3380.35  *          *
* E.G. Slope (ft/ft)     *0.000365  * Area (sq ft)           *          * 3380.35  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  224.69  * Top Width (ft)          *          *  224.69  *          *
* Vel Total (ft/s)       *    5.77  * Avg. Vel. (ft/s)        *          *    5.77  *          *
* Max Chl Dpth (ft)      *   26.42  * Hydr. Depth (ft)        *          *   15.04  *          *
* Conv. Total (cfs)      *1020237.0  * Conv. (cfs)            *          *1020237.0  *          *
* Length Wtd. (ft)       *  608.00  * Wetted Per. (ft)        *          *  236.45  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)        *          *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.88  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)    *    1.44  * 1238.17  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    2.27  *   92.26  *    6.45  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  743.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  742.87  * Reach Len. (ft)        *  223.00  *  608.00  *  716.00  *
* Crit W.S. (ft)         *  728.56  * Flow Area (sq ft)      *          * 4224.83  *          *
* E.G. Slope (ft/ft)     *0.000395  * Area (sq ft)           *          * 4224.83  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  262.24  * Top Width (ft)          *          *  262.24  *          *
* Vel Total (ft/s)       *    6.30  * Avg. Vel. (ft/s)        *          *    6.30  *          *
* Max Chl Dpth (ft)      *   29.87  * Hydr. Depth (ft)        *          *   16.11  *          *
* Conv. Total (cfs)      *1338166.0  * Conv. (cfs)            *          *1338166.0  *          *
* Length Wtd. (ft)       *  608.00  * Wetted Per. (ft)        *          *  274.89  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)        *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    2.39  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)    *   14.56  * 1513.95  *   31.90  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    8.79  *   98.55  *   15.52  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  746.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.69  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  746.15  * Reach Len. (ft)        *  223.00  *  608.00  *  716.00  *
* Crit W.S. (ft)         *  730.98  * Flow Area (sq ft)      *          * 5116.52  *          *
* E.G. Slope (ft/ft)     *0.000383  * Area (sq ft)           *          * 5116.52  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  283.34  * Top Width (ft)          *          *  283.34  *          *
* Vel Total (ft/s)       *    6.68  * Avg. Vel. (ft/s)        *          *    6.68  *          *
* Max Chl Dpth (ft)      *   33.15  * Hydr. Depth (ft)        *          *   18.06  *          *
* Conv. Total (cfs)      *1748665.0  * Conv. (cfs)            *          *1748665.0  *          *
```

```
* Length Wtd. (ft)       *  608.00  * Wetted Per. (ft)       *           *  297.01  *          *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *           *    0.41  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    2.75  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *   49.84  * 1772.74  *   82.72  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.23  *  102.41  *   29.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  752.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.              *   0.044  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  751.33  * Reach Len. (ft)        *  223.00  *  608.00  *  716.00  *
* Crit W.S. (ft)         *  733.85  * Flow Area (sq ft)      *  360.06  * 6688.40  *  301.84  *
* E.G. Slope (ft/ft)     *0.000306  * Area (sq ft)           *  360.06  * 6688.40  *  301.84  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  239.82  *45030.45  *  229.73  *
* Top Width (ft)         *  834.96  * Top Width (ft)         *  294.94  *  310.63  *  229.39  *
* Vel Total (ft/s)       *    6.19  * Avg. Vel. (ft/s)       *    0.67  *    6.73  *    0.76  *
* Max Chl Dpth (ft)      *   38.33  * Hydr. Depth (ft)       *    1.22  *   21.53  *    1.32  *
* Conv. Total (cfs)      *2600184.0  * Conv. (cfs)           * 13705.1  *2573350.0  * 13128.5  *
* Length Wtd. (ft)       *  606.25  * Wetted Per. (ft)       *  296.37  *  325.05  *  229.59  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.02  *    0.39  *    0.03  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.02  *    2.65  *    0.02  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  160.91  * 2137.29  *  220.35  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   70.48  *  105.64  *   67.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.              *   0.044  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  754.35  * Reach Len. (ft)        *  223.00  *  608.00  *  716.00  *
* Crit W.S. (ft)         *  735.82  * Flow Area (sq ft)      * 1596.10  * 7627.74  * 1011.74  *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           * 2419.07  * 7627.74  * 1011.74  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2008.68  *50875.61  * 1515.72  *
* Top Width (ft)         * 1383.90  * Top Width (ft)         *  832.95  *  310.63  *  240.32  *
* Vel Total (ft/s)       *    5.31  * Avg. Vel. (ft/s)       *    1.26  *    6.67  *    1.50  *
* Max Chl Dpth (ft)      *   41.35  * Hydr. Depth (ft)       *    3.69  *   24.56  *    4.21  *
* Conv. Total (cfs)      *3425396.0  * Conv. (cfs)           *126480.1  *3203476.0  * 95439.8  *
* Length Wtd. (ft)       *  595.41  * Wetted Per. (ft)       *  441.30  *  325.05  *  240.93  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.06  *    0.37  *    0.07  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.07  *    2.46  *    0.10  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *  374.08  * 2410.93  *  432.05  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  106.90  *  107.54  *  150.74  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.              *   0.044  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  756.02  * Reach Len. (ft)        *  223.00  *  608.00  *  716.00  *
* Crit W.S. (ft)         *  737.48  * Flow Area (sq ft)      * 2317.90  * 8146.74  * 1418.15  *
* E.G. Slope (ft/ft)     *0.000251  * Area (sq ft)           * 3946.14  * 8146.74  * 1418.15  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 3710.59  *56676.83  * 2612.59  *
* Top Width (ft)         * 1515.51  * Top Width (ft)         *  958.71  *  310.63  *  246.17  *
* Vel Total (ft/s)       *    5.30  * Avg. Vel. (ft/s)       *    1.60  *    6.96  *    1.84  *
* Max Chl Dpth (ft)      *   43.02  * Hydr. Depth (ft)       *    5.37  *   26.23  *    5.76  *
* Conv. Total (cfs)      *3973769.0  * Conv. (cfs)           *234047.8  *3574931.0  *164790.7  *
* Length Wtd. (ft)       *  586.82  * Wetted Per. (ft)       *  446.31  *  325.05  *  247.01  *
* Min Ch El (ft)         *  713.00  * Shear (lb/sq ft)       *    0.08  *    0.39  *    0.09  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.13  *    2.74  *    0.17  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *  559.03  * 2584.40  *  755.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  127.27  *  107.76  *  304.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	759.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.044	0.029	0.041
W.S. Elev (ft)	759.12	Reach Len. (ft)	223.00	608.00	716.00
Crit W.S. (ft)	739.68	Flow Area (sq ft)	3656.09	9108.94	2195.12
E.G. Slope (ft/ft)	0.000219	Area (sq ft)	6915.84	9108.94	2195.12
Q Total (cfs)	75900.00	Flow (cfs)	7306.39	63680.14	4913.47
Top Width (ft)	1525.21	Top Width (ft)	958.71	310.63	255.87
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)	2.00	6.99	2.24
Max Chl Dpth (ft)	46.12	Hydr. Depth (ft)	8.46	29.32	8.58
Conv. Total (cfs)	5132306.0	Conv. (cfs)	494053.4	4306008.0	332245.3
Length Wtd. (ft)	572.04	Wetted Per. (ft)	455.60	325.05	257.20
Min Ch El (ft)	713.00	Shear (lb/sq ft)	0.11	0.38	0.12
Alpha	1.62	Stream Power (lb/ft s)	0.22	2.67	0.26
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	938.21	2839.26	1628.44
C & E Loss (ft)	0.01	Cum SA (acres)	158.85	108.23	479.71

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	748.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.029	
W.S. Elev (ft)	747.80	Reach Len. (ft)	223.00	608.00	716.00
Crit W.S. (ft)	732.15	Flow Area (sq ft)		5598.15	
E.G. Slope (ft/ft)	0.000387	Area (sq ft)		5598.15	
Q Total (cfs)	38300.00	Flow (cfs)		38300.00	
Top Width (ft)	302.41	Top Width (ft)		302.41	
Vel Total (ft/s)	6.84	Avg. Vel. (ft/s)		6.84	
Max Chl Dpth (ft)	34.80	Hydr. Depth (ft)		18.51	
Conv. Total (cfs)	1947429.0	Conv. (cfs)		1947429.0	
Length Wtd. (ft)	607.96	Wetted Per. (ft)		316.46	
Min Ch El (ft)	713.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		2.92	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	79.70	1902.81	120.52
C & E Loss (ft)	0.01	Cum SA (acres)	32.92	103.98	38.32

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.909

INPUT
Description: COE River Station= 47208.87
Preliminary Model River Station
(miles)=3.9

Obstructions are buildings. Ineffective flow on
left is a corridor with high ground dowsntream which will block
the water.
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	774	35.45	772	45.77	770	55.26	768	65.33	766
79.83	764	751.49	754	773.42	752	2035	752	2078.57	752
2112.49	750	2134.34	750	2215	750	2219.18	750	2304.41	750
2313.48	750	2391.98	750	2581.86	750	2614.13	750	2758.94	752
2874.78	752	2912.55	750	2927.02	748	2952.71	746	2956.67	744
2965.88	742	2976	740	2988.08	738	2997.34	736	3008.42	734
3017.98	732	3034.99	730	3058.11	728	3061.82	726	3065.25	724
3068.72	722	3080	712.9	3140	712.9	3154.77	722	3160.97	724
3166.33	726	3171.78	728	3178.03	730	3184	732	3190.56	734
3196	736	3202.41	738	3205.24	740	3212.6	742	3217.83	744
3223.96	746	3228.77	748	3234.39	750	3804.87	750	3912	750

```
 3961.94     750 3971.68     748 3975.53     748 3995.18     750 4005.21     752
 4015.78     754 4051.91     756 4060.77     758 4067.89     760 4074.45     762
 4082.09     764 4087.73     766    4095     768 4101.63     770 4104.77     772
 4112.06     774 4116.55     776 4121.04     778 4124.62     780 4128.33     782
 4132.68     784 4136.15     786 4140.27     788 4144.56     790 4148.85     792
 4152.75     794 4156.96     796 4163.92     798  4173.5     800  4179.7     802
 4190.96     804 4203.13     806 4215.89     808  4229.2     810 4241.51     812
 4251.65     814 4262.52     816

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041    2035    .042    2215    .041 2952.71    .029 3234.39    .041
    3912    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2952.71 3234.39              307     284     246              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1080     775       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
  139.05  592.25     775    1080 2034.25     780  2214.5  2626.5     775
    3296    3914     770  3914.2    4020     754

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  735.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  734.83  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  723.10  * Flow Area (sq ft)      *          * 2333.26  *          *
* E.G. Slope (ft/ft)     *0.000410  * Area (sq ft)           *          * 2333.26  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  189.02  * Top Width (ft)          *          *  189.02  *          *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)        *          *    5.36  *          *
* Max Chl Dpth (ft)      *   21.93  * Hydr. Depth (ft)        *          *   12.34  *          *
* Conv. Total (cfs)      *617032.9  * Conv. (cfs)             *          *617032.9  *          *
* Length Wtd. (ft)       *  284.00  * Wetted Per. (ft)        *          *  198.99  *          *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)        *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.61  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *          *  871.63  *          *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *          *   78.93  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  739.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  739.12  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  726.29  * Flow Area (sq ft)      *          * 3218.18  *          *
* E.G. Slope (ft/ft)     *0.000424  * Area (sq ft)           *          * 3218.18  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  222.71  * Top Width (ft)          *          *  222.71  *          *
* Vel Total (ft/s)       *    6.06  * Avg. Vel. (ft/s)        *          *    6.06  *          *
* Max Chl Dpth (ft)      *   26.22  * Hydr. Depth (ft)        *          *   14.45  *          *
* Conv. Total (cfs)      *946627.9  * Conv. (cfs)             *          *946627.9  *          *
* Length Wtd. (ft)       *  284.00  * Wetted Per. (ft)        *          *  233.97  *          *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)        *          *    0.36  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    2.21  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)    *    1.44  * 1192.12  *    4.45  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *    2.27  *   89.14  *    6.45  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  743.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  742.55  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  729.37  * Flow Area (sq ft)      *          * 4029.89  *          *
```

```
* E.G. Slope (ft/ft)     *0.000436  * Area (sq ft)           *          * 4029.89  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  250.72  * Top Width (ft)         *          *  250.72  *          *
* Vel Total (ft/s)       *    6.60  * Avg. Vel. (ft/s)       *          *    6.60  *          *
* Max Chl Dpth (ft)      *   29.65  * Hydr. Depth (ft)       *          *   16.07  *          *
* Conv. Total (cfs)      *1273998.0  * Conv. (cfs)            *          *1273998.0  *          *
* Length Wtd. (ft)       *  283.95  * Wetted Per. (ft)       *          *  262.95  *          *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)       *          *    0.42  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.75  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   14.56  * 1456.35  *   31.90  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    8.79  *   94.97  *   15.52  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.76  * Wt. n-Val.             *          *   0.029  *          *
* W.S. Elev (ft)         *  745.83  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  731.94  * Flow Area (sq ft)      *          * 4887.27  *          *
* E.G. Slope (ft/ft)     *0.000419  * Area (sq ft)           *          * 4887.27  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  270.41  * Top Width (ft)         *          *  270.41  *          *
* Vel Total (ft/s)       *    7.00  * Avg. Vel. (ft/s)       *          *    7.00  *          *
* Max Chl Dpth (ft)      *   32.93  * Hydr. Depth (ft)       *          *   18.07  *          *
* Conv. Total (cfs)      *1669973.0  * Conv. (cfs)            *          *1669973.0  *          *
* Length Wtd. (ft)       *  283.69  * Wetted Per. (ft)       *          *  283.79  *          *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)       *          *    0.45  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.16  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   49.84  * 1702.93  *   82.72  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   23.23  *   98.54  *   29.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  751.04  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  734.62  * Flow Area (sq ft)      *  285.37  * 6329.36  *   64.09  *
* E.G. Slope (ft/ft)     *0.000327  * Area (sq ft)           *  285.37  * 6329.36  *   64.09  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  249.21  *45208.33  *   42.46  *
* Top Width (ft)         *  585.53  * Top Width (ft)         *  242.04  *  281.68  *   61.81  *
* Vel Total (ft/s)       *    6.81  * Avg. Vel. (ft/s)       *    0.87  *    7.14  *    0.66  *
* Max Chl Dpth (ft)      *   38.14  * Hydr. Depth (ft)       *    1.18  *   22.47  *    1.04  *
* Conv. Total (cfs)      *2515307.0  * Conv. (cfs)            * 13776.4  *2499183.0  *  2347.3  *
* Length Wtd. (ft)       *  283.67  * Wetted Per. (ft)       *  244.22  *  295.87  *   64.92  *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)       *    0.02  *    0.44  *    0.02  *
* Alpha                  *    1.09  * Stream Power (lb/ft s) *    0.02  *    3.12  *    0.01  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  159.26  * 2046.44  *  217.34  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   69.10  *  101.50  *   65.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *   0.041  *   0.029  *   0.041  *
* W.S. Elev (ft)         *  754.05  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  736.46  * Flow Area (sq ft)      * 1606.96  * 7178.11  *  255.44  *
* E.G. Slope (ft/ft)     *0.000284  * Area (sq ft)           * 2258.58  * 7178.11  *  255.44  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2078.55  *51949.68  *  371.76  *
* Top Width (ft)         * 1284.31  * Top Width (ft)         *  838.33  *  281.68  *  164.29  *
* Vel Total (ft/s)       *    6.02  * Avg. Vel. (ft/s)       *    1.29  *    7.24  *    1.46  *
* Max Chl Dpth (ft)      *   41.15  * Hydr. Depth (ft)       *    3.17  *   25.48  *    1.55  *
* Conv. Total (cfs)      *3227738.0  * Conv. (cfs)            *123327.7  *3082352.0  * 22058.0  *
* Length Wtd. (ft)       *  283.15  * Wetted Per. (ft)       *  516.78  *  295.87  *  176.40  *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)       *    0.06  *    0.43  *    0.03  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.07  *    3.11  *    0.04  *
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* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  362.11  * 2307.60  *  421.64  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  102.62  *  103.40  *  147.41  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  756.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *   0.041  *   0.029  *   0.040  *
* W.S. Elev (ft)         *  755.71  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  738.04  * Flow Area (sq ft)      * 2445.70  * 7644.60  *  552.29  *
* E.G. Slope (ft/ft)     *0.000287  * Area (sq ft)           * 3739.02  * 7644.60  *  552.29  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4185.66  *57983.25  *  831.10  *
* Top Width (ft)         * 1425.45  * Top Width (ft)         *  949.56  *  281.68  *  194.21  *
* Vel Total (ft/s)       *    5.92  * Avg. Vel. (ft/s)       *    1.71  *    7.58  *    1.50  *
* Max Chl Dpth (ft)      *   42.81  * Hydr. Depth (ft)       *    4.83  *   27.14  *    2.84  *
* Conv. Total (cfs)      *3719580.0  * Conv. (cfs)            *247125.3  *3423386.0  * 49068.7  *
* Length Wtd. (ft)       *  282.96  * Wetted Per. (ft)       *  521.75  *  295.87  *  209.67  *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)       *    0.08  *    0.46  *    0.05  *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    0.14  *    3.51  *    0.07  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  539.36  * 2474.19  *  739.34  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  122.38  *  103.63  *  300.95  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.041  *   0.029  *   0.038  *
* W.S. Elev (ft)         *  758.85  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  740.17  * Flow Area (sq ft)      * 4038.65  * 8530.55  * 1196.75  *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           * 6851.23  * 8530.55  * 1196.75  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 8899.02  *64687.83  * 2313.15  *
* Top Width (ft)         * 1487.30  * Top Width (ft)         *  994.21  *  281.68  *  211.41  *
* Vel Total (ft/s)       *    5.51  * Avg. Vel. (ft/s)       *    2.20  *    7.58  *    1.93  *
* Max Chl Dpth (ft)      *   45.95  * Hydr. Depth (ft)       *    7.97  *   30.28  *    5.66  *
* Conv. Total (cfs)      *4822210.0  * Conv. (cfs)            *565387.7  *4109859.0  *146963.1  *
* Length Wtd. (ft)       *  282.58  * Wetted Per. (ft)       *  531.18  *  295.87  *  233.51  *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)       *    0.12  *    0.45  *    0.08  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.26  *    3.38  *    0.15  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  902.97  * 2716.16  * 1600.57  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  153.85  *  104.10  *  475.87  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  748.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.041  *   0.029  *          *
* W.S. Elev (ft)         *  747.48  * Reach Len. (ft)        *  307.00  *  284.00  *  246.00  *
* Crit W.S. (ft)         *  732.96  * Flow Area (sq ft)      *   13.98  * 5335.03  *          *
* E.G. Slope (ft/ft)     *0.000401  * Area (sq ft)           *   13.98  * 5335.03  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    8.27  *38291.73  *          *
* Top Width (ft)         *  293.75  * Top Width (ft)         *   18.95  *  274.80  *          *
* Vel Total (ft/s)       *    7.16  * Avg. Vel. (ft/s)       *    0.59  *    7.18  *          *
* Max Chl Dpth (ft)      *   34.58  * Hydr. Depth (ft)       *    0.74  *   19.41  *          *
* Conv. Total (cfs)      *1911844.0  * Conv. (cfs)            *   412.7  *1911431.0  *          *
* Length Wtd. (ft)       *  283.55  * Wetted Per. (ft)       *   19.01  *  288.54  *          *
* Min Ch El (ft)         *  712.90  * Shear (lb/sq ft)       *    0.02  *    0.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.01  *    3.32  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   79.66  * 1826.50  *  120.52  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   32.87  *   99.95  *   38.32  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.856

INPUT
Description: COE River Station= 47492.91
Preliminary Model River Station
(miles)=3.85

KC Southern RR Bridge. B10 (upstream).
Obstructions are buildings. Ineffective flow on left is a
corridor with high ground dowsntream which will block the water.

Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	770	97.38	768	132.17	766	145.63	764	156.02	762
507.02	756	712.83	754	728.19	754	776.14	754	816.17	752
899.02	750	964.52	750	1104.04	752	1819.26	754	1938.85	752
1997.78	750	2105.01	750	2180.53	752	2181.92	752	2199.34	750
2270.96	750	2489.93	750	2678.49	750	2678.5	740	2701.6	729
2713.7	728	2752	712.84	2840	712.84	2893.3	741.2	2954.8	741.2
2954.81	750	3090.57	750	3143.65	750	3176.51	748	3185.92	746
3191.89	746	3201.32	748	3233.48	750	4064.72	752	4072.93	752
4138.59	752	4155.89	754	4177.33	756	4181.83	758	4187.32	760
4189.66	762	4193.4	764	4198.09	766	4201.62	768	4209.71	770
4215.31	772	4219.32	774	4238.63	776	4251.42	778	4265.18	780
4278.03	780								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	2678.5	.04	2893.3	.041

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2678.5 2893.3 25 26 25 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1236	775	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
350.2	798.25	775	1236	2163	780	3145	3230	750
3455	4050	770						

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	735.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.040	
W.S. Elev (ft)	734.86	Reach Len. (ft)	1.50	1.50	1.50
Crit W.S. (ft)	720.82	Flow Area (sq ft)		3059.62	
E.G. Slope (ft/ft)	0.000322	Area (sq ft)		3059.62	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	192.09	Top Width (ft)		192.09	
Vel Total (ft/s)	4.09	Avg. Vel. (ft/s)		4.09	
Max Chl Dpth (ft)	22.02	Hydr. Depth (ft)		15.93	
Conv. Total (cfs)	696149.6	Conv. (cfs)		696149.6	
Length Wtd. (ft)	1.50	Wetted Per. (ft)		201.84	
Min Ch El (ft)	712.84	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.25	
Frctn Loss (ft)		Cum Volume (acre-ft)		854.05	
C & E Loss (ft)		Cum SA (acres)		77.68	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	739.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.040	
W.S. Elev (ft)	739.14	Reach Len. (ft)	1.50	1.50	1.50
Crit W.S. (ft)	723.35	Flow Area (sq ft)		3917.91	
E.G. Slope (ft/ft)	0.000388	Area (sq ft)		3917.91	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	

```
* Top Width (ft)          *  209.12  * Top Width (ft)          *           *  209.12  *           *
* Vel Total (ft/s)        *    4.98  * Avg. Vel. (ft/s)        *           *    4.98  *           *
* Max Chl Dpth (ft)       *   26.30  * Hydr. Depth (ft)        *           *   18.74  *           *
* Conv. Total (cfs)       *989822.4  * Conv. (cfs)             *           *989822.4  *           *
* Length Wtd. (ft)        *    1.50  * Wetted Per. (ft)        *           *  220.90  *           *
* Min Ch El (ft)          *  712.84  * Shear (lb/sq ft)        *           *    0.43  *           *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *           *    2.14  *           *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *    1.44  * 1168.85  *    4.45  *
* C & E Loss (ft)         *          * Cum SA (acres)          *    2.27  *   87.73  *    6.45  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  743.06  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.50  * Wt. n-Val.               *   0.000  *   0.040  *   0.041  *
* W.S. Elev (ft)          *  742.55  * Reach Len. (ft)          *    1.50  *    1.50  *    1.50  *
* Crit W.S. (ft)          *  725.52  * Flow Area (sq ft)        *    0.00  * 4646.42  *   83.21  *
* E.G. Slope (ft/ft)      *0.000423  * Area (sq ft)             *    0.00  * 4646.42  *   83.21  *
* Q Total (cfs)           *26600.00  * Flow (cfs)               *    0.00  *26525.21  *   74.79  *
* Top Width (ft)          *  276.30  * Top Width (ft)           *          *  214.80  *   61.50  *
* Vel Total (ft/s)        *    5.62  * Avg. Vel. (ft/s)         *    0.01  *    5.71  *    0.90  *
* Max Chl Dpth (ft)       *   29.71  * Hydr. Depth (ft)         *    1.33  *   21.63  *    1.35  *
* Conv. Total (cfs)       *1294089.0  * Conv. (cfs)             *     0.0  *1290450.0  *  3638.6  *
* Length Wtd. (ft)        *    1.50  * Wetted Per. (ft)         *    2.44  *  227.29  *   62.79  *
* Min Ch El (ft)          *  712.84  * Shear (lb/sq ft)         *          *    0.54  *    0.03  *
* Alpha                   *    1.03  * Stream Power (lb/ft s) *           *    3.08  *    0.03  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *   14.56  * 1428.06  *   31.67  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *    8.79  *   93.45  *   15.34  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  746.43  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.61  * Wt. n-Val.               *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)          *  745.82  * Reach Len. (ft)          *    1.50  *    1.50  *    1.50  *
* Crit W.S. (ft)          *  727.56  * Flow Area (sq ft)        *    0.02  * 5348.78  *  284.32  *
* E.G. Slope (ft/ft)      *0.000425  * Area (sq ft)             *    0.02  * 5348.78  *  284.32  *
* Q Total (cfs)           *34200.00  * Flow (cfs)               *    0.00  *33638.84  *  561.16  *
* Top Width (ft)          *  276.31  * Top Width (ft)           *          *  214.80  *   61.51  *
* Vel Total (ft/s)        *    6.07  * Avg. Vel. (ft/s)         *    0.02  *    6.29  *    1.97  *
* Max Chl Dpth (ft)       *   32.98  * Hydr. Depth (ft)         *    2.91  *   24.90  *    4.62  *
* Conv. Total (cfs)       *1658901.0  * Conv. (cfs)             *     0.0  *1631681.0  * 27219.8  *
* Length Wtd. (ft)        *    1.50  * Wetted Per. (ft)         *    5.82  *  227.29  *   66.22  *
* Min Ch El (ft)          *  712.84  * Shear (lb/sq ft)         *    0.00  *    0.62  *    0.11  *
* Alpha                   *    1.06  * Stream Power (lb/ft s) *    0.00  *    3.93  *    0.22  *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *   49.84  * 1669.56  *   81.92  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)          *   23.23  *   96.96  *   29.27  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  751.70  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.70  * Wt. n-Val.               *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)          *  751.00  * Reach Len. (ft)          *    1.50  *    1.50  *    1.50  *
* Crit W.S. (ft)          *  730.39  * Flow Area (sq ft)        *  482.28  * 6460.26  * 1042.87  *
* E.G. Slope (ft/ft)      *0.000388  * Area (sq ft)             *  602.91  * 6460.26  * 1042.87  *
* Q Total (cfs)           *45500.00  * Flow (cfs)               *  337.24  *44050.11  * 1112.65  *
* Top Width (ft)          * 1440.74  * Top Width (ft)           *  664.24  *  214.80  *  561.70  *
* Vel Total (ft/s)        *    5.70  * Avg. Vel. (ft/s)         *    0.70  *    6.82  *    1.07  *
* Max Chl Dpth (ft)       *   38.16  * Hydr. Depth (ft)         *    0.99  *   30.08  *    1.86  *
* Conv. Total (cfs)       *2308654.0  * Conv. (cfs)             * 17111.7  *2235087.0  * 56455.3  *
* Length Wtd. (ft)        *    1.50  * Wetted Per. (ft)         *  497.89  *  227.29  *  571.26  *
* Min Ch El (ft)          *  712.84  * Shear (lb/sq ft)         *    0.02  *    0.69  *    0.04  *
```

```
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.02  *    4.70  *    0.05  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  156.13  * 2004.75  *  214.22  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   65.91  *   99.88  *   63.81  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.              *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  754.13  * Reach Len. (ft)        *    1.50  *    1.50  *    1.50  *
* Crit W.S. (ft)         *  732.17  * Flow Area (sq ft)      * 2076.84  * 7132.72  * 3009.72  *
* E.G. Slope (ft/ft)     *0.000303  * Area (sq ft)           * 3329.37  * 7132.72  * 3009.72  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 3261.79  *45857.41  * 5280.80  *
* Top Width (ft)         * 1837.01  * Top Width (ft)         *  953.25  *  214.80  *  668.96  *
* Vel Total (ft/s)       *    4.45  * Avg. Vel. (ft/s)       *    1.57  *    6.43  *    1.75  *
* Max Chl Dpth (ft)      *   41.29  * Hydr. Depth (ft)       *    4.03  *   33.21  *    4.50  *
* Conv. Total (cfs)      *3127222.0  * Conv. (cfs)           *187506.0  *2636145.0  *303570.3  *
* Length Wtd. (ft)       *    1.50  * Wetted Per. (ft)       *  528.20  *  227.29  *  683.94  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.07  *    0.59  *    0.08  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.12  *    3.81  *    0.15  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  342.41  * 2260.95  *  412.42  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   96.31  *  101.78  *  145.06  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  756.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.              *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  755.84  * Reach Len. (ft)        *    1.50  *    1.50  *    1.50  *
* Crit W.S. (ft)         *  733.76  * Flow Area (sq ft)      * 2959.17  * 7500.37  * 4170.42  *
* E.G. Slope (ft/ft)     *0.000288  * Area (sq ft)           * 4960.96  * 7500.37  * 4170.42  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 5728.79  *48646.71  * 8624.50  *
* Top Width (ft)         * 1855.36  * Top Width (ft)         *  953.25  *  214.80  *  687.31  *
* Vel Total (ft/s)       *    4.31  * Avg. Vel. (ft/s)       *    1.94  *    6.49  *    2.07  *
* Max Chl Dpth (ft)      *   43.00  * Hydr. Depth (ft)       *    5.74  *   34.92  *    6.07  *
* Conv. Total (cfs)      *3712239.0  * Conv. (cfs)           *337565.4  *2866480.0  *508193.7  *
* Length Wtd. (ft)       *    1.50  * Wetted Per. (ft)       *  529.91  *  227.29  *  705.79  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.10  *    0.59  *    0.11  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.19  *    3.85  *    0.22  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  508.70  * 2424.82  *  726.01  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  115.68  *  102.01  *  298.46  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.              *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  759.04  * Reach Len. (ft)        *    1.50  *    1.50  *    1.50  *
* Crit W.S. (ft)         *  735.98  * Flow Area (sq ft)      * 4606.61  * 8186.83  * 6382.92  *
* E.G. Slope (ft/ft)     *0.000228  * Area (sq ft)           * 8011.04  * 8186.83  * 6382.92  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *10617.06  *50092.49  *15190.45  *
* Top Width (ft)         * 1885.17  * Top Width (ft)         *  974.00  *  214.80  *  696.37  *
* Vel Total (ft/s)       *    3.96  * Avg. Vel. (ft/s)       *    2.30  *    6.12  *    2.38  *
* Max Chl Dpth (ft)      *   46.20  * Hydr. Depth (ft)       *    8.94  *   38.11  *    9.17  *
* Conv. Total (cfs)      *5025813.0  * Conv. (cfs)           *703021.8  *3316937.0  *1005855.0  *
* Length Wtd. (ft)       *    1.50  * Wetted Per. (ft)       *  533.11  *  227.29  *  721.86  *
```

```
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.12  *    0.51  *    0.13  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *    0.28  *    3.14  *    0.30  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  850.60  * 2661.66  * 1579.16  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  146.92  *  102.48  *  473.31  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  748.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  747.46  * Reach Len. (ft)        *    1.50  *    1.50  *    1.50  *
* Crit W.S. (ft)         *  728.77  * Flow Area (sq ft)      *    0.03  * 5700.50  *  385.03  *
* E.G. Slope (ft/ft)     *0.000425  * Area (sq ft)           *    0.03  * 5700.50  *  385.03  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    0.00  *37384.14  *  915.86  *
* Top Width (ft)         *  276.31  * Top Width (ft)         *          *  214.80  *   61.51  *
* Vel Total (ft/s)       *    6.29  * Avg. Vel. (ft/s)       *    0.02  *    6.56  *    2.38  *
* Max Chl Dpth (ft)      *   34.62  * Hydr. Depth (ft)       *    3.73  *   26.54  *    6.26  *
* Conv. Total (cfs)      *1858850.0  * Conv. (cfs)            *     0.0  *1814400.0  * 44450.4  *
* Length Wtd. (ft)       *    1.50  * Wetted Per. (ft)       *    7.46  *  227.29  *   67.72  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.00  *    0.66  *    0.15  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.00  *    4.36  *    0.36  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   79.61  * 1790.53  *  119.43  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   32.80  *   98.36  *   38.15  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 3.853

INPUT
Description: Bridge B10.  KC Southern RR Bridge.  Bridge has been normalized to
             channel flow from 20 degree skew.
Distance from Upstream XS =     1.5
Deck/Roadway Width        =      22
Weir Coefficient          =     1.7
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************
 2678.49     750  742.85 2954.81     750  742.85

Upstream Bridge Cross Section Data
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     770   97.38     768  132.17     766  145.63     764  156.02     762
  507.02     756  712.83     754  728.19     754  776.14     754  816.17     752
  899.02     750  964.52     750 1104.04     752 1819.26     754 1938.85     752
 1997.78     750 2105.01     750 2180.53     752 2181.92     752 2199.34     750
 2270.96     750 2489.93     750 2678.49     750  2678.5     740  2701.6     729
  2713.7     728    2752  712.84    2840  712.84  2893.3   741.2  2954.8   741.2
 2954.81     750 3090.57     750 3143.65     750 3176.51     748 3185.92     746
 3191.89     746 3201.32     748 3233.48     750 4064.72     752 4072.93     752
 4138.59     752 4155.89     754 4177.33     756 4181.83     758 4187.32     760
 4189.66     762  4193.4     764 4198.09     766 4201.62     768 4209.71     770
 4215.31     772 4219.32     774 4238.63     776 4251.42     778 4265.18     780
 4278.03     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
```

```
       0    .041  2678.5     .04  2893.3    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
        2678.5  2893.3             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1236     775       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************************************
   350.2  798.25     775    1236    2163     780    3145    3230     750
    3455    4050     770

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************
 2678.49     750  742.85 2954.81     750  742.85

Downstream Bridge Cross Section Data
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     770   97.38     768  132.17     766  145.63     764  156.02     762
  507.02     756  712.83     754  728.19     754  776.14     754  816.17     752
  899.02     750  964.52     750 1104.04     752 1819.26     754 1938.85     752
 1997.78     750 2105.01     750 2180.53     752 2181.92     752 2199.34     750
 2270.96     750 2489.93     750 2678.49     750  2678.5     740  2701.6     729
  2713.7     728    2752  712.84    2840  712.84  2893.3   741.2  2954.8   741.2
 2954.81     750 3090.57     750 3143.65     750 3176.51     748 3185.92     746
 3191.89     746 3201.32     748 3233.48     750 4064.72     752 4072.93     752
 4138.59     752 4155.89     754 4177.33     756 4181.83     758 4187.32     760
 4189.66     762  4193.4     764 4198.09     766 4201.62     768 4209.71     770
 4215.31     772 4219.32     774 4238.63     776 4251.42     778 4265.18     780
 4278.03     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041  2678.5     .04  2893.3    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
        2678.5  2893.3             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1236     775       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************************************
   350.2  798.25     775    1236    2163     780    3145    3230     750
    3455    4050     770

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=    2752    Downstream=    2752
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    14.5     713    14.5     736    16.6  736.01    16.6  742.85
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
    14.5     713    14.5     736    16.6  736.01    16.6  742.85

Pier Data
Pier Station     Upstream=    2877    Downstream=    2877
Upstream     num=       4
```

```
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*************************************************************
    14.5     713    14.5     736    16.6  736.01    16.6  742.85
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*************************************************************
    14.5     713    14.5     736    16.6  736.01    16.6  742.85

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.39
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     735.12  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     734.86  * E.G. Elev (ft)         *     735.15  *     735.15  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     734.82  *     734.82  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     721.54  *     721.54  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.98  *      21.98  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.62  *       4.62  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2708.29  *    2708.29  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   27673.07  *   27673.07  *
* Min El Weir Flow (ft)  *     749.79  * Hydr Depth (ft)        *      16.33  *      16.33  *
* Min El Prs (ft)        *     742.85  * W.P. Total (ft)        *     220.77  *     220.77  *
* Delta EG (ft)          *       0.04  * Conv. Total (cfs)      *   535132.8  *   535132.8  *
* Delta WS (ft)          *       0.04  * Top Width (ft)         *     165.88  *     165.88  *
* BR Open Area (sq ft)   *    4209.20  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.62  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.42  *       0.42  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.93  *       1.93  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     739.52  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     739.14  * E.G. Elev (ft)         *     739.58  *     739.58  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     739.07  *     739.07  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     724.24  *     724.24  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.23  *      26.23  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.69  *       5.69  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3426.82  *    3426.82  *
* Weir Submerg           *             * Froude # Chl           *       0.27  *       0.27  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   42350.77  *   42350.77  *
* Min El Weir Flow (ft)  *     749.79  * Hydr Depth (ft)        *      19.51  *      19.51  *
* Min El Prs (ft)        *     742.85  * W.P. Total (ft)        *     253.19  *     253.19  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *   722976.1  *   722976.1  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *     175.65  *     175.65  *
* BR Open Area (sq ft)   *    4209.20  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       5.69  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.61  *       0.61  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       3.50  *       3.50  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	743.06	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	742.55	E.G. Elev (ft)	743.04	743.02
Q Total (cfs)	26600.00	W.S. Elev (ft)	742.37	742.35
Q Bridge (cfs)	26600.00	Crit W.S. (ft)	726.57	726.57
Q Weir (cfs)		Max Chl Dpth (ft)	29.53	29.51
Weir Sta Lft (ft)		Vel Total (ft/s)	6.50	6.51
Weir Sta Rgt (ft)		Flow Area (sq ft)	4091.64	4086.71
Weir Submerg		Froude # Chl	0.28	0.28
Weir Max Depth (ft)		Specif Force (cu ft)	56641.91	56564.84
Min El Weir Flow (ft)	749.79	Hydr Depth (ft)	16.83	16.81
Min El Prs (ft)	742.85	W.P. Total (ft)	338.16	338.06
Delta EG (ft)	0.09	Conv. Total (cfs)	899845.9	898573.3
Delta WS (ft)	0.09	Top Width (ft)	243.10	243.10
BR Open Area (sq ft)	4209.20	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	6.51	C & E Loss (ft)	0.00	0.05
Coef of Q		Shear Total (lb/sq ft)	0.66	0.66
Br Sel Method	Energy only	Power Total (lb/ft s)	4.29	4.30

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	746.43	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	745.82	E.G. Elev (ft)	746.38	746.32
Q Total (cfs)	34200.00	W.S. Elev (ft)	745.32	745.26
Q Bridge (cfs)	34200.00	Crit W.S. (ft)	728.96	728.96
Q Weir (cfs)		Max Chl Dpth (ft)	32.48	32.42
Weir Sta Lft (ft)		Vel Total (ft/s)	8.13	8.13
Weir Sta Rgt (ft)		Flow Area (sq ft)	4209.20	4209.20
Weir Submerg		Froude # Chl	0.32	0.32
Weir Max Depth (ft)		Specif Force (cu ft)	72376.95	72130.84
Min El Weir Flow (ft)	749.79	Hydr Depth (ft)		
Min El Prs (ft)	742.85	W.P. Total (ft)	584.09	584.09
Delta EG (ft)	0.24	Conv. Total (cfs)	663270.1	663270.3
Delta WS (ft)	0.25	Top Width (ft)		
BR Open Area (sq ft)	4209.20	Frctn Loss (ft)	0.06	0.00
BR Open Vel (ft/s)	8.13	C & E Loss (ft)	0.00	0.13
Coef of Q		Shear Total (lb/sq ft)	1.20	1.20
Br Sel Method	Energy only	Power Total (lb/ft s)	9.72	9.72

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	751.70	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	751.00	E.G. Elev (ft)	751.58	751.47
Q Total (cfs)	45500.00	W.S. Elev (ft)	749.70	749.60
Q Bridge (cfs)	45500.00	Crit W.S. (ft)	731.49	731.49
Q Weir (cfs)		Max Chl Dpth (ft)	36.86	36.76
Weir Sta Lft (ft)		Vel Total (ft/s)	10.81	10.81
Weir Sta Rgt (ft)		Flow Area (sq ft)	4209.20	4209.20
Weir Submerg		Froude # Chl	0.39	0.39
Weir Max Depth (ft)		Specif Force (cu ft)	97560.92	97125.21
Min El Weir Flow (ft)	749.79	Hydr Depth (ft)		

```
* Min El Prs (ft)        *     742.85  * W.P. Total (ft)        *     584.09  *     584.09  *
* Delta EG (ft)          *       0.56  * Conv. Total (cfs)      *   663270.3  *   663270.1  *
* Delta WS (ft)          *       0.63  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    4209.20  * Frctn Loss (ft)        *       0.10  *       0.00  *
* BR Open Vel (ft/s)     *      10.81  * C & E Loss (ft)        *       0.00  *       0.33  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.12  *       2.12  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      22.89  *      22.89  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     754.68  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     754.13  * E.G. Elev (ft)         *     754.67  *     754.62  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     754.08  *     754.01  *
* Q Bridge (cfs)         *   31464.36  * Crit W.S. (ft)         *     733.34  *     733.34  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.24  *      41.17  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.68  *       5.74  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9579.84  *    9480.40  *
* Weir Submerg           *             * Froude # Chl           *       0.19  *       0.19  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  121235.60  *  120682.80  *
* Min El Weir Flow (ft)  *     749.79  * Hydr Depth (ft)        *       6.85  *       6.78  *
* Min El Prs (ft)        *     742.85  * W.P. Total (ft)        *    1991.65  *    1990.68  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *  1101331.0  *  1085898.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *    1836.54  *    1835.78  *
* BR Open Area (sq ft)   *    4209.20  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       7.48  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.73  *       0.75  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       4.16  *       4.28  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     756.36  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.84  * E.G. Elev (ft)         *     756.34  *     756.30  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     755.89  *     755.84  *
* Q Bridge (cfs)         *   26577.70  * Crit W.S. (ft)         *     735.00  *     735.00  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.05  *      43.00  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.20  *       5.22  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   12119.69  *   12059.11  *
* Weir Submerg           *             * Froude # Chl           *       0.17  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  141054.70  *  140596.10  *
* Min El Weir Flow (ft)  *     749.79  * Hydr Depth (ft)        *       8.55  *       8.51  *
* Min El Prs (ft)        *     742.85  * W.P. Total (ft)        *    2016.48  *    2015.89  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  1542285.0  *  1530776.0  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *    1855.87  *    1855.42  *
* BR Open Area (sq ft)   *    4209.20  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *       6.31  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.63  *       0.63  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.25  *       3.30  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
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         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     759.45  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     759.04  * E.G. Elev (ft)         *     759.42  *     759.40  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     759.10  *     759.08  *
* Q Bridge (cfs)         *   19505.39  * Crit W.S. (ft)         *     737.26  *     737.26  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      46.26  *      46.24  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.55  *       4.56  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   16685.92  *   16656.40  *
* Weir Submerg           *             * Froude # Chl           *       0.14  *       0.14  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  187618.70  *  187293.30  *
* Min El Weir Flow (ft)  *     749.79  * Hydr Depth (ft)        *      11.69  *      11.67  *
* Min El Prs (ft)        *     742.85  * W.P. Total (ft)        *    2035.45  *    2035.33  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  2545144.0  *  2537877.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *    1888.94  *    1887.67  *
* BR Open Area (sq ft)   *    4209.20  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       4.63  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.46  *       0.46  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.07  *       2.08  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     748.11  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     747.46  * E.G. Elev (ft)         *     748.05  *     747.97  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     746.71  *     746.64  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     729.93  *     729.93  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.87  *      33.80  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.10  *       9.10  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4209.20  *    4209.20  *
* Weir Submerg           *             * Froude # Chl           *       0.35  *       0.35  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   80474.32  *   80165.52  *
* Min El Weir Flow (ft)  *     749.79  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     742.85  * W.P. Total (ft)        *     584.09  *     584.09  *
* Delta EG (ft)          *       0.34  * Conv. Total (cfs)      *   663270.3  *   663270.3  *
* Delta WS (ft)          *       0.36  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    4209.20  * Frctn Loss (ft)        *       0.07  *       0.00  *
* BR Open Vel (ft/s)     *       9.10  * C & E Loss (ft)        *       0.00  *       0.20  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.50  *       1.50  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      13.65  *      13.65  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.851

INPUT
Description: COE River Station= 47518.45
Preliminary Model River Station
(miles)=3.84

KC Southern RR Bridge. B10 (downstream).
Normalized to channel flow from 20 degree skew. Piers are aligned
with channel flow. Underwater channel shown on bridge plans.
Obstructions are buildings. Ineffective flow on left is a
corridor with high ground dowsntream which will block the water.

Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	770	97.38	768	132.17	766	145.63	764	156.02	762
507.02	756	712.83	754	728.19	754	776.14	754	816.17	752
899.02	750	964.52	750	1104.04	752	1819.26	754	1938.85	752
1997.78	750	2105.01	750	2180.53	752	2181.92	752	2199.34	750
2270.96	750	2489.93	750	2678.49	750	2678.5	740	2701.6	729
2713.7	728	2752	712.84	2840	712.84	2893.3	741.2	2954.8	741.2
2954.81	750	3090.57	750	3143.65	750	3176.51	748	3185.92	746
3191.89	746	3201.32	748	3233.48	750	4064.72	752	4072.93	752
4138.59	752	4155.89	754	4177.33	756	4181.83	758	4187.32	760
4189.66	762	4193.4	764	4198.09	766	4201.62	768	4209.71	770
4215.31	772	4219.32	774	4238.63	776	4251.42	778	4265.18	780
4278.03	780								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	2678.5	.04	2893.3	.041

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2678.5	2893.3	304	262	44	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1236	775	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
350.2	798.25	775	1236	2163	780	3145	3230	750
3455	4050	770						

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	735.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.040	
W.S. Elev (ft)	734.82	Reach Len. (ft)	304.00	262.00	44.00
Crit W.S. (ft)	720.82	Flow Area (sq ft)		3052.20	
E.G. Slope (ft/ft)	0.000325	Area (sq ft)		3052.20	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	191.94	Top Width (ft)		191.94	
Vel Total (ft/s)	4.10	Avg. Vel. (ft/s)		4.10	
Max Chl Dpth (ft)	21.98	Hydr. Depth (ft)		15.90	
Conv. Total (cfs)	693732.5	Conv. (cfs)		693732.5	
Length Wtd. (ft)	262.00	Wetted Per. (ft)		201.67	
Min Ch El (ft)	712.84	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.26	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		852.41	
C & E Loss (ft)	0.00	Cum SA (acres)		77.58	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	739.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.040	
W.S. Elev (ft)	739.07	Reach Len. (ft)	304.00	262.00	44.00
Crit W.S. (ft)	723.35	Flow Area (sq ft)		3903.88	

```
* E.G. Slope (ft/ft)     *0.000392  * Area (sq ft)           *          * 3903.88  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  208.85  * Top Width (ft)         *          *  208.85  *          *
* Vel Total (ft/s)       *    5.00  * Avg. Vel. (ft/s)       *          *    5.00  *          *
* Max Chl Dpth (ft)      *   26.23  * Hydr. Depth (ft)       *          *   18.69  *          *
* Conv. Total (cfs)      *984809.3  * Conv. (cfs)            *          *984809.3  *          *
* Length Wtd. (ft)       *  262.00  * Wetted Per. (ft)       *          *  220.61  *          *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *          *    0.43  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.16  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.44  * 1166.79  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *   87.63  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.000  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  742.46  * Reach Len. (ft)        *  304.00  *  262.00  *   44.00  *
* Crit W.S. (ft)         *  725.52  * Flow Area (sq ft)      *    0.00  * 4626.54  *   77.52  *
* E.G. Slope (ft/ft)     *0.000429  * Area (sq ft)           *    0.00  * 4626.54  *   77.52  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *    0.00  *26533.04  *   66.96  *
* Top Width (ft)         *  276.30  * Top Width (ft)         *          *  214.80  *   61.50  *
* Vel Total (ft/s)       *    5.65  * Avg. Vel. (ft/s)       *    0.01  *    5.73  *    0.86  *
* Max Chl Dpth (ft)      *   29.62  * Hydr. Depth (ft)       *    1.24  *   21.54  *    1.26  *
* Conv. Total (cfs)      *1284497.0  * Conv. (cfs)            *     0.0  *1281264.0  *  3233.4  *
* Length Wtd. (ft)       *  261.73  * Wetted Per. (ft)       *    2.44  *  227.29  *   62.79  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *          *    0.54  *    0.03  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *          *    3.13  *    0.03  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   14.56  * 1425.64  *   31.62  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    8.79  *   93.34  *   15.31  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  745.57  * Reach Len. (ft)        *  304.00  *  262.00  *   44.00  *
* Crit W.S. (ft)         *  727.56  * Flow Area (sq ft)      *    0.02  * 5294.10  *  268.66  *
* E.G. Slope (ft/ft)     *0.000441  * Area (sq ft)           *    0.02  * 5294.10  *  268.66  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *    0.00  *33677.71  *  522.29  *
* Top Width (ft)         *  276.31  * Top Width (ft)         *          *  214.80  *   61.50  *
* Vel Total (ft/s)       *    6.15  * Avg. Vel. (ft/s)       *    0.02  *    6.36  *    1.94  *
* Max Chl Dpth (ft)      *   32.73  * Hydr. Depth (ft)       *    2.78  *   24.65  *    4.37  *
* Conv. Total (cfs)      *1628849.0  * Conv. (cfs)            *     0.0  *1603974.0  * 24875.2  *
* Length Wtd. (ft)       *  260.34  * Wetted Per. (ft)       *    5.57  *  227.29  *   65.79  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.00  *    0.64  *    0.11  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.00  *    4.08  *    0.22  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   49.84  * 1667.05  *   81.85  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   23.23  *   96.95  *   29.26  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.77  * Wt. n-Val.             *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  750.37  * Reach Len. (ft)        *  304.00  *  262.00  *   44.00  *
* Crit W.S. (ft)         *  730.39  * Flow Area (sq ft)      *  178.85  * 6325.91  *  696.93  *
* E.G. Slope (ft/ft)     *0.000431  * Area (sq ft)           *  210.89  * 6325.91  *  696.93  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   68.46  *44780.91  *  650.63  *
* Top Width (ft)         * 1298.80  * Top Width (ft)         *  589.25  *  214.80  *  494.75  *
* Vel Total (ft/s)       *    6.32  * Avg. Vel. (ft/s)       *    0.38  *    7.08  *    0.93  *
* Max Chl Dpth (ft)      *   37.53  * Hydr. Depth (ft)       *    0.37  *   29.45  *    1.41  *
* Conv. Total (cfs)      *2192809.0  * Conv. (cfs)            *  3299.6  *2158153.0  * 31356.0  *
* Length Wtd. (ft)       *  258.15  * Wetted Per. (ft)       *  492.41  *  227.29  *  503.85  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.01  *    0.75  *    0.04  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    0.00  *    5.30  *    0.03  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  156.11  * 2002.19  *  214.13  *
```

```
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   65.88  *   99.87  *   63.78  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  754.04  * Reach Len. (ft)        *  304.00  *  262.00  *   44.00  *
* Crit W.S. (ft)         *  732.17  * Flow Area (sq ft)      * 2032.73  * 7114.34  * 2952.51  *
* E.G. Slope (ft/ft)     *0.000308  * Area (sq ft)           * 3247.80  * 7114.34  * 2952.51  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 3174.81  *46057.18  * 5168.00  *
* Top Width (ft)         * 1836.10  * Top Width (ft)         *  953.25  *  214.80  *  668.04  *
* Vel Total (ft/s)       *    4.50  * Avg. Vel. (ft/s)       *    1.56  *    6.47  *    1.75  *
* Max Chl Dpth (ft)      *   41.20  * Hydr. Depth (ft)       *    3.94  *   33.12  *    4.42  *
* Conv. Total (cfs)      *3100297.0  * Conv. (cfs)           *180935.0  *2624833.0  *294528.2  *
* Length Wtd. (ft)       *  244.06  * Wetted Per. (ft)       *  528.12  *  227.29  *  682.85  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.07  *    0.60  *    0.08  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *    0.12  *    3.89  *    0.15  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  340.47  * 2257.88  *  410.89  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   95.74  *  101.66  *  144.66  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  755.76  * Reach Len. (ft)        *  304.00  *  262.00  *   44.00  *
* Crit W.S. (ft)         *  733.76  * Flow Area (sq ft)      * 2920.06  * 7484.08  * 4118.31  *
* E.G. Slope (ft/ft)     *0.000292  * Area (sq ft)           * 4888.64  * 7484.08  * 4118.31  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 5645.88  *48835.66  * 8518.46  *
* Top Width (ft)         * 1854.55  * Top Width (ft)         *  953.25  *  214.80  *  686.50  *
* Vel Total (ft/s)       *    4.34  * Avg. Vel. (ft/s)       *    1.93  *    6.53  *    2.07  *
* Max Chl Dpth (ft)      *   42.92  * Hydr. Depth (ft)       *    5.66  *   34.84  *    6.00  *
* Conv. Total (cfs)      *3684496.0  * Conv. (cfs)           *330194.2  *2856107.0  *498193.9  *
* Length Wtd. (ft)       *  239.23  * Wetted Per. (ft)       *  529.84  *  227.29  *  704.82  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.10  *    0.60  *    0.11  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *    0.19  *    3.92  *    0.22  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  505.73  * 2421.52  *  723.75  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  115.11  *  101.88  *  298.05  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  758.97  * Reach Len. (ft)        *  304.00  *  262.00  *   44.00  *
* Crit W.S. (ft)         *  735.98  * Flow Area (sq ft)      * 4574.99  * 8173.65  * 6340.21  *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           * 7951.40  * 8173.65  * 6340.21  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *10554.79  *50234.80  *15110.41  *
* Top Width (ft)         * 1881.42  * Top Width (ft)         *  970.41  *  214.80  *  696.20  *
* Vel Total (ft/s)       *    3.98  * Avg. Vel. (ft/s)       *    2.31  *    6.15  *    2.38  *
* Max Chl Dpth (ft)      *   46.13  * Hydr. Depth (ft)       *    8.87  *   38.05  *    9.11  *
* Conv. Total (cfs)      *4998141.0  * Conv. (cfs)           *695050.5  *3308045.0  *995045.4  *
* Length Wtd. (ft)       *  227.47  * Wetted Per. (ft)       *  533.05  *  227.29  *  721.56  *
* Min Ch El (ft)         *  712.84  * Shear (lb/sq ft)       *    0.12  *    0.52  *    0.13  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *    0.29  *    3.18  *    0.30  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  845.79  * 2657.95  * 1575.58  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  146.33  *  102.35  *  472.89  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	747.77	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.68	Wt. n-Val.	0.041	0.040	0.041	
W.S. Elev (ft)	747.10	Reach Len. (ft)	304.00	262.00	44.00	
Crit W.S. (ft)	728.77	Flow Area (sq ft)	0.03	5622.56	362.71	
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	0.03	5622.56	362.71	
Q Total (cfs)	38300.00	Flow (cfs)	0.00	37446.63	853.38	
Top Width (ft)	276.31	Top Width (ft)		214.80	61.51	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)	0.02	6.66	2.35	
Max Chl Dpth (ft)	34.26	Hydr. Depth (ft)	3.56	26.18	5.90	
Conv. Total (cfs)	1813653.0	Conv. (cfs)	0.0	1773242.0	40410.6	
Length Wtd. (ft)	259.57	Wetted Per. (ft)	7.07	227.29	67.30	
Min Ch El (ft)	712.84	Shear (lb/sq ft)	0.00	0.69	0.15	
Alpha	1.06	Stream Power (lb/ft s)	0.00	4.59	0.35	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	79.61	1788.01	119.36	
C & E Loss (ft)	0.04	Cum SA (acres)	32.80	98.35	38.14	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.801

INPUT
Description: COE River Station= 47780.85
Preliminary Model River Station
(miles)=3.79

This section crosses three solid buildings, a low wall, and a building which has open walls. The low wall is modeled as a blocked obstruction 7.5' high. The building with open walls will be modeled with an increased n-value. Ineffective flow on left is a corridor with high ground dowsntream which will block the water.

Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	774	5.8	772	138.52	770	209.6	768	253.82	766
287.62	764	301.11	762	322.82	760	323.07	760	619.12	756
836.99	754	859.62	754	891.52	754	928.19	752	1035.22	750
1105.24	750	1627.66	754	1836.85	754	1866.65	754	1949.71	754
2083.96	752	2161.01	750	2272.85	750	2417.55	750	2455.64	748
2469.97	746	2475.9	744	2482.91	742	2490.77	740	2498.2	738
2506.06	736	2512.59	734	2520.22	732	2551.2	730	2565.89	728
2584.76	726	2592.56	724	2597.54	722	2603.66	720	2618.29	718
2628	712.8	2676	712.8	2686.45	718	2704.77	720	2709.44	722
2714.27	724	2719.93	726	2726.34	728	2745.93	730	2751.02	732
2756.55	734	2759.75	736	2761.69	738	2766.51	740	2769.87	742
2774.21	744	2781.59	746	2805.42	748	2884.82	748	3100	748
3481.05	748	3496.67	748	3500	748	3521.09	748	3529.42	748
3572.94	748	3579.75	746	3582.81	746	3585.46	748	3608.8	750
4028.08	750	4260.39	750	4283	750	4339.26	750	4508.04	752
4522.46	754	4557.34	756	4560.97	758	4564.82	760	4568.03	762
4571.16	764	4571.6	766	4579.71	768	4584.39	770	4591.6	772
4599	774	4606.06	776	4616.08	778	4637.98	780		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	2455.64	.03	2805.42	.041	3100	.075	3500	.041
4283	.14								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2455.64	2805.42	100	718	65	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1247	775	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
374.49	769.5	775	1247	2000.7	780	2950	3200	755.5

3573 3585.5 748 3744.9 4283.55 770

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	735.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	734.71	Reach Len. (ft)	100.00	718.00	65.00
Crit W.S. (ft)	723.28	Flow Area (sq ft)		2900.40	
E.G. Slope (ft/ft)	0.000295	Area (sq ft)		2900.40	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	247.42	Top Width (ft)		247.42	
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)		4.31	
Max Chl Dpth (ft)	21.91	Hydr. Depth (ft)		11.72	
Conv. Total (cfs)	727889.3	Conv. (cfs)		727889.3	
Length Wtd. (ft)	718.00	Wetted Per. (ft)		254.31	
Min Ch El (ft)	712.80	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.90	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		834.51	
C & E Loss (ft)	0.01	Cum SA (acres)		76.26	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	739.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.030	
W.S. Elev (ft)	739.00	Reach Len. (ft)	100.00	718.00	65.00
Crit W.S. (ft)	725.96	Flow Area (sq ft)		4007.44	
E.G. Slope (ft/ft)	0.000276	Area (sq ft)		4007.44	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	269.62	Top Width (ft)		269.62	
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		4.87	
Max Chl Dpth (ft)	26.20	Hydr. Depth (ft)		14.86	
Conv. Total (cfs)	1174271.0	Conv. (cfs)		1174271.0	
Length Wtd. (ft)	718.00	Wetted Per. (ft)		278.50	
Min Ch El (ft)	712.80	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.21	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	1.44	1142.99	4.45
C & E Loss (ft)	0.01	Cum SA (acres)	2.27	86.19	6.45

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	742.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	742.42	Reach Len. (ft)	100.00	718.00	65.00
Crit W.S. (ft)	728.46	Flow Area (sq ft)		4962.33	
E.G. Slope (ft/ft)	0.000277	Area (sq ft)		4962.33	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	289.32	Top Width (ft)		289.32	
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.36	
Max Chl Dpth (ft)	29.62	Hydr. Depth (ft)		17.15	
Conv. Total (cfs)	1597490.0	Conv. (cfs)		1597490.0	
Length Wtd. (ft)	718.00	Wetted Per. (ft)		299.48	
Min Ch El (ft)	712.80	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.54	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	14.56	1396.80	31.58
C & E Loss (ft)	0.00	Cum SA (acres)	8.79	91.82	15.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	746.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.030	
W.S. Elev (ft)	745.55	Reach Len. (ft)	100.00	718.00	65.00
Crit W.S. (ft)	730.65	Flow Area (sq ft)		5897.02	
E.G. Slope (ft/ft)	0.000281	Area (sq ft)		5897.02	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	

```
* Top Width (ft)          *  308.60  * Top Width (ft)          *           *  308.60  *          *
* Vel Total (ft/s)        *    5.80  * Avg. Vel. (ft/s)        *           *    5.80  *          *
* Max Chl Dpth (ft)       *   32.75  * Hydr. Depth (ft)        *           *   19.11  *          *
* Conv. Total (cfs)       *2038695.0  * Conv. (cfs)            *           *2038695.0  *          *
* Length Wtd. (ft)        *  718.00  * Wetted Per. (ft)        *           *  319.79  *          *
* Min Ch El (ft)          *  712.80  * Shear (lb/sq ft)        *           *    0.32  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *           *    1.88  *          *
* Frctn Loss (ft)         *    0.19  * Cum Volume (acre-ft)    *   49.84  * 1633.39  *   81.72  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   23.23  *   95.38  *   29.23  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)          *  750.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.52  * Wt. n-Val.              *   0.041  *   0.030  *   0.056  *
* W.S. Elev (ft)          *  750.46  * Reach Len. (ft)        *  100.00  *  718.00  *   65.00  *
* Crit W.S. (ft)          *  732.99  * Flow Area (sq ft)      *  177.30  * 7559.26  * 1434.15  *
* E.G. Slope (ft/ft)      *0.000244  * Area (sq ft)           *  228.80  * 7559.26  * 1434.15  *
* Q Total (cfs)           *45500.00  * Flow (cfs)             *   68.88  *44449.80  *  981.31  *
* Top Width (ft)          * 1600.47  * Top Width (ft)          *  466.79  *  349.78  *  783.90  *
* Vel Total (ft/s)        *    4.96  * Avg. Vel. (ft/s)        *    0.39  *    5.88  *    0.68  *
* Max Chl Dpth (ft)       *   37.66  * Hydr. Depth (ft)        *    0.57  *   21.61  *    1.83  *
* Conv. Total (cfs)       *2909906.0  * Conv. (cfs)            *  4405.2  *2842742.0  * 62759.0  *
* Length Wtd. (ft)        *  695.01  * Wetted Per. (ft)        *  312.36  *  361.33  *  789.85  *
* Min Ch El (ft)          *  712.80  * Shear (lb/sq ft)        *    0.01  *    0.32  *    0.03  *
* Alpha                   *    1.37  * Stream Power (lb/ft s) *    0.00  *    1.88  *    0.02  *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)    *  154.57  * 1960.43  *  213.05  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   62.20  *   98.18  *   63.14  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  754.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.40  * Wt. n-Val.              *   0.041  *   0.030  *   0.057  *
* W.S. Elev (ft)          *  754.10  * Reach Len. (ft)        *  100.00  *  718.00  *   65.00  *
* Crit W.S. (ft)          *  734.43  * Flow Area (sq ft)      * 1605.93  * 8831.20  * 4673.36  *
* E.G. Slope (ft/ft)      *0.000169  * Area (sq ft)           * 2773.39  * 8831.20  * 4673.36  *
* Q Total (cfs)           *54400.00  * Flow (cfs)             * 1752.59  *47914.15  * 4733.26  *
* Top Width (ft)          * 2155.15  * Top Width (ft)          *  875.32  *  349.78  *  930.05  *
* Vel Total (ft/s)        *    3.60  * Avg. Vel. (ft/s)        *    1.09  *    5.43  *    1.01  *
* Max Chl Dpth (ft)       *   41.30  * Hydr. Depth (ft)        *    3.53  *   25.25  *    5.02  *
* Conv. Total (cfs)       *4182542.0  * Conv. (cfs)            *134747.8  *3683878.0  *363916.2  *
* Length Wtd. (ft)        *  618.10  * Wetted Per. (ft)        *  455.88  *  361.33  *  950.69  *
* Min Ch El (ft)          *  712.80  * Shear (lb/sq ft)        *    0.04  *    0.26  *    0.05  *
* Alpha                   *    2.01  * Stream Power (lb/ft s) *    0.04  *    1.40  *    0.05  *
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)    *  319.46  * 2209.92  *  407.04  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   89.36  *   99.96  *  143.86  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  756.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.42  * Wt. n-Val.              *   0.041  *   0.030  *   0.058  *
* W.S. Elev (ft)          *  755.78  * Reach Len. (ft)        *  100.00  *  718.00  *   65.00  *
* Crit W.S. (ft)          *  735.70  * Flow Area (sq ft)      * 2374.31  * 9421.97  * 6340.09  *
* E.G. Slope (ft/ft)      *0.000169  * Area (sq ft)           * 4333.27  * 9421.97  * 6340.09  *
* Q Total (cfs)           *63000.00  * Flow (cfs)             * 3348.38  *53277.19  * 6374.44  *
* Top Width (ft)          * 2491.73  * Top Width (ft)          *  932.44  *  349.78  * 1209.51  *
* Vel Total (ft/s)        *    3.47  * Avg. Vel. (ft/s)        *    1.41  *    5.65  *    1.01  *
* Max Chl Dpth (ft)       *   42.98  * Hydr. Depth (ft)        *    5.22  *   26.94  *    5.24  *
* Conv. Total (cfs)       *4852596.0  * Conv. (cfs)            *257909.8  *4103693.0  *490993.1  *
* Length Wtd. (ft)        *  588.23  * Wetted Per. (ft)        *  457.57  *  361.33  * 1236.38  *
* Min Ch El (ft)          *  712.80  * Shear (lb/sq ft)        *    0.05  *    0.27  *    0.05  *
* Alpha                   *    2.26  * Stream Power (lb/ft s) *    0.08  *    1.55  *    0.05  *
* Frctn Loss (ft)         *    0.09  * Cum Volume (acre-ft)    *  473.55  * 2370.68  *  718.47  *
```

```
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  108.53  *  100.18  *  297.09  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.              *   0.041  *   0.030  *   0.059  *
* W.S. Elev (ft)         *  758.98  * Reach Len. (ft)        *  100.00  *  718.00  *   65.00  *
* Crit W.S. (ft)         *  737.48  * Flow Area (sq ft)      * 3829.04  *10540.44  *10227.39  *
* E.G. Slope (ft/ft)     *0.000133  * Area (sq ft)           * 7314.87  *10540.44  *10227.39  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6570.96  *57098.70  *12230.34  *
* Top Width (ft)         * 2501.01  * Top Width (ft)         *  932.44  *  349.78  * 1218.79  *
* Vel Total (ft/s)       *    3.09  * Avg. Vel. (ft/s)       *    1.72  *    5.42  *    1.20  *
* Max Chl Dpth (ft)      *   46.18  * Hydr. Depth (ft)       *    8.42  *   30.13  *    8.39  *
* Conv. Total (cfs)      *6576358.0  * Conv. (cfs)            *569341.0  *4947319.0  *1059698.0  *
* Length Wtd. (ft)       *  529.59  * Wetted Per. (ft)       *  460.77  *  361.33  * 1252.82  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.07  *    0.24  *    0.07  *
* Alpha                  *    2.37  * Stream Power (lb/ft s) *    0.12  *    1.31  *    0.08  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  792.52  * 2601.67  * 1567.21  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  139.69  *  100.66  *  471.92  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  747.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         *  747.09  * Reach Len. (ft)        *  100.00  *  718.00  *   65.00  *
* Crit W.S. (ft)         *  731.66  * Flow Area (sq ft)      *          * 6387.43  *          *
* E.G. Slope (ft/ft)     *0.000298  * Area (sq ft)           *          * 6387.43  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  332.34  * Top Width (ft)         *          *  332.34  *          *
* Vel Total (ft/s)       *    6.00  * Avg. Vel. (ft/s)       *          *    6.00  *          *
* Max Chl Dpth (ft)      *   34.29  * Hydr. Depth (ft)       *          *   19.22  *          *
* Conv. Total (cfs)      *2219357.0  * Conv. (cfs)            *          *2219357.0  *          *
* Length Wtd. (ft)       *  717.97  * Wetted Per. (ft)       *          *  343.78  *          *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *          *    0.35  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.07  *          *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *   79.61  * 1751.89  *  119.17  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   32.80  *   96.70  *   38.11  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.665

INPUT
Description: COE River Station= 48498.87
Preliminary Model River Station
             (miles)=3.65

Building with open walls to be modeled with
             increased n-values (STA 2246.9 to 2924.1).  Obstructions are
             buildings.   Ineffective flow on left is a corridor with high
             ground dowsntream which will block the water.
Station Elevation Data    num=      75
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      780   13.53      778   67.16      776  104.01      774  128.26      772
  167.08      770  185.62      768  193.75      768  200.51      768  329.09      760
  820.06      754  848.47      754  875.84      754  923.63      752  982.27      750
  996.49      750  998.13      750 1002.36      750 1041.13      750 1129.14      750
 1530.68      752 1541.83      750 1544.82      748 1550.17      746 1555.93      744
 1559.85      742 1561.96      740 1568.68      738 1575.08      736 1578.68      734
```

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 1584.78     732  1591.3     730 1600.95     728 1607.38     726 1611.98     724
 1612.75     722 1617.28     720 1624.73     718 1640.81  712.64 1712.52  712.64
  1728.6     718 1752.86     724 1759.01     726 1764.43     728 1791.79     732
 1798.55     734 1803.54     736 1823.88     744 1828.42     746 1896.15     748
 1924.53     748    2200     748    2900     748 3074.55     748 3084.58     748
 3110.97     748 3120.98     748 3224.85     750 3724.65     750    3725     750
    3745     750 3846.08     750 4004.18     750 4038.11     750  4062.1     750
 4097.86     752 4115.67     754 4144.31     756 4148.59     758 4152.69     760
 4157.04     762 4162.88     764 4169.17     766 4176.04     768 4183.98     770

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041 1530.68     .03 1828.42    .041    2200    .075    2900    .041
    3745     .21

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1530.68 1828.42              180     213      70              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0    1250     775       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
   153.9   318.6     775  395.01  729.24     775    1250    1525     780
  3385.8  3744.9     770

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  734.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  734.56  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  721.29  * Flow Area (sq ft)      *          * 3121.52  *          *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           *          * 3121.52  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  222.29  * Top Width (ft)         *          *  222.29  *          *
* Vel Total (ft/s)       *    4.00  * Avg. Vel. (ft/s)       *          *    4.00  *          *
* Max Chl Dpth (ft)      *   21.92  * Hydr. Depth (ft)       *          *   14.04  *          *
* Conv. Total (cfs)      *880010.4  * Conv. (cfs)             *          *880010.4  *          *
* Length Wtd. (ft)       *  213.00  * Wetted Per. (ft)       *          *  229.88  *          *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.68  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *          *  784.88  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *   72.39  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  739.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  738.84  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  723.75  * Flow Area (sq ft)      *          * 4116.27  *          *
* E.G. Slope (ft/ft)     *0.000223  * Area (sq ft)           *          * 4116.27  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  244.88  * Top Width (ft)         *          *  244.88  *          *
* Vel Total (ft/s)       *    4.74  * Avg. Vel. (ft/s)       *          *    4.74  *          *
* Max Chl Dpth (ft)      *   26.20  * Hydr. Depth (ft)       *          *   16.81  *          *
* Conv. Total (cfs)      *1305371.0  * Conv. (cfs)             *          *1305371.0  *          *
* Length Wtd. (ft)       *  213.00  * Wetted Per. (ft)       *          *  254.08  *          *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.07  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.44  * 1076.04  *    4.45  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    2.27  *   81.95  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.23  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
```

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* Crit W.S. (ft)         *  725.89  * Flow Area (sq ft)      *          * 4976.08  *          *
* E.G. Slope (ft/ft)     *0.000240  * Area (sq ft)           *          * 4976.08  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  259.99  * Top Width (ft)         *          *  259.99  *          *
* Vel Total (ft/s)       *    5.35  * Avg. Vel. (ft/s)       *          *    5.35  *          *
* Max Chl Dpth (ft)      *   29.59  * Hydr. Depth (ft)       *          *   19.14  *          *
* Conv. Total (cfs)      *1716052.0  * Conv. (cfs)            *          *1716052.0  *          *
* Length Wtd. (ft)       *  213.00  * Wetted Per. (ft)       *          *  270.85  *          *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.47  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   14.56  * 1314.89  *   31.58  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    8.79  *   87.30  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.87  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  745.33  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  727.90  * Flow Area (sq ft)      *          * 5805.07  *          *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *          * 5805.07  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  274.82  * Top Width (ft)         *          *  274.82  *          *
* Vel Total (ft/s)       *    5.89  * Avg. Vel. (ft/s)       *          *    5.89  *          *
* Max Chl Dpth (ft)      *   32.69  * Hydr. Depth (ft)       *          *   21.12  *          *
* Conv. Total (cfs)      *2134736.0  * Conv. (cfs)            *          *2134736.0  *          *
* Length Wtd. (ft)       *  212.96  * Wetted Per. (ft)       *          *  286.95  *          *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.91  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   49.84  * 1536.95  *   81.72  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   23.23  *   90.57  *   29.23  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.82  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.030  *   0.054  *
* W.S. Elev (ft)         *  750.29  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  730.78  * Flow Area (sq ft)      *          * 7203.60  * 3296.01  *
* E.G. Slope (ft/ft)     *0.000214  * Area (sq ft)           *   51.69  * 7203.60  * 3296.01  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *43342.07  * 2157.94  *
* Top Width (ft)         * 2380.88  * Top Width (ft)         *  212.97  *  288.19  * 1879.72  *
* Vel Total (ft/s)       *    4.33  * Avg. Vel. (ft/s)       *          *    6.02  *    0.65  *
* Max Chl Dpth (ft)      *   37.65  * Hydr. Depth (ft)       *          *   25.00  *    1.75  *
* Conv. Total (cfs)      *3106713.0  * Conv. (cfs)            *          *2959371.0  *147342.6  *
* Length Wtd. (ft)       *  209.50  * Wetted Per. (ft)       *          *  301.57  * 1880.35  *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *          *    0.32  *    0.02  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *          *    1.92  *    0.02  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  154.25  * 1838.76  *  209.52  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   61.42  *   92.92  *   61.15  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.39  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.             *   0.041  *   0.030  *   0.057  *
* W.S. Elev (ft)         *  754.03  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  732.56  * Flow Area (sq ft)      *   11.62  * 8310.09  *10440.04  *
* E.G. Slope (ft/ft)     *0.000144  * Area (sq ft)           * 1283.27  * 8310.09  *10440.04  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *    6.63  *44146.79  *10246.58  *
* Top Width (ft)         * 2664.50  * Top Width (ft)         *  438.16  *  297.74  * 1928.60  *
* Vel Total (ft/s)       *    2.90  * Avg. Vel. (ft/s)       *    0.57  *    5.31  *    0.98  *
* Max Chl Dpth (ft)      *   41.39  * Hydr. Depth (ft)       *    2.05  *   27.91  *    5.41  *
* Conv. Total (cfs)      *4530642.0  * Conv. (cfs)            *   551.9  *3676716.0  *853374.6  *
* Length Wtd. (ft)       *  190.58  * Wetted Per. (ft)       *    7.74  *  311.27  * 1936.88  *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *    0.01  *    0.24  *    0.05  *
```

```
* Alpha                  *    2.75  * Stream Power (lb/ft s) *    0.01  *    1.28  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  314.80  * 2068.65  *  395.77  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   87.85  *   94.62  *  141.72  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *   0.041  *   0.030  *   0.057  *
* W.S. Elev (ft)         *  755.75  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  734.06  * Flow Area (sq ft)      *   21.38  * 8821.96  *13776.80  *
* E.G. Slope (ft/ft)     *0.000137  * Area (sq ft)           * 2140.69  * 8821.96  *13776.80  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *   15.61  *47502.57  *15481.82  *
* Top Width (ft)         * 2777.39  * Top Width (ft)         *  526.44  *  297.74  * 1953.21  *
* Vel Total (ft/s)       *    2.79  * Avg. Vel. (ft/s)       *    0.73  *    5.38  *    1.12  *
* Max Chl Dpth (ft)      *   43.11  * Hydr. Depth (ft)       *    3.76  *   29.63  *    7.05  *
* Conv. Total (cfs)      *5387024.0  * Conv. (cfs)            *  1334.8  *4061865.0  *1323824.0  *
* Length Wtd. (ft)       *  181.07  * Wetted Per. (ft)       *    9.46  *  311.27  * 1964.99  *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *    0.02  *    0.24  *    0.06  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    0.01  *    1.30  *    0.07  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  466.12  * 2220.32  *  703.46  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *  106.85  *   94.85  *  294.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.041  *   0.030  *   0.058  *
* W.S. Elev (ft)         *  758.96  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  736.02  * Flow Area (sq ft)      *   39.64  * 9778.79  *20074.09  *
* E.G. Slope (ft/ft)     *0.000110  * Area (sq ft)           * 3832.47  * 9778.79  *20074.09  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   32.20  *50548.42  *25319.37  *
* Top Width (ft)         * 2787.23  * Top Width (ft)         *  526.44  *  297.74  * 1963.05  *
* Vel Total (ft/s)       *    2.54  * Avg. Vel. (ft/s)       *    0.81  *    5.17  *    1.26  *
* Max Chl Dpth (ft)      *   46.32  * Hydr. Depth (ft)       *    6.98  *   32.84  *   10.23  *
* Conv. Total (cfs)      *7240899.0  * Conv. (cfs)            *  3072.2  *4822346.0  *2415481.0  *
* Length Wtd. (ft)       *  166.48  * Wetted Per. (ft)       *   12.67  *  311.27  * 1981.93  *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *    0.02  *    0.22  *    0.07  *
* Alpha                  *    2.84  * Stream Power (lb/ft s) *    0.02  *    1.11  *    0.09  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  779.73  * 2434.21  * 1544.60  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  138.02  *   95.32  *  469.55  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  747.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.             *          *   0.030  *   0.041  *
* W.S. Elev (ft)         *  746.85  * Reach Len. (ft)        *  180.00  *  213.00  *   70.00  *
* Crit W.S. (ft)         *  729.02  * Flow Area (sq ft)      *          * 6227.63  *   12.35  *
* E.G. Slope (ft/ft)     *0.000262  * Area (sq ft)           *          * 6227.63  *   12.35  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38295.89  *    4.11  *
* Top Width (ft)         *  309.46  * Top Width (ft)         *          *  280.53  *   28.92  *
* Vel Total (ft/s)       *    6.14  * Avg. Vel. (ft/s)       *          *    6.15  *    0.33  *
* Max Chl Dpth (ft)      *   34.21  * Hydr. Depth (ft)       *          *   22.20  *    0.43  *
* Conv. Total (cfs)      *2366698.0  * Conv. (cfs)            *          *2366445.0  *   253.8  *
* Length Wtd. (ft)       *  212.92  * Wetted Per. (ft)       *          *  293.07  *   28.94  *
* Min Ch El (ft)         *  712.64  * Shear (lb/sq ft)       *          *    0.35  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.14  *    0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   79.61  * 1647.92  *  119.16  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   32.80  *   91.65  *   38.09  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 3.625

INPUT
Description: COE River Station= 48711.57
Preliminary Model River Station
             (miles)=3.61

Bridges B9 and B9A (upstream). Two building with
             open walls to be modeled with increased n-values (STA 964.4 to
             1077.3 and 1898.1 to 2718.9). Obstructions are buildings.
             Ineffective flow on left is a corridor with high ground dowsntream
             which will block the water.
Station Elevation Data    num=      25
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0      784   12.28      782   22.16      780   37.73      778     173      770
  212.14      768  252.23      766  352.67      760  805.02      754  847.26      754
   872.6      754  925.62      752     980      751    1080    750.7    1278    750.2
 1278.01   742.19    1299   742.19    1381    712.5    1481    712.5    1565      741
 1565.01    750.2    1900    750.2    2500    750.2    3455      751 3938.81      752

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041     980    .075    1080    .041    1299     .04    1565    .041
    1900    .075    2500    .041    3455      .2

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1299    1565              53      50      73              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1030     775       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************
   92.34   359.1     775  425.79  738.72     775  3231.9 3452.49     770

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  734.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  734.56  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  719.82  * Flow Area (sq ft)      *          * 3595.53  *          *
* E.G. Slope (ft/ft)     *0.000229  * Area (sq ft)           *          * 3595.53  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  225.95  * Top Width (ft)         *          *  225.95  *          *
* Vel Total (ft/s)       *    3.48  * Avg. Vel. (ft/s)       *          *    3.48  *          *
* Max Chl Dpth (ft)      *   22.06  * Hydr. Depth (ft)       *          *   15.91  *          *
* Conv. Total (cfs)      *826780.3  * Conv. (cfs)            *          *826780.3  *          *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *          *  233.47  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.76  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  768.46  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   71.29  *          *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  739.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *          *   0.040  *          *
* W.S. Elev (ft)         *  738.83  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  722.11  * Flow Area (sq ft)      *          * 4612.80  *          *
* E.G. Slope (ft/ft)     *0.000279  * Area (sq ft)           *          * 4612.80  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  250.34  * Top Width (ft)         *          *  250.34  *          *
* Vel Total (ft/s)       *    4.23  * Avg. Vel. (ft/s)       *          *    4.23  *          *
* Max Chl Dpth (ft)      *   26.33  * Hydr. Depth (ft)       *          *   18.43  *          *
* Conv. Total (cfs)      *1167703.0  * Conv. (cfs)            *          *1167703.0  *          *
```

```
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *           *  259.31  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *           *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *           *    1.31  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  * 1054.70  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   80.74  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.36  * Wt. n-Val.              *   0.041  *   0.040  *   0.000  *
* W.S. Elev (ft)         *  742.23  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  724.09  * Flow Area (sq ft)      *    0.83  * 5493.72  *    0.00  *
* E.G. Slope (ft/ft)     *0.000315  * Area (sq ft)           *    0.83  * 5493.72  *    0.00  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *    0.06  *26599.94  *    0.00  *
* Top Width (ft)         *  286.99  * Top Width (ft)         *   20.99  *  266.00  *          *
* Vel Total (ft/s)       *    4.84  * Avg. Vel. (ft/s)       *    0.07  *    4.84  *    0.00  *
* Max Chl Dpth (ft)      *   29.73  * Hydr. Depth (ft)       *    0.04  *   20.65  *    0.61  *
* Conv. Total (cfs)      *1499223.0  * Conv. (cfs)           *     3.5  *1499220.0  *     0.0  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *   20.99  *  275.91  *    1.23  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.00  *    0.39  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    1.89  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  * 1289.29  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.74  *   86.01  *   15.28  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.79  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.              *   0.041  *   0.040  *   0.000  *
* W.S. Elev (ft)         *  745.33  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  725.94  * Flow Area (sq ft)      *   66.02  * 6319.79  *    0.01  *
* E.G. Slope (ft/ft)     *0.000325  * Area (sq ft)           *   66.02  * 6319.79  *    0.01  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *   84.36  *34115.64  *    0.00  *
* Top Width (ft)         *  287.00  * Top Width (ft)         *   20.99  *  266.00  *          *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)       *    1.28  *    5.40  *    0.01  *
* Max Chl Dpth (ft)      *   32.83  * Hydr. Depth (ft)       *    3.14  *   23.76  *    2.15  *
* Conv. Total (cfs)      *1898154.0  * Conv. (cfs)           *  4682.1  *1893472.0  *     0.0  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *   24.12  *  275.91  *    4.38  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.06  *    0.46  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.07  *    2.51  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   49.71  * 1507.31  *   81.72  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   23.18  *   89.25  *   29.23  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.              *   0.041  *   0.040  *   0.058  *
* W.S. Elev (ft)         *  750.23  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  728.38  * Flow Area (sq ft)      *  168.84  * 7620.72  *   24.35  *
* E.G. Slope (ft/ft)     *0.000306  * Area (sq ft)           *  168.84  * 7620.72  *   24.35  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  283.49  *45215.57  *    0.94  *
* Top Width (ft)         * 1262.66  * Top Width (ft)         *   31.13  *  266.00  *  965.53  *
* Vel Total (ft/s)       *    5.82  * Avg. Vel. (ft/s)       *    1.68  *    5.93  *    0.04  *
* Max Chl Dpth (ft)      *   37.73  * Hydr. Depth (ft)       *    5.42  *   28.65  *    0.03  *
* Conv. Total (cfs)      *2602978.0  * Conv. (cfs)           * 16218.2  *2586706.0  *    53.9  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *   39.13  *  275.91  *  974.72  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.08  *    0.53  *    0.00  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.14  *    3.13  *    0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  153.80  * 1802.52  *  206.85  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   60.91  *   91.56  *   58.87  *
*****************************************************************************************
```

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  754.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.043  *   0.040  *   0.055  *
* W.S. Elev (ft)         *  753.96  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  730.09  * Flow Area (sq ft)      * 1102.41  * 8615.11  * 7249.27  *
* E.G. Slope (ft/ft)     *0.000215  * Area (sq ft)           * 1439.48  * 8615.11  * 7249.27  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1394.93  *46519.77  * 6485.30  *
* Top Width (ft)         * 2844.66  * Top Width (ft)         *  425.44  *  266.00  * 2153.22  *
* Vel Total (ft/s)       *    3.21  * Avg. Vel. (ft/s)       *    1.27  *    5.40  *    0.89  *
* Max Chl Dpth (ft)      *   41.46  * Hydr. Depth (ft)       *    4.10  *   32.39  *    3.37  *
* Conv. Total (cfs)      *3710940.0  * Conv. (cfs)            * 95156.4  *3173383.0  *442400.1  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  277.00  *  275.91  * 2170.49  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.05  *    0.42  *    0.04  *
* Alpha                  *    2.44  * Stream Power (lb/ft s) *    0.07  *    2.26  *    0.04  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  309.18  * 2027.27  *  381.55  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   86.07  *   93.24  *  138.44  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  756.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.35  * Wt. n-Val.             *   0.044  *   0.040  *   0.056  *
* W.S. Elev (ft)         *  755.72  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  731.63  * Flow Area (sq ft)      * 1574.46  * 9081.90  *11027.79  *
* E.G. Slope (ft/ft)     *0.000196  * Area (sq ft)           * 2388.67  * 9081.90  *11027.79  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2384.89  *48515.91  *12099.19  *
* Top Width (ft)         * 2979.50  * Top Width (ft)         *  560.28  *  266.00  * 2153.22  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    1.51  *    5.34  *    1.10  *
* Max Chl Dpth (ft)      *   43.22  * Hydr. Depth (ft)       *    5.85  *   34.14  *    5.12  *
* Conv. Total (cfs)      *4499574.0  * Conv. (cfs)            *170333.1  *3465095.0  *864146.2  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  277.00  *  275.91  * 2175.76  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.07  *    0.40  *    0.06  *
* Alpha                  *    2.64  * Stream Power (lb/ft s) *    0.11  *    2.15  *    0.07  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  456.76  * 2176.55  *  683.53  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  104.61  *   93.47  *  291.43  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  759.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.044  *   0.040  *   0.057  *
* W.S. Elev (ft)         *  758.97  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  733.73  * Flow Area (sq ft)      * 2448.78  * 9946.46  *18026.28  *
* E.G. Slope (ft/ft)     *0.000145  * Area (sq ft)           * 4209.72  * 9946.46  *18026.28  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4244.45  *48574.57  *23080.98  *
* Top Width (ft)         * 2979.50  * Top Width (ft)         *  560.28  *  266.00  * 2153.22  *
* Vel Total (ft/s)       *    2.49  * Avg. Vel. (ft/s)       *    1.73  *    4.88  *    1.28  *
* Max Chl Dpth (ft)      *   46.47  * Hydr. Depth (ft)       *    9.10  *   37.39  *    8.37  *
* Conv. Total (cfs)      *6300398.0  * Conv. (cfs)            *352328.1  *4032136.0  *1915934.0  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *  277.00  *  275.91  * 2185.51  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.08  *    0.33  *    0.07  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    0.14  *    1.60  *    0.10  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  763.11  * 2385.98  * 1513.99  *
```

```
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *  135.77  *   93.94  *  466.24  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  747.35  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *   0.041  *   0.040  *   0.041  *
* W.S. Elev (ft)         *  746.85  * Reach Len. (ft)        *    7.00  *    7.00  *    7.00  *
* Crit W.S. (ft)         *  726.86  * Flow Area (sq ft)      *   97.92  * 6723.94  *    0.02  *
* E.G. Slope (ft/ft)     *0.000330  * Area (sq ft)           *   97.92  * 6723.94  *    0.02  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  157.45  *38142.55  *    0.00  *
* Top Width (ft)         *  287.00  * Top Width (ft)         *   21.00  *  266.00  *          *
* Vel Total (ft/s)       *    5.61  * Avg. Vel. (ft/s)       *    1.61  *    5.67  *    0.01  *
* Max Chl Dpth (ft)      *   34.35  * Hydr. Depth (ft)       *    4.66  *   25.28  *    2.94  *
* Conv. Total (cfs)      *2108222.0  * Conv. (cfs)           *  8666.9  *2099555.0  *     0.0  *
* Length Wtd. (ft)       *    7.00  * Wetted Per. (ft)       *   25.65  *  275.91  *    5.83  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.08  *    0.50  *    0.00  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.13  *    2.85  *    0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   79.41  * 1616.26  *  119.15  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   32.76  *   90.31  *   38.07  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 3.620

INPUT
Description: Bridges B9 and B9A.  Missouri Pacific RR. Modeled together using
             composite of the two bridge decks and piers.  Piers are aligned
             with channel flow.  The top of side rail is modeled as the top of
             bridge deck.
Distance from Upstream XS =       7
Deck/Roadway Width        =      36
Weir Coefficient          =       1
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    1278   750.2     743  1341.5   750.2     743 1341.51     752     743
 1434.12     752     743 1434.13   750.2     743 1565.01   750.2     743

Upstream Bridge Cross Section Data
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     784   12.28     782   22.16     780   37.73     778     173     770
  212.14     768  252.23     766  352.67     760  805.02     754  847.26     754
   872.6     754  925.62     752     980     751    1080   750.7    1278   750.2
 1278.01  742.19    1299  742.19    1381   712.5    1481   712.5    1565     741
 1565.01   750.2    1900   750.2    2500   750.2    3455     751 3938.81     752

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041     980    .075    1080    .041    1299     .04    1565    .041
    1900    .075    2500    .041    3455      .2

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1299    1565             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1030     775       F
```

```
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
   92.34   359.1     775  425.79  738.72     775  3231.9 3452.49     770

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************************************
    1278   750.2     743  1341.5   750.2     743 1341.51     752     743
 1434.12     752     743 1434.13   750.2     743 1565.01   750.2     743

Downstream Bridge Cross Section Data
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************
       0     784   12.28     782   22.16     780   37.73     778     173     770
  212.14     768  252.23     766  352.67     760  805.02     754  847.26     754
   872.6     754  925.62     752     980     751    1080   750.7    1278   750.2
 1278.01  742.19    1299  742.19    1381   712.5    1481   712.5    1565     741
 1565.01   750.2    1900   750.2    2500   750.2    3455     751 3938.81     752

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************
       0    .041     980    .075    1080    .041    1299     .03    1565    .041
    1900    .075    2500    .041    3455      .2

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1299    1565             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1030     775       F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
   92.34   359.1     775  425.79  738.72     775  3231.9 3452.49     770

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=  1341.5    Downstream=  1341.5
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
**********************************************************************
     4.5     710     4.5   736.4     5.5  736.41     5.5     743
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
**********************************************************************
     4.5     710     4.5   736.4     5.5  736.41     5.5     743

Pier Data
Pier Station     Upstream= 1434.12    Downstream= 1434.12
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
**********************************************************************
     4.5     710     4.5   736.4     5.5  736.41     5.5     743
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
**********************************************************************
     4.5     710     4.5   736.4     5.5  736.41     5.5     743

Pier Data
Pier Station     Upstream=  1497.3    Downstream=  1497.3
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
**********************************************************************
     4.5     710     4.5   736.4     5.5  736.41     5.5     743
```

```
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*************************************************************
     4.5     710     4.5   736.4     5.5  736.41     5.5     743

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     734.75  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     734.56  * E.G. Elev (ft)         *     734.77  *     734.77  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     734.55  *     734.55  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     719.99  *     719.99  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      22.05  *      22.05  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.69  *       3.69  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3385.19  *    3385.19  *
* Weir Submerg           *             * Froude # Chl           *       0.16  *       0.16  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   34111.93  *   34111.93  *
* Min El Weir Flow (ft)  *     750.21  * Hydr Depth (ft)        *      15.94  *      15.94  *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *     312.03  *     312.03  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *   616272.4  *   821696.6  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     212.41  *     212.41  *
* BR Open Area (sq ft)   *    5373.42  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       3.69  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.28  *       0.16  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.03  *       0.58  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     739.11  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     738.83  * E.G. Elev (ft)         *     739.13  *     739.13  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     738.82  *     738.82  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     722.40  *     722.40  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      26.32  *      26.32  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.50  *       4.50  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4336.13  *    4336.13  *
* Weir Submerg           *             * Froude # Chl           *       0.20  *       0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   51842.82  *   51842.82  *
* Min El Weir Flow (ft)  *     750.21  * Hydr Depth (ft)        *      18.55  *      18.55  *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *     366.38  *     366.38  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *   836528.8  *  1115372.0  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     233.77  *     233.77  *
* BR Open Area (sq ft)   *    5373.42  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       4.50  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.40  *       0.23  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       1.81  *       1.02  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
```

```
*********************************************************************************************
* E.G. US. (ft)          *     742.59  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.23  * E.G. Elev (ft)         *     742.62  *     742.62  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     742.21  *     742.21  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     724.44  *     724.44  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.71  *      29.71  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.16  *       5.16  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5159.72  *    5159.72  *
* Weir Submerg           *             * Froude # Chl           *       0.21  *       0.21  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   69458.73  *   69458.73  *
* Min El Weir Flow (ft)  *     750.21  * Hydr Depth (ft)        *      19.08  *      19.08  *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *     425.65  *     425.65  *
* Delta EG (ft)          *       0.02  * Conv. Total (cfs)       *  1048148.0  *  1397530.0  *
* Delta WS (ft)          *       0.02  * Top Width (ft)          *     270.49  *     270.49  *
* BR Open Area (sq ft)   *    5373.42  * Frctn Loss (ft)         *             *             *
* BR Open Vel (ft/s)     *       5.16  * C & E Loss (ft)         *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.49  *       0.27  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.51  *       1.41  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     745.79  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     745.33  * E.G. Elev (ft)         *     745.76  *     745.72  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     745.13  *     745.08  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     726.35  *     726.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      32.63  *      32.58  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.36  *       6.36  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5373.42  *    5373.42  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   87590.27  *   87334.38  *
* Min El Weir Flow (ft)  *     750.21  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *     702.44  *     702.44  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)       *   805826.9  *  1074325.0  *
* Delta WS (ft)          *       0.13  * Top Width (ft)          *             *             *
* BR Open Area (sq ft)   *    5373.42  * Frctn Loss (ft)         *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       6.36  * C & E Loss (ft)         *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.86  *       0.48  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.47  *       3.08  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     750.77  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.23  * E.G. Elev (ft)         *     750.71  *     750.62  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     749.59  *     749.50  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     728.81  *     728.81  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      37.09  *      37.00  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.47  *       8.47  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5373.42  *    5373.42  *
* Weir Submerg           *             * Froude # Chl           *       0.29  *       0.29  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  116751.80  *  116298.80  *
* Min El Weir Flow (ft)  *     750.21  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *     702.44  *     702.44  *
* Delta EG (ft)          *       0.32  * Conv. Total (cfs)       *   805826.9  *  1074325.0  *
* Delta WS (ft)          *       0.33  * Top Width (ft)          *             *             *
* BR Open Area (sq ft)   *    5373.42  * Frctn Loss (ft)         *       0.08  *       0.00  *
* BR Open Vel (ft/s)     *       8.47  * C & E Loss (ft)         *       0.00  *       0.17  *
```

```
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.52  *       0.86  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      12.89  *       7.25  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*******************************************************************************************
* E.G. US. (ft)          *     754.35  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.96  * E.G. Elev (ft)         *     754.33  *     754.26  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     754.02  *     753.85  *
* Q Bridge (cfs)         *   31247.99  * Crit W.S. (ft)         *     730.63  *     730.63  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      41.52  *      41.35  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.74  *       3.87  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   14533.79  *   14072.74  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *       0.12  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  151764.30  *  150346.10  *
* Min El Weir Flow (ft)  *     750.21  * Hydr Depth (ft)        *       5.41  *       5.23  *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *    3402.49  *    3401.97  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  1345473.0  *  1563835.0  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *    2914.48  *    2841.52  *
* BR Open Area (sq ft)   *    5373.42  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *       5.82  * C & E Loss (ft)        *       0.01  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.44  *       0.31  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.63  *       1.21  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*******************************************************************************************
* E.G. US. (ft)          *     756.06  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     755.72  * E.G. Elev (ft)         *     756.02  *     755.98  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     755.82  *     755.71  *
* Q Bridge (cfs)         *   25517.09  * Crit W.S. (ft)         *     732.24  *     732.24  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.32  *      43.21  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.25  *       3.30  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   19372.23  *   19088.54  *
* Weir Submerg           *             * Froude # Chl           *       0.10  *       0.10  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  181927.40  *  180690.80  *
* Min El Weir Flow (ft)  *     750.21  * Hydr Depth (ft)        *       7.21  *       7.10  *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *    3407.89  *    3407.57  *
* Delta EG (ft)          *       0.10  * Conv. Total (cfs)      *  1962063.0  *  2228753.0  *
* Delta WS (ft)          *       0.18  * Top Width (ft)         *    2979.50  *    2979.50  *
* BR Open Area (sq ft)   *    5373.42  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       4.75  * C & E Loss (ft)        *       0.01  *       0.02  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.37  *       0.28  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.19  *       0.92  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	759.22	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	758.97	E.G. Elev (ft)	759.18	759.16
Q Total (cfs)	75900.00	W.S. Elev (ft)	759.05	759.01
Q Bridge (cfs)	17924.45	Crit W.S. (ft)	734.44	734.44
Q Weir (cfs)		Max Chl Dpth (ft)	46.55	46.51
Weir Sta Lft (ft)		Vel Total (ft/s)	2.70	2.72
Weir Sta Rgt (ft)		Flow Area (sq ft)	28076.95	27954.39
Weir Submerg		Froude # Chl	0.08	0.08
Weir Max Depth (ft)		Specif Force (cu ft)	258448.60	257627.70
Min El Weir Flow (ft)	750.21	Hydr Depth (ft)	10.44	10.40
Min El Prs (ft)	743.00	W.P. Total (ft)	3417.60	3417.46
Delta EG (ft)	0.08	Conv. Total (cfs)	3398970.0	3753025.0
Delta WS (ft)	0.16	Top Width (ft)	2981.36	2979.50
BR Open Area (sq ft)	5373.42	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	3.34	C & E Loss (ft)	0.00	0.02
Coef of Q		Shear Total (lb/sq ft)	0.26	0.21
Br Sel Method	Energy only	Power Total (lb/ft s)	0.69	0.57

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	747.35	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	746.85	E.G. Elev (ft)	747.32	747.26
Q Total (cfs)	38300.00	W.S. Elev (ft)	746.52	746.46
Q Bridge (cfs)	38300.00	Crit W.S. (ft)	727.26	727.26
Q Weir (cfs)		Max Chl Dpth (ft)	34.02	33.96
Weir Sta Lft (ft)		Vel Total (ft/s)	7.13	7.13
Weir Sta Rgt (ft)		Flow Area (sq ft)	5373.42	5373.42
Weir Submerg		Froude # Chl	0.26	0.26
Weir Max Depth (ft)		Specif Force (cu ft)	96798.88	96478.05
Min El Weir Flow (ft)	750.21	Hydr Depth (ft)		
Min El Prs (ft)	743.00	W.P. Total (ft)	702.44	702.44
Delta EG (ft)	0.18	Conv. Total (cfs)	805826.9	1074325.0
Delta WS (ft)	0.19	Top Width (ft)		
BR Open Area (sq ft)	5373.42	Frctn Loss (ft)	0.06	0.00
BR Open Vel (ft/s)	7.13	C & E Loss (ft)	0.00	0.09
Coef of Q		Shear Total (lb/sq ft)	1.08	0.61
Br Sel Method	Energy only	Power Total (lb/ft s)	7.69	4.33

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.615

INPUT

```
Description: COE River Station= 48761.63  Preliminary Model= 3.6
Bridges B9
             and B9A (downstream). Bridges modeled together with composite deck
             and piers.  Top of side rail modeled as top of bridge.
             Obstructions buildings and high ground downstream.  Piers are
             aligned with channel  flow. Underwater channel shown on bridge
             plans. Buildings with open walls modeled with increased n-values
             (STA 970 to 1077 & 1780 to 2688).  Ineffective flow on left is a
             corridor with high ground dowsntream which will block the water.
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     784   12.28     782   22.16     780   37.73     778     173     770
  212.14     768  252.23     766  352.67     760  805.02     754  847.26     754
   872.6     754  925.62     752     980     751    1080   750.7    1278   750.2
 1278.01  742.19    1299  742.19    1381   712.5    1481   712.5    1565     741
 1565.01   750.2    1900   750.2    2500   750.2    3455     751 3938.81     752

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .041     980    .075    1080    .041    1299     .03    1565    .041
    1900    .075    2500    .041    3455      .2

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1299    1565             405     236      73              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
       0    1030     775       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
   92.34   359.1     775  425.79  738.72     775  3231.9 3452.49     770

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  734.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  734.55  * Reach Len. (ft)        *  405.00  *  236.00  *   73.00  *
* Crit W.S. (ft)         *  719.82  * Flow Area (sq ft)      *          * 3593.67  *          *
* E.G. Slope (ft/ft)     *0.000129  * Area (sq ft)           *          * 3593.67  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  225.91  * Top Width (ft)         *          *  225.91  *          *
* Vel Total (ft/s)       *    3.48  * Avg. Vel. (ft/s)       *          *    3.48  *          *
* Max Chl Dpth (ft)      *   22.05  * Hydr. Depth (ft)       *          *   15.91  *          *
* Conv. Total (cfs)      *1101579.0  * Conv. (cfs)            *          *1101579.0  *          *
* Length Wtd. (ft)       *  236.00  * Wetted Per. (ft)       *          *  233.42  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.12  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.43  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *          *  764.54  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   71.05  *          *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  739.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  738.82  * Reach Len. (ft)        *  405.00  *  236.00  *   73.00  *
* Crit W.S. (ft)         *  722.11  * Flow Area (sq ft)      *          * 4609.44  *          *
* E.G. Slope (ft/ft)     *0.000157  * Area (sq ft)           *          * 4609.44  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  250.27  * Top Width (ft)         *          *  250.27  *          *
* Vel Total (ft/s)       *    4.23  * Avg. Vel. (ft/s)       *          *    4.23  *          *
* Max Chl Dpth (ft)      *   26.32  * Hydr. Depth (ft)       *          *   18.42  *          *
* Conv. Total (cfs)      *1555372.0  * Conv. (cfs)            *          *1555372.0  *          *
* Length Wtd. (ft)       *  236.00  * Wetted Per. (ft)       *          *  259.23  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.74  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    1.44  * 1049.68  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *   80.47  *    6.45  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	742.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.041	0.030	0.000
W.S. Elev (ft)	742.21	Reach Len. (ft)	405.00	236.00	73.00
Crit W.S. (ft)	724.09	Flow Area (sq ft)	0.42	5488.56	0.00
E.G. Slope (ft/ft)	0.000178	Area (sq ft)	0.42	5488.56	0.00
Q Total (cfs)	26600.00	Flow (cfs)	0.01	26599.98	0.00
Top Width (ft)	286.99	Top Width (ft)	20.99	266.00	
Vel Total (ft/s)	4.85	Avg. Vel. (ft/s)	0.04	4.85	0.00
Max Chl Dpth (ft)	29.71	Hydr. Depth (ft)	0.02	20.63	0.59
Conv. Total (cfs)	1995831.0	Conv. (cfs)	1.1	1995830.0	0.0
Length Wtd. (ft)	236.00	Wetted Per. (ft)	20.99	275.91	1.23
Min Ch El (ft)	712.50	Shear (lb/sq ft)	0.00	0.22	
Alpha	1.00	Stream Power (lb/ft s)	0.00	1.07	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	14.56	1283.32	31.58
C & E Loss (ft)	0.00	Cum SA (acres)	8.72	85.72	15.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	745.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.041	0.030	0.000
W.S. Elev (ft)	745.20	Reach Len. (ft)	405.00	236.00	73.00
Crit W.S. (ft)	725.94	Flow Area (sq ft)	63.26	6284.87	0.01
E.G. Slope (ft/ft)	0.000186	Area (sq ft)	63.26	6284.87	0.01
Q Total (cfs)	34200.00	Flow (cfs)	59.70	34140.30	0.00
Top Width (ft)	287.00	Top Width (ft)	20.99	266.00	
Vel Total (ft/s)	5.39	Avg. Vel. (ft/s)	0.94	5.43	0.01
Max Chl Dpth (ft)	32.70	Hydr. Depth (ft)	3.01	23.63	2.13
Conv. Total (cfs)	2505796.0	Conv. (cfs)	4374.5	2501421.0	0.0
Length Wtd. (ft)	236.15	Wetted Per. (ft)	24.00	275.91	4.15
Min Ch El (ft)	712.50	Shear (lb/sq ft)	0.03	0.26	
Alpha	1.01	Stream Power (lb/ft s)	0.03	1.44	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	49.68	1501.01	81.72
C & E Loss (ft)	0.00	Cum SA (acres)	23.18	89.21	29.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	750.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.041	0.030	0.041
W.S. Elev (ft)	749.89	Reach Len. (ft)	405.00	236.00	73.00
Crit W.S. (ft)	728.38	Flow Area (sq ft)	161.73	7532.30	0.04
E.G. Slope (ft/ft)	0.000179	Area (sq ft)	161.73	7532.30	0.04
Q Total (cfs)	45500.00	Flow (cfs)	248.35	45251.65	0.00
Top Width (ft)	287.01	Top Width (ft)	21.00	266.00	
Vel Total (ft/s)	5.91	Avg. Vel. (ft/s)	1.54	6.01	0.01
Max Chl Dpth (ft)	37.39	Hydr. Depth (ft)	7.70	28.32	4.46
Conv. Total (cfs)	3401071.0	Conv. (cfs)	18563.6	3382507.0	0.0
Length Wtd. (ft)	231.47	Wetted Per. (ft)	28.69	275.91	8.86
Min Ch El (ft)	712.50	Shear (lb/sq ft)	0.06	0.31	0.00
Alpha	1.03	Stream Power (lb/ft s)	0.10	1.83	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	153.75	1796.01	206.85
C & E Loss (ft)	0.04	Cum SA (acres)	60.91	91.52	58.79

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	754.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.043	0.030	0.055
W.S. Elev (ft)	753.81	Reach Len. (ft)	405.00	236.00	73.00
Crit W.S. (ft)	730.09	Flow Area (sq ft)	1061.83	8574.98	6924.39

```
* E.G. Slope (ft/ft)     *0.000134  * Area (sq ft)           * 1375.59  * 8574.98  * 6924.39  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1036.37  *48599.95  * 4763.68  *
* Top Width (ft)         * 2840.66  * Top Width (ft)         *  421.44  *  266.00  * 2153.22  *
* Vel Total (ft/s)       *    3.28  * Avg. Vel. (ft/s)       *    0.98  *    5.67  *    0.69  *
* Max Chl Dpth (ft)      *   41.31  * Hydr. Depth (ft)       *    3.95  *   32.24  *    3.22  *
* Conv. Total (cfs)      *4699423.0  * Conv. (cfs)            * 89528.1  *4198377.0  *411517.7  *
* Length Wtd. (ft)       *  211.32  * Wetted Per. (ft)       *  277.00  *  275.91  * 2170.04  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.03  *    0.26  *    0.03  *
* Alpha                  *    2.67  * Stream Power (lb/ft s) *    0.03  *    1.47  *    0.02  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  307.69  * 2019.79  *  373.33  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   85.55  *   92.94  *  135.97  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  755.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.             *   0.044  *   0.030  *   0.056  *
* W.S. Elev (ft)         *  755.54  * Reach Len. (ft)        *  405.00  *  236.00  *   73.00  *
* Crit W.S. (ft)         *  731.63  * Flow Area (sq ft)      * 1525.68  * 9033.66  *10637.33  *
* E.G. Slope (ft/ft)     *0.000129  * Area (sq ft)           * 2287.07  * 9033.66  *10637.33  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1834.12  *51920.09  * 9245.79  *
* Top Width (ft)         * 2979.50  * Top Width (ft)         *  560.28  *  266.00  * 2153.22  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.20  *    5.75  *    0.87  *
* Max Chl Dpth (ft)      *   43.04  * Hydr. Depth (ft)       *    5.67  *   33.96  *    4.94  *
* Conv. Total (cfs)      *5556539.0  * Conv. (cfs)            *161767.5  *4579302.0  *815469.9  *
* Length Wtd. (ft)       *  202.63  * Wetted Per. (ft)       *  277.00  *  275.91  * 2175.21  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.04  *    0.26  *    0.04  *
* Alpha                  *    3.10  * Stream Power (lb/ft s) *    0.05  *    1.51  *    0.03  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  454.15  * 2168.51  *  670.81  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *  103.97  *   93.16  *  288.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  759.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.044  *   0.030  *   0.057  *
* W.S. Elev (ft)         *  758.81  * Reach Len. (ft)        *  405.00  *  236.00  *   73.00  *
* Crit W.S. (ft)         *  733.73  * Flow Area (sq ft)      * 2405.78  * 9903.94  *17682.08  *
* E.G. Slope (ft/ft)     *0.000101  * Area (sq ft)           * 4120.15  * 9903.94  *17682.08  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3445.92  *53756.04  *18698.04  *
* Top Width (ft)         * 2979.50  * Top Width (ft)         *  560.28  *  266.00  * 2153.22  *
* Vel Total (ft/s)       *    2.53  * Avg. Vel. (ft/s)       *    1.43  *    5.43  *    1.06  *
* Max Chl Dpth (ft)      *   46.31  * Hydr. Depth (ft)       *    8.94  *   37.23  *    8.21  *
* Conv. Total (cfs)      *7536809.0  * Conv. (cfs)            *342177.4  *5337931.0  *1856701.0  *
* Length Wtd. (ft)       *  189.53  * Wetted Per. (ft)       *  277.00  *  275.91  * 2185.03  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.05  *    0.23  *    0.05  *
* Alpha                  *    3.32  * Stream Power (lb/ft s) *    0.08  *    1.23  *    0.05  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  758.40  * 2376.95  * 1493.19  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *  135.13  *   93.64  *  463.77  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  747.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.041  *   0.030  *   0.041  *
* W.S. Elev (ft)         *  746.66  * Reach Len. (ft)        *  405.00  *  236.00  *   73.00  *
* Crit W.S. (ft)         *  726.86  * Flow Area (sq ft)      *   93.88  * 6672.86  *    0.02  *
* E.G. Slope (ft/ft)     *0.000191  * Area (sq ft)           *   93.88  * 6672.86  *    0.02  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  112.20  *38187.80  *    0.00  *
* Top Width (ft)         *  287.00  * Top Width (ft)         *   21.00  *  266.00  *          *
* Vel Total (ft/s)       *    5.66  * Avg. Vel. (ft/s)       *    1.20  *    5.72  *    0.01  *
```

```
* Max Chl Dpth (ft)      *   34.16  * Hydr. Depth (ft)       *    4.47  *   25.09  *    2.86  *
* Conv. Total (cfs)      *2772176.0  * Conv. (cfs)            *  8120.9  *2764055.0  *     0.0  *
* Length Wtd. (ft)       *  236.21  * Wetted Per. (ft)       *   25.46  *  275.91  *    5.61  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.04  *    0.29  *    0.00  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.05  *    1.65  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   79.38  * 1609.89  *  119.15  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   32.75  *   90.27  *   38.07  *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.571

INPUT
Description: COE River Station= 48997.95
Preliminary Model River Station
(miles)=3.55

Building with open walls to be modeled with
increased n-value (STA 933.7 to 1129). Obstructions are
buildings. Ineffective flow on left is a corridor with high
ground dowsntream which will block the water. Ineffective flow on
right is due to buildings and high ground downstream.

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	802	4.93	800	11.46	798	17.15	796	23.65	794
28.7	792	37.11	790	44.34	788	49.29	786	52.05	784
59.37	782	63.81	780	71.68	778	78.75	776	87.03	774
111.31	772	115.71	772	140.04	772	151.21	770	169.69	768
187.13	766	213.01	764	241.4	762	270.07	760	425.54	754
486.57	754	710.1	754	869.59	752	945	751	1049.66	748
1054.1	746	1058.97	744	1068.13	742	1069.58	740	1095.14	738
1102.94	736	1111.02	734	1143.53	732	1149.13	730	1153.62	728
1159.67	726	1164.13	724	1169.14	722	1174.13	720	1179.36	718
1195.8	712.52	1261.37	712.52	1277.81	718	1284.48	720	1290.99	722
1298.71	724	1306.7	726	1315.49	728	1336.09	730	1350.24	732
1359.85	734	1365.3	736	1369.87	738	1375.47	740	1383.6	742
1386.36	744	1394.24	746	2033.97	748	2255.23	748	2328.9	748
2621.67	748	2945.06	750	3450.87	750	3467.31	750	3517.77	750
3539.72	750	3553.16	752	3559.78	752	3603.95	750	3725.75	750

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.041	945	.075	1049.66	.03	1394.24	.041

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1049.66 1394.24 445 355 44 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
412	489.25	775	F
3400	3725	770	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
206	412	775	489.25	731.3	780

CROSS SECTION OUTPUT Profile #2-yr

```
*****************************************************************************************************
* E.G. Elev (ft)         *  734.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  734.43  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)         *  721.53  * Flow Area (sq ft)      *          * 3043.04  *          *
* E.G. Slope (ft/ft)     *0.000256  * Area (sq ft)           *          * 3043.04  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  251.74  * Top Width (ft)          *          *  251.74  *          *
* Vel Total (ft/s)       *    4.11  * Avg. Vel. (ft/s)        *          *    4.11  *          *
* Max Chl Dpth (ft)      *   21.91  * Hydr. Depth (ft)        *          *   12.09  *          *
* Conv. Total (cfs)      *780713.8  * Conv. (cfs)             *          *780713.8  *          *
* Length Wtd. (ft)       *  355.00  * Wetted Per. (ft)        *          *  258.13  *          *
```

```
* Min Ch El (ft)         *  712.52  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.77  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *          *  746.56  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *   69.76  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  739.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  738.71  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)         *  724.17  * Flow Area (sq ft)      *          * 4181.90  *          *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *          * 4181.90  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  285.75  * Top Width (ft)         *          *  285.75  *          *
* Vel Total (ft/s)       *    4.66  * Avg. Vel. (ft/s)       *          *    4.66  *          *
* Max Chl Dpth (ft)      *   26.19  * Hydr. Depth (ft)       *          *   14.63  *          *
* Conv. Total (cfs)      *1217554.0  * Conv. (cfs)            *          *1217554.0  *          *
* Length Wtd. (ft)       *  355.00  * Wetted Per. (ft)       *          *  293.44  *          *
* Min Ch El (ft)         *  712.52  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.06  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    1.44  * 1025.86  *    4.45  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *   79.01  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  742.12  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)         *  726.39  * Flow Area (sq ft)      *          * 5222.93  *          *
* E.G. Slope (ft/ft)     *0.000261  * Area (sq ft)           *          * 5222.93  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  316.17  * Top Width (ft)         *          *  316.17  *          *
* Vel Total (ft/s)       *    5.09  * Avg. Vel. (ft/s)       *          *    5.09  *          *
* Max Chl Dpth (ft)      *   29.60  * Hydr. Depth (ft)       *          *   16.52  *          *
* Conv. Total (cfs)      *1645932.0  * Conv. (cfs)            *          *1645932.0  *          *
* Length Wtd. (ft)       *  355.00  * Wetted Per. (ft)       *          *  325.45  *          *
* Min Ch El (ft)         *  712.52  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.33  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   14.56  * 1254.30  *   31.58  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.62  *   84.14  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  745.14  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)         *  728.59  * Flow Area (sq ft)      *          * 6204.56  *          *
* E.G. Slope (ft/ft)     *0.000263  * Area (sq ft)           *          * 6204.56  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  334.63  * Top Width (ft)         *          *  334.63  *          *
* Vel Total (ft/s)       *    5.51  * Avg. Vel. (ft/s)       *          *    5.51  *          *
* Max Chl Dpth (ft)      *   32.62  * Hydr. Depth (ft)       *          *   18.54  *          *
* Conv. Total (cfs)      *2109154.0  * Conv. (cfs)            *          *2109154.0  *          *
* Length Wtd. (ft)       *  355.00  * Wetted Per. (ft)       *          *  345.08  *          *
* Min Ch El (ft)         *  712.52  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.63  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   49.39  * 1467.17  *   81.72  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.08  *   87.58  *   29.23  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
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*****************************************************************************************
* E.G. Elev (ft)          *  750.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.43  * Wt. n-Val.             *   0.075  *   0.030  *   0.041  *
* W.S. Elev (ft)          *  749.94  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)          *  731.34  * Flow Area (sq ft)      *   65.54  * 7848.68  * 3322.69  *
* E.G. Slope (ft/ft)      *0.000195  * Area (sq ft)           *   65.54  * 7848.68  * 3322.69  *
* Q Total (cfs)           *45500.00  * Flow (cfs)             *   17.74  *42677.25  * 2805.01  *
* Top Width (ft)          * 1953.06  * Top Width (ft)         *   67.62  *  344.58  * 1540.85  *
* Vel Total (ft/s)        *    4.05  * Avg. Vel. (ft/s)       *    0.27  *    5.44  *    0.84  *
* Max Chl Dpth (ft)       *   37.42  * Hydr. Depth (ft)       *    0.97  *   22.78  *    2.16  *
* Conv. Total (cfs)       *3260328.0  * Conv. (cfs)           *  1271.3  *3058062.0  *200994.6  *
* Length Wtd. (ft)        *  338.06  * Wetted Per. (ft)       *   67.65  *  355.74  * 1540.86  *
* Min Ch El (ft)          *  712.52  * Shear (lb/sq ft)       *    0.01  *    0.27  *    0.03  *
* Alpha                   *    1.69  * Stream Power (lb/ft s) *    0.00  *    1.46  *    0.02  *
* Frctn Loss (ft)         *    0.07  * Cum Volume (acre-ft)   *  152.70  * 1754.35  *  204.07  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   60.49  *   89.87  *   57.50  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)          *  754.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.23  * Wt. n-Val.             *   0.062  *   0.030  *   0.041  *
* W.S. Elev (ft)          *  753.94  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)          *  733.41  * Flow Area (sq ft)      *  796.50  * 9226.96  *11320.08  *
* E.G. Slope (ft/ft)      *0.000104  * Area (sq ft)           *  796.50  * 9226.96  *12529.16  *
* Q Total (cfs)           *54400.00  * Flow (cfs)             *  417.13  *40764.84  *13218.04  *
* Top Width (ft)          * 2994.45  * Top Width (ft)         *  318.36  *  344.58  * 2331.51  *
* Vel Total (ft/s)        *    2.55  * Avg. Vel. (ft/s)       *    0.52  *    4.42  *    1.17  *
* Max Chl Dpth (ft)       *   41.42  * Hydr. Depth (ft)       *    2.50  *   26.78  *    5.64  *
* Conv. Total (cfs)       *5343954.0  * Conv. (cfs)           * 40976.1  *4004511.0  *1298467.0  *
* Length Wtd. (ft)        *  286.50  * Wetted Per. (ft)       *  318.62  *  355.74  * 2010.46  *
* Min Ch El (ft)          *  712.52  * Shear (lb/sq ft)       *    0.02  *    0.17  *    0.04  *
* Alpha                   *    2.30  * Stream Power (lb/ft s) *    0.01  *    0.74  *    0.04  *
* Frctn Loss (ft)         *    0.03  * Cum Volume (acre-ft)   *  297.60  * 1971.57  *  357.03  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   82.11  *   91.28  *  132.21  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)          *  755.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.21  * Wt. n-Val.             *   0.056  *   0.030  *   0.041  *
* W.S. Elev (ft)          *  755.67  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)          *  734.88  * Flow Area (sq ft)      * 1347.46  * 9823.28  *14792.53  *
* E.G. Slope (ft/ft)      *0.000092  * Area (sq ft)           * 1472.83  * 9823.28  *16564.05  *
* Q Total (cfs)           *63000.00  * Flow (cfs)             *  947.96  *42618.41  *19433.63  *
* Top Width (ft)          * 3071.70  * Top Width (ft)         *  395.61  *  344.58  * 2331.51  *
* Vel Total (ft/s)        *    2.43  * Avg. Vel. (ft/s)       *    0.70  *    4.34  *    1.31  *
* Max Chl Dpth (ft)       *   43.15  * Hydr. Depth (ft)       *    4.23  *   28.51  *    7.37  *
* Conv. Total (cfs)       *6570872.0  * Conv. (cfs)           * 98871.7  *4445082.0  *2026919.0  *
* Length Wtd. (ft)        *  267.05  * Wetted Per. (ft)       *  320.36  *  355.74  * 2012.19  *
* Min Ch El (ft)          *  712.52  * Shear (lb/sq ft)       *    0.02  *    0.16  *    0.04  *
* Alpha                   *    2.25  * Stream Power (lb/ft s) *    0.02  *    0.69  *    0.06  *
* Frctn Loss (ft)         *    0.03  * Cum Volume (acre-ft)   *  436.67  * 2117.43  *  648.01  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   99.52  *   91.51  *  285.20  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)          *  759.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.15  * Wt. n-Val.             *   0.052  *   0.030  *   0.041  *
* W.S. Elev (ft)          *  758.92  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)          *  736.68  * Flow Area (sq ft)      * 2381.74  *10942.75  *21311.24  *
* E.G. Slope (ft/ft)      *0.000067  * Area (sq ft)           * 2758.08  *10942.75  *24138.61  *
* Q Total (cfs)           *75900.00  * Flow (cfs)             * 2129.98  *43412.55  *30357.47  *
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* Top Width (ft)          * 3071.70  * Top Width (ft)          *  395.61  *  344.58  * 2331.51  *
* Vel Total (ft/s)        *    2.19  * Avg. Vel. (ft/s)        *    0.89  *    3.97  *    1.42  *
* Max Chl Dpth (ft)       *   46.40  * Hydr. Depth (ft)        *    7.48  *   31.76  *   10.62  *
* Conv. Total (cfs)       *9302988.0  * Conv. (cfs)            *261070.0  *5321033.0  *3720885.0  *
* Length Wtd. (ft)        *  239.66  * Wetted Per. (ft)        *  323.60  *  355.74  * 2015.44  *
* Min Ch El (ft)          *  712.52  * Shear (lb/sq ft)        *    0.03  *    0.13  *    0.04  *
* Alpha                   *    2.05  * Stream Power (lb/ft s) *    0.03  *    0.51  *    0.06  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *  726.43  * 2320.47  * 1458.15  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *  130.69  *   91.98  *  460.01  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)          *  747.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.51  * Wt. n-Val.              *          *   0.030  *   0.041  *
* W.S. Elev (ft)          *  746.61  * Reach Len. (ft)        *  445.00  *  355.00  *   44.00  *
* Crit W.S. (ft)          *  729.69  * Flow Area (sq ft)      *          * 6704.06  *   59.58  *
* E.G. Slope (ft/ft)      *0.000262  * Area (sq ft)           *          * 6704.06  *   59.58  *
* Q Total (cfs)           *38300.00  * Flow (cfs)             *          *38284.17  *   15.83  *
* Top Width (ft)          *  536.73  * Top Width (ft)          *          *  341.50  *  195.23  *
* Vel Total (ft/s)        *    5.66  * Avg. Vel. (ft/s)        *          *    5.71  *    0.27  *
* Max Chl Dpth (ft)       *   34.09  * Hydr. Depth (ft)        *          *   19.63  *    0.31  *
* Conv. Total (cfs)       *2367528.0  * Conv. (cfs)            *          *2366549.0  *   978.8  *
* Length Wtd. (ft)        *  354.92  * Wetted Per. (ft)        *          *  352.36  *  195.23  *
* Min Ch El (ft)          *  712.52  * Shear (lb/sq ft)        *          *    0.31  *    0.00  *
* Alpha                   *    1.02  * Stream Power (lb/ft s) *          *    1.78  *    0.00  *
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)    *   78.94  * 1573.66  *  119.10  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   32.66  *   88.63  *   37.91  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.503

INPUT
Description: COE River Station= 49353.09
Preliminary Model River Station
             (miles)=3.49

Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.
Station Elevation Data    num=      75
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      796      6.5      794    13.33      792    20.95      790    42.56      788
   47.07      786    52.65      784    58.05      782    63.58      780    70.55      778
   88.88      776   103.97      774   108.59      772   115.22      770   176.28      768
  203.51      766    245.2      762   277.58      760   316.14      758   335.13      756
  366.62      754   452.09      752   500.74      752   508.66      754   635.62      754
  656.97      754   665.34      754   768.32      752   831.82      750   1102.1      748
 1105.07      746  1108.17      744  1111.96      742  1114.25      740  1143.23      738
 1151.24      736  1156.25      734   1163.5      732  1170.34      730  1174.82      728
 1189.77      726  1205.55      724  1210.18      722  1218.85      720  1222.92      718
 1239.57   712.45  1296.96   712.45  1313.61      718   1320.3      720  1328.14      722
 1334.66      724  1341.83      726  1350.15      728  1365.42      730  1376.75      732
 1383.66      734  1388.45      736  1392.94      738   1398.5      740  1402.28      742
  1408.5      744  1415.13      746  1800.57      748  2005.21      748  2019.46      748
 2077.85      748  2169.33      748   2172.6      748  2211.25      748     2384      748
 2572.32      748  2756.48      750   3305.8      752  3326.66      752  3371.01      752

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041  1102.1     .03  1415.13    .041
```

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1102.1 1415.13              240     207      35            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     829     770       F
    3197 3371.01     770       F

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  734.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  734.33  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  722.09  * Flow Area (sq ft)      *          * 2972.19  *          *
* E.G. Slope (ft/ft)     *0.000245  * Area (sq ft)           *          * 2972.19  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  229.01  * Top Width (ft)         *          *  229.01  *          *
* Vel Total (ft/s)       *    4.21  * Avg. Vel. (ft/s)       *          *    4.21  *          *
* Max Chl Dpth (ft)      *   21.88  * Hydr. Depth (ft)       *          *   12.98  *          *
* Conv. Total (cfs)      *798605.4  * Conv. (cfs)            *          *798605.4  *          *
* Length Wtd. (ft)       *  207.00  * Wetted Per. (ft)       *          *  235.24  *          *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.81  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *          *  722.05  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *   67.80  *          *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  738.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  738.58  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  724.83  * Flow Area (sq ft)      *          * 3996.73  *          *
* E.G. Slope (ft/ft)     *0.000264  * Area (sq ft)           *          * 3996.73  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  259.72  * Top Width (ft)         *          *  259.72  *          *
* Vel Total (ft/s)       *    4.88  * Avg. Vel. (ft/s)       *          *    4.88  *          *
* Max Chl Dpth (ft)      *   26.13  * Hydr. Depth (ft)       *          *   15.39  *          *
* Conv. Total (cfs)      *1201197.0  * Conv. (cfs)            *          *1201197.0  *          *
* Length Wtd. (ft)       *  207.00  * Wetted Per. (ft)       *          *  267.39  *          *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.20  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *    1.44  *  992.54  *    4.45  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.27  *   76.79  *    6.45  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  742.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  741.97  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  727.19  * Flow Area (sq ft)      *          * 4949.39  *          *
* E.G. Slope (ft/ft)     *0.000280  * Area (sq ft)           *          * 4949.39  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  290.23  * Top Width (ft)         *          *  290.23  *          *
* Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *          *    5.37  *          *
* Max Chl Dpth (ft)      *   29.52  * Hydr. Depth (ft)       *          *   17.05  *          *
* Conv. Total (cfs)      *1590723.0  * Conv. (cfs)            *          *1590723.0  *          *
* Length Wtd. (ft)       *  207.00  * Wetted Per. (ft)       *          *  299.43  *          *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.55  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   14.56  * 1212.85  *   31.58  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    8.62  *   81.67  *   15.28  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*************************************************************************************************
* E.G. Elev (ft)         *  745.50  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  744.97  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  729.21  * Flow Area (sq ft)      *          * 5842.62  *          *
* E.G. Slope (ft/ft)     *0.000285  * Area (sq ft)           *          * 5842.62  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  305.06  * Top Width (ft)         *          *  305.06  *          *
* Vel Total (ft/s)       *    5.85  * Avg. Vel. (ft/s)       *          *    5.85  *          *
* Max Chl Dpth (ft)      *   32.52  * Hydr. Depth (ft)       *          *   19.15  *          *
* Conv. Total (cfs)      *2025537.0  * Conv. (cfs)            *          *2025537.0  *          *
* Length Wtd. (ft)       *  207.00  * Wetted Per. (ft)       *          *  315.52  *          *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)       *          *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.93  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   49.39  * 1418.08  *   81.72  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   23.08  *   84.97  *   29.23  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  750.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *   0.041  *   0.030  *   0.041  *
* W.S. Elev (ft)         *  749.78  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  731.65  * Flow Area (sq ft)      *  214.08  * 7338.88  * 2591.07  *
* E.G. Slope (ft/ft)     *0.000221  * Area (sq ft)           *  214.08  * 7338.88  * 2591.07  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  106.70  *43206.24  * 2187.06  *
* Top Width (ft)         * 1874.66  * Top Width (ft)         *  240.54  *  313.03  * 1321.09  *
* Vel Total (ft/s)       *    4.49  * Avg. Vel. (ft/s)       *    0.50  *    5.89  *    0.84  *
* Max Chl Dpth (ft)      *   37.33  * Hydr. Depth (ft)       *    0.89  *   23.44  *    1.96  *
* Conv. Total (cfs)      *3061042.0  * Conv. (cfs)            *  7178.5  *2906728.0  *147135.8  *
* Length Wtd. (ft)       *  201.50  * Wetted Per. (ft)       *  240.55  *  324.55  * 1321.10  *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)       *    0.01  *    0.31  *    0.03  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    0.01  *    1.84  *    0.02  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  151.27  * 1692.46  *  201.08  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   58.92  *   87.19  *   56.05  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  754.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.             *   0.041  *   0.030  *   0.041  *
* W.S. Elev (ft)         *  753.85  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  733.29  * Flow Area (sq ft)      * 1322.08  * 8613.49  * 9394.13  *
* E.G. Slope (ft/ft)     *0.000120  * Area (sq ft)           * 1750.87  * 8613.49  * 9737.91  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1502.52  *41596.38  *11301.10  *
* Top Width (ft)         * 2833.16  * Top Width (ft)         *  564.25  *  313.03  * 1955.88  *
* Vel Total (ft/s)       *    2.81  * Avg. Vel. (ft/s)       *    1.14  *    4.83  *    1.20  *
* Max Chl Dpth (ft)      *   41.40  * Hydr. Depth (ft)       *    4.84  *   27.52  *    5.27  *
* Conv. Total (cfs)      *4964359.0  * Conv. (cfs)            *137115.1  *3795944.0  *1031300.0  *
* Length Wtd. (ft)       *  177.69  * Wetted Per. (ft)       *  273.11  *  324.55  * 1781.89  *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)       *    0.04  *    0.20  *    0.04  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    0.04  *    0.96  *    0.05  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  284.58  * 1898.87  *  345.78  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   77.60  *   88.60  *  130.05  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  755.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.041  *   0.030  *   0.041  *
* W.S. Elev (ft)         *  755.59  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  734.69  * Flow Area (sq ft)      * 1797.84  * 9158.81  *12498.26  *
* E.G. Slope (ft/ft)     *0.000107  * Area (sq ft)           * 3027.83  * 9158.81  *13145.18  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2366.19  *43473.88  *17159.94  *
* Top Width (ft)         * 3029.49  * Top Width (ft)         *  760.58  *  313.03  * 1955.88  *
* Vel Total (ft/s)       *    2.69  * Avg. Vel. (ft/s)       *    1.32  *    4.75  *    1.37  *
* Max Chl Dpth (ft)      *   43.14  * Hydr. Depth (ft)       *    6.58  *   29.26  *    7.01  *
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* Conv. Total (cfs)      *6093473.0  * Conv. (cfs)            *228861.6  *4204871.0  *1659741.0  *
* Length Wtd. (ft)       *  167.27  * Wetted Per. (ft)        *  273.11  *  324.55  * 1781.89  *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)        *    0.04  *    0.19  *    0.05  *
* Alpha                  *    2.24  * Stream Power (lb/ft s) *    0.06  *    0.89  *    0.06  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    *  413.68  * 2040.08  *  633.01  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *   93.62  *   88.83  *  283.04  *
*****************************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  759.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.041  *   0.030  *   0.041  *
* W.S. Elev (ft)         *  758.86  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  736.62  * Flow Area (sq ft)      * 2690.93  *10182.48  *18325.34  *
* E.G. Slope (ft/ft)     *0.000078  * Area (sq ft)           * 5577.28  *10182.48  *19541.30  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3953.03  *44246.80  *27700.16  *
* Top Width (ft)         * 3071.53  * Top Width (ft)         *  802.62  *  313.03  * 1955.88  *
* Vel Total (ft/s)       *    2.43  * Avg. Vel. (ft/s)       *    1.47  *    4.35  *    1.51  *
* Max Chl Dpth (ft)      *   46.41  * Hydr. Depth (ft)       *    9.85  *   32.53  *   10.28  *
* Conv. Total (cfs)      *8606045.0  * Conv. (cfs)            *448221.3  *5016996.0  *3140828.0  *
* Length Wtd. (ft)       *  151.76  * Wetted Per. (ft)        *  273.11  *  324.55  * 1781.89  *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)        *    0.05  *    0.15  *    0.05  *
* Alpha                  *    2.02  * Stream Power (lb/ft s) *    0.07  *    0.66  *    0.08  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *  683.85  * 2234.39  * 1436.09  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *  124.57  *   89.30  *  457.85  *
*****************************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  747.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.030  *   0.041  *
* W.S. Elev (ft)         *  746.44  * Reach Len. (ft)        *  240.00  *  207.00  *   35.00  *
* Crit W.S. (ft)         *  730.15  * Flow Area (sq ft)      *          * 6294.52  *   18.47  *
* E.G. Slope (ft/ft)     *0.000286  * Area (sq ft)           *          * 6294.52  *   18.47  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38295.88  *    4.11  *
* Top Width (ft)         *  395.10  * Top Width (ft)         *          *  310.71  *   84.39  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *          *    6.08  *    0.22  *
* Max Chl Dpth (ft)      *   33.99  * Hydr. Depth (ft)       *          *   20.26  *    0.22  *
* Conv. Total (cfs)      *2263832.0  * Conv. (cfs)            *          *2263589.0  *   243.2  *
* Length Wtd. (ft)       *  206.99  * Wetted Per. (ft)        *          *  321.75  *   84.39  *
* Min Ch El (ft)         *  712.45  * Shear (lb/sq ft)        *          *    0.35  *    0.00  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *    2.13  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)    *   78.94  * 1520.69  *  119.06  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *   32.66  *   85.97  *   37.76  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 3.464

INPUT
Description: COE River Station= 49560.42
Preliminary Model River Station
             (miles)=3.44

Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.
Station Elevation Data    num=      78
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     796    5.56     794   12.16     792   18.47     790   22.29     788
   27.96     786   33.46     784    41.5     782      50     780   72.24     778
```

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   86.36     776   94.43     774  101.89     772  107.53     770  115.09     768
  168.39     766  199.04     764  230.24     762  261.22     760  293.74     758
  305.01     758  308.09     758  338.33     756   382.1     754  421.62     752
  501.23     752  694.39     752  843.65     750  955.73     750 1163.58     750
 1176.74     748 1177.46     746 1179.38     744 1180.47     742 1181.67     740
 1211.57     738  1217.8     736 1225.27     734 1230.44     732 1238.26     730
  1244.7     728 1251.91     726 1260.99     724 1270.04     722 1284.66     720
 1289.08     718 1305.91  712.39 1337.56  712.39 1354.39     718 1362.24     720
  1366.5     722    1374     724 1378.66     726 1384.92     728 1386.66     730
 1390.06     732 1393.47     734 1398.71     736  1405.2     738 1412.81     740
 1416.76     742 1420.85     744 1426.05     746 1448.24     748 1664.92     748
 1785.29     748 2207.75     748 2388.07     748 2403.18     750 2419.98     748
 2527.16     748 2651.29     750 2679.63     750 2701.19     750 3135.78     752
 3205.82     752 3289.35     752 3317.59     752

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041 1176.74    .018 1448.24    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1176.74 1448.24              152     157      51             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1050     770       F
    3130 3317.59     770       F

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  734.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  734.06  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  724.22  * Flow Area (sq ft)      *          * 2239.23  *          *
* E.G. Slope (ft/ft)     *0.000154  * Area (sq ft)           *          * 2239.23  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  168.56  * Top Width (ft)         *          *  168.56  *          *
* Vel Total (ft/s)       *    5.58  * Avg. Vel. (ft/s)       *          *    5.58  *          *
* Max Chl Dpth (ft)      *   21.67  * Hydr. Depth (ft)       *          *   13.28  *          *
* Conv. Total (cfs)      *1006326.0  * Conv. (cfs)            *          *1006326.0  *          *
* Length Wtd. (ft)       *  157.00  * Wetted Per. (ft)       *          *  176.29  *          *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *          *    0.12  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.68  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *          *  709.67  *          *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *          *   66.85  *          *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  738.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  738.22  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  726.98  * Flow Area (sq ft)      *          * 2996.02  *          *
* E.G. Slope (ft/ft)     *0.000176  * Area (sq ft)           *          * 2996.02  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  197.73  * Top Width (ft)         *          *  197.73  *          *
* Vel Total (ft/s)       *    6.51  * Avg. Vel. (ft/s)       *          *    6.51  *          *
* Max Chl Dpth (ft)      *   25.83  * Hydr. Depth (ft)       *          *   15.15  *          *
* Conv. Total (cfs)      *1470195.0  * Conv. (cfs)            *          *1470195.0  *          *
* Length Wtd. (ft)       *  157.00  * Wetted Per. (ft)       *          *  206.72  *          *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.04  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    1.44  *  975.92  *    4.45  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    2.27  *   75.70  *    6.45  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  742.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  741.55  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
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```
* Crit W.S. (ft)         *  729.18  * Flow Area (sq ft)      *          * 3740.04  *          *
* E.G. Slope (ft/ft)     *0.000197  * Area (sq ft)           *          * 3740.04  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  235.14  * Top Width (ft)         *          *  235.14  *          *
* Vel Total (ft/s)       *    7.11  * Avg. Vel. (ft/s)       *          *    7.11  *          *
* Max Chl Dpth (ft)      *   29.16  * Hydr. Depth (ft)       *          *   15.91  *          *
* Conv. Total (cfs)      *1896503.0  * Conv. (cfs)            *          *1896503.0  *          *
* Length Wtd. (ft)       *  157.00  * Wetted Per. (ft)       *          *  245.67  *          *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.33  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   14.56  * 1192.20  *   31.58  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    8.62  *   80.43  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  744.50  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  731.23  * Flow Area (sq ft)      *          * 4443.86  *          *
* E.G. Slope (ft/ft)     *0.000193  * Area (sq ft)           *          * 4443.86  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  243.24  * Top Width (ft)         *          *  243.24  *          *
* Vel Total (ft/s)       *    7.70  * Avg. Vel. (ft/s)       *          *    7.70  *          *
* Max Chl Dpth (ft)      *   32.11  * Hydr. Depth (ft)       *          *   18.27  *          *
* Conv. Total (cfs)      *2458863.0  * Conv. (cfs)            *          *2458863.0  *          *
* Length Wtd. (ft)       *  157.00  * Wetted Per. (ft)       *          *  256.09  *          *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.61  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   49.39  * 1393.64  *   81.72  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   23.08  *   83.67  *   29.23  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.21  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *   0.041  *   0.018  *   0.041  *
* W.S. Elev (ft)         *  749.26  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  733.90  * Flow Area (sq ft)      *    5.21  * 5675.07  * 1379.71  *
* E.G. Slope (ft/ft)     *0.000170  * Area (sq ft)           *    5.21  * 5675.07  * 1379.71  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    1.80  *44755.86  *  742.34  *
* Top Width (ft)         * 1425.00  * Top Width (ft)         *    8.28  *  271.50  * 1145.22  *
* Vel Total (ft/s)       *    6.44  * Avg. Vel. (ft/s)       *    0.34  *    7.89  *    0.54  *
* Max Chl Dpth (ft)      *   36.87  * Hydr. Depth (ft)       *    0.63  *   20.90  *    1.20  *
* Conv. Total (cfs)      *3484657.0  * Conv. (cfs)            *   137.7  *3427666.0  * 56853.1  *
* Length Wtd. (ft)       *  155.66  * Wetted Per. (ft)       *    8.38  *  286.76  * 1145.38  *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *    0.01  *    0.21  *    0.01  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.00  *    1.66  *    0.01  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  150.66  * 1661.54  *  199.48  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   58.23  *   85.80  *   55.06  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.08  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.041  *   0.018  *   0.041  *
* W.S. Elev (ft)         *  753.46  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  735.82  * Flow Area (sq ft)      *  452.25  * 6816.93  * 7653.38  *
* E.G. Slope (ft/ft)     *0.000100  * Area (sq ft)           * 1955.65  * 6816.93  * 7928.17  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  381.56  *46419.56  * 7598.89  *
* Top Width (ft)         * 2924.91  * Top Width (ft)         *  784.06  *  271.50  * 1869.35  *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)       *    0.84  *    6.81  *    0.99  *
```

```
* Max Chl Dpth (ft)      *   41.07  * Hydr. Depth (ft)       *    3.57  *   25.11  *    4.55  *
* Conv. Total (cfs)      *5452462.0  * Conv. (cfs)            * 38243.0  *4652590.0  *761629.3  *
* Length Wtd. (ft)       *  144.02  * Wetted Per. (ft)       *  126.89  *  286.76  * 1682.03  *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *    0.02  *    0.15  *    0.03  *
* Alpha                  *    2.99  * Stream Power (lb/ft s) *    0.02  *    1.01  *    0.03  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  274.37  * 1862.21  *  338.68  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   73.89  *   87.22  *  128.51  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  755.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.              *   0.041  *   0.018  *   0.041  *
* W.S. Elev (ft)         *  755.22  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  737.54  * Flow Area (sq ft)      *  674.76  * 7293.60  *10606.00  *
* E.G. Slope (ft/ft)     *0.000091  * Area (sq ft)           * 3364.23  * 7293.60  *11210.15  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  711.84  *49753.43  *12534.73  *
* Top Width (ft)         * 2962.19  * Top Width (ft)         *  821.34  *  271.50  * 1869.35  *
* Vel Total (ft/s)       *    3.39  * Avg. Vel. (ft/s)       *    1.05  *    6.82  *    1.18  *
* Max Chl Dpth (ft)      *   42.83  * Hydr. Depth (ft)       *    5.32  *   26.86  *    6.31  *
* Conv. Total (cfs)      *6593769.0  * Conv. (cfs)            * 74503.2  *5207343.0  *1311922.0  *
* Length Wtd. (ft)       *  137.75  * Wetted Per. (ft)       *  126.89  *  286.76  * 1682.03  *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *    0.03  *    0.14  *    0.04  *
* Alpha                  *    3.22  * Stream Power (lb/ft s) *    0.03  *    0.99  *    0.04  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  396.07  * 2000.99  *  623.22  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   89.26  *   87.44  *  281.50  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  759.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.              *   0.041  *   0.018  *   0.041  *
* W.S. Elev (ft)         *  758.57  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  740.38  * Flow Area (sq ft)      * 1098.73  * 8201.80  *16231.75  *
* E.G. Slope (ft/ft)     *0.000069  * Area (sq ft)           * 6220.24  * 8201.80  *17463.41  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1390.29  *52431.62  *22078.09  *
* Top Width (ft)         * 3033.04  * Top Width (ft)         *  892.19  *  271.50  * 1869.35  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.27  *    6.39  *    1.36  *
* Max Chl Dpth (ft)      *   46.18  * Hydr. Depth (ft)       *    8.67  *   30.21  *    9.65  *
* Conv. Total (cfs)      *9166655.0  * Conv. (cfs)            *167908.8  *6332314.0  *2666433.0  *
* Length Wtd. (ft)       *  127.80  * Wetted Per. (ft)       *  126.89  *  286.76  * 1682.03  *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *    0.04  *    0.12  *    0.04  *
* Alpha                  *    3.26  * Stream Power (lb/ft s) *    0.05  *    0.78  *    0.06  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  651.35  * 2190.71  * 1421.22  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  119.90  *   87.91  *  456.31  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  746.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.              *         *   0.018  *          *
* W.S. Elev (ft)         *  745.93  * Reach Len. (ft)        *  152.00  *  157.00  *   51.00  *
* Crit W.S. (ft)         *  732.26  * Flow Area (sq ft)      *          * 4796.49  *          *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)           *          * 4796.49  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  248.35  * Top Width (ft)         *          *  248.35  *          *
* Vel Total (ft/s)       *    7.99  * Avg. Vel. (ft/s)       *          *    7.99  *          *
* Max Chl Dpth (ft)      *   33.54  * Hydr. Depth (ft)       *          *   19.31  *          *
* Conv. Total (cfs)      *2749899.0  * Conv. (cfs)            *          *2749899.0  *          *
* Length Wtd. (ft)       *  157.00  * Wetted Per. (ft)       *          *  262.07  *          *
* Min Ch El (ft)         *  712.39  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.77  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   78.94  * 1494.34  *  119.06  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   32.66  *   84.64  *   37.73  *
```

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*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.434

INPUT
Description: COE River Station= 49717.33
Preliminary Model River Station
             (miles)=3.42

Obstruction is a building.  Ineffective flow on
             left is due to high ground dowsntream which will block the water.
             Ineffective flow on right is due to buildings and high ground
             downstream.
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     782    2.74     780    6.95     778    10.7     776   14.86     774
   24.85     772   39.02     770  102.63     768  128.23     766  135.13     764
  144.15     762  195.56     760  232.73     758  286.22     756  360.49     754
  689.67     752 1292.81     752 1301.65     750 1306.67     748 1312.33     746
 1322.03     742 1328.17     740 1333.06     738 1340.26     736  1346.6     734
 1354.09     732 1357.99     730 1363.79     728 1370.06     726 1377.41     724
 1382.38     722 1393.41     720 1415.53     718 1415.53  712.85 1433.05  712.85
 1433.06     718 1442.54     720 1463.58     722 1470.72     724 1477.89     726
 1483.91     728 1490.01     730 1497.19     732 1501.96     734 1508.78     736
 1514.02     738 1519.54     740 1526.43     742 1531.84     744 1538.53     746
 1575.87     748 1609.19     748 1616.69     748 1734.48     750 1751.37     750
 1921.25     748 1934.91     748 1941.91     750 1945.52     750 1962.61     748
 1962.79     748 1986.69     750 2082.62     748 2130.47     746  2193.3     746
 2323.72     748 2351.56     750 2373.82     748 2479.46     748 2602.13     750
 2629.41     750 2656.64     750 3134.07     752 3259.93     754 3290.43     754
 3370.81     754 3385.06     756

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041 1292.81    .014 1538.53    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1292.81 1538.53              172     296     120             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     862     770       F
    3150 3385.06     770       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     862    1233     770

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  734.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  733.58  * Reach Len. (ft)        *  172.00  *  296.00  *  120.00  *
* Crit W.S. (ft)         *  727.47  * Flow Area (sq ft)      *          * 1652.17  *          *
* E.G. Slope (ft/ft)     *0.000240  * Area (sq ft)           *          * 1652.17  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  152.80  * Top Width (ft)          *          *  152.80  *          *
* Vel Total (ft/s)       *    7.57  * Avg. Vel. (ft/s)       *          *    7.57  *          *
* Max Chl Dpth (ft)      *   20.73  * Hydr. Depth (ft)        *          *   10.81  *          *
* Conv. Total (cfs)      *806726.4  * Conv. (cfs)             *          *806726.4  *          *
* Length Wtd. (ft)       *  296.00  * Wetted Per. (ft)        *          *  167.44  *          *
* Min Ch El (ft)         *  712.85  * Shear (lb/sq ft)        *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.12  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *          *  702.66  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *   66.27  *          *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	738.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.014	
W.S. Elev (ft)	737.73	Reach Len. (ft)	172.00	296.00	120.00
Crit W.S. (ft)	730.14	Flow Area (sq ft)		2340.50	
E.G. Slope (ft/ft)	0.000225	Area (sq ft)		2340.50	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	179.25	Top Width (ft)		179.25	
Vel Total (ft/s)	8.33	Avg. Vel. (ft/s)		8.33	
Max Chl Dpth (ft)	24.88	Hydr. Depth (ft)		13.06	
Conv. Total (cfs)	1301447.0	Conv. (cfs)		1301447.0	
Length Wtd. (ft)	296.00	Wetted Per. (ft)		195.18	
Min Ch El (ft)	712.85	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		1.40	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	1.44	966.30	4.45
C & E Loss (ft)	0.01	Cum SA (acres)	2.27	75.02	6.45

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	742.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.014	
W.S. Elev (ft)	741.00	Reach Len. (ft)	172.00	296.00	120.00
Crit W.S. (ft)	732.39	Flow Area (sq ft)		2957.39	
E.G. Slope (ft/ft)	0.000218	Area (sq ft)		2957.39	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	197.90	Top Width (ft)		197.90	
Vel Total (ft/s)	8.99	Avg. Vel. (ft/s)		8.99	
Max Chl Dpth (ft)	28.15	Hydr. Depth (ft)		14.94	
Conv. Total (cfs)	1802218.0	Conv. (cfs)		1802218.0	
Length Wtd. (ft)	296.00	Wetted Per. (ft)		214.96	
Min Ch El (ft)	712.85	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		1.68	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	14.56	1180.14	31.58
C & E Loss (ft)	0.01	Cum SA (acres)	8.62	79.64	15.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	745.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.44	Wt. n-Val.		0.014	
W.S. Elev (ft)	743.90	Reach Len. (ft)	172.00	296.00	120.00
Crit W.S. (ft)	734.50	Flow Area (sq ft)		3554.90	
E.G. Slope (ft/ft)	0.000216	Area (sq ft)		3554.90	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	
Top Width (ft)	214.13	Top Width (ft)		214.13	
Vel Total (ft/s)	9.62	Avg. Vel. (ft/s)		9.62	
Max Chl Dpth (ft)	31.05	Hydr. Depth (ft)		16.60	
Conv. Total (cfs)	2326306.0	Conv. (cfs)		2326306.0	
Length Wtd. (ft)	295.99	Wetted Per. (ft)		232.20	
Min Ch El (ft)	712.85	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		1.99	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	49.39	1379.23	81.72
C & E Loss (ft)	0.01	Cum SA (acres)	23.08	82.84	29.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	750.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.		0.014	0.041
W.S. Elev (ft)	748.67	Reach Len. (ft)	172.00	296.00	120.00
Crit W.S. (ft)	737.17	Flow Area (sq ft)		4632.71	705.23

```
* E.G. Slope (ft/ft)     *0.000174  * Area (sq ft)           *          * 4632.71  *  705.23  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45090.48  *  409.53  *
* Top Width (ft)         *  875.78  * Top Width (ft)         *          *  233.55  *  642.23  *
* Vel Total (ft/s)       *    8.52  * Avg. Vel. (ft/s)       *          *    9.73  *    0.58  *
* Max Chl Dpth (ft)      *   35.82  * Hydr. Depth (ft)       *          *   19.84  *    1.10  *
* Conv. Total (cfs)      *3448564.0  * Conv. (cfs)            *          *3417525.0  * 31039.0  *
* Length Wtd. (ft)       *  294.92  * Wetted Per. (ft)       *          *  252.83  *  642.58  *
* Min Ch El (ft)         *  712.85  * Shear (lb/sq ft)       *          *    0.20  *    0.01  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *          *    1.94  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  150.66  * 1642.96  *  198.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   58.22  *   84.89  *   54.01  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  753.00  * Reach Len. (ft)        *  172.00  *  296.00  *  120.00  *
* Crit W.S. (ft)         *  739.03  * Flow Area (sq ft)      *   59.89  * 5673.39  * 6148.38  *
* E.G. Slope (ft/ft)     *0.000110  * Area (sq ft)           *  314.97  * 5673.39  * 6165.99  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   22.55  *48669.10  * 5708.35  *
* Top Width (ft)         * 2301.23  * Top Width (ft)         *  396.95  *  245.72  * 1658.55  *
* Vel Total (ft/s)       *    4.58  * Avg. Vel. (ft/s)       *    0.38  *    8.58  *    0.93  *
* Max Chl Dpth (ft)      *   40.15  * Hydr. Depth (ft)       *    1.00  *   23.09  *    3.82  *
* Conv. Total (cfs)      *5183274.0  * Conv. (cfs)            *  2148.6  *4637230.0  *543896.0  *
* Length Wtd. (ft)       *  285.14  * Wetted Per. (ft)       *   60.81  *  265.47  * 1612.29  *
* Min Ch El (ft)         *  712.85  * Shear (lb/sq ft)       *    0.01  *    0.15  *    0.03  *
* Alpha                  *    3.15  * Stream Power (lb/ft s) *    0.00  *    1.26  *    0.02  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  270.41  * 1839.70  *  330.43  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   71.82  *   86.28  *  126.45  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  755.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  754.78  * Reach Len. (ft)        *  172.00  *  296.00  *  120.00  *
* Crit W.S. (ft)         *  740.66  * Flow Area (sq ft)      *  166.32  * 6110.65  * 9015.96  *
* E.G. Slope (ft/ft)     *0.000100  * Area (sq ft)           * 1243.07  * 6110.65  * 9286.56  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  115.84  *52571.86  *10312.30  *
* Top Width (ft)         * 2673.88  * Top Width (ft)         *  590.32  *  245.72  * 1837.84  *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)       *    0.70  *    8.60  *    1.14  *
* Max Chl Dpth (ft)      *   41.93  * Hydr. Depth (ft)       *    2.78  *   24.87  *    5.59  *
* Conv. Total (cfs)      *6289069.0  * Conv. (cfs)            * 11564.2  *5248064.0  *1029441.0  *
* Length Wtd. (ft)       *  278.98  * Wetted Per. (ft)       *   62.59  *  265.47  * 1612.29  *
* Min Ch El (ft)         *  712.85  * Shear (lb/sq ft)       *    0.02  *    0.14  *    0.04  *
* Alpha                  *    3.65  * Stream Power (lb/ft s) *    0.01  *    1.24  *    0.04  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  388.03  * 1976.83  *  611.23  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   86.80  *   86.51  *  279.33  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  758.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  758.23  * Reach Len. (ft)        *  172.00  *  296.00  *  120.00  *
* Crit W.S. (ft)         *  742.91  * Flow Area (sq ft)      *  372.55  * 6957.89  *14572.30  *
* E.G. Slope (ft/ft)     *0.000074  * Area (sq ft)           * 3473.20  * 6957.89  *15648.10  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  366.94  *55880.94  *19652.12  *
* Top Width (ft)         * 2785.58  * Top Width (ft)         *  693.33  *  245.72  * 1846.53  *
* Vel Total (ft/s)       *    3.47  * Avg. Vel. (ft/s)       *    0.98  *    8.03  *    1.35  *
* Max Chl Dpth (ft)      *   45.38  * Hydr. Depth (ft)       *    6.23  *   28.32  *    9.04  *
```

```
* Conv. Total (cfs)      *8850361.0  * Conv. (cfs)            * 42787.0  *6516028.0  *2291546.0  *
* Length Wtd. (ft)       *  268.04  * Wetted Per. (ft)       *   66.04  *  265.47  * 1612.29  *
* Min Ch El (ft)         *  712.85  * Shear (lb/sq ft)       *    0.03  *    0.12  *    0.04  *
* Alpha                  *    3.99  * Stream Power (lb/ft s) *    0.03  *    0.97  *    0.06  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  634.44  * 2163.39  * 1401.84  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *  117.13  *   86.98  *  454.13  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

```
*****************************************************************************************
* E.G. Elev (ft)         *  746.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  745.31  * Reach Len. (ft)        *  172.00  *  296.00  *  120.00  *
* Crit W.S. (ft)         *  735.53  * Flow Area (sq ft)      *          * 3863.43  *          *
* E.G. Slope (ft/ft)     *0.000216  * Area (sq ft)           *          * 3863.43  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *38300.00  *          *
* Top Width (ft)         *  222.22  * Top Width (ft)         *          *  222.22  *          *
* Vel Total (ft/s)       *    9.91  * Avg. Vel. (ft/s)       *          *    9.91  *          *
* Max Chl Dpth (ft)      *   32.46  * Hydr. Depth (ft)       *          *   17.39  *          *
* Conv. Total (cfs)      *2608539.0  * Conv. (cfs)            *          *2608539.0  *          *
* Length Wtd. (ft)       *  295.93  * Wetted Per. (ft)       *          *  240.79  *          *
* Min Ch El (ft)         *  712.85  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.14  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   78.94  * 1478.73  *  119.06  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   32.66  *   83.79  *   37.73  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.378

INPUT
Description: COE River Station= 50015.72
Preliminary Model River Station
(miles)=3.36

Independence Ave. Bridge. B8 (upstream).
Ineffective flow on left is due to high ground dowsntream which will block the water. Ineffective flow on right is due to buildings and high ground downstream. Obstructions are buildings.

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	782	15.9	780	30.37	778	45.28	776	58.6	774
77.36	772	92.85	770	109.59	768	126.27	766	143.48	764
160.8	762	296.8	758	383.28	756	1490	754	1490.01	743.5
1502	743.5	1571	719.3	1597.99	718.3	1598	712.8	1613	712.8
1613.01	718.3	1639	719.3	1714	743.5	1729	743.5	1729.01	754
1920	756	1980	758	2030	760	2060	762	2265	772
2330	774	2380	774	2410	748	2500	748	2580	750
2690	752	2730	770	2760	772	2810	770	2840	768
2990	760	3040	758	3122.85	754	3153.57	754	3254.2	754
3261.38	754	3277.66	754	3318.94	756	3320.79	756	3376.83	756

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1502	.014	1714	.041

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1502 1714 20 76 15 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

```
       0     739     770       F
    3060 3376.83     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     739    1360     770 2817.05    3060     770

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  734.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  733.55  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  726.94  * Flow Area (sq ft)      *          * 1696.61  *          *
* E.G. Slope (ft/ft)     *0.000222  * Area (sq ft)           *          * 1696.61  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  152.77  * Top Width (ft)         *          *  152.77  *          *
* Vel Total (ft/s)       *    7.37  * Avg. Vel. (ft/s)       *          *    7.37  *          *
* Max Chl Dpth (ft)      *   20.75  * Hydr. Depth (ft)       *          *   11.11  *          *
* Conv. Total (cfs)      *839812.2  * Conv. (cfs)            *          *839812.2  *          *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *          *  168.45  *          *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.03  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  691.28  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   65.23  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  737.69  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  729.71  * Flow Area (sq ft)      *          * 2380.08  *          *
* E.G. Slope (ft/ft)     *0.000211  * Area (sq ft)           *          * 2380.08  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  177.40  * Top Width (ft)         *          *  177.40  *          *
* Vel Total (ft/s)       *    8.19  * Avg. Vel. (ft/s)       *          *    8.19  *          *
* Max Chl Dpth (ft)      *   24.89  * Hydr. Depth (ft)       *          *   13.42  *          *
* Conv. Total (cfs)      *1341690.0  * Conv. (cfs)            *          *1341690.0  *          *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *          *  194.45  *          *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.32  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  *  950.27  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   73.81  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  740.96  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  732.00  * Flow Area (sq ft)      *          * 2992.79  *          *
* E.G. Slope (ft/ft)     *0.000209  * Area (sq ft)           *          * 2992.79  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  196.89  * Top Width (ft)         *          *  196.89  *          *
* Vel Total (ft/s)       *    8.89  * Avg. Vel. (ft/s)       *          *    8.89  *          *
* Max Chl Dpth (ft)      *   28.16  * Hydr. Depth (ft)       *          *   15.20  *          *
* Conv. Total (cfs)      *1838093.0  * Conv. (cfs)            *          *1838093.0  *          *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *          *  215.00  *          *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.62  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  * 1159.92  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.62  *   78.30  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.26  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    1.41  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  743.85  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  734.12  * Flow Area (sq ft)      *    4.22  * 3586.62  *    5.28  *
* E.G. Slope (ft/ft)     *0.000208  * Area (sq ft)           *    4.22  * 3586.62  *    5.28  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *    1.08  *34197.57  *    1.35  *
* Top Width (ft)         *  238.99  * Top Width (ft)         *   11.99  *  212.00  *   15.00  *
* Vel Total (ft/s)       *    9.51  * Avg. Vel. (ft/s)       *    0.26  *    9.53  *    0.26  *
* Max Chl Dpth (ft)      *   31.05  * Hydr. Depth (ft)       *    0.35  *   16.92  *    0.35  *
* Conv. Total (cfs)      *2369739.0  * Conv. (cfs)           *    74.7  *2369571.0  *    93.7  *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *   12.34  *  230.95  *   15.38  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.00  *    0.20  *    0.00  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    1.93  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   49.38  * 1354.96  *   81.71  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   23.06  *   81.40  *   29.21  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  750.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.51  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  748.56  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  736.81  * Flow Area (sq ft)      *   60.73  * 4585.71  *  133.32  *
* E.G. Slope (ft/ft)     *0.000161  * Area (sq ft)           *   60.73  * 4585.71  *  133.32  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   65.20  *45333.24  *  101.56  *
* Top Width (ft)         *  352.22  * Top Width (ft)         *   11.99  *  212.00  *  128.23  *
* Vel Total (ft/s)       *    9.52  * Avg. Vel. (ft/s)       *    1.07  *    9.89  *    0.76  *
* Max Chl Dpth (ft)      *   35.76  * Hydr. Depth (ft)       *    5.06  *   21.63  *    1.04  *
* Conv. Total (cfs)      *3582049.0  * Conv. (cfs)           *  5133.0  *3568921.0  *  7995.6  *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *   17.05  *  230.95  *  133.56  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.04  *    0.20  *    0.01  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.04  *    1.98  *    0.01  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  150.54  * 1611.64  *  197.11  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   58.20  *   83.37  *   52.95  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  753.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.48  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.46  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  738.73  * Flow Area (sq ft)      *  107.50  * 5412.16  *  985.76  *
* E.G. Slope (ft/ft)     *0.000129  * Area (sq ft)           *  107.50  * 5412.16  *  985.76  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  131.50  *53372.88  *  895.62  *
* Top Width (ft)         *  525.18  * Top Width (ft)         *   12.00  *  212.00  *  301.19  *
* Vel Total (ft/s)       *    8.36  * Avg. Vel. (ft/s)       *    1.22  *    9.86  *    0.91  *
* Max Chl Dpth (ft)      *   39.66  * Hydr. Depth (ft)       *    8.96  *   25.53  *    3.27  *
* Conv. Total (cfs)      *4794641.0  * Conv. (cfs)           * 11589.7  *4704114.0  * 78937.4  *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *   20.95  *  230.95  *  311.95  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.04  *    0.19  *    0.03  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.05  *    1.86  *    0.02  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  269.58  * 1802.03  *  320.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   71.02  *   84.73  *  123.75  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  755.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.72  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  753.91  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  740.38  * Flow Area (sq ft)      *  124.86  * 5718.79  * 1424.92  *
* E.G. Slope (ft/ft)     *0.000141  * Area (sq ft)           *  124.86  * 5718.79  * 1424.92  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  168.91  *61159.15  * 1671.94  *
* Top Width (ft)         *  530.07  * Top Width (ft)         *   12.00  *  212.00  *  306.07  *
* Vel Total (ft/s)       *    8.67  * Avg. Vel. (ft/s)       *    1.35  *   10.69  *    1.17  *
* Max Chl Dpth (ft)      *   41.11  * Hydr. Depth (ft)       *   10.40  *   26.98  *    4.66  *
* Conv. Total (cfs)      *5311849.0  * Conv. (cfs)           * 14241.5  *5156638.0  *140970.0  *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *   22.36  *  230.95  *  319.09  *
```

```
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.05  *    0.22  *    0.04  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.07  *    2.33  *    0.05  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  385.33  * 1936.64  *  596.47  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   85.61  *   84.95  *  276.38  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.85  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  756.99  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  742.66  * Flow Area (sq ft)      *  535.27  * 6371.97  * 2778.76  *
* E.G. Slope (ft/ft)     *0.000134  * Area (sq ft)           * 1023.00  * 6371.97  * 3473.72  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  512.94  *71540.96  * 3846.10  *
* Top Width (ft)         * 1605.61  * Top Width (ft)         *  540.53  *  212.00  *  853.08  *
* Vel Total (ft/s)       *    7.84  * Avg. Vel. (ft/s)       *    0.96  *   11.23  *    1.38  *
* Max Chl Dpth (ft)      *   44.19  * Hydr. Depth (ft)       *    3.77  *   30.06  *    5.17  *
* Conv. Total (cfs)      *6551437.0  * Conv. (cfs)            * 44275.0  *6175180.0  *331982.8  *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *  155.25  *  230.95  *  552.15  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.03  *    0.23  *    0.04  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    0.03  *    2.60  *    0.06  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  625.56  * 2118.10  * 1375.50  *
* C & E Loss (ft)        *          * Cum SA (acres)         *  114.70  *   85.43  *  450.42  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  746.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  745.26  * Reach Len. (ft)        *   76.00  *   76.00  *   76.00  *
* Crit W.S. (ft)         *  735.14  * Flow Area (sq ft)      *   21.16  * 3886.17  *   26.47  *
* E.G. Slope (ft/ft)     *0.000200  * Area (sq ft)           *   21.16  * 3886.17  *   26.47  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *   14.44  *38267.20  *   18.36  *
* Top Width (ft)         *  238.99  * Top Width (ft)         *   11.99  *  212.00  *   15.00  *
* Vel Total (ft/s)       *    9.74  * Avg. Vel. (ft/s)       *    0.68  *    9.85  *    0.69  *
* Max Chl Dpth (ft)      *   32.46  * Hydr. Depth (ft)       *    1.76  *   18.33  *    1.76  *
* Conv. Total (cfs)      *2710829.0  * Conv. (cfs)            *  1021.9  *2708508.0  *  1299.4  *
* Length Wtd. (ft)       *   76.00  * Wetted Per. (ft)       *   13.75  *  230.95  *   16.79  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.02  *    0.21  *    0.02  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.01  *    2.06  *    0.01  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   78.90  * 1452.40  *  119.02  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   32.63  *   82.32  *   37.71  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

MULTIPLE OPENING


RIVER: Blue River
REACH: Main               RS: 3.371

INPUT
Description: Bridge B8.  Independence Avenue.  This bridge has multiple
             openings.  It has been normalized to the channel flow from 40
             degree skew.  Pier widths have been increased because they were
             skewed to channel flow.
Distance from Upstream XS =       1
Deck/Roadway Width        =      74
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=      20
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       0     788     782     500     782     776  839.99     771     765
     840     771     754     980     766            1180     760
    1350   754.5          1488.6   754.5   748.5  1730.4     754   748.5
    1920  756.05            1980  758.05            2030  760.05
    2060  762.05            2265  772.05            2330  774.05
```

```
    2382     775     769    2540   775.9   769.9    2640     774     768
    2725     773     767    2760     772

Upstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0     782    15.9     780   30.37     778   45.28     776    58.6     774
   77.36     772   92.85     770  109.59     768  126.27     766  143.48     764
   160.8     762   296.8     758  383.28     756    1490     754 1490.01   743.5
    1502   743.5    1571   719.3 1597.99   718.3    1598   712.8    1613   712.8
 1613.01   718.3    1639   719.3    1714   743.5    1729   743.5 1729.01     754
    1920     756    1980     758    2030     760    2060     762    2265     772
    2330     774    2380     774    2410     748    2500     748    2580     750
    2690     752    2730     770    2760     772    2810     770    2840     768
    2990     760    3040     758 3122.85     754 3153.57     754  3254.2     754
 3261.38     754 3277.66     754 3318.94     756 3320.79     756 3376.83     756

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .041    1502    .014    1714    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1502    1714             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     739     770       F
    3060 3376.83     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
     739    1360     770 2817.05    3060     770

Downstream  Deck/Roadway Coordinates
    num=      20
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**************************************************************************
       0     788     782     500     782     776  839.99     771     765
     840     771     754     980     766            1180     760
    1350   754.5          1488.6   754.5   748.5  1730.4     754   748.5
    1920  756.05            1980  758.05            2030  760.05
    2060  762.05            2265  772.05            2330  774.05
    2382     775     769    2540   775.9   769.9    2640     774     768
    2725     773     767    2760     772

Downstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0     782    15.9     780   30.37     778   45.28     776    58.6     774
   77.36     772   92.85     770  109.59     768  126.27     766  143.48     764
   160.8     762   296.8     758  383.28     756    1490     754 1490.01   743.5
    1502   743.5    1571   719.3 1597.99   718.3    1598   712.8    1613   712.8
 1613.01   718.3    1639   719.3    1714   743.5    1729   743.5 1729.01     754
    1920     756    1980     758    2030     760    2060     762    2265     772
    2330     774    2380     774    2410     748    2500     748    2580     750
    2690     752    2730     770    2760     772    2810     770    2840     768
    2990     760    3040     758 3122.85     754 3153.57     754  3254.2     754
 3261.38     754 3277.66     754 3318.94     756 3320.79     756 3376.83     756

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .041    1502    .014    1714    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1502    1714             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     739     770       F
    3060 3376.83     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
     739    1360     770 2817.05    3060     770
```

```
Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =     754
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  25

Pier Data
Pier Station     Upstream=      33    Downstream=      33
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=      87    Downstream=      87
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     141    Downstream=     141
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     195    Downstream=     195
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     249    Downstream=     249
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     303    Downstream=     303
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     790
```

```
Pier Data
Pier Station     Upstream=     357    Downstream=     357
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     387    Downstream=     387
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     450    Downstream=     450
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     483    Downstream=     483
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     552    Downstream=     552
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     594    Downstream=     594
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     648    Downstream=     648
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
```

```
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     702    Downstream=     702
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     756    Downstream=     756
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=     810    Downstream=     810
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     790

Pier Data
Pier Station     Upstream=    1560    Downstream=    1560
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    12.6     720    12.6   748.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    12.6     720    12.6   748.5

Pier Data
Pier Station     Upstream=    1657    Downstream=    1657
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    13.1     720    13.1   748.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    13.1     720    13.1   748.5

Pier Data
Pier Station     Upstream=    2405    Downstream=    2405
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     775

Pier Data
Pier Station     Upstream=    2455    Downstream=    2455
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     2.5     745     2.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
```

```
********************************
     2.5     745     2.5     775

Pier Data
Pier Station     Upstream=    2505    Downstream=    2505
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775

Pier Data
Pier Station     Upstream=    2555    Downstream=    2555
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775

Pier Data
Pier Station     Upstream=    2605    Downstream=    2605
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775

Pier Data
Pier Station     Upstream=    2655    Downstream=    2655
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775

Pier Data
Pier Station     Upstream=    2705    Downstream=    2705
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     2.5     745     2.5     775

Number of Bridge Coefficient Sets =  3

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only
```

```
Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

Multiple Opening Stagnation Limits
****************************************************************
*              *       Upstream        *      Downstream       *
****************************************************************
* Opening Type *  Sta. Left* Sta. Right*  Sta. Left* Sta. Right*
****************************************************************
*    Bridge    *          0*       1350*          0*       1350*
*    Bridge    *       1350*       2000*       1350*       2000*
*    Bridge    *       2000*    3376.83*       2000*    3376.83*
****************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.364

INPUT
Description: COE River Station= 50089.65
Preliminary Model River Station
             (miles)=3.35

Independence Ave.  B8 (downstream).  Multiple
             Openings.    Normalized to channel flow from 40 degree skew.
             Obstructions: Buildings and high ground downstream. Piers width
             increased due to slight skew to channel flow.  Underwater channel
             shown on bridge plans.  Ineffective flow on left is due to high
             ground dowsntream which will block the water.  Ineffective flow on
             right is due to buildings and high ground downstream.
Station Elevation Data    num=      50
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0      782    15.9      780   30.37      778   45.28      776    58.6      774
   77.36      772   92.85      770  109.59      768  126.27      766  143.48      764
   160.8      762   296.8      758  383.28      756    1490      754 1490.01   743.5
    1502    743.5    1571   719.3 1597.99   718.3    1598   712.8    1613   712.8
 1613.01    718.3    1639   719.3    1714   743.5    1729   743.5 1729.01     754
    1920      756    1980     758    2030     760    2060     762    2265     772
    2330      774    2380     774    2410     748    2500     748    2580     750
    2690      752    2730     770    2760     772    2810     770    2840     768
    2990      760    3040     758 3122.85     754 3153.57     754  3254.2     754
 3261.38      754 3277.66     754 3318.94     756 3320.79     756 3376.83     756

Manning's n Values        num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
***********************************************
       0     .041    1502     .014    1714     .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1502    1714              206     235     190              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     739     770       F
    3060 3376.83     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
     739    1360     770 2817.05    3060     770

CROSS SECTION OUTPUT  Profile #2-yr
```

```
*********************************************************************************************
* E.G. Elev (ft)          *  734.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.88  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  733.33  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)          *  726.94  * Flow Area (sq ft)      *          * 1663.67  *          *
* E.G. Slope (ft/ft)      *0.000234  * Area (sq ft)           *          * 1663.67  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  151.48  * Top Width (ft)         *          *  151.48  *          *
* Vel Total (ft/s)        *    7.51  * Avg. Vel. (ft/s)       *          *    7.51  *          *
* Max Chl Dpth (ft)       *   20.53  * Hydr. Depth (ft)       *          *   10.98  *          *
* Conv. Total (cfs)       *817213.6  * Conv. (cfs)            *          *817213.6  *          *
* Length Wtd. (ft)        *  235.00  * Wetted Per. (ft)       *          *  167.10  *          *
* Min Ch El (ft)          *  712.80  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.09  *          *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)   *          *  688.35  *          *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *          *   64.97  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  738.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.09  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  737.41  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)          *  729.71  * Flow Area (sq ft)      *          * 2331.53  *          *
* E.G. Slope (ft/ft)      *0.000224  * Area (sq ft)           *          * 2331.53  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)          *  175.77  * Top Width (ft)         *          *  175.77  *          *
* Vel Total (ft/s)        *    8.36  * Avg. Vel. (ft/s)       *          *    8.36  *          *
* Max Chl Dpth (ft)       *   24.61  * Hydr. Depth (ft)       *          *   13.26  *          *
* Conv. Total (cfs)       *1304120.0  * Conv. (cfs)            *          *1304120.0  *          *
* Length Wtd. (ft)        *  235.00  * Wetted Per. (ft)       *          *  192.72  *          *
* Min Ch El (ft)          *  712.80  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.41  *          *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)   *    1.44  *  946.16  *    4.45  *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)         *    2.27  *   73.50  *    6.45  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)          *  741.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.28  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  740.64  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)          *  732.00  * Flow Area (sq ft)      *          * 2930.05  *          *
* E.G. Slope (ft/ft)      *0.000222  * Area (sq ft)           *          * 2930.05  *          *
* Q Total (cfs)           *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)          *  194.98  * Top Width (ft)         *          *  194.98  *          *
* Vel Total (ft/s)        *    9.08  * Avg. Vel. (ft/s)       *          *    9.08  *          *
* Max Chl Dpth (ft)       *   27.84  * Hydr. Depth (ft)       *          *   15.03  *          *
* Conv. Total (cfs)       *1785471.0  * Conv. (cfs)            *          *1785471.0  *          *
* Length Wtd. (ft)        *  235.00  * Wetted Per. (ft)       *          *  212.99  *          *
* Min Ch El (ft)          *  712.80  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.73  *          *
* Frctn Loss (ft)         *    0.05  * Cum Volume (acre-ft)   *   14.56  * 1154.75  *   31.58  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         *    8.62  *   77.96  *   15.28  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. Elev (ft)          *  744.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.48  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  743.49  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)          *  734.12  * Flow Area (sq ft)      *          * 3509.01  *          *
* E.G. Slope (ft/ft)      *0.000224  * Area (sq ft)           *          * 3509.01  *          *
* Q Total (cfs)           *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)          *  211.91  * Top Width (ft)         *          *  211.91  *          *
* Vel Total (ft/s)        *    9.75  * Avg. Vel. (ft/s)       *          *    9.75  *          *
* Max Chl Dpth (ft)       *   30.69  * Hydr. Depth (ft)       *          *   16.56  *          *
```

```
* Conv. Total (cfs)      *2285328.0  * Conv. (cfs)            *          *2285328.0  *          *
* Length Wtd. (ft)       *  235.00  * Wetted Per. (ft)       *          *  230.86  *          *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.07  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   49.37  * 1348.77  *   81.70  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   23.05  *   81.03  *   29.20  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  749.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.56  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  748.26  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)         *  736.81  * Flow Area (sq ft)      *   57.03  * 4520.34  *   95.74  *
* E.G. Slope (ft/ft)     *0.000169  * Area (sq ft)           *   57.03  * 4520.34  *   95.74  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   60.95  *45355.30  *   83.75  *
* Top Width (ft)         *  339.53  * Top Width (ft)         *   11.99  *  212.00  *  115.54  *
* Vel Total (ft/s)       *    9.74  * Avg. Vel. (ft/s)       *    1.07  *   10.03  *    0.87  *
* Max Chl Dpth (ft)      *   35.46  * Hydr. Depth (ft)       *    4.76  *   21.32  *    0.83  *
* Conv. Total (cfs)      *3495649.0  * Conv. (cfs)            *  4682.6  *3484532.0  *  6434.3  *
* Length Wtd. (ft)       *  234.72  * Wetted Per. (ft)       *   16.73  *  230.95  *  120.37  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.04  *    0.21  *    0.01  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.04  *    2.08  *    0.01  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  150.43  * 1603.70  *  196.91  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   58.18  *   83.00  *   52.74  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  753.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.89  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)         *  738.73  * Flow Area (sq ft)      *  100.68  * 5291.58  *  815.30  *
* E.G. Slope (ft/ft)     *0.000140  * Area (sq ft)           *  100.68  * 5291.58  *  815.30  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  125.12  *53570.96  *  703.92  *
* Top Width (ft)         *  517.66  * Top Width (ft)         *   12.00  *  212.00  *  293.67  *
* Vel Total (ft/s)       *    8.76  * Avg. Vel. (ft/s)       *    1.24  *   10.12  *    0.86  *
* Max Chl Dpth (ft)      *   39.09  * Hydr. Depth (ft)       *    8.39  *   24.96  *    2.78  *
* Conv. Total (cfs)      *4600851.0  * Conv. (cfs)            * 10582.0  *4530736.0  * 59533.3  *
* Length Wtd. (ft)       *  233.64  * Wetted Per. (ft)       *   20.38  *  230.95  *  303.60  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.04  *    0.20  *    0.02  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.05  *    2.02  *    0.02  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  269.40  * 1792.69  *  319.01  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   71.00  *   84.36  *  123.23  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  755.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.86  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  753.15  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)         *  740.38  * Flow Area (sq ft)      *  115.71  * 5557.15  * 1192.54  *
* E.G. Slope (ft/ft)     *0.000157  * Area (sq ft)           *  115.71  * 5557.15  * 1192.54  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  160.66  *61508.50  * 1330.84  *
* Top Width (ft)         *  527.49  * Top Width (ft)         *   12.00  *  212.00  *  303.50  *
* Vel Total (ft/s)       *    9.18  * Avg. Vel. (ft/s)       *    1.39  *   11.07  *    1.12  *
* Max Chl Dpth (ft)      *   40.35  * Hydr. Depth (ft)       *    9.64  *   26.21  *    3.93  *
* Conv. Total (cfs)      *5035222.0  * Conv. (cfs)            * 12840.9  *4916015.0  *106366.4  *
* Length Wtd. (ft)       *  232.90  * Wetted Per. (ft)       *   21.59  *  230.95  *  315.30  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.05  *    0.24  *    0.04  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    0.07  *    2.60  *    0.04  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  385.12  * 1926.80  *  594.19  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *   85.59  *   84.58  *  275.84  *
```

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*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  758.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.00  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  756.24  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)         *  742.66  * Flow Area (sq ft)      *  428.83  * 6213.05  * 2385.46  *
* E.G. Slope (ft/ft)     *0.000149  * Area (sq ft)           *  629.95  * 6213.05  * 2849.42  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  374.48  *72232.80  * 3292.72  *
* Top Width (ft)         * 1532.65  * Top Width (ft)         *  508.12  *  212.00  *  812.53  *
* Vel Total (ft/s)       *    8.41  * Avg. Vel. (ft/s)       *    0.87  *   11.63  *    1.38  *
* Max Chl Dpth (ft)      *   43.44  * Hydr. Depth (ft)       *    3.02  *   29.31  *    4.66  *
* Conv. Total (cfs)      *6221216.0  * Conv. (cfs)            * 30695.0  *5920630.0  *269891.0  *
* Length Wtd. (ft)       *  231.12  * Wetted Per. (ft)       *  154.50  *  230.95  *  526.68  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.03  *    0.25  *    0.04  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.02  *    2.91  *    0.06  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  624.12  * 2107.12  * 1369.98  *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)         *  113.78  *   85.06  *  448.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  746.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  744.88  * Reach Len. (ft)        *  206.00  *  235.00  *  190.00  *
* Crit W.S. (ft)         *  735.14  * Flow Area (sq ft)      *   16.60  * 3805.59  *   20.77  *
* E.G. Slope (ft/ft)     *0.000214  * Area (sq ft)           *   16.60  * 3805.59  *   20.77  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *   10.17  *38276.94  *   12.89  *
* Top Width (ft)         *  238.99  * Top Width (ft)         *   11.99  *  212.00  *   15.00  *
* Vel Total (ft/s)       *    9.97  * Avg. Vel. (ft/s)       *    0.61  *   10.06  *    0.62  *
* Max Chl Dpth (ft)      *   32.08  * Hydr. Depth (ft)       *    1.38  *   17.95  *    1.38  *
* Conv. Total (cfs)      *2617123.0  * Conv. (cfs)            *   694.9  *2615547.0  *   880.7  *
* Length Wtd. (ft)       *  234.99  * Wetted Per. (ft)       *   13.37  *  230.95  *   16.41  *
* Min Ch El (ft)         *  712.80  * Shear (lb/sq ft)       *    0.02  *    0.22  *    0.02  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.01  *    2.22  *    0.01  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   78.87  * 1445.69  *  118.98  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   32.61  *   81.95  *   37.68  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.319

INPUT
Description: COE River Station= 50324.54
Preliminary Model River Station
             (miles)=3.31

Truss Bridge supporting gas lines.  B7B
             (upstream).
 Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.  Obstructions are
             buildings.
Station Elevation Data    num=      46
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
```

```
       0     780    4.86     778   10.76     776   16.54     774   22.31     772
   27.61     770   37.91     768   65.46     766   95.61     764  128.81     762
  162.86     760  172.12     758  286.29     756  436.63     754  630.24     752
 1631.76     750    1641   749.4 1641.01   743.5    1647   743.5    1748  719.25
    1774  718.25 1774.01  712.75    1790  712.75 1790.01  718.25    1816  719.25
    1890   743.5    1900   743.5 1900.01   749.4 1916.76     750 1925.34     750
  1997.8     750 2034.38     752 2038.55     752    2085     750 2163.48     748
 2174.71     746 2175.94     746 2215.14     746 2283.81     746 2344.21     746
 2368.33     746 2488.71     748 2552.02     750 2784.34     752  3213.7     754
 3272.46     754

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0    .041 1641.01    .014    1900    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1641.01    1900                25      26      30              .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0     591     765       F
    3084 3272.46     765       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     591  1593.4     765  2724.2    3084     765

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)          *  734.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.74  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  733.37  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)          *  726.74  * Flow Area (sq ft)      *          * 1810.20  *          *
* E.G. Slope (ft/ft)      *0.000202  * Area (sq ft)           *          * 1810.20  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  169.92  * Top Width (ft)         *          *  169.92  *          *
* Vel Total (ft/s)        *    6.91  * Avg. Vel. (ft/s)       *          *    6.91  *          *
* Max Chl Dpth (ft)       *   20.62  * Hydr. Depth (ft)       *          *   10.65  *          *
* Conv. Total (cfs)       *879361.4  * Conv. (cfs)            *          *879361.4  *          *
* Length Wtd. (ft)        *    6.50  * Wetted Per. (ft)       *          *  184.87  *          *
* Min Ch El (ft)          *  712.75  * Shear (lb/sq ft)       *          *    0.12  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.85  *          *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)   *          *  678.98  *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *          *   64.10  *          *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)          *  738.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.89  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  737.50  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)          *  729.36  * Flow Area (sq ft)      *          * 2572.56  *          *
* E.G. Slope (ft/ft)      *0.000187  * Area (sq ft)           *          * 2572.56  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)          *  199.69  * Top Width (ft)         *          *  199.69  *          *
* Vel Total (ft/s)        *    7.58  * Avg. Vel. (ft/s)       *          *    7.58  *          *
* Max Chl Dpth (ft)       *   24.75  * Hydr. Depth (ft)       *          *   12.88  *          *
* Conv. Total (cfs)       *1424932.0  * Conv. (cfs)            *          *1424932.0  *          *
* Length Wtd. (ft)        *    6.50  * Wetted Per. (ft)       *          *  215.79  *          *
* Min Ch El (ft)          *  712.75  * Shear (lb/sq ft)       *          *    0.14  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.06  *          *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)   *    1.44  *  932.93  *    4.45  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    2.27  *   72.49  *    6.45  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)          *  741.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.03  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  740.77  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
```

```
* Crit W.S. (ft)         *  731.53  * Flow Area (sq ft)      *          * 3263.60  *          *
* E.G. Slope (ft/ft)     *0.000182  * Area (sq ft)           *          * 3263.60  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  223.27  * Top Width (ft)         *          *  223.27  *          *
* Vel Total (ft/s)       *    8.15  * Avg. Vel. (ft/s)       *          *    8.15  *          *
* Max Chl Dpth (ft)      *   28.02  * Hydr. Depth (ft)       *          *   14.62  *          *
* Conv. Total (cfs)      *1971920.0  * Conv. (cfs)            *          *1971920.0  *          *
* Length Wtd. (ft)       *    6.50  * Wetted Per. (ft)       *          *  240.27  *          *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.26  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   14.56  * 1138.04  *   31.58  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.62  *   76.83  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.82  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  743.65  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)         *  733.56  * Flow Area (sq ft)      *          * 3939.75  *          *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)           *    0.00  * 3939.75  *    0.00  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  258.99  * Top Width (ft)         *          *  258.99  *          *
* Vel Total (ft/s)       *    8.68  * Avg. Vel. (ft/s)       *          *    8.68  *          *
* Max Chl Dpth (ft)      *   30.90  * Hydr. Depth (ft)       *          *   15.21  *          *
* Conv. Total (cfs)      *2456154.0  * Conv. (cfs)            *          *2456154.0  *          *
* Length Wtd. (ft)       *    6.50  * Wetted Per. (ft)       *          *  276.75  *          *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.50  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   49.37  * 1328.68  *   81.70  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   23.05  *   79.76  *   29.20  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.66  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  748.50  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)         *  736.12  * Flow Area (sq ft)      *    0.02  * 5196.48  *  691.25  *
* E.G. Slope (ft/ft)     *0.000134  * Area (sq ft)           *    0.02  * 5196.48  *  691.25  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    0.00  *45053.39  *  446.61  *
* Top Width (ft)         *  619.86  * Top Width (ft)         *          *  258.99  *  360.86  *
* Vel Total (ft/s)       *    7.73  * Avg. Vel. (ft/s)       *    0.01  *    8.67  *    0.65  *
* Max Chl Dpth (ft)      *   35.75  * Hydr. Depth (ft)       *    2.50  *   20.06  *    1.92  *
* Conv. Total (cfs)      *3934959.0  * Conv. (cfs)            *     0.0  *3896334.0  * 38624.3  *
* Length Wtd. (ft)       *    6.50  * Wetted Per. (ft)       *    5.00  *  276.75  *  366.10  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *    0.00  *    0.16  *    0.02  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.00  *    1.36  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  150.30  * 1577.49  *  195.19  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   58.15  *   81.73  *   51.70  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.28  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.23  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)         *  737.89  * Flow Area (sq ft)      *  107.46  * 6161.57  * 2934.23  *
* E.G. Slope (ft/ft)     *0.000100  * Area (sq ft)           *  107.46  * 6161.57  * 2934.23  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   60.50  *51868.68  * 2470.82  *
* Top Width (ft)         * 1130.80  * Top Width (ft)         *   47.61  *  258.99  *  824.20  *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *    0.56  *    8.42  *    0.84  *
* Max Chl Dpth (ft)      *   39.48  * Hydr. Depth (ft)       *    2.26  *   23.79  *    3.56  *
* Conv. Total (cfs)      *5428179.0  * Conv. (cfs)            *  6037.2  *5175597.0  *246545.4  *
* Length Wtd. (ft)       *    6.50  * Wetted Per. (ft)       *   55.67  *  276.75  *  831.20  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *    0.01  *    0.14  *    0.02  *
```

```
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.01  *    1.18  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  268.90  * 1761.80  *  310.83  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   70.86  *   83.09  *  120.79  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  753.60  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)         *  739.46  * Flow Area (sq ft)      *  172.89  * 6517.54  * 4067.05  *
* E.G. Slope (ft/ft)     *0.000106  * Area (sq ft)           *  242.36  * 6517.54  * 4071.67  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  135.07  *58497.27  * 4367.67  *
* Top Width (ft)         * 1291.31  * Top Width (ft)         *  163.58  *  258.99  *  868.74  *
* Vel Total (ft/s)       *    5.86  * Avg. Vel. (ft/s)       *    0.78  *    8.98  *    1.07  *
* Max Chl Dpth (ft)      *   40.85  * Hydr. Depth (ft)       *    3.63  *   25.17  *    4.93  *
* Conv. Total (cfs)      *6120953.0  * Conv. (cfs)           * 13122.7  *5683476.0  *424353.7  *
* Length Wtd. (ft)       *    6.50  * Wetted Per. (ft)       *   57.05  *  276.75  *  832.58  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *    0.02  *    0.16  *    0.03  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.02  *    1.40  *    0.03  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  384.28  * 1894.23  *  582.71  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   85.17  *   83.31  *  273.29  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.10  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  756.84  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)         *  741.58  * Flow Area (sq ft)      *  327.10  * 7356.41  * 6736.65  *
* E.G. Slope (ft/ft)     *0.000091  * Area (sq ft)           * 1186.19  * 7356.41  * 7311.49  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  348.50  *66207.49  * 9344.01  *
* Top Width (ft)         * 1672.06  * Top Width (ft)         *  400.41  *  258.99  * 1012.66  *
* Vel Total (ft/s)       *    5.26  * Avg. Vel. (ft/s)       *    1.07  *    9.00  *    1.39  *
* Max Chl Dpth (ft)      *   44.09  * Hydr. Depth (ft)       *    6.87  *   28.40  *    8.17  *
* Conv. Total (cfs)      *7972343.0  * Conv. (cfs)           * 36605.2  *6954267.0  *981470.6  *
* Length Wtd. (ft)       *    6.50  * Wetted Per. (ft)       *   60.29  *  276.75  *  835.82  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *    0.03  *    0.15  *    0.05  *
* Alpha                  *    2.56  * Stream Power (lb/ft s) *    0.03  *    1.35  *    0.06  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  619.82  * 2070.52  * 1347.82  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *  111.63  *   83.79  *  444.98  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  746.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *   0.000  *   0.014  *   0.000  *
* W.S. Elev (ft)         *  745.08  * Reach Len. (ft)        *    6.50  *    6.50  *    6.50  *
* Crit W.S. (ft)         *  734.53  * Flow Area (sq ft)      *    0.00  * 4309.82  *    0.00  *
* E.G. Slope (ft/ft)     *0.000180  * Area (sq ft)           *    0.00  * 4309.82  *    0.00  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    0.00  *38300.00  *    0.00  *
* Top Width (ft)         *  259.00  * Top Width (ft)         *          *  258.99  *          *
* Vel Total (ft/s)       *    8.89  * Avg. Vel. (ft/s)       *    0.01  *    8.89  *    0.01  *
* Max Chl Dpth (ft)      *   32.33  * Hydr. Depth (ft)       *    0.79  *   16.64  *    0.79  *
* Conv. Total (cfs)      *2852592.0  * Conv. (cfs)           *     0.0  *2852592.0  *     0.0  *
* Length Wtd. (ft)       *    6.50  * Wetted Per. (ft)       *    1.58  *  276.75  *    1.58  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.56  *          *
```

```
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   78.83  * 1423.80  *  118.93  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   32.58  *   80.68  *   37.65  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 3.317

INPUT
Description: Bridge B7B.  This is a truss bridge with no piers supporting some
             gas lines.  The top and bottom of the truss were modeled as the
             top and bottom of the bridge assuming full clogging of the narrow
             truss openings.
Distance from Upstream XS =     6.5
Deck/Roadway Width        =      12
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
 1640.99   749.4   749.4    1641     762   749.4 1900.01     762   749.4
 1900.02   749.4   749.4

Upstream Bridge Cross Section Data
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0     780    4.86     778   10.76     776   16.54     774   22.31     772
   27.61     770   37.91     768   65.46     766   95.61     764  128.81     762
  162.86     760  172.12     758  286.29     756  436.63     754  630.24     752
 1631.76     750    1641   749.4 1641.01   743.5    1647   743.5    1748  719.25
    1774  718.25 1774.01  712.75    1790  712.75 1790.01  718.25    1816  719.25
    1890   743.5    1900   743.5 1900.01   749.4 1916.76     750 1925.34     750
  1997.8     750 2034.38     752 2038.55     752    2085     750 2163.48     748
 2174.71     746 2175.94     746 2215.14     746 2283.81     746 2344.21     746
 2368.33     746 2488.71     748 2552.02     750 2784.34     752  3213.7     754
 3272.46     754

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041 1641.01    .014    1900    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1641.01    1900            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     591     765        F
    3084 3272.46     765        F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************
     591  1593.4     765  2724.2    3084     765

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
 1640.99   749.4   749.4    1641     762   749.4 1900.01     762   749.4
 1900.02   749.4   749.4

Downstream Bridge Cross Section Data
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0     780    4.86     778   10.76     776   16.54     774   22.31     772
   27.61     770   37.91     768   65.46     766   95.61     764  128.81     762
  162.86     760  172.12     758  286.29     756  436.63     754  630.24     752
 1631.76     750    1641   749.4 1641.01   743.5    1647   743.5    1748  719.25
    1774  718.25 1774.01  712.75    1790  712.75 1790.01  718.25    1816  719.25
    1890   743.5    1900   743.5 1900.01   749.4 1916.76     750 1925.34     750
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  1997.8     750 2034.38     752 2038.55     752    2085     750 2163.48     748
 2174.71     746 2175.94     746 2215.14     746 2283.81     746 2344.21     746
 2368.33     746 2488.71     748 2552.02     750 2784.34     752  3213.7     754
 3272.46     754

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041 1641.01    .014    1900    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
      1641.01    1900          .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0     591     765       F
    3084 3272.46     765       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************
     591  1593.4     765  2724.2    3084     765

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     734.11  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     733.37  * E.G. Elev (ft)         *     734.11  *     734.11  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     733.37  *     733.37  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     726.74  *     726.74  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      20.62  *      20.62  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.91  *       6.91  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1809.94  *    1809.46  *
* Weir Submerg           *             * Froude # Chl           *       0.37  *       0.37  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   15032.06  *   15027.68  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *      10.65  *      10.65  *
* Min El Prs (ft)        *     749.40  * W.P. Total (ft)        *     184.86  *     184.84  *
* Delta EG (ft)          *       0.01  * Conv. Total (cfs)      *   879187.8  *   878868.4  *
* Delta WS (ft)          *       0.01  * Top Width (ft)         *     169.91  *     169.89  *
* BR Open Area (sq ft)   *    5428.99  * Frctn Loss (ft)        *       0.00  *       0.00  *
* BR Open Vel (ft/s)     *       6.91  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.12  *       0.12  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.85  *       0.85  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     738.39  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     737.50  * E.G. Elev (ft)         *     738.39  *     738.39  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     737.50  *     737.49  *
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```
* Q Bridge (cfs)          *   19500.00  * Crit W.S. (ft)          *     729.36  *     729.36  *
* Q Weir (cfs)            *             * Max Chl Dpth (ft)       *      24.75  *      24.74  *
* Weir Sta Lft (ft)       *             * Vel Total (ft/s)        *       7.58  *       7.58  *
* Weir Sta Rgt (ft)       *             * Flow Area (sq ft)       *    2572.28  *    2571.77  *
* Weir Submerg            *             * Froude # Chl            *       0.37  *       0.37  *
* Weir Max Depth (ft)     *             * Specif Force (cu ft)    *   25938.55  *   25932.88  *
* Min El Weir Flow (ft)   *     746.01  * Hydr Depth (ft)         *      12.88  *      12.88  *
* Min El Prs (ft)         *     749.40  * W.P. Total (ft)         *     215.78  *     215.76  *
* Delta EG (ft)           *       0.00  * Conv. Total (cfs)       *  1424720.0  *  1424332.0  *
* Delta WS (ft)           *       0.01  * Top Width (ft)          *     199.68  *     199.66  *
* BR Open Area (sq ft)    *    5428.99  * Frctn Loss (ft)         *       0.00  *       0.00  *
* BR Open Vel (ft/s)      *       7.58  * C & E Loss (ft)         *       0.00  *       0.00  *
* Coef of Q               *             * Shear Total (lb/sq ft)  *       0.14  *       0.14  *
* Br Sel Method           *Energy only  * Power Total (lb/ft s)   *       1.06  *       1.06  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. US. (ft)           *     741.80  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)           *     740.77  * E.G. Elev (ft)          *     741.80  *     741.79  *
* Q Total (cfs)           *   26600.00  * W.S. Elev (ft)          *     740.77  *     740.76  *
* Q Bridge (cfs)          *   26600.00  * Crit W.S. (ft)          *     731.53  *     731.53  *
* Q Weir (cfs)            *             * Max Chl Dpth (ft)       *      28.02  *      28.01  *
* Weir Sta Lft (ft)       *             * Vel Total (ft/s)        *       8.15  *       8.15  *
* Weir Sta Rgt (ft)       *             * Flow Area (sq ft)       *    3263.30  *    3262.74  *
* Weir Submerg            *             * Froude # Chl            *       0.38  *       0.38  *
* Weir Max Depth (ft)     *             * Specif Force (cu ft)    *   37594.62  *   37587.61  *
* Min El Weir Flow (ft)   *     746.01  * Hydr Depth (ft)         *      14.62  *      14.62  *
* Min El Prs (ft)         *     749.40  * W.P. Total (ft)         *     240.26  *     240.25  *
* Delta EG (ft)           *       0.00  * Conv. Total (cfs)       *  1971673.0  *  1971214.0  *
* Delta WS (ft)           *       0.01  * Top Width (ft)          *     223.26  *     223.25  *
* BR Open Area (sq ft)    *    5428.99  * Frctn Loss (ft)         *       0.00  *       0.00  *
* BR Open Vel (ft/s)      *       8.15  * C & E Loss (ft)         *       0.00  *       0.00  *
* Coef of Q               *             * Shear Total (lb/sq ft)  *       0.15  *       0.15  *
* Br Sel Method           *Energy only  * Power Total (lb/ft s)   *       1.26  *       1.26  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)           *     744.82  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)           *     743.65  * E.G. Elev (ft)          *     744.82  *     744.82  *
* Q Total (cfs)           *   34200.00  * W.S. Elev (ft)          *     743.65  *     743.65  *
* Q Bridge (cfs)          *   34200.00  * Crit W.S. (ft)          *     733.56  *     733.56  *
* Q Weir (cfs)            *             * Max Chl Dpth (ft)       *      30.90  *      30.90  *
* Weir Sta Lft (ft)       *             * Vel Total (ft/s)        *       8.68  *       8.68  *
* Weir Sta Rgt (ft)       *             * Flow Area (sq ft)       *    3939.37  *    3938.66  *
* Weir Submerg            *             * Froude # Chl            *       0.39  *       0.39  *
* Weir Max Depth (ft)     *             * Specif Force (cu ft)    *   50448.62  *   50439.46  *
* Min El Weir Flow (ft)   *     746.01  * Hydr Depth (ft)         *      15.21  *      15.21  *
* Min El Prs (ft)         *     749.40  * W.P. Total (ft)         *     277.04  *     277.04  *
* Delta EG (ft)           *       0.01  * Conv. Total (cfs)       *  2455760.0  *  2455021.0  *
* Delta WS (ft)           *       0.01  * Top Width (ft)          *     258.99  *     258.99  *
* BR Open Area (sq ft)    *    5428.99  * Frctn Loss (ft)         *       0.00  *       0.00  *
* BR Open Vel (ft/s)      *       8.68  * C & E Loss (ft)         *       0.00  *       0.00  *
* Coef of Q               *             * Shear Total (lb/sq ft)  *       0.17  *       0.17  *
* Br Sel Method           *Energy only  * Power Total (lb/ft s)   *       1.49  *       1.50  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)           *     749.66  * Element                 *Inside BR US *Inside BR DS *
```

```
* W.S. US. (ft)          *     748.50  * E.G. Elev (ft)         *     749.66  *     749.66  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     748.50  *     748.50  *
* Q Bridge (cfs)         *   45053.67  * Crit W.S. (ft)         *     736.12  *     736.12  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.75  *      35.75  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.73  *       7.73  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5887.15  *    5886.01  *
* Weir Submerg           *             * Froude # Chl           *       0.34  *       0.34  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   76313.06  *   76303.66  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *       9.50  *       9.50  *
* Min El Prs (ft)        *     749.40  * W.P. Total (ft)        *     647.78  *     647.54  *
* Delta EG (ft)          *       0.00  * Conv. Total (cfs)      *  3934615.0  *  3933970.0  *
* Delta WS (ft)          *       0.00  * Top Width (ft)         *     619.79  *     619.66  *
* BR Open Area (sq ft)   *    5428.99  * Frctn Loss (ft)        *       0.00  *       0.00  *
* BR Open Vel (ft/s)     *       8.67  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.08  *       0.08  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.59  *       0.59  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     753.28  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     752.23  * E.G. Elev (ft)         *     753.26  *     753.26  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     752.04  *     752.03  *
* Q Bridge (cfs)         *   50108.71  * Crit W.S. (ft)         *     737.89  *     737.89  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      39.29  *      39.28  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.55  *       6.55  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8304.98  *    8301.09  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  103496.20  *  103463.70  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *       9.53  *       9.52  *
* Min El Prs (ft)        *     749.40  * W.P. Total (ft)        *    1427.46  *    1427.45  *
* Delta EG (ft)          *       0.07  * Conv. Total (cfs)      *  2929362.0  *  2928847.0  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *     871.77  *     871.77  *
* BR Open Area (sq ft)   *    5428.99  * Frctn Loss (ft)        *       0.00  *       0.00  *
* BR Open Vel (ft/s)     *       9.23  * C & E Loss (ft)        *       0.00  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.13  *       0.13  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       0.82  *       0.82  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     754.77  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     753.60  * E.G. Elev (ft)         *     754.74  *     754.74  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     753.36  *     753.35  *
* Q Bridge (cfs)         *   54829.80  * Crit W.S. (ft)         *     739.46  *     739.46  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.61  *      40.60  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.66  *       6.67  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9452.75  *    9448.01  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  118337.10  *  118293.30  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *      10.84  *      10.84  *
* Min El Prs (ft)        *     749.40  * W.P. Total (ft)        *    1432.82  *    1432.80  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)      *  3100353.0  *  3099572.0  *
* Delta WS (ft)          *       0.11  * Top Width (ft)         *     963.77  *     963.24  *
* BR Open Area (sq ft)   *    5428.99  * Frctn Loss (ft)        *       0.00  *       0.00  *
* BR Open Vel (ft/s)     *      10.10  * C & E Loss (ft)        *       0.00  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.17  *       0.17  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.13  *       1.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	757.94	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	756.84	E.G. Elev (ft)	757.93	757.93
Q Total (cfs)	75900.00	W.S. Elev (ft)	756.70	756.70
Q Bridge (cfs)	55563.92	Crit W.S. (ft)	741.58	741.58
Q Weir (cfs)		Max Chl Dpth (ft)	43.95	43.95
Weir Sta Lft (ft)		Vel Total (ft/s)	6.14	6.14
Weir Sta Rgt (ft)		Flow Area (sq ft)	12370.79	12366.05
Weir Submerg		Froude # Chl	0.20	0.20
Weir Max Depth (ft)		Specif Force (cu ft)	156663.40	156604.20
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	14.19	14.18
Min El Prs (ft)	749.40	W.P. Total (ft)	1446.24	1446.00
Delta EG (ft)	0.05	Conv. Total (cfs)	3685838.0	3684842.0
Delta WS (ft)	0.06	Top Width (ft)	1405.07	1404.76
BR Open Area (sq ft)	5428.99	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	10.23	C & E Loss (ft)	0.00	0.04
Coef of Q		Shear Total (lb/sq ft)	0.23	0.23
Br Sel Method	Energy only	Power Total (lb/ft s)	1.39	1.39

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	746.31	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	745.08	E.G. Elev (ft)	746.30	746.30
Q Total (cfs)	38300.00	W.S. Elev (ft)	745.08	745.08
Q Bridge (cfs)	38300.00	Crit W.S. (ft)	734.53	734.53
Q Weir (cfs)		Max Chl Dpth (ft)	32.33	32.33
Weir Sta Lft (ft)		Vel Total (ft/s)	8.89	8.89
Weir Sta Rgt (ft)		Flow Area (sq ft)	4309.48	4308.83
Weir Submerg		Froude # Chl	0.38	0.38
Weir Max Depth (ft)		Specif Force (cu ft)	57692.70	57683.51
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	16.64	16.64
Min El Prs (ft)	749.40	W.P. Total (ft)	279.91	279.91
Delta EG (ft)	0.00	Conv. Total (cfs)	2852208.0	2851493.0
Delta WS (ft)	0.01	Top Width (ft)	259.00	259.00
BR Open Area (sq ft)	5428.99	Frctn Loss (ft)	0.00	0.00
BR Open Vel (ft/s)	8.89	C & E Loss (ft)	0.00	0.00
Coef of Q		Shear Total (lb/sq ft)	0.17	0.17
Br Sel Method	Energy only	Power Total (lb/ft s)	1.54	1.54

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 3.314

INPUT
Description: COE River Station= 50350.05
Preliminary Model River Station
(miles)=3.3

Truss Bridge supporting gas lines. B7B
(downstream). No piers. Ineffective flow on left is due to high ground dowsntream which will block the water. Ineffective flow on right is due to buildings and high ground downstream.
Obstructions are buildings. Underwater channel shown on bridge plans. Top and bottom of truss modeled as top and bottom of bridge with full clogging of narrow truss members assumed.
Station Elevation Data num= 46

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     780    4.86     778   10.76     776   16.54     774   22.31     772
   27.61     770   37.91     768   65.46     766   95.61     764  128.81     762
  162.86     760  172.12     758  286.29     756  436.63     754  630.24     752
 1631.76     750    1641   749.4 1641.01   743.5    1647   743.5    1748  719.25
    1774  718.25 1774.01  712.75    1790  712.75 1790.01  718.25    1816  719.25
    1890   743.5    1900   743.5 1900.01   749.4 1916.76     750 1925.34     750
  1997.8     750 2034.38     752 2038.55     752    2085     750 2163.48     748
 2174.71     746 2175.94     746 2215.14     746 2283.81     746 2344.21     746
 2368.33     746 2488.71     748 2552.02     750 2784.34     752  3213.7     754
 3272.46     754

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041 1641.01    .014    1900    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1641.01    1900              80     103      55              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     591     765       F
    3084 3272.46     765       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************
     591  1593.4     765  2724.2    3084     765

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  734.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  733.37  * Reach Len. (ft)        *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  726.74  * Flow Area (sq ft)      *          * 1809.15  *          *
* E.G. Slope (ft/ft)     *0.000202  * Area (sq ft)           *          * 1809.15  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  169.88  * Top Width (ft)         *          *  169.88  *          *
* Vel Total (ft/s)       *    6.91  * Avg. Vel. (ft/s)       *          *    6.91  *          *
* Max Chl Dpth (ft)      *   20.62  * Hydr. Depth (ft)       *          *   10.65  *          *
* Conv. Total (cfs)      *878660.1  * Conv. (cfs)             *          *878660.1  *          *
* Length Wtd. (ft)       *  103.00  * Wetted Per. (ft)        *          *  184.82  *          *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)        *          *    0.12  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.85  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *          *  677.90  *          *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *          *   64.00  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  738.39  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  737.49  * Reach Len. (ft)        *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  729.36  * Flow Area (sq ft)      *          * 2571.44  *          *
* E.G. Slope (ft/ft)     *0.000187  * Area (sq ft)           *          * 2571.44  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  199.65  * Top Width (ft)         *          *  199.65  *          *
* Vel Total (ft/s)       *    7.58  * Avg. Vel. (ft/s)       *          *    7.58  *          *
* Max Chl Dpth (ft)      *   24.74  * Hydr. Depth (ft)       *          *   12.88  *          *
* Conv. Total (cfs)      *1424082.0  * Conv. (cfs)             *          *1424082.0  *          *
* Length Wtd. (ft)       *  103.00  * Wetted Per. (ft)        *          *  215.74  *          *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)        *          *    0.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.06  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *    1.44  *  931.39  *    4.45  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    2.27  *   72.37  *    6.45  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  741.79  * Element                *  Left OB *  Channel * Right OB *
```

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* Vel Head (ft)          *    1.03  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  740.76  * Reach Len. (ft)         *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  731.53  * Flow Area (sq ft)       *          * 3262.37  *          *
* E.G. Slope (ft/ft)     *0.000182  * Area (sq ft)            *          * 3262.37  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  223.23  * Top Width (ft)          *          *  223.23  *          *
* Vel Total (ft/s)       *    8.15  * Avg. Vel. (ft/s)        *          *    8.15  *          *
* Max Chl Dpth (ft)      *   28.01  * Hydr. Depth (ft)        *          *   14.61  *          *
* Conv. Total (cfs)      *1970910.0  * Conv. (cfs)            *          *1970910.0  *          *
* Length Wtd. (ft)       *  103.00  * Wetted Per. (ft)        *          *  240.23  *          *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)        *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    1.26  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)     *   14.56  * 1136.10  *   31.58  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)           *    8.62  *   76.70  *   15.28  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  744.82  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  743.64  * Reach Len. (ft)         *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  733.56  * Flow Area (sq ft)       *          * 3938.22  *          *
* E.G. Slope (ft/ft)     *0.000194  * Area (sq ft)            *    0.00  * 3938.22  *    0.00  *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  258.99  * Top Width (ft)          *          *  258.99  *          *
* Vel Total (ft/s)       *    8.68  * Avg. Vel. (ft/s)        *          *    8.68  *          *
* Max Chl Dpth (ft)      *   30.89  * Hydr. Depth (ft)        *          *   15.21  *          *
* Conv. Total (cfs)      *2454561.0  * Conv. (cfs)            *          *2454561.0  *          *
* Length Wtd. (ft)       *  103.00  * Wetted Per. (ft)        *          *  276.75  *          *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)        *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    1.50  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)     *   49.37  * 1326.33  *   81.70  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)           *   23.05  *   79.60  *   29.20  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  749.65  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  748.50  * Reach Len. (ft)         *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  736.12  * Flow Area (sq ft)       *    0.02  * 5195.45  *  689.82  *
* E.G. Slope (ft/ft)     *0.000134  * Area (sq ft)            *    0.02  * 5195.45  *  689.82  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *    0.00  *45054.54  *  445.46  *
* Top Width (ft)         *  619.58  * Top Width (ft)          *          *  258.99  *  360.58  *
* Vel Total (ft/s)       *    7.73  * Avg. Vel. (ft/s)        *    0.01  *    8.67  *    0.65  *
* Max Chl Dpth (ft)      *   35.75  * Hydr. Depth (ft)        *    2.52  *   20.06  *    1.91  *
* Conv. Total (cfs)      *3933561.0  * Conv. (cfs)            *     0.0  *3895050.0  * 38511.1  *
* Length Wtd. (ft)       *  102.50  * Wetted Per. (ft)        *    4.96  *  276.75  *  365.75  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)        *    0.00  *    0.16  *    0.02  *
* Alpha                  *    1.25  * Stream Power (lb/ft s)   *    0.00  *    1.36  *    0.01  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)     *  150.30  * 1574.39  *  194.78  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)           *   58.15  *   81.58  *   51.49  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  753.21  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.06  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.15  * Reach Len. (ft)         *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  737.89  * Flow Area (sq ft)       *  103.47  * 6139.89  * 2865.21  *
* E.G. Slope (ft/ft)     *0.000102  * Area (sq ft)            *  103.47  * 6139.89  * 2865.21  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *   57.29  *51950.08  * 2392.63  *
* Top Width (ft)         * 1130.80  * Top Width (ft)          *   47.61  *  258.99  *  824.20  *
* Vel Total (ft/s)       *    5.97  * Avg. Vel. (ft/s)        *    0.55  *    8.46  *    0.84  *
* Max Chl Dpth (ft)      *   39.40  * Hydr. Depth (ft)        *    2.17  *   23.71  *    3.48  *
* Conv. Total (cfs)      *5387915.0  * Conv. (cfs)            *  5674.2  *5145269.0  *236971.9  *
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* Length Wtd. (ft)       *  100.35  * Wetted Per. (ft)       *   55.59  *  276.75  *  831.12  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *    0.01  *    0.14  *    0.02  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *    0.01  *    1.19  *    0.02  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  268.84  * 1758.44  *  309.16  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   70.83  *   83.05  *  120.30  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.18  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  753.49  * Reach Len. (ft)        *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  739.46  * Flow Area (sq ft)      *  167.69  * 6489.21  * 3976.90  *
* E.G. Slope (ft/ft)     *0.000108  * Area (sq ft)           *  225.05  * 6489.21  * 3977.94  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  129.73  *58622.65  * 4247.62  *
* Top Width (ft)         * 1257.24  * Top Width (ft)         *  152.99  *  258.99  *  845.26  *
* Vel Total (ft/s)       *    5.92  * Avg. Vel. (ft/s)       *    0.77  *    9.03  *    1.07  *
* Max Chl Dpth (ft)      *   40.74  * Hydr. Depth (ft)       *    3.52  *   25.06  *    4.83  *
* Conv. Total (cfs)      *6063682.0  * Conv. (cfs)           * 12486.5  *5642366.0  *408829.1  *
* Length Wtd. (ft)       *   99.25  * Wetted Per. (ft)       *   56.94  *  276.75  *  832.47  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *    0.02  *    0.16  *    0.03  *
* Alpha                  *    2.17  * Stream Power (lb/ft s) *    0.02  *    1.43  *    0.03  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  384.15  * 1890.82  *  580.38  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   85.08  *   83.27  *  272.79  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  756.78  * Reach Len. (ft)        *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  741.58  * Flow Area (sq ft)      *  324.07  * 7339.93  * 6684.18  *
* E.G. Slope (ft/ft)     *0.000092  * Area (sq ft)           * 1160.82  * 7339.93  * 7247.03  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  345.07  *66285.91  * 9269.02  *
* Top Width (ft)         * 1668.42  * Top Width (ft)         *  396.77  *  258.99  * 1012.66  *
* Vel Total (ft/s)       *    5.29  * Avg. Vel. (ft/s)       *    1.06  *    9.03  *    1.39  *
* Max Chl Dpth (ft)      *   44.03  * Hydr. Depth (ft)       *    6.81  *   28.34  *    8.11  *
* Conv. Total (cfs)      *7933189.0  * Conv. (cfs)           * 36067.1  *6928309.0  *968812.5  *
* Length Wtd. (ft)       *   96.49  * Wetted Per. (ft)       *   60.22  *  276.75  *  835.75  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *    0.03  *    0.15  *    0.05  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    0.03  *    1.37  *    0.06  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  619.14  * 2066.97  * 1343.53  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  111.40  *   83.74  *  444.38  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  746.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *   0.000  *   0.014  *   0.000  *
* W.S. Elev (ft)         *  745.07  * Reach Len. (ft)        *   80.00  *  103.00  *   55.00  *
* Crit W.S. (ft)         *  734.53  * Flow Area (sq ft)      *    0.00  * 4308.41  *    0.00  *
* E.G. Slope (ft/ft)     *0.000180  * Area (sq ft)           *    0.00  * 4308.41  *    0.00  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    0.00  *38300.00  *    0.00  *
* Top Width (ft)         *  259.00  * Top Width (ft)         *          *  258.99  *          *
* Vel Total (ft/s)       *    8.89  * Avg. Vel. (ft/s)       *    0.01  *    8.89  *    0.01  *
* Max Chl Dpth (ft)      *   32.32  * Hydr. Depth (ft)       *    0.79  *   16.64  *    0.78  *
* Conv. Total (cfs)      *2851040.0  * Conv. (cfs)           *     0.0  *2851040.0  *     0.0  *
* Length Wtd. (ft)       *  102.99  * Wetted Per. (ft)       *    1.57  *  276.75  *    1.58  *
* Min Ch El (ft)         *  712.75  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.56  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   78.83  * 1421.23  *  118.93  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   32.58  *   80.52  *   37.65  *
**********************************************************************************************
```

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.295

INPUT
Description: COE River Station= 50452.50
Preliminary Model River Station
             (miles)=3.28

 Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.  Obstructions are
             buildings.
Station Elevation Data    num=      49
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     770    3.36     768   20.03     766   57.11     764   87.02     762
   133.8     760  143.27     758  289.03     756  429.07     754  603.64     752
 1104.21     752 1658.01     748  1691.5     746 1699.76     744 1706.93     742
 1712.07     740 1720.23     738  1724.6     736 1730.49     734  1740.5     732
 1745.83     730 1752.56     728 1758.41     726 1765.07     724  1769.8     722
 1785.14     720 1797.05     718 1797.06  712.72 1814.78  712.72 1814.78     718
 1828.24     720 1843.53     722 1852.72     724 1861.47     726 1869.05     728
  1875.2     730 1882.18     732 1887.19     734 1893.29     736 1900.14     738
 1905.23     740 1910.75     742 1934.02     744  2016.7     746 2451.72     748
 2514.83     750 2620.95     752 3056.68     752 3250.67     754

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041  1691.5    .014 1910.75    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1691.5 1910.75             410     463     310              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     585     770       F
    3100 3250.67     770       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
     206  334.75     770     585    1685     770 2652.25    3100     770

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  734.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  732.97  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  727.83  * Flow Area (sq ft)      *          * 1501.16  *          *
* E.G. Slope (ft/ft)     *0.000320  * Area (sq ft)           *          * 1501.16  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  148.98  * Top Width (ft)         *          *  148.98  *          *
* Vel Total (ft/s)       *    8.33  * Avg. Vel. (ft/s)       *          *    8.33  *          *
* Max Chl Dpth (ft)      *   20.25  * Hydr. Depth (ft)       *          *   10.08  *          *
* Conv. Total (cfs)      *698958.5  * Conv. (cfs)             *          *698958.5  *          *
* Length Wtd. (ft)       *  463.00  * Wetted Per. (ft)        *          *  163.38  *          *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)        *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.53  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *          *  673.98  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   63.62  *          *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  738.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *          *   0.014  *          *
```

```
* W.S. Elev (ft)         *  737.07  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  730.55  * Flow Area (sq ft)      *          * 2167.11  *          *
* E.G. Slope (ft/ft)     *0.000281  * Area (sq ft)           *          * 2167.11  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  174.69  * Top Width (ft)         *          *  174.69  *          *
* Vel Total (ft/s)       *    9.00  * Avg. Vel. (ft/s)       *          *    9.00  *          *
* Max Chl Dpth (ft)      *   24.35  * Hydr. Depth (ft)       *          *   12.41  *          *
* Conv. Total (cfs)      *1163777.0  * Conv. (cfs)            *          *1163777.0  *          *
* Length Wtd. (ft)       *  463.00  * Wetted Per. (ft)       *          *  190.41  *          *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.79  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    1.44  *  925.79  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *   71.93  *    6.45  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  741.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.44  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  740.29  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  732.85  * Flow Area (sq ft)      *          * 2761.23  *          *
* E.G. Slope (ft/ft)     *0.000268  * Area (sq ft)           *          * 2761.23  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  194.70  * Top Width (ft)         *          *  194.70  *          *
* Vel Total (ft/s)       *    9.63  * Avg. Vel. (ft/s)       *          *    9.63  *          *
* Max Chl Dpth (ft)      *   27.57  * Hydr. Depth (ft)       *          *   14.18  *          *
* Conv. Total (cfs)      *1624982.0  * Conv. (cfs)            *          *1624982.0  *          *
* Length Wtd. (ft)       *  463.00  * Wetted Per. (ft)       *          *  211.49  *          *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.10  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *   14.56  * 1128.98  *   31.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.62  *   76.21  *   15.28  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  744.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.64  * Wt. n-Val.             *          *   0.014  *   0.041  *
* W.S. Elev (ft)         *  743.11  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  734.92  * Flow Area (sq ft)      *          * 3330.41  *    7.15  *
* E.G. Slope (ft/ft)     *0.000258  * Area (sq ft)           *          * 3330.41  *    7.15  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34197.20  *    2.80  *
* Top Width (ft)         *  220.70  * Top Width (ft)         *          *  207.79  *   12.90  *
* Vel Total (ft/s)       *   10.25  * Avg. Vel. (ft/s)       *          *   10.27  *    0.39  *
* Max Chl Dpth (ft)      *   30.39  * Hydr. Depth (ft)       *          *   16.03  *    0.55  *
* Conv. Total (cfs)      *2128890.0  * Conv. (cfs)            *          *2128715.0  *   174.5  *
* Length Wtd. (ft)       *  462.99  * Wetted Per. (ft)       *          *  225.36  *   12.95  *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *          *    0.24  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.44  *    0.00  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *   49.37  * 1317.74  *   81.70  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.05  *   79.05  *   29.19  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  749.59  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.62  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  747.97  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  737.56  * Flow Area (sq ft)      *   11.56  * 4379.76  *  784.67  *
* E.G. Slope (ft/ft)     *0.000192  * Area (sq ft)           *   11.56  * 4379.76  *  784.67  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    7.36  *44984.25  *  508.40  *
* Top Width (ft)         *  760.76  * Top Width (ft)         *    6.50  *  219.25  *  535.01  *
* Vel Total (ft/s)       *    8.79  * Avg. Vel. (ft/s)       *    0.64  *   10.27  *    0.65  *
* Max Chl Dpth (ft)      *   35.25  * Hydr. Depth (ft)       *    1.78  *   19.98  *    1.47  *
* Conv. Total (cfs)      *3284935.0  * Conv. (cfs)            *   531.3  *3247700.0  * 36704.3  *
* Length Wtd. (ft)       *  461.06  * Wetted Per. (ft)       *    8.10  *  237.17  *  535.12  *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *    0.02  *    0.22  *    0.02  *
```

```
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    0.01  *    2.27  *    0.01  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  150.29  * 1563.07  *  193.85  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   58.14  *   81.01  *   50.92  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  753.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.38  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.79  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  739.33  * Flow Area (sq ft)      *   36.36  * 5216.15  * 3108.92  *
* E.G. Slope (ft/ft)     *0.000137  * Area (sq ft)           *   36.36  * 5216.15  * 3108.92  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   32.41  *50805.45  * 3562.14  *
* Top Width (ft)         *  924.67  * Top Width (ft)         *    6.50  *  219.25  *  698.92  *
* Vel Total (ft/s)       *    6.51  * Avg. Vel. (ft/s)       *    0.89  *    9.74  *    1.15  *
* Max Chl Dpth (ft)      *   39.07  * Hydr. Depth (ft)       *    5.59  *   23.79  *    4.45  *
* Conv. Total (cfs)      *4653326.0  * Conv. (cfs)            *  2772.6  *4345851.0  *304702.1  *
* Length Wtd. (ft)       *  454.44  * Wetted Per. (ft)       *   11.91  *  237.17  *  699.08  *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *    0.03  *    0.19  *    0.04  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *    0.02  *    1.83  *    0.04  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  268.72  * 1745.02  *  305.39  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   70.78  *   82.48  *  119.34  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.55  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  753.08  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  741.03  * Flow Area (sq ft)      *   44.75  * 5499.24  * 4058.49  *
* E.G. Slope (ft/ft)     *0.000146  * Area (sq ft)           *   77.40  * 5499.24  * 4077.86  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *   44.29  *57433.72  * 5522.00  *
* Top Width (ft)         * 1104.05  * Top Width (ft)         *   82.00  *  219.25  *  802.80  *
* Vel Total (ft/s)       *    6.56  * Avg. Vel. (ft/s)       *    0.99  *   10.44  *    1.36  *
* Max Chl Dpth (ft)      *   40.36  * Hydr. Depth (ft)       *    6.88  *   25.08  *    5.47  *
* Conv. Total (cfs)      *5205991.0  * Conv. (cfs)            *  3659.5  *4746023.0  *456308.8  *
* Length Wtd. (ft)       *  451.54  * Wetted Per. (ft)       *   13.20  *  237.17  *  742.74  *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *    0.03  *    0.21  *    0.05  *
* Alpha                  *    2.31  * Stream Power (lb/ft s) *    0.03  *    2.21  *    0.07  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  383.87  * 1876.64  *  575.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   84.87  *   82.71  *  271.75  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  756.41  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  743.18  * Flow Area (sq ft)      *   66.41  * 6229.91  * 6529.60  *
* E.G. Slope (ft/ft)     *0.000123  * Area (sq ft)           *  745.55  * 6229.91  * 7009.91  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   67.35  *64703.42  *11129.23  *
* Top Width (ft)         * 1368.17  * Top Width (ft)         *  256.75  *  219.25  *  892.17  *
* Vel Total (ft/s)       *    5.92  * Avg. Vel. (ft/s)       *    1.01  *   10.39  *    1.70  *
* Max Chl Dpth (ft)      *   43.69  * Hydr. Depth (ft)       *   10.22  *   28.41  *    8.81  *
* Conv. Total (cfs)      *6853978.0  * Conv. (cfs)            *  6081.5  *5842896.0  *1005000.0  *
* Length Wtd. (ft)       *  444.12  * Wetted Per. (ft)       *   16.53  *  237.17  *  746.08  *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *    0.03  *    0.20  *    0.07  *
* Alpha                  *    2.64  * Stream Power (lb/ft s) *    0.03  *    2.09  *    0.11  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  617.39  * 2050.93  * 1334.53  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  110.80  *   83.18  *  443.18  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  746.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.73  * Wt. n-Val.             *          *   0.014  *   0.041  *
* W.S. Elev (ft)         *  744.49  * Reach Len. (ft)        *  410.00  *  463.00  *  310.00  *
* Crit W.S. (ft)         *  735.93  * Flow Area (sq ft)      *          * 3621.84  *   39.83  *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           *          * 3621.84  *   39.83  *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *38278.48  *   21.52  *
* Top Width (ft)         *  256.74  * Top Width (ft)         *          *  213.03  *   43.71  *
* Vel Total (ft/s)       *   10.46  * Avg. Vel. (ft/s)       *          *   10.57  *    0.54  *
* Max Chl Dpth (ft)      *   31.77  * Hydr. Depth (ft)       *          *   17.00  *    0.91  *
* Conv. Total (cfs)      *2411033.0  * Conv. (cfs)            *          *2409678.0  *  1354.7  *
* Length Wtd. (ft)       *  462.91  * Wetted Per. (ft)       *          *  230.77  *   43.80  *
* Min Ch El (ft)         *  712.72  * Shear (lb/sq ft)       *          *    0.25  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *          *    2.61  *    0.01  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   78.83  * 1411.85  *  118.91  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   32.58  *   79.96  *   37.62  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.207

INPUT
Description: COE River Station=50915.85
Preliminary Model River Station
             (miles)=3.19

 Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.  Obstructions are
             buildings.
Station Elevation Data    num=      51
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0     776   19.68     774   22.34     772   24.34     770   26.74     768
   33.41     762  451.36     754  762.47     752  972.62     752 1072.41     750
    1126     748 1991.63     746 2047.31     746 2080.64     746 2085.65     744
 2094.42     742 2104.56     740 2111.66     738 2116.06     736 2119.24     734
 2126.33     732 2131.28     730 2140.29     728 2144.93     726 2151.07     724
 2161.03     722 2183.63     720 2189.57     718 2189.58  712.62  2206.9  712.62
  2206.9     718 2212.13     720 2237.87     722 2242.19     724 2251.22     726
  2257.7     728 2262.17     730 2267.33     732 2271.16     734 2279.97     736
 2286.86     738 2294.35     740  2305.1     742 2335.81     744 2474.79     746
 2581.41     748 2627.46     750 2755.24     752 2852.61     752 3151.47     752
 3397.55     754

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041 2080.64    .014  2305.1    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2080.64  2305.1              253     297     245              .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0     718     770       F
    3250 3397.55     770       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
   154.5  345.05     770     718 1982.75     770  2729.5    3250     770

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  733.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.14  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  732.75  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  727.95  * Flow Area (sq ft)      *          * 1461.63  *          *
* E.G. Slope (ft/ft)     *0.000341  * Area (sq ft)           *          * 1461.63  *          *
```

```
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  145.12  * Top Width (ft)          *          *  145.12  *          *
* Vel Total (ft/s)       *    8.55  * Avg. Vel. (ft/s)        *          *    8.55  *          *
* Max Chl Dpth (ft)      *   20.13  * Hydr. Depth (ft)        *          *   10.07  *          *
* Conv. Total (cfs)      *677016.1  * Conv. (cfs)             *          *677016.1  *          *
* Length Wtd. (ft)       *  297.00  * Wetted Per. (ft)        *          *  160.32  *          *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)        *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.66  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *          *  658.24  *          *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *          *   62.06  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  736.85  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  730.64  * Flow Area (sq ft)      *          * 2103.81  *          *
* E.G. Slope (ft/ft)     *0.000299  * Area (sq ft)           *          * 2103.81  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  168.71  * Top Width (ft)          *          *  168.71  *          *
* Vel Total (ft/s)       *    9.27  * Avg. Vel. (ft/s)        *          *    9.27  *          *
* Max Chl Dpth (ft)      *   24.23  * Hydr. Depth (ft)        *          *   12.47  *          *
* Conv. Total (cfs)      *1127166.0  * Conv. (cfs)             *          *1127166.0  *          *
* Length Wtd. (ft)       *  297.00  * Wetted Per. (ft)        *          *  185.50  *          *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)        *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.96  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *    1.44  *  903.09  *    4.45  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)          *    2.27  *   70.11  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  740.06  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  732.85  * Flow Area (sq ft)      *          * 2677.72  *          *
* E.G. Slope (ft/ft)     *0.000291  * Area (sq ft)           *          * 2677.72  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  190.41  * Top Width (ft)          *          *  190.41  *          *
* Vel Total (ft/s)       *    9.93  * Avg. Vel. (ft/s)        *          *    9.93  *          *
* Max Chl Dpth (ft)      *   27.44  * Hydr. Depth (ft)        *          *   14.06  *          *
* Conv. Total (cfs)      *1560333.0  * Conv. (cfs)             *          *1560333.0  *          *
* Length Wtd. (ft)       *  297.00  * Wetted Per. (ft)        *          *  208.16  *          *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)        *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.32  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   14.56  * 1100.07  *   31.58  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *    8.62  *   74.16  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.71  * Wt. n-Val.              *          *   0.014  *   0.041  *
* W.S. Elev (ft)         *  742.90  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  734.93  * Flow Area (sq ft)      *          * 3258.81  *    6.25  *
* E.G. Slope (ft/ft)     *0.000290  * Area (sq ft)           *          * 3258.81  *    6.25  *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34197.73  *    2.26  *
* Top Width (ft)         *  228.49  * Top Width (ft)          *          *  214.64  *   13.85  *
* Vel Total (ft/s)       *   10.47  * Avg. Vel. (ft/s)        *          *   10.49  *    0.36  *
* Max Chl Dpth (ft)      *   30.28  * Hydr. Depth (ft)        *          *   15.18  *    0.45  *
* Conv. Total (cfs)      *2008806.0  * Conv. (cfs)             *          *2008673.0  *   133.0  *
* Length Wtd. (ft)       *  297.00  * Wetted Per. (ft)        *          *  232.85  *   13.88  *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)        *          *    0.25  *    0.01  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.66  *    0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *   49.37  * 1282.72  *   81.65  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *   23.05  *   76.80  *   29.10  *
```

```
*****************************************************************************************
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.61  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  747.89  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  737.62  * Flow Area (sq ft)      *  184.99  * 4365.38  *  647.22  *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)           *  184.99  * 4365.38  *  647.22  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  142.61  *44766.13  *  591.26  *
* Top Width (ft)         *  592.83  * Top Width (ft)         *   97.89  *  224.46  *  270.48  *
* Vel Total (ft/s)       *    8.75  * Avg. Vel. (ft/s)       *    0.77  *   10.25  *    0.91  *
* Max Chl Dpth (ft)      *   35.27  * Hydr. Depth (ft)       *    1.89  *   19.45  *    2.39  *
* Conv. Total (cfs)      *3228544.0  * Conv. (cfs)           * 10119.2  *3176471.0  * 41953.9  *
* Length Wtd. (ft)       *  296.31  * Wetted Per. (ft)       *   99.76  *  243.19  *  270.58  *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)       *    0.02  *    0.22  *    0.03  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    0.02  *    2.28  *    0.03  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  149.36  * 1516.59  *  188.75  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   57.65  *   78.65  *   48.05  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.67  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  739.54  * Flow Area (sq ft)      *  554.88  * 5213.53  * 1902.75  *
* E.G. Slope (ft/ft)     *0.000145  * Area (sq ft)           *  554.88  * 5213.53  * 1902.75  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  741.30  *51402.56  * 2256.14  *
* Top Width (ft)         *  746.75  * Top Width (ft)         *   97.89  *  224.46  *  424.40  *
* Vel Total (ft/s)       *    7.09  * Avg. Vel. (ft/s)       *    1.34  *    9.86  *    1.19  *
* Max Chl Dpth (ft)      *   39.05  * Hydr. Depth (ft)       *    5.67  *   23.23  *    4.48  *
* Conv. Total (cfs)      *4519344.0  * Conv. (cfs)           * 61584.4  *4270328.0  *187431.8  *
* Length Wtd. (ft)       *  294.20  * Wetted Per. (ft)       *  103.54  *  243.19  *  424.63  *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)       *    0.05  *    0.19  *    0.04  *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *    0.06  *    1.91  *    0.05  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  265.93  * 1689.59  *  287.55  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   70.29  *   80.12  *  115.34  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.63  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.92  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  741.33  * Flow Area (sq ft)      *  677.27  * 5494.18  * 2433.38  *
* E.G. Slope (ft/ft)     *0.000157  * Area (sq ft)           *  708.51  * 5494.18  * 2434.25  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1067.27  *58400.55  * 3532.19  *
* Top Width (ft)         *  859.95  * Top Width (ft)         *  196.47  *  224.46  *  439.02  *
* Vel Total (ft/s)       *    7.32  * Avg. Vel. (ft/s)       *    1.58  *   10.63  *    1.45  *
* Max Chl Dpth (ft)      *   40.30  * Hydr. Depth (ft)       *    6.92  *   24.48  *    5.73  *
* Conv. Total (cfs)      *5027312.0  * Conv. (cfs)           * 85166.7  *4660282.0  *281863.4  *
* Length Wtd. (ft)       *  293.34  * Wetted Per. (ft)       *  104.79  *  243.19  *  425.88  *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)       *    0.06  *    0.22  *    0.06  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *    0.10  *    2.35  *    0.08  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  380.17  * 1818.22  *  552.12  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   83.56  *   80.35  *  267.33  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.60  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
```

```
* W.S. Elev (ft)         *  756.17  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  743.57  * Flow Area (sq ft)      *  995.32  * 6223.45  * 3812.27  *
* E.G. Slope (ft/ft)     *0.000137  * Area (sq ft)           * 1924.47  * 6223.45  * 4220.72  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1854.67  *67111.64  * 6933.69  *
* Top Width (ft)         * 1267.25  * Top Width (ft)         *  470.84  *  224.46  *  571.95  *
* Vel Total (ft/s)       *    6.88  * Avg. Vel. (ft/s)       *    1.86  *   10.78  *    1.82  *
* Max Chl Dpth (ft)      *   43.55  * Hydr. Depth (ft)       *   10.17  *   27.73  *    8.98  *
* Conv. Total (cfs)      *6487400.0  * Conv. (cfs)           *158524.0  *5736233.0  *592643.5  *
* Length Wtd. (ft)       *  291.30  * Wetted Per. (ft)       *  108.04  *  243.19  *  429.13  *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)       *    0.08  *    0.22  *    0.08  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *    0.15  *    2.36  *    0.14  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  604.83  * 1984.74  * 1294.57  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *  107.37  *   80.82  *  437.97  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  746.10  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.79  * Wt. n-Val.             *          *   0.014  *   0.041  *
* W.S. Elev (ft)         *  744.31  * Reach Len. (ft)        *  253.00  *  297.00  *  245.00  *
* Crit W.S. (ft)         *  735.95  * Flow Area (sq ft)      *          * 3565.55  *   43.64  *
* E.G. Slope (ft/ft)     *0.000278  * Area (sq ft)           *          * 3565.55  *   43.64  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38276.66  *   23.34  *
* Top Width (ft)         *  272.58  * Top Width (ft)         *          *  220.23  *   52.35  *
* Vel Total (ft/s)       *   10.61  * Avg. Vel. (ft/s)       *          *   10.74  *    0.53  *
* Max Chl Dpth (ft)      *   31.69  * Hydr. Depth (ft)       *          *   16.19  *    0.83  *
* Conv. Total (cfs)      *2297152.0  * Conv. (cfs)           *          *2295753.0  *  1399.8  *
* Length Wtd. (ft)       *  296.98  * Wetted Per. (ft)       *          *  238.63  *   52.42  *
* Min Ch El (ft)         *  712.62  * Shear (lb/sq ft)       *          *    0.26  *    0.01  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *          *    2.78  *    0.01  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   78.83  * 1373.65  *  118.61  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   32.58  *   77.66  *   37.28  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.151

INPUT
Description: COE River Station= 51213.37
Preliminary Model River Station
             (miles)=3.14

RR Lift Bridge.  B7A (upstream).  Modeled in the
             raised position.  Ineffective flow on left is due to high ground
             dowsntream which will block the water. Obstructions are buildings.

Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     764   67.84     762  262.06     758  368.41     756  543.82     754
   776.8     754  887.12     752 1048.77     748 2189.57     746 2260.09     745
    2280     745 2280.01     740    2289     740    2358     719    2384     718
 2384.01   712.5    2400   712.5 2400.01     718    2426     719    2485     740
    2493     740 2493.01     745 2500.78     745 2556.01     746 2665.86     748
 2830.11     748 2838.43     748 2877.34     750 2891.62     752 3266.77     752
 3343.35     752 3429.49     752

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041 2280.01    .014    2493    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2280.01    2493               25      24      48              .1       .3
Ineffective Flow     num=       1
```

```
   Sta L   Sta R    Elev  Permanent
       0     942     765       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     309     360     765   669.5     793     765     942    2008     765
    2740    3429     765

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  732.85  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  726.60  * Flow Area (sq ft)      *          * 1655.84  *          *
* E.G. Slope (ft/ft)     *0.000239  * Area (sq ft)           *          * 1655.84  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  152.40  * Top Width (ft)         *          *  152.40  *          *
* Vel Total (ft/s)       *    7.55  * Avg. Vel. (ft/s)       *          *    7.55  *          *
* Max Chl Dpth (ft)      *   20.35  * Hydr. Depth (ft)       *          *   10.87  *          *
* Conv. Total (cfs)      *808328.5  * Conv. (cfs)             *          *808328.5  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  167.87  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.11  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  647.61  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   61.05  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.09  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  736.95  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  729.32  * Flow Area (sq ft)      *          * 2332.09  *          *
* E.G. Slope (ft/ft)     *0.000226  * Area (sq ft)           *          * 2332.09  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  177.39  * Top Width (ft)         *          *  177.39  *          *
* Vel Total (ft/s)       *    8.36  * Avg. Vel. (ft/s)       *          *    8.36  *          *
* Max Chl Dpth (ft)      *   24.45  * Hydr. Depth (ft)       *          *   13.15  *          *
* Conv. Total (cfs)      *1298089.0  * Conv. (cfs)             *          *1298089.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  194.18  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.41  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  *  887.97  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   68.93  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  740.16  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  731.62  * Flow Area (sq ft)      *          * 2936.17  *          *
* E.G. Slope (ft/ft)     *0.000245  * Area (sq ft)           *    0.00  * 2936.17  *    0.00  *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  212.99  * Top Width (ft)         *          *  212.99  *          *
* Vel Total (ft/s)       *    9.06  * Avg. Vel. (ft/s)       *          *    9.06  *          *
* Max Chl Dpth (ft)      *   27.66  * Hydr. Depth (ft)       *          *   13.79  *          *
* Conv. Total (cfs)      *1697891.0  * Conv. (cfs)             *          *1697891.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  230.88  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.77  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   14.56  * 1080.93  *   31.58  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    8.62  *   72.78  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  744.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *   0.000  *   0.014  *   0.000  *
* W.S. Elev (ft)         *  743.01  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  733.71  * Flow Area (sq ft)      *    0.01  * 3543.65  *    0.01  *
* E.G. Slope (ft/ft)     *0.000217  * Area (sq ft)           *    0.01  * 3543.65  *    0.01  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *    0.00  *34200.00  *    0.00  *
* Top Width (ft)         *  213.00  * Top Width (ft)         *          *  212.99  *          *
* Vel Total (ft/s)       *    9.65  * Avg. Vel. (ft/s)       *    0.01  *    9.65  *    0.01  *
* Max Chl Dpth (ft)      *   30.51  * Hydr. Depth (ft)       *    1.51  *   16.64  *    1.49  *
* Conv. Total (cfs)      *2323698.0  * Conv. (cfs)           *     0.0  *2323698.0  *     0.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *    3.01  *  230.76  *    3.05  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   49.37  * 1259.53  *   81.63  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   23.05  *   75.35  *   29.06  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  749.40  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.47  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  747.93  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.42  * Flow Area (sq ft)      *  552.45  * 4591.92  *  260.05  *
* E.G. Slope (ft/ft)     *0.000158  * Area (sq ft)           *  552.45  * 4591.92  *  260.05  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  396.87  *44948.56  *  154.57  *
* Top Width (ft)         *  654.25  * Top Width (ft)         *  272.01  *  212.99  *  169.25  *
* Vel Total (ft/s)       *    8.42  * Avg. Vel. (ft/s)       *    0.72  *    9.79  *    0.59  *
* Max Chl Dpth (ft)      *   35.43  * Hydr. Depth (ft)       *    2.03  *   21.56  *    1.54  *
* Conv. Total (cfs)      *3622829.0  * Conv. (cfs)           * 31599.8  *3578922.0  * 12307.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  278.62  *  230.76  *  174.27  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.02  *    0.20  *    0.01  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *    0.01  *    1.92  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  147.22  * 1486.06  *  186.20  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   56.58  *   77.16  *   46.82  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  753.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.71  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  738.28  * Flow Area (sq ft)      * 1580.17  * 5396.66  * 1188.28  *
* E.G. Slope (ft/ft)     *0.000119  * Area (sq ft)           * 1603.33  * 5396.66  * 1188.28  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1969.88  *51121.36  * 1308.75  *
* Top Width (ft)         *  775.26  * Top Width (ft)         *  315.27  *  212.99  *  247.00  *
* Vel Total (ft/s)       *    6.66  * Avg. Vel. (ft/s)       *    1.25  *    9.47  *    1.10  *
* Max Chl Dpth (ft)      *   39.21  * Hydr. Depth (ft)       *    5.81  *   25.34  *    4.81  *
* Conv. Total (cfs)      *4984620.0  * Conv. (cfs)           *180498.6  *4684201.0  *119919.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  282.40  *  230.76  *  255.73  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.04  *    0.17  *    0.03  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    0.05  *    1.65  *    0.04  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  259.67  * 1653.42  *  278.86  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   69.09  *   78.63  *  113.45  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.51  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.96  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
```

```
* Crit W.S. (ft)         *  740.34  * Flow Area (sq ft)      * 1919.07  * 5662.02  * 1496.49  *
* E.G. Slope (ft/ft)     *0.000131  * Area (sq ft)           * 2034.27  * 5662.02  * 1496.49  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2850.57  *58139.04  * 2010.40  *
* Top Width (ft)         *  840.24  * Top Width (ft)         *  379.76  *  212.99  *  247.49  *
* Vel Total (ft/s)       *    6.94  * Avg. Vel. (ft/s)       *    1.49  *   10.27  *    1.34  *
* Max Chl Dpth (ft)      *   40.46  * Hydr. Depth (ft)       *    7.06  *   26.58  *    6.05  *
* Conv. Total (cfs)      *5498612.0  * Conv. (cfs)           *248796.5  *5074349.0  *175466.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  283.65  *  230.76  *  259.38  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.06  *    0.20  *    0.05  *
* Alpha                  *    2.02  * Stream Power (lb/ft s) *    0.08  *    2.06  *    0.06  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  372.21  * 1780.19  *  541.06  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   81.89  *   78.86  *  265.40  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  757.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  756.18  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  742.19  * Flow Area (sq ft)      * 2795.68  * 6348.43  * 2294.08  *
* E.G. Slope (ft/ft)     *0.000119  * Area (sq ft)           * 3857.81  * 6348.43  * 2294.08  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 5043.28  *66991.06  * 3865.66  *
* Top Width (ft)         * 1190.99  * Top Width (ft)         *  730.51  *  212.99  *  247.49  *
* Vel Total (ft/s)       *    6.64  * Avg. Vel. (ft/s)       *    1.80  *   10.55  *    1.69  *
* Max Chl Dpth (ft)      *   43.68  * Hydr. Depth (ft)       *   10.28  *   29.81  *    9.27  *
* Conv. Total (cfs)      *6957123.0  * Conv. (cfs)           *462275.7  *6140515.0  *354332.7  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  286.87  *  230.76  *  269.05  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.07  *    0.20  *    0.06  *
* Alpha                  *    2.24  * Stream Power (lb/ft s) *    0.13  *    2.16  *    0.11  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  588.03  * 1941.89  * 1276.24  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  103.88  *   79.33  *  435.66  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************************
* E.G. Elev (ft)         *  745.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.54  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  744.41  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  734.75  * Flow Area (sq ft)      *    0.02  * 3841.71  *    0.02  *
* E.G. Slope (ft/ft)     *0.000208  * Area (sq ft)           *    0.02  * 3841.71  *    0.02  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *    0.00  *38300.00  *    0.00  *
* Top Width (ft)         *  213.01  * Top Width (ft)         *          *  212.99  *          *
* Vel Total (ft/s)       *    9.97  * Avg. Vel. (ft/s)       *    0.01  *    9.97  *    0.01  *
* Max Chl Dpth (ft)      *   31.91  * Hydr. Depth (ft)       *    2.22  *   18.04  *    2.22  *
* Conv. Total (cfs)      *2658497.0  * Conv. (cfs)           *     0.0  *2658497.0  *     0.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *    4.39  *  230.76  *    4.39  *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *    0.00  *    0.22  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    2.15  *    0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   78.83  * 1348.40  *  118.49  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   32.58  *   76.18  *   37.13  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 3.149
```

```
INPUT
Description: Bridge B7A.  This is a RR lift bridge.  It is modeled in the
             raised position since this is the most likely positing during a
             flood.  The bridge has been normalized to the channel flow from a
             25 degree skew.  The piers were already aligned with channel flow.
              The top of side rail was modeled aa the top of the bridge.
Distance from Upstream XS =       1
Deck/Roadway Width        =      22
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
 2284.99   758.5   758.5    2285   758.5   751.9    2396   758.5   751.9
    2491   758.5   751.9 2491.01   751.9   751.9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     764   67.84     762  262.06     758  368.41     756  543.82     754
   776.8     754  887.12     752 1048.77     748 2189.57     746 2260.09     745
    2280     745 2280.01     740    2289     740    2358     719    2384     718
 2384.01   712.5    2400   712.5 2400.01     718    2426     719    2485     740
    2493     740 2493.01     745 2500.78     745 2556.01     746 2665.86     748
 2830.11     748 2838.43     748 2877.34     750 2891.62     752 3266.77     752
 3343.35     752 3429.49     752

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041 2280.01    .014    2493    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2280.01    2493            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     942     765       F
Blocked Obstructions      num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
     309     360     765   669.5     793     765     942    2008     765
    2740    3429     765

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
 2284.99   758.5   758.5    2285   758.5   751.9    2396   758.5   751.9
    2491   758.5   751.9 2491.01   751.9   751.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     764   67.84     762  262.06     758  368.41     756  543.82     754
   776.8     754  887.12     752 1048.77     748 2189.57     746 2260.09     745
    2280     745 2280.01     740    2289     740    2358     719    2384     718
 2384.01   712.5    2400   712.5 2400.01     718    2426     719    2485     740
    2493     740 2493.01     745 2500.78     745 2556.01     746 2665.86     748
 2830.11     748 2838.43     748 2877.34     750 2891.62     752 3266.77     752
 3343.35     752 3429.49     752

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041 2280.01    .014    2493    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2280.01    2493            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0     942     765       F
Blocked Obstructions      num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
```

```
***************************************************************************
     309     360     765   669.5     793     765     942    2008     765
    2740    3429     765

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=  2289.4    Downstream=  2289.4
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     735       5  763.42
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     735       5  763.42

Pier Data
Pier Station     Upstream=  2342.2    Downstream=  2342.2
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     712     6.5     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     712     6.5     765

Pier Data
Pier Station     Upstream=  2433.1    Downstream=  2433.1
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     712     6.5     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     712     6.5     765

Pier Data
Pier Station     Upstream=  2486.1    Downstream=  2486.1
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     735       5     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     735       5     765

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.39
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	733.73	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	732.85	E.G. Elev (ft)	733.73	733.73
Q Total (cfs)	12500.00	W.S. Elev (ft)	732.64	732.64
Q Bridge (cfs)	12500.00	Crit W.S. (ft)	726.80	726.80
Q Weir (cfs)		Max Chl Dpth (ft)	20.14	20.14
Weir Sta Lft (ft)		Vel Total (ft/s)	8.36	8.36
Weir Sta Rgt (ft)		Flow Area (sq ft)	1495.43	1495.43
Weir Submerg		Froude # Chl	0.45	0.45
Weir Max Depth (ft)		Specif Force (cu ft)	13616.87	13616.87
Min El Weir Flow (ft)	740.01	Hydr Depth (ft)	10.82	10.82
Min El Prs (ft)	758.50	W.P. Total (ft)	192.78	192.78
Delta EG (ft)	0.17	Conv. Total (cfs)	621975.2	621975.2
Delta WS (ft)	0.20	Top Width (ft)	138.16	138.16
BR Open Area (sq ft)	4853.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	8.36	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.20	0.20
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.64	1.64

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	738.03	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	736.95	E.G. Elev (ft)	738.03	738.03
Q Total (cfs)	19500.00	W.S. Elev (ft)	736.70	736.70
Q Bridge (cfs)	19500.00	Crit W.S. (ft)	729.80	729.80
Q Weir (cfs)		Max Chl Dpth (ft)	24.20	24.20
Weir Sta Lft (ft)		Vel Total (ft/s)	9.26	9.26
Weir Sta Rgt (ft)		Flow Area (sq ft)	2105.45	2105.45
Weir Submerg		Froude # Chl	0.45	0.45
Weir Max Depth (ft)		Specif Force (cu ft)	23243.98	23243.98
Min El Weir Flow (ft)	740.01	Hydr Depth (ft)	12.93	12.93
Min El Prs (ft)	758.50	W.P. Total (ft)	234.99	234.99
Delta EG (ft)	0.21	Conv. Total (cfs)	963983.3	963983.3
Delta WS (ft)	0.25	Top Width (ft)	162.87	162.87
BR Open Area (sq ft)	4853.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	9.26	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.23	0.23
Br Sel Method	Yarnell	Power Total (lb/ft s)	2.12	2.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	741.43	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	740.16	E.G. Elev (ft)	741.41	741.40
Q Total (cfs)	26600.00	W.S. Elev (ft)	739.84	739.82
Q Bridge (cfs)	26600.00	Crit W.S. (ft)	732.24	732.24
Q Weir (cfs)		Max Chl Dpth (ft)	27.34	27.32
Weir Sta Lft (ft)		Vel Total (ft/s)	10.05	10.06
Weir Sta Rgt (ft)		Flow Area (sq ft)	2645.67	2643.73
Weir Submerg		Froude # Chl	0.46	0.46
Weir Max Depth (ft)		Specif Force (cu ft)	33382.84	33360.21
Min El Weir Flow (ft)	740.01	Hydr Depth (ft)	14.81	14.79
Min El Prs (ft)	758.50	W.P. Total (ft)	265.28	265.22
Delta EG (ft)	0.12	Conv. Total (cfs)	1301040.0	1299662.0
Delta WS (ft)	0.15	Top Width (ft)	178.70	178.70
BR Open Area (sq ft)	4853.03	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	10.06	C & E Loss (ft)	0.00	0.08
Coef of Q		Shear Total (lb/sq ft)	0.26	0.26
Br Sel Method	Energy only	Power Total (lb/ft s)	2.62	2.62

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir

flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	744.46	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	743.01	E.G. Elev (ft)	744.42	744.41
Q Total (cfs)	34200.00	W.S. Elev (ft)	742.62	742.61
Q Bridge (cfs)	34147.20	Crit W.S. (ft)	734.48	734.48
Q Weir (cfs)		Max Chl Dpth (ft)	30.12	30.11
Weir Sta Lft (ft)		Vel Total (ft/s)	10.78	10.79
Weir Sta Rgt (ft)		Flow Area (sq ft)	3172.45	3170.25
Weir Submerg		Froude # Chl	0.46	0.46
Weir Max Depth (ft)		Specif Force (cu ft)	44618.77	44589.95
Min El Weir Flow (ft)	740.01	Hydr Depth (ft)	16.70	16.69
Min El Prs (ft)	758.50	W.P. Total (ft)	308.86	308.74
Delta EG (ft)	0.14	Conv. Total (cfs)	1608882.0	1607429.0
Delta WS (ft)	0.18	Top Width (ft)	190.00	190.00
BR Open Area (sq ft)	4853.03	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	10.83	C & E Loss (ft)	0.00	0.10
Coef of Q		Shear Total (lb/sq ft)	0.29	0.29
Br Sel Method	Energy only	Power Total (lb/ft s)	3.12	3.13

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	749.40	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	747.93	E.G. Elev (ft)	749.37	749.36
Q Total (cfs)	45500.00	W.S. Elev (ft)	747.54	747.53
Q Bridge (cfs)	44709.18	Crit W.S. (ft)	737.30	737.30
Q Weir (cfs)		Max Chl Dpth (ft)	35.04	35.03
Weir Sta Lft (ft)		Vel Total (ft/s)	9.58	9.59
Weir Sta Rgt (ft)		Flow Area (sq ft)	4748.98	4742.74
Weir Submerg		Froude # Chl	0.36	0.36
Weir Max Depth (ft)		Specif Force (cu ft)	66892.27	66854.62
Min El Weir Flow (ft)	740.01	Hydr Depth (ft)	7.79	7.79
Min El Prs (ft)	758.50	W.P. Total (ft)	783.64	782.97
Delta EG (ft)	0.14	Conv. Total (cfs)	2269087.0	2267434.0
Delta WS (ft)	0.18	Top Width (ft)	609.47	608.91
BR Open Area (sq ft)	4853.03	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	11.03	C & E Loss (ft)	0.00	0.10
Coef of Q		Shear Total (lb/sq ft)	0.15	0.15
Br Sel Method	Energy only	Power Total (lb/ft s)	1.46	1.46

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	753.02	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	751.71	E.G. Elev (ft)	753.01	753.00
Q Total (cfs)	54400.00	W.S. Elev (ft)	751.56	751.56
Q Bridge (cfs)	49151.11	Crit W.S. (ft)	739.25	739.25
Q Weir (cfs)		Max Chl Dpth (ft)	39.06	39.06
Weir Sta Lft (ft)		Vel Total (ft/s)	7.19	7.20

```
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    7563.36  *    7557.74  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   92142.88  *   92093.17  *
* Min El Weir Flow (ft)  *     740.01  * Hydr Depth (ft)        *      10.67  *      10.66  *
* Min El Prs (ft)        *     758.50  * W.P. Total (ft)        *     931.03  *     930.93  *
* Delta EG (ft)          *       0.06  * Conv. Total (cfs)      *  3055743.0  *  3053966.0  *
* Delta WS (ft)          *       0.07  * Top Width (ft)         *     746.25  *     745.93  *
* BR Open Area (sq ft)   *    4853.03  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *      10.26  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.16  *       0.16  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       1.16  *       1.16  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     754.47  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     752.96  * E.G. Elev (ft)         *     754.46  *     754.45  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     752.97  *     752.96  *
* Q Bridge (cfs)         *   52281.25  * Crit W.S. (ft)         *     740.99  *     740.99  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      40.47  *      40.46  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.53  *       7.54  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8366.45  *    8358.96  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  105971.00  *  105869.10  *
* Min El Weir Flow (ft)  *     740.01  * Hydr Depth (ft)        *      15.89  *      15.88  *
* Min El Prs (ft)        *     758.50  * W.P. Total (ft)        *    1137.77  *    1137.67  *
* Delta EG (ft)          *       0.02  * Conv. Total (cfs)      *  2578846.0  *  2577368.0  *
* Delta WS (ft)          *       0.03  * Top Width (ft)         *     635.02  *     634.23  *
* BR Open Area (sq ft)   *    4853.03  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *      10.77  * C & E Loss (ft)        *       0.00  *       0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.27  *       0.27  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.06  *       2.07  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. US. (ft)          *     757.71  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     756.18  * E.G. Elev (ft)         *     757.69  *     757.67  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     756.25  *     756.23  *
* Q Bridge (cfs)         *   54474.07  * Crit W.S. (ft)         *     742.99  *     742.99  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.75  *      43.73  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.52  *       7.53  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *   10089.40  *   10080.53  *
* Weir Submerg           *             * Froude # Chl           *       0.24  *       0.24  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  139294.10  *  139147.70  *
* Min El Weir Flow (ft)  *     740.01  * Hydr Depth (ft)        *      19.16  *      19.15  *
* Min El Prs (ft)        *     758.50  * W.P. Total (ft)        *    1160.68  *    1160.56  *
* Delta EG (ft)          *       0.05  * Conv. Total (cfs)      *  2971512.0  *  2969236.0  *
* Delta WS (ft)          *       0.06  * Top Width (ft)         *     984.98  *     984.98  *
* BR Open Area (sq ft)   *    4853.03  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *      11.22  * C & E Loss (ft)        *       0.00  *       0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.35  *       0.35  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       2.66  *       2.67  *
*********************************************************************************************
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Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. US. (ft)          *     745.96  * Element                 *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     744.41  * E.G. Elev (ft)          *     745.92  *     745.91  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)          *     743.98  *     743.97  *
* Q Bridge (cfs)         *   38206.25  * Crit W.S. (ft)          *     735.56  *     735.56  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *      31.48  *      31.47  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)        *      11.16  *      11.17  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)       *    3431.48  *    3429.24  *
* Weir Submerg           *             * Froude # Chl            *       0.46  *       0.46  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)    *   50946.25  *   50914.50  *
* Min El Weir Flow (ft)  *     740.01  * Hydr Depth (ft)         *      18.06  *      18.05  *
* Min El Prs (ft)        *     758.50  * W.P. Total (ft)         *     325.37  *     325.25  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)       *  1780817.0  *  1779322.0  *
* Delta WS (ft)          *       0.19  * Top Width (ft)          *     190.01  *     190.01  *
* BR Open Area (sq ft)   *    4853.03  * Frctn Loss (ft)         *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *      11.23  * C & E Loss (ft)         *       0.00  *       0.11  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       0.30  *       0.30  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)   *       3.40  *       3.41  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.146

INPUT
Description: COE River Station= 51236.41
Preliminary Model River Station
             (miles)=3.13

RR Lift Bridge. B7A (downstream). Modeled in the
             raised position. Bridge normalized to channel flow from 25 degree
             skew. Obstructions: Buildings and high ground downstream. Piers
             are aligned with channel flow. Underwater channel shown on bridge
             plans.  Top of side rail modeled as top of bridge.
Station Elevation Data    num=      32
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      764   67.84      762  262.06      758  368.41      756  543.82      754
   776.8      754  887.12      752 1048.77      748 2189.57      746 2260.09      745
    2280      745 2280.01      740    2289      740    2358      719    2384      718
 2384.01    712.5    2400    712.5 2400.01      718    2426      719    2485      740
    2493      740 2493.01      745 2500.78      745 2556.01      746 2665.86      748
 2830.11      748 2838.43      748 2877.34      750 2891.62      752 3266.77      752
 3343.35      752 3429.49      752

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041 2280.01    .014    2493    .041
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2280.01    2493              105     171     230             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      0     942     765       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
     309     360     765   669.5     793     765     942    2008     765
    2740    3429     765

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.56  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  732.64  * Reach Len. (ft)        *  105.00  *  171.00  *  230.00  *
* Crit W.S. (ft)         *  726.60  * Flow Area (sq ft)      *          * 1625.12  *          *
* E.G. Slope (ft/ft)     *0.000252  * Area (sq ft)           *          * 1625.12  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  151.16  * Top Width (ft)         *          *  151.16  *          *
* Vel Total (ft/s)       *    7.69  * Avg. Vel. (ft/s)       *          *    7.69  *          *
* Max Chl Dpth (ft)      *   20.14  * Hydr. Depth (ft)       *          *   10.75  *          *
* Conv. Total (cfs)      *787557.1  * Conv. (cfs)            *          *787557.1  *          *
* Length Wtd. (ft)       *  171.00  * Wetted Per. (ft)       *          *  166.57  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.18  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *          *  646.78  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *   60.97  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  737.82  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  736.70  * Reach Len. (ft)        *  105.00  *  171.00  *  230.00  *
* Crit W.S. (ft)         *  729.32  * Flow Area (sq ft)      *          * 2287.83  *          *
* E.G. Slope (ft/ft)     *0.000238  * Area (sq ft)           *          * 2287.83  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  175.87  * Top Width (ft)         *          *  175.87  *          *
* Vel Total (ft/s)       *    8.52  * Avg. Vel. (ft/s)       *          *    8.52  *          *
* Max Chl Dpth (ft)      *   24.20  * Hydr. Depth (ft)       *          *   13.01  *          *
* Conv. Total (cfs)      *1264274.0  * Conv. (cfs)            *          *1264274.0  *          *
* Length Wtd. (ft)       *  171.00  * Wetted Per. (ft)       *          *  192.57  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.50  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *    1.44  *  886.80  *    4.45  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *   68.84  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.32  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  740.01  * Reach Len. (ft)        *  105.00  *  171.00  *  230.00  *
* Crit W.S. (ft)         *  731.62  * Flow Area (sq ft)      *          * 2904.84  *          *
* E.G. Slope (ft/ft)     *0.000254  * Area (sq ft)           *          * 2904.84  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  212.99  * Top Width (ft)         *          *  212.99  *          *
* Vel Total (ft/s)       *    9.16  * Avg. Vel. (ft/s)       *          *    9.16  *          *
* Max Chl Dpth (ft)      *   27.51  * Hydr. Depth (ft)       *          *   13.64  *          *
* Conv. Total (cfs)      *1668391.0  * Conv. (cfs)            *          *1668391.0  *          *
* Length Wtd. (ft)       *  171.00  * Wetted Per. (ft)       *          *  230.76  *          *
* Min Ch El (ft)         *  712.50  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.83  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   14.56  * 1079.47  *   31.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.62  *   72.69  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	744.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.48	Wt. n-Val.	0.000	0.014	0.000
W.S. Elev (ft)	742.84	Reach Len. (ft)	105.00	171.00	230.00
Crit W.S. (ft)	733.71	Flow Area (sq ft)	0.01	3506.21	0.01
E.G. Slope (ft/ft)	0.000224	Area (sq ft)	0.01	3506.21	0.01
Q Total (cfs)	34200.00	Flow (cfs)	0.00	34200.00	0.00
Top Width (ft)	213.00	Top Width (ft)		212.99	
Vel Total (ft/s)	9.75	Avg. Vel. (ft/s)	0.01	9.75	0.01
Max Chl Dpth (ft)	30.34	Hydr. Depth (ft)	1.43	16.46	1.43
Conv. Total (cfs)	2282925.0	Conv. (cfs)	0.0	2282925.0	0.0
Length Wtd. (ft)	171.00	Wetted Per. (ft)	2.80	230.76	2.80
Min Ch El (ft)	712.50	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		2.08	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	49.37	1257.77	81.63
C & E Loss (ft)	0.02	Cum SA (acres)	23.05	75.24	29.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	749.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.50	Wt. n-Val.	0.041	0.014	0.041
W.S. Elev (ft)	747.76	Reach Len. (ft)	105.00	171.00	230.00
Crit W.S. (ft)	736.42	Flow Area (sq ft)	504.83	4554.64	231.26
E.G. Slope (ft/ft)	0.000163	Area (sq ft)	504.83	4554.64	231.26
Q Total (cfs)	45500.00	Flow (cfs)	346.87	45019.09	134.03
Top Width (ft)	644.64	Top Width (ft)	272.01	212.99	159.64
Vel Total (ft/s)	8.60	Avg. Vel. (ft/s)	0.69	9.88	0.58
Max Chl Dpth (ft)	35.26	Hydr. Depth (ft)	1.86	21.38	1.45
Conv. Total (cfs)	3568338.0	Conv. (cfs)	27203.7	3530622.0	10511.7
Length Wtd. (ft)	170.63	Wetted Per. (ft)	278.45	230.76	164.65
Min Ch El (ft)	712.50	Shear (lb/sq ft)	0.02	0.20	0.01
Alpha	1.31	Stream Power (lb/ft s)	0.01	1.98	0.01
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	146.97	1483.78	186.09
C & E Loss (ft)	0.03	Cum SA (acres)	56.43	77.06	46.74

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	752.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.	0.041	0.014	0.041
W.S. Elev (ft)	751.64	Reach Len. (ft)	105.00	171.00	230.00
Crit W.S. (ft)	738.28	Flow Area (sq ft)	1561.45	5381.99	1171.28
E.G. Slope (ft/ft)	0.000120	Area (sq ft)	1581.72	5381.99	1171.28
Q Total (cfs)	54400.00	Flow (cfs)	1942.17	51172.81	1285.02
Top Width (ft)	772.48	Top Width (ft)	312.49	212.99	247.00
Vel Total (ft/s)	6.70	Avg. Vel. (ft/s)	1.24	9.51	1.10
Max Chl Dpth (ft)	39.14	Hydr. Depth (ft)	5.74	25.27	4.74
Conv. Total (cfs)	4957078.0	Conv. (cfs)	176976.2	4663007.0	117094.1
Length Wtd. (ft)	169.21	Wetted Per. (ft)	282.33	230.76	255.66
Min Ch El (ft)	712.50	Shear (lb/sq ft)	0.04	0.18	0.03
Alpha	1.89	Stream Power (lb/ft s)	0.05	1.67	0.04
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	258.81	1650.72	278.23
C & E Loss (ft)	0.03	Cum SA (acres)	68.92	78.53	113.31

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	754.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.	0.041	0.014	0.041
W.S. Elev (ft)	752.93	Reach Len. (ft)	105.00	171.00	230.00
Crit W.S. (ft)	740.34	Flow Area (sq ft)	1911.85	5656.37	1489.92
E.G. Slope (ft/ft)	0.000132	Area (sq ft)	2024.21	5656.37	1489.92
Q Total (cfs)	63000.00	Flow (cfs)	2838.70	58161.34	1999.96

```
* Top Width (ft)          *  838.77  * Top Width (ft)          *  378.29  *  212.99  *  247.49  *
* Vel Total (ft/s)        *    6.96  * Avg. Vel. (ft/s)        *    1.48  *   10.28  *    1.34  *
* Max Chl Dpth (ft)       *   40.43  * Hydr. Depth (ft)        *    7.03  *   26.56  *    6.02  *
* Conv. Total (cfs)       *5487358.0  * Conv. (cfs)            *247253.4  *5065906.0  *174198.5  *
* Length Wtd. (ft)        *  168.87  * Wetted Per. (ft)        *  283.62  *  230.76  *  259.30  *
* Min Ch El (ft)          *  712.50  * Shear (lb/sq ft)        *    0.06  *    0.20  *    0.05  *
* Alpha                   *    2.02  * Stream Power (lb/ft s) *    0.08  *    2.07  *    0.06  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *  371.09  * 1777.45  *  540.24  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)          *   81.68  *   78.85  *  265.26  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)          *  757.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.54  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)          *  756.12  * Reach Len. (ft)        *  105.00  *  171.00  *  230.00  *
* Crit W.S. (ft)          *  742.19  * Flow Area (sq ft)      * 2778.85  * 6335.25  * 2278.77  *
* E.G. Slope (ft/ft)      *0.000120  * Area (sq ft)           * 3812.64  * 6335.25  * 2278.77  *
* Q Total (cfs)           *75900.00  * Flow (cfs)             * 5014.88  *67045.36  * 3839.76  *
* Top Width (ft)          * 1188.92  * Top Width (ft)          *  728.44  *  212.99  *  247.49  *
* Vel Total (ft/s)        *    6.66  * Avg. Vel. (ft/s)        *    1.80  *   10.58  *    1.69  *
* Max Chl Dpth (ft)       *   43.62  * Hydr. Depth (ft)        *   10.22  *   29.74  *    9.21  *
* Conv. Total (cfs)       *6927450.0  * Conv. (cfs)            *457711.3  *6119280.0  *350458.2  *
* Length Wtd. (ft)        *  168.16  * Wetted Per. (ft)        *  286.81  *  230.76  *  268.87  *
* Min Ch El (ft)          *  712.50  * Shear (lb/sq ft)        *    0.07  *    0.21  *    0.06  *
* Alpha                   *    2.24  * Stream Power (lb/ft s) *    0.13  *    2.18  *    0.11  *
* Frctn Loss (ft)         *    0.02  * Cum Volume (acre-ft)    *  585.89  * 1939.12  * 1274.97  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *  103.48  *   79.32  *  435.52  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)          *  745.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.58  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)          *  744.22  * Reach Len. (ft)        *  105.00  *  171.00  *  230.00  *
* Crit W.S. (ft)          *  734.75  * Flow Area (sq ft)      *    0.02  * 3801.13  *    0.02  *
* E.G. Slope (ft/ft)      *0.000215  * Area (sq ft)           *    0.02  * 3801.13  *    0.02  *
* Q Total (cfs)           *38300.00  * Flow (cfs)             *    0.00  *38300.00  *    0.00  *
* Top Width (ft)          *  213.01  * Top Width (ft)          *          *  212.99  *          *
* Vel Total (ft/s)        *   10.08  * Avg. Vel. (ft/s)        *    0.01  *   10.08  *    0.01  *
* Max Chl Dpth (ft)       *   31.72  * Hydr. Depth (ft)        *    2.11  *   17.85  *    2.09  *
* Conv. Total (cfs)       *2611853.0  * Conv. (cfs)            *     0.0  *2611853.0  *     0.0  *
* Length Wtd. (ft)        *  171.00  * Wetted Per. (ft)        *    4.22  *  230.76  *    4.27  *
* Min Ch El (ft)          *  712.50  * Shear (lb/sq ft)        *    0.00  *    0.22  *    0.00  *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *    0.00  *    2.23  *    0.00  *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)    *   78.83  * 1346.50  *  118.49  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *   32.58  *   76.08  *   37.13  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.114

INPUT
Description: COE River Station= 51407.41
Preliminary Model River Station
             (miles)=3.1

Wilson Avenue Bridge.  B7 (upstream).
 Ineffective
             flow on left is due to high ground dowsntream which will block the
```

```
             water.   Obstructions are buildings.
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     766   19.88     764   81.79     762  220.76     758  223.68     756
  227.61     754  267.66     752  272.76     750  380.32     750  725.66     752
  900.61     752  914.59     752  915.11     752  993.47     750 1152.28     748
 2131.79     746    2390   746.4 2390.01   737.2    2443     719 2466.01     718
  2469.6     718 2469.61  712.51  2484.4  712.51 2484.41     718 2487.79     718
    2511     719    2575  740.12 2575.01   746.9 2593.49     748 2827.77     750
 2896.25     752 3052.52     750 3200.04     752 3249.21     754  3469.7     756
 3478.38     758 3492.97     760 3548.63     760 3584.18     760

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041    2390    .014 2575.01    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2390 2575.01               45      55      60              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1030     765       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
     250   463.5     753   463.5  643.75     765     644     721     753
     721   875.5     765    1030  2008.5     765  2801.6    3575     765

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  732.56  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  726.66  * Flow Area (sq ft)      *          * 1594.94  *          *
* E.G. Slope (ft/ft)     *0.000263  * Area (sq ft)           *          * 1594.94  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  148.59  * Top Width (ft)         *          *  148.59  *          *
* Vel Total (ft/s)       *    7.84  * Avg. Vel. (ft/s)       *          *    7.84  *          *
* Max Chl Dpth (ft)      *   20.05  * Hydr. Depth (ft)       *          *   10.73  *          *
* Conv. Total (cfs)      *771164.9  * Conv. (cfs)             *          *771164.9  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  164.04  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.25  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  640.46  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   60.38  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  737.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  736.61  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  729.40  * Flow Area (sq ft)      *          * 2244.38  *          *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           *          * 2244.38  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  172.62  * Top Width (ft)         *          *  172.62  *          *
* Vel Total (ft/s)       *    8.69  * Avg. Vel. (ft/s)       *          *    8.69  *          *
* Max Chl Dpth (ft)      *   24.10  * Hydr. Depth (ft)       *          *   13.00  *          *
* Conv. Total (cfs)      *1238199.0  * Conv. (cfs)             *          *1238199.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)        *          *  189.39  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.59  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  *  877.91  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   68.15  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.27  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    1.37  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  739.90  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  731.69  * Flow Area (sq ft)      *          * 2834.47  *          *
* E.G. Slope (ft/ft)     *0.000235  * Area (sq ft)           *          * 2834.47  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  184.33  * Top Width (ft)         *          *  184.33  *          *
* Vel Total (ft/s)       *    9.38  * Avg. Vel. (ft/s)       *          *    9.38  *          *
* Max Chl Dpth (ft)      *   27.39  * Hydr. Depth (ft)       *          *   15.38  *          *
* Conv. Total (cfs)      *1736364.0  * Conv. (cfs)            *          *1736364.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  204.42  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.91  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  * 1068.20  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.62  *   71.91  *   15.28  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  744.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.63  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  742.63  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  733.81  * Flow Area (sq ft)      *          * 3339.72  *          *
* E.G. Slope (ft/ft)     *0.000233  * Area (sq ft)           *          * 3339.72  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  185.00  * Top Width (ft)         *          *  185.00  *          *
* Vel Total (ft/s)       *   10.24  * Avg. Vel. (ft/s)       *          *   10.24  *          *
* Max Chl Dpth (ft)      *   30.12  * Hydr. Depth (ft)       *          *   18.05  *          *
* Conv. Total (cfs)      *2239590.0  * Conv. (cfs)            *          *2239590.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  210.29  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.37  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   49.37  * 1244.34  *   81.63  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   23.05  *   74.46  *   29.06  *
*****************************************************************************************
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  749.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  747.44  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  736.53  * Flow Area (sq ft)      *  482.20  * 4229.30  *    2.45  *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           *  482.20  * 4229.30  *    2.45  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  284.77  *45214.71  *    0.52  *
* Top Width (ft)         *  575.58  * Top Width (ft)         *  381.50  *  185.01  *    9.07  *
* Vel Total (ft/s)       *    9.65  * Avg. Vel. (ft/s)       *    0.59  *   10.69  *    0.21  *
* Max Chl Dpth (ft)      *   34.93  * Hydr. Depth (ft)       *    1.26  *   22.86  *    0.27  *
* Conv. Total (cfs)      *3257392.0  * Conv. (cfs)            * 20387.2  *3236967.0  *    37.0  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  382.69  *  218.41  *    9.09  *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *    0.02  *    0.24  *    0.00  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.01  *    2.52  *    0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  145.79  * 1466.54  *  185.48  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *   55.64  *   76.28  *   46.29  *
*****************************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT Profile #100-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  752.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.58  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.34  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
```

```
* Crit W.S. (ft)         *  738.33  * Flow Area (sq ft)      * 1970.06  * 4950.85  *  582.12  *
* E.G. Slope (ft/ft)     *0.000149  * Area (sq ft)           * 2062.59  * 4950.85  *  582.12  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2579.17  *51340.37  *  480.46  *
* Top Width (ft)         *  882.13  * Top Width (ft)         *  470.53  *  185.01  *  226.59  *
* Vel Total (ft/s)       *    7.25  * Avg. Vel. (ft/s)       *    1.31  *   10.37  *    0.83  *
* Max Chl Dpth (ft)      *   38.83  * Hydr. Depth (ft)       *    5.16  *   26.76  *    2.57  *
* Conv. Total (cfs)      *4459601.0  * Conv. (cfs)           *211435.0  *4208779.0  * 39387.4  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  386.59  *  218.41  *  228.19  *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *    0.05  *    0.21  *    0.02  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *    0.06  *    2.18  *    0.02  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  254.42  * 1630.44  *  273.60  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   67.97  *   77.74  *  112.06  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  754.40  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.81  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.59  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  739.90  * Flow Area (sq ft)      * 2446.28  * 5181.79  *  864.97  *
* E.G. Slope (ft/ft)     *0.000164  * Area (sq ft)           * 2697.26  * 5181.79  *  864.97  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 3875.81  *58151.82  *  972.37  *
* Top Width (ft)         *  947.85  * Top Width (ft)         *  536.25  *  185.01  *  226.59  *
* Vel Total (ft/s)       *    7.42  * Avg. Vel. (ft/s)       *    1.58  *   11.22  *    1.12  *
* Max Chl Dpth (ft)      *   40.08  * Hydr. Depth (ft)       *    6.41  *   28.01  *    3.82  *
* Conv. Total (cfs)      *4919650.0  * Conv. (cfs)           *302660.5  *4541057.0  * 75932.5  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  387.84  *  218.41  *  229.44  *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *    0.06  *    0.24  *    0.04  *
* Alpha                  *    2.12  * Stream Power (lb/ft s) *    0.10  *    2.73  *    0.04  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  365.39  * 1756.17  *  534.02  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   80.57  *   78.07  *  264.01  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  757.62  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.78  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  755.84  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  741.95  * Flow Area (sq ft)      * 3686.81  * 5783.39  * 1601.77  *
* E.G. Slope (ft/ft)     *0.000147  * Area (sq ft)           * 5323.06  * 5783.39  * 1601.77  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 7229.96  *66122.94  * 2547.10  *
* Top Width (ft)         * 1264.36  * Top Width (ft)         *  852.76  *  185.01  *  226.59  *
* Vel Total (ft/s)       *    6.86  * Avg. Vel. (ft/s)       *    1.96  *   11.43  *    1.59  *
* Max Chl Dpth (ft)      *   43.33  * Hydr. Depth (ft)       *    9.66  *   31.26  *    7.07  *
* Conv. Total (cfs)      *6259663.0  * Conv. (cfs)           *596273.1  *5453324.0  *210065.8  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *  391.09  *  218.41  *  232.69  *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *    0.09  *    0.24  *    0.06  *
* Alpha                  *    2.43  * Stream Power (lb/ft s) *    0.17  *    2.78  *    0.10  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  574.88  * 1915.33  * 1264.73  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *  101.58  *   78.54  *  434.27  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.
```

```
CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  745.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.77  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  743.97  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  734.85  * Flow Area (sq ft)      *          * 3587.37  *          *
* E.G. Slope (ft/ft)     *0.000234  * Area (sq ft)           *          * 3587.37  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  185.00  * Top Width (ft)         *          *  185.00  *          *
* Vel Total (ft/s)       *   10.68  * Avg. Vel. (ft/s)       *          *   10.68  *          *
* Max Chl Dpth (ft)      *   31.46  * Hydr. Depth (ft)       *          *   19.39  *          *
* Conv. Total (cfs)      *2502032.0  * Conv. (cfs)            *          *2502032.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  212.96  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.63  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   78.83  * 1332.00  *  118.49  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   32.58  *   75.30  *   37.13  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 3.109

INPUT
Description: Bridge B7.  Wilson Avenue Bridge.  The pier widths have been
             increased slightly to account for a slight skew to channel flow.
Distance from Upstream XS =       1
Deck/Roadway Width        =      52
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
    2390   746.4   743.5    2437   750.2   740.8    2452   751.8     745
    2477   752.3   747.5    2502   751.8     745  2527.5   750.8   740.8
 2575.01   746.9     745

Upstream Bridge Cross Section Data
Station Elevation Data    num=      39
     Sta     Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     766   19.88     764   81.79     762  220.76     758  223.68     756
  227.61     754  267.66     752  272.76     750  380.32     750  725.66     752
  900.61     752  914.59     752  915.11     752  993.47     750 1152.28     748
 2131.79     746    2390   746.4 2390.01   737.2    2443     719 2466.01     718
  2469.6     718 2469.61  712.51  2484.4  712.51 2484.41     718 2487.79     718
    2511     719    2575  740.12 2575.01   746.9 2593.49     748 2827.77     750
 2896.25     752 3052.52     750 3200.04     752 3249.21     754  3469.7     756
 3478.38     758 3492.97     760 3548.63     760 3584.18     760

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041    2390    .014 2575.01    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          2390 2575.01            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1030     765       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
     250   463.5     753   463.5  643.75     765     644     721     753
     721   875.5     765    1030  2008.5     765  2801.6    3575     765

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
```

```
***************************************************************************
    2390   746.4   743.5    2437   750.2   740.8    2452   751.8     745
    2477   752.3   747.5    2502   751.8     745  2527.5   750.8   740.8
 2575.01   746.9     745

Downstream Bridge Cross Section Data
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     766   19.88     764   81.79     762  220.76     758  223.68     756
  227.61     754  267.66     752  272.76     750  380.32     750  725.66     752
  900.61     752  914.59     752  915.11     752  993.47     750 1152.28     748
 2131.79     746    2390   746.4 2390.01   737.2    2443     719 2466.01     718
  2469.6     718 2469.61  712.51  2484.4  712.51 2484.41     718 2487.79     718
    2511     719    2575  740.12 2575.01   746.9 2593.49     748 2827.77     750
 2896.25     752 3052.52     750 3200.04     752 3249.21     754  3469.7     756
 3478.38     758 3492.97     760 3548.63     760 3584.18     760

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .041    2390    .014 2575.01    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          2390 2575.01             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1030     765       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************************************
     250   463.5     753   463.5  643.75     765     644     721     753
     721   875.5     765    1030  2008.5     765  2801.6    3575     765

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=    2437    Downstream=    2437
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     718       5     745
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     718       5     745

Pier Data
Pier Station     Upstream=  2527.5    Downstream=  2527.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     718       5     745
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       5     718       5     745

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only
```

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	733.52	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	732.56	E.G. Elev (ft)	733.54	733.54
Q Total (cfs)	12500.00	W.S. Elev (ft)	732.43	732.43
Q Bridge (cfs)	12500.00	Crit W.S. (ft)	726.82	726.82
Q Weir (cfs)		Max Chl Dpth (ft)	19.92	19.92
Weir Sta Lft (ft)		Vel Total (ft/s)	8.45	8.45
Weir Sta Rgt (ft)		Flow Area (sq ft)	1478.59	1478.59
Weir Submerg		Froude # Chl	0.45	0.45
Weir Max Depth (ft)		Specif Force (cu ft)	13347.66	13347.66
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	10.73	10.73
Min El Prs (ft)	747.50	W.P. Total (ft)	191.37	191.37
Delta EG (ft)	0.11	Conv. Total (cfs)	613338.1	613338.1
Delta WS (ft)	0.13	Top Width (ft)	137.80	137.80
BR Open Area (sq ft)	3339.30	Frctn Loss (ft)		
BR Open Vel (ft/s)	8.45	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.20	0.20
Br Sel Method	Yarnell	Power Total (lb/ft s)	1.69	1.69

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	737.78	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	736.61	E.G. Elev (ft)	737.81	737.81
Q Total (cfs)	19500.00	W.S. Elev (ft)	736.44	736.44
Q Bridge (cfs)	19500.00	Crit W.S. (ft)	729.75	729.75
Q Weir (cfs)		Max Chl Dpth (ft)	23.93	23.93
Weir Sta Lft (ft)		Vel Total (ft/s)	9.38	9.38
Weir Sta Rgt (ft)		Flow Area (sq ft)	2079.05	2079.05
Weir Submerg		Froude # Chl	0.46	0.46
Weir Max Depth (ft)		Specif Force (cu ft)	22847.96	22847.96
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	12.86	12.86
Min El Prs (ft)	747.50	W.P. Total (ft)	232.56	232.56
Delta EG (ft)	0.13	Conv. Total (cfs)	950513.3	950513.3
Delta WS (ft)	0.17	Top Width (ft)	161.63	161.63
BR Open Area (sq ft)	3339.30	Frctn Loss (ft)		
BR Open Vel (ft/s)	9.38	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.23	0.23
Br Sel Method	Yarnell	Power Total (lb/ft s)	2.20	2.20

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	741.27	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	739.90	E.G. Elev (ft)	741.26	741.26
Q Total (cfs)	26600.00	W.S. Elev (ft)	739.67	739.67
Q Bridge (cfs)	26600.00	Crit W.S. (ft)	732.17	732.17
Q Weir (cfs)		Max Chl Dpth (ft)	27.16	27.16
Weir Sta Lft (ft)		Vel Total (ft/s)	10.14	10.14
Weir Sta Rgt (ft)		Flow Area (sq ft)	2622.43	2622.43
Weir Submerg		Froude # Chl	0.46	0.46
Weir Max Depth (ft)		Specif Force (cu ft)	33119.52	33119.52
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	15.10	15.10
Min El Prs (ft)	747.50	W.P. Total (ft)	260.47	260.47
Delta EG (ft)	0.15	Conv. Total (cfs)	1297770.0	1297770.0
Delta WS (ft)	0.19	Top Width (ft)	173.62	173.62
BR Open Area (sq ft)	3339.30	Frctn Loss (ft)		

```
* BR Open Vel (ft/s)     *      10.14  * C & E Loss (ft)        *              *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.26  *       0.26  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       2.68  *       2.68  *
*********************************************************************************************

Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     744.26  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.63  * E.G. Elev (ft)         *     744.35  *     744.35  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     742.42  *     742.42  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     734.33  *     734.33  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.91  *      29.91  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      11.15  *      11.15  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3068.35  *    3068.35  *
* Weir Submerg           *             * Froude # Chl           *       0.47  *       0.47  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   44454.84  *   44454.84  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *      25.00  *      25.00  *
* Min El Prs (ft)        *     747.50  * W.P. Total (ft)        *     325.72  *     325.72  *
* Delta EG (ft)          *       0.17  * Conv. Total (cfs)      *  1452600.0  *  1452600.0  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *     122.72  *     122.72  *
* BR Open Area (sq ft)   *    3339.30  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      11.15  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.33  *       0.33  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       3.63  *       3.63  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     749.20  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     747.44  * E.G. Elev (ft)         *     748.76  *     748.71  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     745.83  *     745.77  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     737.21  *     737.21  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.32  *      33.26  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      13.74  *      13.75  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3311.45  *    3309.43  *
* Weir Submerg           *             * Froude # Chl           *       0.53  *       0.53  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   62984.04  *   62799.47  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *      99.21  *      95.74  *
* Min El Prs (ft)        *     747.50  * W.P. Total (ft)        *     419.47  *     418.27  *
* Delta EG (ft)          *       0.46  * Conv. Total (cfs)      *  1393472.0  *  1394703.0  *
* Delta WS (ft)          *       0.57  * Top Width (ft)         *      33.38  *      34.57  *
* BR Open Area (sq ft)   *    3339.30  * Frctn Loss (ft)        *       0.06  *       0.00  *
* BR Open Vel (ft/s)     *      13.75  * C & E Loss (ft)        *       0.00  *       0.29  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.53  *       0.53  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.22  *       7.23  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	752.92	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	751.34	E.G. Elev (ft)	752.36	752.27
Q Total (cfs)	54400.00	W.S. Elev (ft)	749.11	748.94
Q Bridge (cfs)	50812.38	Crit W.S. (ft)	739.02	739.02
Q Weir (cfs)		Max Chl Dpth (ft)	36.60	36.43
Weir Sta Lft (ft)		Vel Total (ft/s)	11.73	11.99
Weir Sta Rgt (ft)		Flow Area (sq ft)	4635.99	4536.00
Weir Submerg		Froude # Chl	0.42	0.43
Weir Max Depth (ft)		Specif Force (cu ft)	80214.04	79762.82
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	7.85	8.02
Min El Prs (ft)	747.50	W.P. Total (ft)	1046.40	1021.71
Delta EG (ft)	0.69	Conv. Total (cfs)	1366815.0	1358824.0
Delta WS (ft)	0.89	Top Width (ft)	590.30	565.79
BR Open Area (sq ft)	3339.30	Frctn Loss (ft)	0.08	0.00
BR Open Vel (ft/s)	15.22	C & E Loss (ft)	0.01	0.44
Coef of Q		Shear Total (lb/sq ft)	0.44	0.44
Br Sel Method	Energy only	Power Total (lb/ft s)	5.14	5.33

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The user has entered known energy, a known water surface, or a change in water surface. Therefore, no hydraulic properties were computed through the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	754.40	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	752.59	E.G. Elev (ft)	754.31	754.21
Q Total (cfs)	63000.00	W.S. Elev (ft)	751.72	751.45
Q Bridge (cfs)	50045.06	Crit W.S. (ft)	740.60	740.60
Q Weir (cfs)		Max Chl Dpth (ft)	39.21	38.94
Weir Sta Lft (ft)		Vel Total (ft/s)	9.79	10.09
Weir Sta Rgt (ft)		Flow Area (sq ft)	6438.20	6240.77
Weir Submerg		Froude # Chl	0.33	0.34
Weir Max Depth (ft)		Specif Force (cu ft)	94799.95	93916.52
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	8.70	8.54
Min El Prs (ft)	747.50	W.P. Total (ft)	1201.04	1191.12
Delta EG (ft)	0.43	Conv. Total (cfs)	1603635.0	1571202.0
Delta WS (ft)	0.56	Top Width (ft)	844.18	824.05
BR Open Area (sq ft)	3339.30	Frctn Loss (ft)	0.08	0.00
BR Open Vel (ft/s)	14.99	C & E Loss (ft)	0.02	0.25
Coef of Q		Shear Total (lb/sq ft)	0.52	0.53
Br Sel Method	Energy only	Power Total (lb/ft s)	5.05	5.31

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	757.62	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	755.84	E.G. Elev (ft)	757.36	757.31
Q Total (cfs)	75900.00	W.S. Elev (ft)	755.81	755.74
Q Bridge (cfs)	40696.59	Crit W.S. (ft)	741.77	741.77

```
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      43.30  *      43.23  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.85  *       7.90  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    9669.67  *    9613.33  *
* Weir Submerg           *             * Froude # Chl           *       0.25  *       0.25  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  125833.80  *  125295.40  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *      12.19  *      12.12  *
* Min El Prs (ft)        *     747.50  * W.P. Total (ft)        *    1262.18  *    1262.03  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *  2492257.0  *  2473188.0  *
* Delta WS (ft)          *       0.21  * Top Width (ft)         *    1264.30  *    1264.16  *
* BR Open Area (sq ft)   *    3339.30  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *      12.19  * C & E Loss (ft)        *       0.00  *       0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.44  *       0.45  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.48  *       3.54  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     745.74  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     743.97  * E.G. Elev (ft)         *     745.98  *     745.98  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     743.75  *     743.75  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     735.47  *     735.47  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.24  *      31.24  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      11.98  *      11.98  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3198.00  *    3198.00  *
* Weir Submerg           *             * Froude # Chl           *       0.48  *       0.48  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   51027.78  *   51027.78  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *      41.98  *      41.98  *
* Min El Prs (ft)        *     747.50  * W.P. Total (ft)        *     375.08  *     375.08  *
* Delta EG (ft)          *       0.18  * Conv. Total (cfs)      *  1416596.0  *  1416596.0  *
* Delta WS (ft)          *       0.22  * Top Width (ft)         *      76.17  *      76.17  *
* BR Open Area (sq ft)   *    3339.30  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      11.98  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.39  *       0.39  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.66  *       4.66  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 3.104

INPUT
Description: COE River Station= 51462.79
Preliminary Model River Station
             (miles)=3.09

Wilson Avenue Bridge.  B7 (downstream).
             Ineffective flow on left is due to high ground dowsntream which
             will block the water.  Ineffective flow on right is due to
             buildings and high ground downstream.  Obstructions are buildings.
             Piers width
increased due to slight skew to channel flow.
             Underwater channel shown on bridge plans.
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
       0     766   19.88     764   81.79     762  220.76     758  223.68     756
  227.61     754  267.66     752  272.76     750  380.32     750  725.66     752
  900.61     752  914.59     752  915.11     752  993.47     750 1152.28     748
 2131.79     746    2390   746.4 2390.01   737.2    2443     719 2466.01     718
  2469.6     718 2469.61  712.51  2484.4  712.51 2484.41     718 2487.79     718
    2511     719    2575  740.12 2575.01   746.9 2593.49     748 2827.77     750
 2896.25     752 3052.52     750 3200.04     752 3249.21     754  3469.7     756
 3478.38     758 3492.97     760 3548.63     760 3584.18     760

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041    2390    .014 2575.01    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          2390 2575.01              256     298     325             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0    1030     765       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
     250   463.5     753   463.5  643.75     765     644     721     753
     721   875.5     765    1030  2008.5     765  2801.6    3575     765

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  732.43  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  726.66  * Flow Area (sq ft)      *          * 1575.37  *          *
* E.G. Slope (ft/ft)     *0.000272  * Area (sq ft)           *          * 1575.37  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  147.80  * Top Width (ft)         *          *  147.80  *          *
* Vel Total (ft/s)       *    7.93  * Avg. Vel. (ft/s)       *          *    7.93  *          *
* Max Chl Dpth (ft)      *   19.92  * Hydr. Depth (ft)        *          *   10.66  *          *
* Conv. Total (cfs)      *758013.9  * Conv. (cfs)             *          *758013.9  *          *
* Length Wtd. (ft)       *  298.00  * Wetted Per. (ft)        *          *  163.21  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)        *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.30  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *          *  638.59  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *   60.21  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  737.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  736.44  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  729.40  * Flow Area (sq ft)      *          * 2215.94  *          *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *          * 2215.94  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  171.63  * Top Width (ft)         *          *  171.63  *          *
* Vel Total (ft/s)       *    8.80  * Avg. Vel. (ft/s)       *          *    8.80  *          *
* Max Chl Dpth (ft)      *   23.93  * Hydr. Depth (ft)        *          *   12.91  *          *
* Conv. Total (cfs)      *1216602.0  * Conv. (cfs)             *          *1216602.0  *          *
* Length Wtd. (ft)       *  298.00  * Wetted Per. (ft)        *          *  188.35  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)        *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.66  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *    1.44  *  875.28  *    4.45  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    2.27  *   67.95  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.41  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  739.67  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  731.69  * Flow Area (sq ft)      *          * 2791.57  *          *
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```
* E.G. Slope (ft/ft)     *0.000245  * Area (sq ft)           *          * 2791.57  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  183.62  * Top Width (ft)         *          *  183.62  *          *
* Vel Total (ft/s)       *    9.53  * Avg. Vel. (ft/s)       *          *    9.53  *          *
* Max Chl Dpth (ft)      *   27.16  * Hydr. Depth (ft)       *          *   15.20  *          *
* Conv. Total (cfs)      *1698166.0  * Conv. (cfs)            *          *1698166.0  *          *
* Length Wtd. (ft)       *  298.00  * Wetted Per. (ft)       *          *  203.45  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.00  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   14.56  * 1064.89  *   31.58  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    8.62  *   71.69  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.67  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  742.42  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  733.81  * Flow Area (sq ft)      *          * 3301.22  *          *
* E.G. Slope (ft/ft)     *0.000242  * Area (sq ft)           *          * 3301.22  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  185.00  * Top Width (ft)         *          *  185.00  *          *
* Vel Total (ft/s)       *   10.36  * Avg. Vel. (ft/s)       *          *   10.36  *          *
* Max Chl Dpth (ft)      *   29.91  * Hydr. Depth (ft)       *          *   17.84  *          *
* Conv. Total (cfs)      *2199440.0  * Conv. (cfs)            *          *2199440.0  *          *
* Length Wtd. (ft)       *  298.00  * Wetted Per. (ft)       *          *  209.90  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.46  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   49.37  * 1240.45  *   81.63  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   23.05  *   74.30  *   29.06  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.96  * Wt. n-Val.             *   0.041  *   0.014  *          *
* W.S. Elev (ft)         *  746.45  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  736.53  * Flow Area (sq ft)      *  105.94  * 4046.83  *          *
* E.G. Slope (ft/ft)     *0.000228  * Area (sq ft)           *  105.94  * 4046.83  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   24.66  *45475.34  *          *
* Top Width (ft)         *  566.51  * Top Width (ft)         *  381.50  *  185.01  *          *
* Vel Total (ft/s)       *   10.96  * Avg. Vel. (ft/s)       *    0.23  *   11.24  *          *
* Max Chl Dpth (ft)      *   33.94  * Hydr. Depth (ft)       *    0.28  *   21.87  *          *
* Conv. Total (cfs)      *3013767.0  * Conv. (cfs)            *  1633.6  *3012134.0  *          *
* Length Wtd. (ft)       *  297.43  * Wetted Per. (ft)       *  381.70  *  217.91  *          *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *    0.00  *    0.26  *          *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.00  *    2.97  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  145.78  * 1462.33  *  185.48  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   55.63  *   76.23  *   46.29  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.88  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  749.96  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  738.33  * Flow Area (sq ft)      * 1442.14  * 4694.83  *  268.56  *
* E.G. Slope (ft/ft)     *0.000186  * Area (sq ft)           * 1449.02  * 4694.83  *  268.56  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1718.46  *52532.98  *  148.56  *
* Top Width (ft)         *  826.16  * Top Width (ft)         *  414.55  *  185.01  *  226.59  *
* Vel Total (ft/s)       *    8.49  * Avg. Vel. (ft/s)       *    1.19  *   11.19  *    0.55  *
* Max Chl Dpth (ft)      *   37.45  * Hydr. Depth (ft)       *    3.78  *   25.38  *    1.19  *
* Conv. Total (cfs)      *3989243.0  * Conv. (cfs)            *126017.4  *3852331.0  * 10893.8  *
* Length Wtd. (ft)       *  296.27  * Wetted Per. (ft)       *  385.21  *  218.41  *  226.81  *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)       *    0.04  *    0.25  *    0.01  *
* Alpha                  *    1.68  * Stream Power (lb/ft s) *    0.05  *    2.79  *    0.01  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  253.03  * 1626.09  *  273.47  *
```

```
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   67.49  *   77.67  *  111.89  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.94  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.03  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  739.90  * Flow Area (sq ft)      * 2231.64  * 5077.70  *  737.48  *
* E.G. Slope (ft/ft)     *0.000179  * Area (sq ft)           * 2395.56  * 5077.70  *  737.48  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 3478.41  *58741.40  *  780.19  *
* Top Width (ft)         *  947.85  * Top Width (ft)          *  536.25  *  185.01  *  226.59  *
* Vel Total (ft/s)       *    7.83  * Avg. Vel. (ft/s)        *    1.56  *   11.57  *    1.06  *
* Max Chl Dpth (ft)      *   39.52  * Hydr. Depth (ft)        *    5.85  *   27.45  *    3.25  *
* Conv. Total (cfs)      *4708313.0  * Conv. (cfs)            *259959.6  *4390046.0  * 58307.6  *
* Length Wtd. (ft)       *  295.57  * Wetted Per. (ft)        *  387.27  *  218.41  *  228.88  *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)        *    0.06  *    0.26  *    0.04  *
* Alpha                  *    2.04  * Stream Power (lb/ft s) *    0.10  *    3.01  *    0.04  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  362.63  * 1751.53  *  533.21  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   79.97  *   77.90  *  263.73  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.86  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  755.42  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  741.95  * Flow Area (sq ft)      * 3526.14  * 5705.48  * 1506.34  *
* E.G. Slope (ft/ft)     *0.000156  * Area (sq ft)           * 4964.11  * 5705.48  * 1506.34  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6921.21  *66606.90  * 2371.89  *
* Top Width (ft)         * 1263.53  * Top Width (ft)          *  851.93  *  185.01  *  226.59  *
* Vel Total (ft/s)       *    7.07  * Avg. Vel. (ft/s)        *    1.96  *   11.67  *    1.57  *
* Max Chl Dpth (ft)      *   42.91  * Hydr. Depth (ft)        *    9.24  *   30.84  *    6.65  *
* Conv. Total (cfs)      *6075275.0  * Conv. (cfs)            *553995.3  *5331426.0  *189853.9  *
* Length Wtd. (ft)       *  294.00  * Wetted Per. (ft)        *  390.67  *  218.41  *  232.27  *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)        *    0.09  *    0.25  *    0.06  *
* Alpha                  *    2.40  * Stream Power (lb/ft s) *    0.17  *    2.97  *    0.10  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  568.23  * 1909.74  * 1262.73  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *  100.50  *   78.31  *  433.99  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  745.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.81  * Wt. n-Val.             *         *   0.014  *         *
* W.S. Elev (ft)         *  743.75  * Reach Len. (ft)        *  256.00  *  298.00  *  325.00  *
* Crit W.S. (ft)         *  734.85  * Flow Area (sq ft)      *         * 3546.80  *         *
* E.G. Slope (ft/ft)     *0.000243  * Area (sq ft)           *         * 3546.80  *         *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *         *38300.00  *         *
* Top Width (ft)         *  185.00  * Top Width (ft)          *         *  185.00  *         *
* Vel Total (ft/s)       *   10.80  * Avg. Vel. (ft/s)        *         *   10.80  *         *
* Max Chl Dpth (ft)      *   31.24  * Hydr. Depth (ft)        *         *   19.17  *         *
* Conv. Total (cfs)      *2458049.0  * Conv. (cfs)            *         *2458049.0  *         *
* Length Wtd. (ft)       *  297.89  * Wetted Per. (ft)        *         *  212.57  *         *
* Min Ch El (ft)         *  712.51  * Shear (lb/sq ft)        *         *    0.25  *         *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    2.73  *         *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   78.83  * 1327.95  *  118.49  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   32.58  *   75.20  *   37.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION
```

```
RIVER: Blue River
REACH: Main                RS: 3.047

INPUT
Description: COE River Station= 51760.97
Preliminary Model River Station
             (miles)=3.03

 Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.  Obstructions are
             buildings.
Station Elevation Data    num=      88
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     754   62.75     754  709.09     754   713.6     754  838.05     752
  976.89     752 1033.74     752 1255.55     750 1361.11     750 1551.89     752
 1579.26     752 1674.87     750 1699.39     750 1710.37     750  2040.6     750
 2135.52     748 2176.51     746 2213.68     744 2255.32     742 2261.22     742
 2414.28     742 2420.03     740 2427.75     738 2431.87     736 2437.33     734
 2443.42     730 2443.78     732 2447.74     728 2454.25     726  2458.5     724
 2463.89     722 2472.81     720 2498.78     718 2498.79  712.43 2516.26  712.43
 2516.26     718 2530.76     720 2549.21     722 2555.32     724 2561.51     726
 2567.72     728 2573.81     730 2578.61     732 2584.44     734 2589.52     736
 2594.64     738 2599.35     740 2604.55     742 2609.99     744 2615.61     746
 2622.49     748 3486.96     750 3849.39     752 3852.76     754 3854.39     754
 3910.56     754 3913.85     756  3916.2     758 3918.65     760 3921.78     762
 3923.39     764 3926.14     766 3932.53     768 3941.04     770 3954.64     772
 3976.88     774 4001.15     774 4015.84     774    4060     774 4068.94     774
  4107.1     776 4132.49     778 4145.86     780 4160.38     782 4168.57     784
 4172.77     786 4178.23     788 4181.61     790 4185.86     792 4190.55     794
 4197.18     796 4200.94     798  4216.2     800 4314.76     802 4345.54     804
 4357.27     806 4367.24     808  4383.8     812

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041 2414.28    .014 2622.49    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2414.28 2622.49              150     315     450             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    1050     770       F
    3400  4383.8     770       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************************************
     412     721     770    1050    1744     770    2781    3400     770

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  733.31  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.12  * Wt. n-Val.            *          *   0.014  *          *
* W.S. Elev (ft)         *  732.18  * Reach Len. (ft)       *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  727.08  * Flow Area (sq ft)     *          * 1468.84  *          *
* E.G. Slope (ft/ft)     *0.000328  * Area (sq ft)          *          * 1468.84  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)            *          *12500.00  *          *
* Top Width (ft)         *  139.04  * Top Width (ft)        *          *  139.04  *          *
* Vel Total (ft/s)       *    8.51  * Avg. Vel. (ft/s)      *          *    8.51  *          *
* Max Chl Dpth (ft)      *   19.75  * Hydr. Depth (ft)      *          *   10.56  *          *
* Conv. Total (cfs)      *690701.5  * Conv. (cfs)           *          *690701.5  *          *
* Length Wtd. (ft)       *  315.00  * Wetted Per. (ft)      *          *  157.51  *          *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)      *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.62  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)  *          *  628.18  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *          *   59.23  *          *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
```

```
* E.G. Elev (ft)         *  737.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  736.15  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  729.75  * Flow Area (sq ft)      *          * 2056.91  *          *
* E.G. Slope (ft/ft)     *0.000306  * Area (sq ft)           *          * 2056.91  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  158.32  * Top Width (ft)         *          *  158.32  *          *
* Vel Total (ft/s)       *    9.48  * Avg. Vel. (ft/s)       *          *    9.48  *          *
* Max Chl Dpth (ft)      *   23.72  * Hydr. Depth (ft)       *          *   12.99  *          *
* Conv. Total (cfs)      *1114051.0  * Conv. (cfs)            *          *1114051.0  *          *
* Length Wtd. (ft)       *  315.00  * Wetted Per. (ft)       *          *  178.44  *          *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.09  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    1.44  *  860.66  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *   66.82  *    6.45  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  740.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.64  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  739.33  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  732.04  * Flow Area (sq ft)      *          * 2585.76  *          *
* E.G. Slope (ft/ft)     *0.000302  * Area (sq ft)           *          * 2585.76  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  175.15  * Top Width (ft)         *          *  175.15  *          *
* Vel Total (ft/s)       *   10.29  * Avg. Vel. (ft/s)       *          *   10.29  *          *
* Max Chl Dpth (ft)      *   26.90  * Hydr. Depth (ft)       *          *   14.76  *          *
* Conv. Total (cfs)      *1529801.0  * Conv. (cfs)            *          *1529801.0  *          *
* Length Wtd. (ft)       *  315.00  * Wetted Per. (ft)       *          *  196.48  *          *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.56  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   14.56  * 1046.49  *   31.58  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.62  *   70.46  *   15.28  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  743.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.90  * Wt. n-Val.             *   0.041  *   0.014  *          *
* W.S. Elev (ft)         *  742.08  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  734.17  * Flow Area (sq ft)      *   13.41  * 3090.23  *          *
* E.G. Slope (ft/ft)     *0.000307  * Area (sq ft)           *   13.41  * 3090.23  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *    1.63  *34198.38  *          *
* Top Width (ft)         *  351.21  * Top Width (ft)         *  160.71  *  190.50  *          *
* Vel Total (ft/s)       *   11.02  * Avg. Vel. (ft/s)       *    0.12  *   11.07  *          *
* Max Chl Dpth (ft)      *   29.65  * Hydr. Depth (ft)       *    0.08  *   16.22  *          *
* Conv. Total (cfs)      *1952514.0  * Conv. (cfs)            *    92.8  *1952421.0  *          *
* Length Wtd. (ft)       *  315.00  * Wetted Per. (ft)       *  160.71  *  212.77  *          *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)       *    0.00  *    0.28  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    3.08  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   49.33  * 1218.59  *   81.63  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   22.57  *   73.02  *   29.06  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  748.33  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.91  * Wt. n-Val.             *   0.041  *   0.014  *          *
* W.S. Elev (ft)         *  746.42  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  736.95  * Flow Area (sq ft)      *  899.42  * 3941.99  *          *
* E.G. Slope (ft/ft)     *0.000247  * Area (sq ft)           *  899.42  * 3941.99  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1215.17  *44284.84  *          *
* Top Width (ft)         *  449.13  * Top Width (ft)         *  246.36  *  202.77  *          *
* Vel Total (ft/s)       *    9.40  * Avg. Vel. (ft/s)       *    1.35  *   11.23  *          *
* Max Chl Dpth (ft)      *   33.99  * Hydr. Depth (ft)       *    3.65  *   19.44  *          *
* Conv. Total (cfs)      *2892946.0  * Conv. (cfs)            * 77261.8  *2815685.0  *          *
```

```
* Length Wtd. (ft)       *  310.64  * Wetted Per. (ft)       *  246.47  *  225.79  *          *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)       *    0.06  *    0.27  *          *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.08  *    3.03  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  142.82  * 1435.01  *  185.48  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   53.78  *   74.90  *   46.29  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.75  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  749.99  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  738.91  * Flow Area (sq ft)      * 1962.98  * 4681.05  *  286.29  *
* E.G. Slope (ft/ft)     *0.000193  * Area (sq ft)           * 1962.98  * 4681.05  *  294.15  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2986.39  *51201.41  *  212.19  *
* Top Width (ft)         *  822.32  * Top Width (ft)         *  373.18  *  208.21  *  240.93  *
* Vel Total (ft/s)       *    7.85  * Avg. Vel. (ft/s)       *    1.52  *   10.94  *    0.74  *
* Max Chl Dpth (ft)      *   37.56  * Hydr. Depth (ft)       *    5.26  *   22.48  *    1.81  *
* Conv. Total (cfs)      *3918406.0  * Conv. (cfs)           *215108.6  *3688014.0  * 15284.2  *
* Length Wtd. (ft)       *  306.39  * Wetted Per. (ft)       *  373.35  *  231.46  *  160.13  *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)       *    0.06  *    0.24  *    0.02  *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *    0.10  *    2.66  *    0.02  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  243.00  * 1594.02  *  271.37  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   65.17  *   76.32  *  110.14  *
*****************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  753.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.79  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  752.08  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  740.68  * Flow Area (sq ft)      * 3358.44  * 5115.49  *  617.03  *
* E.G. Slope (ft/ft)     *0.000181  * Area (sq ft)           * 3375.93  * 5115.49  * 1196.31  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4780.80  *57486.62  *  732.58  *
* Top Width (ft)         * 1703.20  * Top Width (ft)         *  886.96  *  208.21  *  608.03  *
* Vel Total (ft/s)       *    6.93  * Avg. Vel. (ft/s)       *    1.42  *   11.24  *    1.19  *
* Max Chl Dpth (ft)      *   39.65  * Hydr. Depth (ft)       *    5.01  *   24.57  *    3.89  *
* Conv. Total (cfs)      *4686043.0  * Conv. (cfs)           *355603.6  *4275949.0  * 54490.6  *
* Length Wtd. (ft)       *  303.44  * Wetted Per. (ft)       *  672.53  *  231.46  *  162.22  *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)       *    0.06  *    0.25  *    0.04  *
* Alpha                  *    2.40  * Stream Power (lb/ft s) *    0.08  *    2.80  *    0.05  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  345.68  * 1716.66  *  526.00  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   75.78  *   76.56  *  260.61  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  757.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.56  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  755.59  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  743.72  * Flow Area (sq ft)      * 5712.15  * 5846.63  * 1173.65  *
* E.G. Slope (ft/ft)     *0.000143  * Area (sq ft)           * 7437.65  * 5846.63  * 3433.52  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *10252.24  *63775.25  * 1872.52  *
* Top Width (ft)         * 2291.17  * Top Width (ft)         * 1411.28  *  208.21  *  671.68  *
* Vel Total (ft/s)       *    5.96  * Avg. Vel. (ft/s)       *    1.79  *   10.91  *    1.60  *
* Max Chl Dpth (ft)      *   43.16  * Hydr. Depth (ft)       *    8.52  *   28.08  *    7.40  *
* Conv. Total (cfs)      *6357977.0  * Conv. (cfs)           *858807.3  *5342313.0  *156856.7  *
* Length Wtd. (ft)       *  297.09  * Wetted Per. (ft)       *  676.04  *  231.46  *  165.73  *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)       *    0.08  *    0.22  *    0.06  *
* Alpha                  *    2.83  * Stream Power (lb/ft s) *    0.13  *    2.45  *    0.10  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  531.79  * 1870.22  * 1244.30  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   93.85  *   76.96  *  430.64  *
```

```
*******************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

```
*******************************************************************************************
* E.G. Elev (ft)         *  745.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.99  * Wt. n-Val.             *   0.041  *   0.014  *          *
* W.S. Elev (ft)         *  743.47  * Reach Len. (ft)        *  150.00  *  315.00  *  450.00  *
* Crit W.S. (ft)         *  735.23  * Flow Area (sq ft)      *  257.03  * 3357.78  *          *
* E.G. Slope (ft/ft)     *0.000296  * Area (sq ft)           *  257.03  * 3357.78  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  196.28  *38103.72  *          *
* Top Width (ft)         *  383.94  * Top Width (ft)          *  189.66  *  194.28  *          *
* Vel Total (ft/s)       *   10.60  * Avg. Vel. (ft/s)        *    0.76  *   11.35  *          *
* Max Chl Dpth (ft)      *   31.04  * Hydr. Depth (ft)        *    1.36  *   17.28  *          *
* Conv. Total (cfs)      *2225733.0  * Conv. (cfs)            * 11406.2  *2214326.0  *          *
* Length Wtd. (ft)       *  314.24  * Wetted Per. (ft)        *  189.70  *  216.80  *          *
* Min Ch El (ft)         *  712.43  * Shear (lb/sq ft)        *    0.03  *    0.29  *          *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    0.02  *    3.25  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *   78.07  * 1304.33  *  118.49  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   32.03  *   73.90  *   37.13  *
*******************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.988

INPUT
Description: COE River Station= 52076.16
Preliminary Model River Station
(miles)=2.97

FEMA XSEC D. Ineffective flow on left is due to
high ground dowsntream which will block the water. Ineffective
flow on right is due to buildings and high ground downstream.
Obstructions are buildings.

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	756	362.64	754	650.8	752	737.44	752	823.45	752
1060.07	750	1063.5	750	1113.25	752	1138.82	752	1370.36	750
1709.61	748	1758.2	746	1808.24	744	1900.21	742	2011.29	742
2024.89	742	2032.59	740	2039.32	738	2043.8	736	2048.82	734
2054.14	732	2060.56	730	2065.97	728	2071.8	726	2077.87	724
2083.59	722	2089.63	720	2114.36	718	2114.37	712.37	2134.32	712.37
2134.32	718	2145.61	720	2162.5	722	2168.01	724	2173.99	726
2179.79	728	2186.33	730	2193.79	732	2201.17	734	2207.6	736
2215.02	738	2221.8	740	2228.59	742	2235.57	744	2242.46	746
2247.58	748	2254.28	750	2497.69	750	2509.09	750	2521.01	752
2524.35	752	2538.89	750	3690.79	750	4071.91	750	4133.67	750
4156.42	752	4161.6	754	4167.33	756	4173.71	758	4177.74	760
4183.05	762	4188.01	764	4192.99	766	4208.93	768	4227.03	770
4239.37	772	4248.23	772	4249.7	770	4253.91	768	4257.35	766
4266.79	766	4269.71	766	4283.65	764	4299.78	764	4306.42	766
4314.09	768	4316.98	770	4322.5	772	4325.81	774	4326.71	776
4330.05	778	4331.36	780	4333.81	782	4409.97	784	4432.02	786
4463.01	786	4470.5	786	4476.93	788	4486.3	790	4507.87	792
4510.39	794	4512.94	796	4516.71	798	4517.99	800	4521.66	802
4526.61	804	4537.66	806	4546.49	808	4554.61	810	4560.86	812
4568.11	814	4573.29	816	4579.35	818	4585.45	820	4588.14	820
4619.37	820	4623.37	822	4627.74	824				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	2024.89	.014	2254.28	.041

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
       2024.89 2254.28              500     728     665             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0     850     770       F
    2524    2875     752       F
    2875    4350     770       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
       0  180.25     770     850    1206     770

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  731.94  * Reach Len. (ft)        *  500.00  *  728.00  *  665.00  *
* Crit W.S. (ft)         *  727.18  * Flow Area (sq ft)      *          * 1397.19  *          *
* E.G. Slope (ft/ft)     *0.000377  * Area (sq ft)           *          * 1397.19  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  139.23  * Top Width (ft)         *          *  139.23  *          *
* Vel Total (ft/s)       *    8.95  * Avg. Vel. (ft/s)       *          *    8.95  *          *
* Max Chl Dpth (ft)      *   19.57  * Hydr. Depth (ft)       *          *   10.03  *          *
* Conv. Total (cfs)      *643977.3  * Conv. (cfs)            *          *643977.3  *          *
* Length Wtd. (ft)       *  728.00  * Wetted Per. (ft)       *          *  154.39  *          *
* Min Ch El (ft)         *  712.37  * Shear (lb/sq ft)       *          *    0.21  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.90  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *          *  617.82  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   58.22  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  737.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  735.97  * Reach Len. (ft)        *  500.00  *  728.00  *  665.00  *
* Crit W.S. (ft)         *  730.02  * Flow Area (sq ft)      *          * 2008.86  *          *
* E.G. Slope (ft/ft)     *0.000336  * Area (sq ft)           *          * 2008.86  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  163.63  * Top Width (ft)         *          *  163.63  *          *
* Vel Total (ft/s)       *    9.71  * Avg. Vel. (ft/s)       *          *    9.71  *          *
* Max Chl Dpth (ft)      *   23.60  * Hydr. Depth (ft)       *          *   12.28  *          *
* Conv. Total (cfs)      *1064346.0  * Conv. (cfs)           *          *1064346.0  *          *
* Length Wtd. (ft)       *  728.00  * Wetted Per. (ft)       *          *  180.12  *          *
* Min Ch El (ft)         *  712.37  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.27  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *    1.44  *  845.96  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *   65.65  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.66  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  739.21  * Reach Len. (ft)        *  500.00  *  728.00  *  665.00  *
* Crit W.S. (ft)         *  732.39  * Flow Area (sq ft)      *          * 2571.37  *          *
* E.G. Slope (ft/ft)     *0.000318  * Area (sq ft)           *          * 2571.37  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  183.90  * Top Width (ft)         *          *  183.90  *          *
* Vel Total (ft/s)       *   10.34  * Avg. Vel. (ft/s)       *          *   10.34  *          *
* Max Chl Dpth (ft)      *   26.84  * Hydr. Depth (ft)       *          *   13.98  *          *
* Conv. Total (cfs)      *1490684.0  * Conv. (cfs)           *          *1490684.0  *          *
* Length Wtd. (ft)       *  728.00  * Wetted Per. (ft)       *          *  201.43  *          *
* Min Ch El (ft)         *  712.37  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.63  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *   14.56  * 1027.85  *   31.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.62  *   69.16  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	743.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	Wt. n-Val.	0.041	0.014	
W.S. Elev (ft)	742.00	Reach Len. (ft)	500.00	728.00	665.00
Crit W.S. (ft)	734.55	Flow Area (sq ft)	0.24	3111.44	
E.G. Slope (ft/ft)	0.000317	Area (sq ft)	0.24	3111.44	
Q Total (cfs)	34200.00	Flow (cfs)	0.00	34200.00	
Top Width (ft)	328.48	Top Width (ft)	124.77	203.71	
Vel Total (ft/s)	10.99	Avg. Vel. (ft/s)	0.01	10.99	
Max Chl Dpth (ft)	29.63	Hydr. Depth (ft)	0.00	15.27	
Conv. Total (cfs)	1919608.0	Conv. (cfs)	0.1	1919608.0	
Length Wtd. (ft)	728.00	Wetted Per. (ft)	124.77	222.02	
Min Ch El (ft)	712.37	Shear (lb/sq ft)	0.00	0.28	
Alpha	1.00	Stream Power (lb/ft s)	0.00	3.05	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	49.31	1196.17	81.63
C & E Loss (ft)	0.00	Cum SA (acres)	22.08	71.59	29.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	748.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.	0.041	0.014	
W.S. Elev (ft)	746.41	Reach Len. (ft)	500.00	728.00	665.00
Crit W.S. (ft)	737.27	Flow Area (sq ft)	935.09	4042.33	
E.G. Slope (ft/ft)	0.000244	Area (sq ft)	935.09	4042.33	
Q Total (cfs)	45500.00	Flow (cfs)	1191.54	44308.46	
Top Width (ft)	495.18	Top Width (ft)	276.57	218.61	
Vel Total (ft/s)	9.14	Avg. Vel. (ft/s)	1.27	10.96	
Max Chl Dpth (ft)	34.04	Hydr. Depth (ft)	3.38	18.49	
Conv. Total (cfs)	2914694.0	Conv. (cfs)	76329.3	2838365.0	
Length Wtd. (ft)	724.95	Wetted Per. (ft)	276.64	237.56	
Min Ch El (ft)	712.37	Shear (lb/sq ft)	0.05	0.26	
Alpha	1.40	Stream Power (lb/ft s)	0.07	2.84	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	139.66	1406.14	185.48
C & E Loss (ft)	0.00	Cum SA (acres)	52.88	73.38	46.29

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	751.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.66	Wt. n-Val.	0.041	0.014	0.041
W.S. Elev (ft)	750.06	Reach Len. (ft)	500.00	728.00	665.00
Crit W.S. (ft)	739.20	Flow Area (sq ft)	2416.66	4860.03	15.58
E.G. Slope (ft/ft)	0.000190	Area (sq ft)	2416.66	4860.03	113.05
Q Total (cfs)	54400.00	Flow (cfs)	2862.18	51536.62	1.21
Top Width (ft)	2742.09	Top Width (ft)	661.60	229.39	1851.09
Vel Total (ft/s)	7.46	Avg. Vel. (ft/s)	1.18	10.60	0.08
Max Chl Dpth (ft)	37.69	Hydr. Depth (ft)	3.65	21.19	0.06
Conv. Total (cfs)	3947833.0	Conv. (cfs)	207709.6	3740036.0	87.5
Length Wtd. (ft)	721.08	Wetted Per. (ft)	661.71	248.93	255.18
Min Ch El (ft)	712.37	Shear (lb/sq ft)	0.04	0.23	0.00
Alpha	1.92	Stream Power (lb/ft s)	0.05	2.45	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	235.46	1559.52	269.27
C & E Loss (ft)	0.00	Cum SA (acres)	63.39	74.74	99.34

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	753.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.56	Wt. n-Val.	0.041	0.014	0.041
W.S. Elev (ft)	752.19	Reach Len. (ft)	500.00	728.00	665.00
Crit W.S. (ft)	740.91	Flow Area (sq ft)	4052.20	5348.12	1325.52
E.G. Slope (ft/ft)	0.000166	Area (sq ft)	4095.36	5348.12	4107.64
Q Total (cfs)	63000.00	Flow (cfs)	5487.45	56487.09	1025.46

```
* Top Width (ft)         * 3177.32  * Top Width (ft)         * 1045.30  *  229.39  * 1902.63  *
* Vel Total (ft/s)       *    5.87  * Avg. Vel. (ft/s)       *    1.35  *   10.56  *    0.77  *
* Max Chl Dpth (ft)      *   39.82  * Hydr. Depth (ft)       *    4.95  *   23.31  *    2.14  *
* Conv. Total (cfs)      *4892566.0  * Conv. (cfs)           *426153.7  *4386775.0  * 79637.1  *
* Length Wtd. (ft)       *  714.80  * Wetted Per. (ft)       *  819.77  *  248.93  *  621.02  *
* Min Ch El (ft)         *  712.37  * Shear (lb/sq ft)       *    0.05  *    0.22  *    0.02  *
* Alpha                  *    2.90  * Stream Power (lb/ft s) *    0.07  *    2.35  *    0.02  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  332.81  * 1678.83  *  498.60  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   72.46  *   74.98  *  247.64  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  756.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  755.83  * Reach Len. (ft)        *  500.00  *  728.00  *  665.00  *
* Crit W.S. (ft)         *  743.77  * Flow Area (sq ft)      * 7032.27  * 6182.90  * 3584.42  *
* E.G. Slope (ft/ft)     *0.000115  * Area (sq ft)           * 8854.38  * 6182.90  *11049.22  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *11433.02  *59979.12  * 4487.86  *
* Top Width (ft)         * 3630.59  * Top Width (ft)         * 1488.64  *  229.39  * 1912.56  *
* Vel Total (ft/s)       *    4.52  * Avg. Vel. (ft/s)       *    1.63  *    9.70  *    1.25  *
* Max Chl Dpth (ft)      *   43.46  * Hydr. Depth (ft)       *    8.59  *   26.95  *    5.77  *
* Conv. Total (cfs)      *7069242.0  * Conv. (cfs)           *1064859.0  *5586389.0  *417994.2  *
* Length Wtd. (ft)       *  700.23  * Wetted Per. (ft)       *  823.41  *  248.93  *  621.02  *
* Min Ch El (ft)         *  712.37  * Shear (lb/sq ft)       *    0.06  *    0.18  *    0.04  *
* Alpha                  *    3.67  * Stream Power (lb/ft s) *    0.10  *    1.73  *    0.05  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *  503.74  * 1826.73  * 1169.49  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   88.86  *   75.38  *  417.29  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  745.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.94  * Wt. n-Val.             *   0.041  *   0.014  *          *
* W.S. Elev (ft)         *  743.41  * Reach Len. (ft)        *  500.00  *  728.00  *  665.00  *
* Crit W.S. (ft)         *  735.57  * Flow Area (sq ft)      *  221.94  * 3402.21  *          *
* E.G. Slope (ft/ft)     *0.000302  * Area (sq ft)           *  221.94  * 3402.21  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  155.30  *38144.71  *          *
* Top Width (ft)         *  398.25  * Top Width (ft)         *  189.62  *  208.63  *          *
* Vel Total (ft/s)       *   10.57  * Avg. Vel. (ft/s)       *    0.70  *   11.21  *          *
* Max Chl Dpth (ft)      *   31.04  * Hydr. Depth (ft)       *    1.17  *   16.31  *          *
* Conv. Total (cfs)      *2203136.0  * Conv. (cfs)           *  8933.1  *2194203.0  *          *
* Length Wtd. (ft)       *  727.54  * Wetted Per. (ft)       *  189.64  *  227.14  *          *
* Min Ch El (ft)         *  712.37  * Shear (lb/sq ft)       *    0.02  *    0.28  *          *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *    0.02  *    3.17  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *   77.25  * 1279.89  *  118.49  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   31.37  *   72.44  *   37.13  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.850

INPUT
Description: COE River Station= 52803.74
Preliminary Model River Station
             (miles)=2.83

Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.  Obstructions are
             buildings.
Station Elevation Data    num=     111
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	758	183.38	758	217.58	758	320.73	758	387.12	756
635.76	754	704	754	743.7	754	1034.21	752	1121.5	752
1168.74	752	1471.64	750	1586.93	748	1663.66	746	1695.87	744
1705.97	742	1750.18	738	1754.28	736	1760.1	734	1765.19	732
1772.24	730	1778.06	728	1783.83	726	1790.5	724	1796.13	722
1802.25	720	1826.6	718	1826.61	712.22	1848.7	712.22	1848.7	718
1863.15	720	1874.16	722	1879.44	724	1885	726	1890.55	728
1895.61	730	1900.12	732	1906.48	734	1914.51	736	1921.41	738
1930.88	740	1937.49	742	1945.88	744	1954.33	746	1963.18	748
1979.52	750	2049.32	750	2432.25	750	2533.3	750	2598.67	750
2642.61	750	2657.43	750	2680.47	752	2687.45	752	2749.78	750
2809.68	750	3102.74	752	3408.13	752	3951.74	752	4373.68	750
4396.04	750	4425.21	752	4457.07	754	4467.05	756	4507.08	758
4513.11	760	4518.3	762	4524.32	764	4552.79	766	4569.47	768
4573.93	770	4581.99	772	4582.01	772	4583.08	770	4584.39	768
4585.68	766	4586.95	764	4588.46	762	4590.14	760	4591.69	758
4653.67	758	4656.82	760	4659.51	762	4662.44	764	4666.06	766
4667.78	768	4671.92	770	4673.35	772	4677.34	774	4680.68	776
4681.82	778	4684.43	780	4688.14	782	4754.74	784	4801.81	784
4808.32	784	4814.02	786	4819.54	788	4824.73	790	4834.9	792
4849.14	794	4851.86	796	4854.95	798	4857.76	800	4861.19	802
4866.14	804	4873.56	806	4880.27	808	4885.74	810	4889.49	812
4892.23	814								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1695.87	.014	1979.52	.041

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1695.87	1979.52	329	252	87	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	1195	770	F
2685	3055	752	F
3055	4700	770	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1195	1308.1	770

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	732.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.		0.014	
W.S. Elev (ft)	731.58	Reach Len. (ft)	329.00	252.00	87.00
Crit W.S. (ft)	726.93	Flow Area (sq ft)		1358.57	
E.G. Slope (ft/ft)	0.000391	Area (sq ft)		1358.57	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	132.51	Top Width (ft)		132.51	
Vel Total (ft/s)	9.20	Avg. Vel. (ft/s)		9.20	
Max Chl Dpth (ft)	19.36	Hydr. Depth (ft)		10.25	
Conv. Total (cfs)	631910.2	Conv. (cfs)		631910.2	
Length Wtd. (ft)	252.00	Wetted Per. (ft)		148.09	
Min Ch El (ft)	712.22	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		2.06	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		594.79	
C & E Loss (ft)	0.09	Cum SA (acres)		55.95	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	737.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.57	Wt. n-Val.		0.014	
W.S. Elev (ft)	735.60	Reach Len. (ft)	329.00	252.00	87.00
Crit W.S. (ft)	729.80	Flow Area (sq ft)		1938.56	
E.G. Slope (ft/ft)	0.000362	Area (sq ft)		1938.56	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	157.44	Top Width (ft)		157.44	
Vel Total (ft/s)	10.06	Avg. Vel. (ft/s)		10.06	
Max Chl Dpth (ft)	23.38	Hydr. Depth (ft)		12.31	

```
* Conv. Total (cfs)      *1025116.0  * Conv. (cfs)            *          *1025116.0  *          *
* Length Wtd. (ft)       *  252.00  * Wetted Per. (ft)        *          *  174.32  *          *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.53  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *    1.44  *  812.98  *    4.45  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)          *    2.27  *   62.97  *    6.45  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  740.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.78  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  738.83  * Reach Len. (ft)        *  329.00  *  252.00  *   87.00  *
* Crit W.S. (ft)         *  732.21  * Flow Area (sq ft)      *          * 2482.02  *          *
* E.G. Slope (ft/ft)     *0.000360  * Area (sq ft)           *          * 2482.02  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  184.38  * Top Width (ft)          *          *  184.38  *          *
* Vel Total (ft/s)       *   10.72  * Avg. Vel. (ft/s)        *          *   10.72  *          *
* Max Chl Dpth (ft)      *   26.61  * Hydr. Depth (ft)        *          *   13.46  *          *
* Conv. Total (cfs)      *1401624.0  * Conv. (cfs)            *          *1401624.0  *          *
* Length Wtd. (ft)       *  252.00  * Wetted Per. (ft)        *          *  202.24  *          *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)        *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.96  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   14.56  *  985.62  *   31.58  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)          *    8.62  *   66.08  *   15.28  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  743.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.92  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  741.70  * Reach Len. (ft)        *  329.00  *  252.00  *   87.00  *
* Crit W.S. (ft)         *  734.43  * Flow Area (sq ft)      *          * 3073.07  *          *
* E.G. Slope (ft/ft)     *0.000378  * Area (sq ft)           *          * 3073.07  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  227.19  * Top Width (ft)          *          *  227.19  *          *
* Vel Total (ft/s)       *   11.13  * Avg. Vel. (ft/s)        *          *   11.13  *          *
* Max Chl Dpth (ft)      *   29.48  * Hydr. Depth (ft)        *          *   13.53  *          *
* Conv. Total (cfs)      *1758172.0  * Conv. (cfs)            *          *1758172.0  *          *
* Length Wtd. (ft)       *  252.00  * Wetted Per. (ft)        *          *  245.55  *          *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)        *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.29  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   49.31  * 1144.49  *   81.63  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *   21.37  *   67.99  *   29.06  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  748.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.83  * Wt. n-Val.              *   0.041  *   0.014  *          *
* W.S. Elev (ft)         *  746.20  * Reach Len. (ft)        *  329.00  *  252.00  *   87.00  *
* Crit W.S. (ft)         *  737.26  * Flow Area (sq ft)      *   39.49  * 4184.54  *          *
* E.G. Slope (ft/ft)     *0.000283  * Area (sq ft)           *   39.49  * 4184.54  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *   23.86  *45476.14  *          *
* Top Width (ft)         *  299.31  * Top Width (ft)          *   39.95  *  259.35  *          *
* Vel Total (ft/s)       *   10.77  * Avg. Vel. (ft/s)        *    0.60  *   10.87  *          *
* Max Chl Dpth (ft)      *   33.98  * Hydr. Depth (ft)        *    0.99  *   16.13  *          *
* Conv. Total (cfs)      *2706020.0  * Conv. (cfs)            *  1418.7  *2704602.0  *          *
* Length Wtd. (ft)       *  252.02  * Wetted Per. (ft)        *   40.02  *  278.46  *          *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)        *    0.02  *    0.27  *          *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.01  *    2.88  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)    *  134.07  * 1337.39  *  185.48  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   51.06  *   69.39  *   46.29  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

```
CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         *  751.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.67  * Wt. n-Val.             *   0.041  *   0.014  *          *
* W.S. Elev (ft)         *  749.90  * Reach Len. (ft)        *  329.00  *  252.00  *   87.00  *
* Crit W.S. (ft)         *  739.58  * Flow Area (sq ft)      *  484.00  * 5180.18  *          *
* E.G. Slope (ft/ft)     *0.000218  * Area (sq ft)           *  484.00  * 5180.18  *          *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  440.11  *53959.89  *          *
* Top Width (ft)         *  501.18  * Top Width (ft)         *  218.36  *  282.82  *          *
* Vel Total (ft/s)       *    9.60  * Avg. Vel. (ft/s)       *    0.91  *   10.42  *          *
* Max Chl Dpth (ft)      *   37.68  * Hydr. Depth (ft)       *    2.22  *   18.32  *          *
* Conv. Total (cfs)      *3684670.0  * Conv. (cfs)            * 29810.2  *3654859.0  *          *
* Length Wtd. (ft)       *  252.31  * Wetted Per. (ft)       *  218.47  *  302.24  *          *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)       *    0.03  *    0.23  *          *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.03  *    2.43  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  218.81  * 1475.62  *  268.41  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   58.34  *   70.46  *   85.21  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. Elev (ft)         *  753.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.66  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.94  * Reach Len. (ft)        *  329.00  *  252.00  *   87.00  *
* Crit W.S. (ft)         *  741.49  * Flow Area (sq ft)      * 1171.10  * 5759.72  * 1337.89  *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           * 1172.10  * 5759.72  * 2257.64  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1234.87  *60723.86  * 1041.27  *
* Top Width (ft)         * 2254.28  * Top Width (ft)         *  405.18  *  283.65  * 1565.46  *
* Vel Total (ft/s)       *    7.62  * Avg. Vel. (ft/s)       *    1.05  *   10.54  *    0.78  *
* Max Chl Dpth (ft)      *   39.72  * Hydr. Depth (ft)       *    3.02  *   20.31  *    1.91  *
* Conv. Total (cfs)      *4516606.0  * Conv. (cfs)            * 88530.6  *4353425.0  * 74650.6  *
* Length Wtd. (ft)       *  250.20  * Wetted Per. (ft)       *  388.74  *  303.08  *  700.36  *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)       *    0.04  *    0.23  *    0.02  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *    0.04  *    2.43  *    0.02  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  302.58  * 1586.01  *  450.02  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   64.13  *   70.69  *  221.17  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  756.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  755.70  * Reach Len. (ft)        *  329.00  *  252.00  *   87.00  *
* Crit W.S. (ft)         *  743.65  * Flow Area (sq ft)      * 2629.38  * 6826.44  * 5827.93  *
* E.G. Slope (ft/ft)     *0.000126  * Area (sq ft)           * 4375.80  * 6826.44  *11497.66  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3797.27  *64796.42  * 7306.31  *
* Top Width (ft)         * 3928.32  * Top Width (ft)         * 1158.63  *  283.65  * 2486.04  *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)       *    1.44  *    9.49  *    1.25  *
* Max Chl Dpth (ft)      *   43.48  * Hydr. Depth (ft)       *    6.78  *   24.07  *    5.42  *
* Conv. Total (cfs)      *6768769.0  * Conv. (cfs)            *338640.4  *5778551.0  *651577.8  *
* Length Wtd. (ft)       *  238.24  * Wetted Per. (ft)       *  392.50  *  303.08  * 1075.60  *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)       *    0.05  *    0.18  *    0.04  *
* Alpha                  *    3.13  * Stream Power (lb/ft s) *    0.08  *    1.68  *    0.05  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  427.81  * 1718.02  *  997.39  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   73.66  *   71.09  *  383.71  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  745.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.95  * Wt. n-Val.             *         *   0.014  *          *
* W.S. Elev (ft)         *  743.17  * Reach Len. (ft)        *  329.00  *  252.00  *   87.00  *
```

```
* Crit W.S. (ft)         *  735.53  * Flow Area (sq ft)      *          * 3419.78  *          *
* E.G. Slope (ft/ft)     *0.000360  * Area (sq ft)           *          * 3419.78  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *38300.00  *          *
* Top Width (ft)         *  242.35  * Top Width (ft)          *          *  242.35  *          *
* Vel Total (ft/s)       *   11.20  * Avg. Vel. (ft/s)        *          *   11.20  *          *
* Max Chl Dpth (ft)      *   30.95  * Hydr. Depth (ft)        *          *   14.11  *          *
* Conv. Total (cfs)      *2017188.0  * Conv. (cfs)             *          *2017188.0  *          *
* Length Wtd. (ft)       *  252.00  * Wetted Per. (ft)        *          *  261.02  *          *
* Min Ch El (ft)         *  712.22  * Shear (lb/sq ft)        *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.30  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   75.97  * 1222.88  *  118.49  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   30.28  *   68.68  *   37.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.802

INPUT
Description: COE River Station= 53055.28
Preliminary Model River Station
             (miles)=2.79

Ineffective flow on left is due to high ground
             dowsntream which will block the water.  Ineffective flow on right
             is due to buildings and high ground downstream.  Obstructions are
             buildings.
Station Elevation Data    num=      75
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      756  473.18      754  502.18      752  508.77      750  518.41      748
  527.97      748  532.17      750  539.85      752  578.75      754  683.69      754
   724.8      752  788.05      752  902.32      754  923.92      754 1004.52      754
 1013.36      754  1048.1      752 1163.71      750    1244    749.1 1244.01    742.5
    1313    718.3    1339    717.3 1339.01    711.8    1355    711.8 1355.01    717.3
    1381    718.3    1445    740.5 1445.01    749.1 1479.47      750  1567.5      750
 1573.62      750 1596.32      748 1618.34      746 1643.96      744 1666.81      742
 1703.97      740 1724.96      740 1755.73      742 1796.19      744 1871.82      746
 1905.58      748 2036.35      750 2147.12      750 2223.78      750 2237.94      750
 2393.35      750    2416      750 3328.95      752 3810.86      752 3924.01      752
 4050.45      752 4052.42      752 4393.04      752 4438.59      752 4469.04      754
 4489.13      756 4506.41      758 4515.48      760 4521.06      762 4525.59      764
 4527.06      766 4531.21      768 4533.02      770 4535.92      772 4538.82      774
 4541.72      776 4546.29      778 4552.14      780 4564.05      780  4569.8      778
 4578.45      776 4613.58      784 4623.55      786 4627.41      788 4630.28      790

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041    1244    .014 1445.01    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1244 1445.01               22      22      22             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     968     770       F
    2575 4630.28     770       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
       0     190     770     470     580     754     968  1153.6     770
    1565    2040     750

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  732.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  731.72  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  725.93  * Flow Area (sq ft)      *          * 1558.91  *          *
* E.G. Slope (ft/ft)     *0.000275  * Area (sq ft)           *          * 1558.91  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
```

```
* Top Width (ft)         *  144.95  * Top Width (ft)         *          *  144.95  *          *
* Vel Total (ft/s)       *    8.02  * Avg. Vel. (ft/s)       *          *    8.02  *          *
* Max Chl Dpth (ft)      *   19.92  * Hydr. Depth (ft)       *          *   10.75  *          *
* Conv. Total (cfs)      *753172.1  * Conv. (cfs)            *          *753172.1  *          *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *          *  160.51  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.34  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  586.35  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   55.15  *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.99  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  735.76  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  728.70  * Flow Area (sq ft)      *          * 2191.15  *          *
* E.G. Slope (ft/ft)     *0.000260  * Area (sq ft)           *          * 2191.15  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  168.11  * Top Width (ft)         *          *  168.11  *          *
* Vel Total (ft/s)       *    8.90  * Avg. Vel. (ft/s)       *          *    8.90  *          *
* Max Chl Dpth (ft)      *   23.96  * Hydr. Depth (ft)       *          *   13.03  *          *
* Conv. Total (cfs)      *1208209.0  * Conv. (cfs)            *          *1208209.0  *          *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *          *  185.04  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.71  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  *  801.03  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   62.03  *    6.45  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.44  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.44  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  739.00  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  731.02  * Flow Area (sq ft)      *          * 2766.03  *          *
* E.G. Slope (ft/ft)     *0.000255  * Area (sq ft)           *          * 2766.03  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  186.69  * Top Width (ft)         *          *  186.69  *          *
* Vel Total (ft/s)       *    9.62  * Avg. Vel. (ft/s)       *          *    9.62  *          *
* Max Chl Dpth (ft)      *   27.20  * Hydr. Depth (ft)       *          *   14.82  *          *
* Conv. Total (cfs)      *1665409.0  * Conv. (cfs)            *          *1665409.0  *          *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *          *  204.72  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.07  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  *  970.44  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.62  *   65.01  *   15.28  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.46  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.66  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  741.81  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
```

```
* Crit W.S. (ft)         *  733.17  * Flow Area (sq ft)      *          * 3310.08  *          *
* E.G. Slope (ft/ft)     *0.000254  * Area (sq ft)           *          * 3310.08  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  199.01  * Top Width (ft)         *          *  199.01  *          *
* Vel Total (ft/s)       *   10.33  * Avg. Vel. (ft/s)       *          *   10.33  *          *
* Max Chl Dpth (ft)      *   30.01  * Hydr. Depth (ft)       *          *   16.63  *          *
* Conv. Total (cfs)      *2147449.0  * Conv. (cfs)            *          *2147449.0  *          *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *          *  219.03  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.47  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   49.31  * 1126.02  *   81.63  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *   21.37  *   66.76  *   29.06  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  747.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.84  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  746.13  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  735.92  * Flow Area (sq ft)      *          * 4178.41  *          *
* E.G. Slope (ft/ft)     *0.000219  * Area (sq ft)           *          * 4178.41  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  201.00  * Top Width (ft)         *          *  201.00  *          *
* Vel Total (ft/s)       *   10.89  * Avg. Vel. (ft/s)       *          *   10.89  *          *
* Max Chl Dpth (ft)      *   34.33  * Hydr. Depth (ft)       *          *   20.79  *          *
* Conv. Total (cfs)      *3072306.0  * Conv. (cfs)            *          *3072306.0  *          *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *          *  229.16  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.72  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  133.92  * 1313.20  *  185.48  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *   50.91  *   68.05  *   46.29  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.94  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  749.55  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  737.81  * Flow Area (sq ft)      *    9.03  * 4865.85  *    3.88  *
* E.G. Slope (ft/ft)     *0.000195  * Area (sq ft)           *    9.03  * 4865.85  *    3.88  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *    1.69  *54397.58  *    0.73  *
* Top Width (ft)         *  258.39  * Top Width (ft)         *   40.15  *  201.01  *   17.23  *
* Vel Total (ft/s)       *   11.15  * Avg. Vel. (ft/s)       *    0.19  *   11.18  *    0.19  *
* Max Chl Dpth (ft)      *   37.75  * Hydr. Depth (ft)       *    0.23  *   24.21  *    0.23  *
* Conv. Total (cfs)      *3893602.0  * Conv. (cfs)            *   121.1  *3893429.0  *    52.0  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *   40.15  *  235.07  *   17.24  *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *    0.00  *    0.25  *    0.00  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.00  *    2.82  *    0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  216.95  * 1446.56  *  268.40  *
* C & E Loss (ft)        *    0.31  * Cum SA (acres)         *   57.37  *   69.06  *   85.19  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #200-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  753.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.14  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.37  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  739.50  * Flow Area (sq ft)      *  159.23  * 5231.98  * 1537.55  *
* E.G. Slope (ft/ft)     *0.000199  * Area (sq ft)           *  159.23  * 5231.98  * 1776.47  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  117.56  *61918.21  *  964.23  *
* Top Width (ft)         * 1888.44  * Top Width (ft)         *   90.40  *  201.01  * 1597.03  *
* Vel Total (ft/s)       *    9.09  * Avg. Vel. (ft/s)       *    0.74  *   11.83  *    0.63  *
* Max Chl Dpth (ft)      *   39.57  * Hydr. Depth (ft)       *    1.76  *   26.03  *    1.36  *
* Conv. Total (cfs)      *4470616.0  * Conv. (cfs)            *  8342.6  *4393850.0  * 68423.9  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *   91.60  *  235.07  * 1130.00  *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *    0.02  *    0.28  *    0.02  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.02  *    3.27  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  297.55  * 1554.21  *  445.99  *
* C & E Loss (ft)        *    0.49  * Cum SA (acres)         *   62.26  *   69.29  *  218.01  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  756.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.80  * Wt. n-Val.             *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  755.01  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  741.69  * Flow Area (sq ft)      *  488.15  * 5963.37  * 5649.08  *
* E.G. Slope (ft/ft)     *0.000154  * Area (sq ft)           * 1390.48  * 5963.37  *11947.47  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *  652.70  *67818.55  * 7428.75  *
* Top Width (ft)         * 4059.37  * Top Width (ft)         *  824.18  *  201.01  * 3034.18  *
* Vel Total (ft/s)       *    6.27  * Avg. Vel. (ft/s)       *    1.34  *   11.37  *    1.32  *
* Max Chl Dpth (ft)      *   43.21  * Hydr. Depth (ft)       *    5.40  *   29.67  *    5.00  *
* Conv. Total (cfs)      *6115714.0  * Conv. (cfs)            * 52591.9  *5464544.0  *598578.1  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *   95.24  *  235.07  * 1130.00  *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *    0.05  *    0.24  *    0.05  *
* Alpha                  *    2.94  * Stream Power (lb/ft s) *    0.07  *    2.77  *    0.06  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  406.03  * 1681.02  *  973.97  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   66.17  *   69.69  *  378.20  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  744.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  743.23  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  734.22  * Flow Area (sq ft)      *          * 3594.64  *          *
* E.G. Slope (ft/ft)     *0.000248  * Area (sq ft)           *          * 3594.64  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  200.99  * Top Width (ft)         *          *  200.99  *          *
* Vel Total (ft/s)       *   10.65  * Avg. Vel. (ft/s)       *          *   10.65  *          *
* Max Chl Dpth (ft)      *   31.43  * Hydr. Depth (ft)       *          *   17.88  *          *
* Conv. Total (cfs)      *2432232.0  * Conv. (cfs)            *          *2432232.0  *          *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *          *  223.32  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.65  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   75.97  * 1202.59  *  118.49  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   30.28  *   67.39  *   37.13  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 2.800

INPUT
Description: Bridge B6. KC Terminal RR Bridge. Bridge has been normalized to channel flow from a 29 degree skew. Pier widths increased from 3.75 ft and 5.1 ft to 17 ft and 18.5 ft to account for skew to channel flow.
Distance from Upstream XS = 3.5
Deck/Roadway Width = 15
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1244	749.1	743	1445.01	749.1	743

Upstream Bridge Cross Section Data
Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	756	473.18	754	502.18	752	508.77	750	518.41	748
527.97	748	532.17	750	539.85	752	578.75	754	683.69	754
724.8	752	788.05	752	902.32	754	923.92	754	1004.52	754
1013.36	754	1048.1	752	1163.71	750	1244	749.1	1244.01	742.5
1313	718.3	1339	717.3	1339.01	711.8	1355	711.8	1355.01	717.3
1381	718.3	1445	740.5	1445.01	749.1	1479.47	750	1567.5	750
1573.62	750	1596.32	748	1618.34	746	1643.96	744	1666.81	742
1703.97	740	1724.96	740	1755.73	742	1796.19	744	1871.82	746
1905.58	748	2036.35	750	2147.12	750	2223.78	750	2237.94	750
2393.35	750	2416	750	3328.95	752	3810.86	752	3924.01	752
4050.45	752	4052.42	752	4393.04	752	4438.59	752	4469.04	754
4489.13	756	4506.41	758	4515.48	760	4521.06	762	4525.59	764
4527.06	766	4531.21	768	4533.02	770	4535.92	772	4538.82	774
4541.72	776	4546.29	778	4552.14	780	4564.05	780	4569.8	778
4578.45	776	4613.58	784	4623.55	786	4627.41	788	4630.28	790

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1244	.014	1445.01	.041

Bank Sta: Left Right Coeff Contr. Expan.
1244 1445.01 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	968	770	F
2575	4630.28	770	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	190	770	470	580	754	968	1153.6	770
1565	2040	750						

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1244	749.1	743	1445.01	749.1	743

Downstream Bridge Cross Section Data
Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	756	473.18	754	502.18	752	508.77	750	518.41	748
527.97	748	532.17	750	539.85	752	578.75	754	683.69	754
724.8	752	788.05	752	902.32	754	923.92	754	1004.52	754
1013.36	754	1048.1	752	1163.71	750	1244	749.1	1244.01	742.5
1313	718.3	1339	717.3	1339.01	711.8	1355	711.8	1355.01	717.3
1381	718.3	1445	740.5	1445.01	749.1	1479.47	750	1567.5	750

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 1573.62     750 1596.32     748 1618.34     746 1643.96     744 1666.81     742
 1703.97     740 1724.96     740 1755.73     742 1796.19     744 1871.82     746
 1905.58     748 2036.35     750 2147.12     750 2223.78     750 2237.94     750
 2393.35     750    2416     750 3328.95     752 3810.86     752 3924.01     752
 4050.45     752 4052.42     752 4393.04     752 4438.59     752 4469.04     754
 4489.13     756 4506.41     758 4515.48     760 4521.06     762 4525.59     764
 4527.06     766 4531.21     768 4533.02     770 4535.92     772 4538.82     774
 4541.72     776 4546.29     778 4552.14     780 4564.05     780  4569.8     778
 4578.45     776 4613.58     784 4623.55     786 4627.41     788 4630.28     790

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041    1244    .014 1445.01    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1244 1445.01             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      0     968     770       F
    2575 4630.28     770       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***************************************************************************
       0     190     770     470     580     754     968  1153.6     770
    1565    2040     750

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=    1265    Downstream=    1265
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
      17     711      17     743
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
      17     711      17     743

Pier Data
Pier Station     Upstream=    1375    Downstream=    1375
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    18.5     711    18.5     743
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    18.5     711    18.5     743

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.33
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	732.72	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	731.72	E.G. Elev (ft)	732.82	732.82
Q Total (cfs)	12500.00	W.S. Elev (ft)	731.27	731.27
Q Bridge (cfs)	12500.00	Crit W.S. (ft)	727.12	727.12
Q Weir (cfs)		Max Chl Dpth (ft)	19.47	19.47
Weir Sta Lft (ft)		Vel Total (ft/s)	9.99	9.99
Weir Sta Rgt (ft)		Flow Area (sq ft)	1251.49	1251.49
Weir Submerg		Froude # Chl	0.55	0.55
Weir Max Depth (ft)		Specif Force (cu ft)	12121.22	12121.22
Min El Weir Flow (ft)	749.11	Hydr Depth (ft)	10.10	10.10
Min El Prs (ft)	743.00	W.P. Total (ft)	164.47	164.47
Delta EG (ft)	0.36	Conv. Total (cfs)	513877.3	513877.3
Delta WS (ft)	0.45	Top Width (ft)	123.86	123.86
BR Open Area (sq ft)	2956.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	9.99	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.28	0.28
Br Sel Method	Yarnell	Power Total (lb/ft s)	2.81	2.81

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	736.99	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	735.76	E.G. Elev (ft)	737.10	737.10
Q Total (cfs)	19500.00	W.S. Elev (ft)	735.22	735.22
Q Bridge (cfs)	19500.00	Crit W.S. (ft)	730.15	730.15
Q Weir (cfs)		Max Chl Dpth (ft)	23.42	23.42
Weir Sta Lft (ft)		Vel Total (ft/s)	11.00	11.00
Weir Sta Rgt (ft)		Flow Area (sq ft)	1772.46	1772.46
Weir Submerg		Froude # Chl	0.54	0.54
Weir Max Depth (ft)		Specif Force (cu ft)	20866.01	20866.01
Min El Weir Flow (ft)	749.11	Hydr Depth (ft)	12.86	12.86
Min El Prs (ft)	743.00	W.P. Total (ft)	190.18	190.18
Delta EG (ft)	0.43	Conv. Total (cfs)	833142.9	833142.9
Delta WS (ft)	0.54	Top Width (ft)	137.78	137.78
BR Open Area (sq ft)	2956.03	Frctn Loss (ft)		
BR Open Vel (ft/s)	11.00	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.32	0.32
Br Sel Method	Yarnell	Power Total (lb/ft s)	3.51	3.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	740.44	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	739.00	E.G. Elev (ft)	740.62	740.62
Q Total (cfs)	26600.00	W.S. Elev (ft)	738.41	738.41
Q Bridge (cfs)	26600.00	Crit W.S. (ft)	732.59	732.59
Q Weir (cfs)		Max Chl Dpth (ft)	26.61	26.61
Weir Sta Lft (ft)		Vel Total (ft/s)	11.95	11.95
Weir Sta Rgt (ft)		Flow Area (sq ft)	2225.89	2225.89
Weir Submerg		Froude # Chl	0.54	0.54
Weir Max Depth (ft)		Specif Force (cu ft)	30432.96	30432.96
Min El Weir Flow (ft)	749.11	Hydr Depth (ft)	15.06	15.06
Min El Prs (ft)	743.00	W.P. Total (ft)	210.60	210.60
Delta EG (ft)	0.53	Conv. Total (cfs)	1137809.0	1137809.0
Delta WS (ft)	0.66	Top Width (ft)	147.78	147.78

```
* BR Open Area (sq ft)   *    2956.03  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      11.95  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.36  *       0.36  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.31  *       4.31  *
*******************************************************************************************

Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*******************************************************************************************
* E.G. US. (ft)          *     743.46  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     741.81  * E.G. Elev (ft)         *     743.35  *     743.34  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     740.58  *     740.57  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     734.72  *     734.72  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      28.78  *      28.77  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      13.35  *      13.36  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2561.31  *    2559.39  *
* Weir Submerg           *             * Froude # Chl           *       0.59  *       0.59  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   39950.73  *   39930.61  *
* Min El Weir Flow (ft)  *     749.11  * Hydr Depth (ft)        *      16.01  *      16.00  *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *     232.38  *     232.30  *
* Delta EG (ft)          *       0.42  * Conv. Total (cfs)      *  1346389.0  *  1345029.0  *
* Delta WS (ft)          *       0.54  * Top Width (ft)         *     160.03  *     159.99  *
* BR Open Area (sq ft)   *    2956.03  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *      13.36  * C & E Loss (ft)        *       0.00  *       0.30  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.44  *       0.44  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.93  *       5.94  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     747.97  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     746.13  * E.G. Elev (ft)         *     746.34  *     746.33  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     742.40  *     742.39  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     737.57  *     737.57  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      30.60  *      30.59  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      15.93  *      15.94  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2857.10  *    2854.33  *
* Weir Submerg           *             * Froude # Chl           *       0.67  *       0.68  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   53198.26  *   53172.19  *
* Min El Weir Flow (ft)  *     749.11  * Hydr Depth (ft)        *      17.29  *      17.28  *
* Min El Prs (ft)        *     743.00  * W.P. Total (ft)        *     246.95  *     246.83  *
* Delta EG (ft)          *       0.64  * Conv. Total (cfs)      *  1551202.0  *  1549187.0  *
* Delta WS (ft)          *       0.85  * Top Width (ft)         *     165.21  *     165.17  *
* BR Open Area (sq ft)   *    2956.03  * Frctn Loss (ft)        *       0.01  *       0.00  *
* BR Open Vel (ft/s)     *      15.94  * C & E Loss (ft)        *       0.00  *       0.46  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.62  *       0.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.90  *       9.93  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    The user has entered known energy, a known water surface, or a change in water surface.
         Therefore, no hydraulic properties were computed through the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	751.49	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	749.55	E.G. Elev (ft)	750.11	750.08	
Q Total (cfs)	54400.00	W.S. Elev (ft)	744.85	744.82	
Q Bridge (cfs)	54400.00	Crit W.S. (ft)	739.74	739.74	
Q Weir (cfs)		Max Chl Dpth (ft)	33.05	33.02	
Weir Sta Lft (ft)		Vel Total (ft/s)	18.40	18.40	
Weir Sta Rgt (ft)		Flow Area (sq ft)	2956.03	2956.03	
Weir Submerg		Froude # Chl	0.73	0.73	
Weir Max Depth (ft)		Specif Force (cu ft)	69001.58	68903.97	
Min El Weir Flow (ft)	749.11	Hydr Depth (ft)			
Min El Prs (ft)	743.00	W.P. Total (ft)	416.23	416.23	
Delta EG (ft)	1.18	Conv. Total (cfs)	1159196.0	1159196.0	
Delta WS (ft)	1.49	Top Width (ft)			
BR Open Area (sq ft)	2956.03	Frctn Loss (ft)	0.03	0.00	
BR Open Vel (ft/s)	18.40	C & E Loss (ft)	0.00	0.83	
Coef of Q		Shear Total (lb/sq ft)	0.98	0.98	
Br Sel Method	Energy only	Power Total (lb/ft s)	17.97	17.97	

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The user has entered known energy, a known water surface, or a change in water surface. Therefore, no hydraulic properties were computed through the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	753.51	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	751.37	E.G. Elev (ft)	753.01	752.97	
Q Total (cfs)	63000.00	W.S. Elev (ft)	745.96	745.92	
Q Bridge (cfs)	63000.00	Crit W.S. (ft)	741.56	741.56	
Q Weir (cfs)		Max Chl Dpth (ft)	34.16	34.12	
Weir Sta Lft (ft)		Vel Total (ft/s)	21.31	21.31	
Weir Sta Rgt (ft)		Flow Area (sq ft)	2956.03	2956.03	
Weir Submerg		Froude # Chl	0.82	0.82	
Weir Max Depth (ft)		Specif Force (cu ft)	82881.30	82750.30	
Min El Weir Flow (ft)	749.11	Hydr Depth (ft)			
Min El Prs (ft)	743.00	W.P. Total (ft)	416.23	416.23	
Delta EG (ft)	1.84	Conv. Total (cfs)	1159195.0	1159196.0	
Delta WS (ft)	2.44	Top Width (ft)			
BR Open Area (sq ft)	2956.03	Frctn Loss (ft)	0.04	0.00	
BR Open Vel (ft/s)	21.31	C & E Loss (ft)	0.00	1.29	
Coef of Q		Shear Total (lb/sq ft)	1.31	1.31	
Br Sel Method	Energy only	Power Total (lb/ft s)	27.91	27.91	

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	756.81	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	755.01	E.G. Elev (ft)	756.65	756.57
Q Total (cfs)	75900.00	W.S. Elev (ft)	754.23	753.57
Q Bridge (cfs)	44494.51	Crit W.S. (ft)	753.57	753.57
Q Weir (cfs)		Max Chl Dpth (ft)	42.43	41.77
Weir Sta Lft (ft)		Vel Total (ft/s)	8.27	9.21
Weir Sta Rgt (ft)		Flow Area (sq ft)	9175.88	8237.97
Weir Submerg		Froude # Chl	0.27	0.30
Weir Max Depth (ft)		Specif Force (cu ft)	106664.40	104272.50
Min El Weir Flow (ft)	749.11	Hydr Depth (ft)	6.46	5.80
Min El Prs (ft)	743.00	W.P. Total (ft)	1841.71	1841.05
Delta EG (ft)	1.96	Conv. Total (cfs)	1960525.0	1759552.0
Delta WS (ft)	3.03	Top Width (ft)	3867.57	3494.35
BR Open Area (sq ft)	2956.03	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	15.05	C & E Loss (ft)	0.06	0.03
Coef of Q		Shear Total (lb/sq ft)	0.47	0.52
Br Sel Method	Energy only	Power Total (lb/ft s)	3.86	4.79

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The user has entered known energy, a known water surface, or a change in water surface. Therefore, no hydraulic properties were computed through the bridge.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	744.99	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	743.23	E.G. Elev (ft)	744.87	744.86
Q Total (cfs)	38300.00	W.S. Elev (ft)	741.91	741.90
Q Bridge (cfs)	38300.00	Crit W.S. (ft)	735.81	735.81
Q Weir (cfs)		Max Chl Dpth (ft)	30.11	30.10
Weir Sta Lft (ft)		Vel Total (ft/s)	13.79	13.80
Weir Sta Rgt (ft)		Flow Area (sq ft)	2776.77	2774.77
Weir Submerg		Froude # Chl	0.59	0.59
Weir Max Depth (ft)		Specif Force (cu ft)	45725.75	45703.69
Min El Weir Flow (ft)	749.11	Hydr Depth (ft)	16.95	16.94
Min El Prs (ft)	743.00	W.P. Total (ft)	243.02	242.94
Delta EG (ft)	0.45	Conv. Total (cfs)	1495093.0	1493650.0
Delta WS (ft)	0.57	Top Width (ft)	163.82	163.79
BR Open Area (sq ft)	2956.03	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	13.80	C & E Loss (ft)	0.00	0.32
Coef of Q		Shear Total (lb/sq ft)	0.47	0.47
Br Sel Method	Energy only	Power Total (lb/ft s)	6.46	6.47

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.798

INPUT
Description: COE River Station= 53077.58
Preliminary Model River Station
(miles)=2.78

KC Terminal RR Bridge. B6 (downstream). Normalized
to channel flow from 29 degree skew. Ineffective flow on left is
due to high ground which will block the water. Ineffective flow
on right is due to buildings and high ground. Obstructions are
buildings. Piers are skewed to flow. Underwater channel shown on
bridge plans.

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	756	473.18	754	502.18	752	508.77	750	518.41	748
527.97	748	532.17	750	539.85	752	578.75	754	683.69	754
724.8	752	788.05	752	902.32	754	923.92	754	1004.52	754
1013.36	754	1048.1	752	1163.71	750	1244	749.1	1244.01	742.5
1313	718.3	1339	717.3	1339.01	711.8	1355	711.8	1355.01	717.3
1381	718.3	1445	740.5	1445.01	749.1	1479.47	750	1567.5	750
1573.62	750	1596.32	748	1618.34	746	1643.96	744	1666.81	742
1703.97	740	1724.96	740	1755.73	742	1796.19	744	1871.82	746
1905.58	748	2036.35	750	2147.12	750	2223.78	750	2237.94	750
2393.35	750	2416	750	3328.95	752	3810.86	752	3924.01	752
4050.45	752	4052.42	752	4393.04	752	4438.59	752	4469.04	754
4489.13	756	4506.41	758	4515.48	760	4521.06	762	4525.59	764
4527.06	766	4531.21	768	4533.02	770	4535.92	772	4538.82	774
4541.72	776	4546.29	778	4552.14	780	4564.05	780	4569.8	778
4578.45	776	4613.58	784	4623.55	786	4627.41	788	4630.28	790

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	1244	.014	1445.01	.041

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1244	1445.01		104	79	62	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	968	770	F
2575	4630.28	770	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	190	770	470	580	754	968	1153.6	770
1565	2040	750						

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	732.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.014	
W.S. Elev (ft)	731.27	Reach Len. (ft)	104.00	79.00	62.00
Crit W.S. (ft)	725.93	Flow Area (sq ft)		1494.05	
E.G. Slope (ft/ft)	0.000310	Area (sq ft)		1494.05	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	142.36	Top Width (ft)		142.36	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	19.47	Hydr. Depth (ft)		10.49	
Conv. Total (cfs)	709780.8	Conv. (cfs)		709780.8	
Length Wtd. (ft)	79.00	Wetted Per. (ft)		157.77	
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		1.53	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		585.69	
C & E Loss (ft)	0.01	Cum SA (acres)		55.08	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	736.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.34	Wt. n-Val.		0.014	
W.S. Elev (ft)	735.22	Reach Len. (ft)	104.00	79.00	62.00
Crit W.S. (ft)	728.70	Flow Area (sq ft)		2101.55	
E.G. Slope (ft/ft)	0.000292	Area (sq ft)		2101.55	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	165.02	Top Width (ft)		165.02	
Vel Total (ft/s)	9.28	Avg. Vel. (ft/s)		9.28	
Max Chl Dpth (ft)	23.42	Hydr. Depth (ft)		12.73	
Conv. Total (cfs)	1140451.0	Conv. (cfs)		1140451.0	
Length Wtd. (ft)	79.00	Wetted Per. (ft)		181.77	
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		1.96	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.44	800.11	4.45
C & E Loss (ft)	0.01	Cum SA (acres)	2.27	61.96	6.45

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	739.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.56	Wt. n-Val.		0.014	
W.S. Elev (ft)	738.41	Reach Len. (ft)	104.00	79.00	62.00
Crit W.S. (ft)	731.02	Flow Area (sq ft)		2656.04	
E.G. Slope (ft/ft)	0.000285	Area (sq ft)		2656.04	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	183.28	Top Width (ft)		183.28	
Vel Total (ft/s)	10.01	Avg. Vel. (ft/s)		10.01	
Max Chl Dpth (ft)	26.61	Hydr. Depth (ft)		14.49	
Conv. Total (cfs)	1575087.0	Conv. (cfs)		1575087.0	
Length Wtd. (ft)	79.00	Wetted Per. (ft)		201.11	
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		2.36	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	14.56	969.27	31.58
C & E Loss (ft)	0.02	Cum SA (acres)	8.62	64.93	15.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	743.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.		0.014	
W.S. Elev (ft)	741.27	Reach Len. (ft)	104.00	79.00	62.00
Crit W.S. (ft)	733.17	Flow Area (sq ft)		3203.95	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		3203.95	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	
Top Width (ft)	197.49	Top Width (ft)		197.49	
Vel Total (ft/s)	10.67	Avg. Vel. (ft/s)		10.67	
Max Chl Dpth (ft)	29.47	Hydr. Depth (ft)		16.22	
Conv. Total (cfs)	2047291.0	Conv. (cfs)		2047291.0	
Length Wtd. (ft)	79.00	Wetted Per. (ft)		216.89	
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		2.75	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	49.31	1124.68	81.63
C & E Loss (ft)	0.02	Cum SA (acres)	21.37	66.68	29.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	745.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.43	Wt. n-Val.		0.014	
W.S. Elev (ft)	743.45	Reach Len. (ft)	104.00	79.00	62.00
Crit W.S. (ft)	735.92	Flow Area (sq ft)		3638.89	
E.G. Slope (ft/ft)	0.000337	Area (sq ft)		3638.89	
Q Total (cfs)	45500.00	Flow (cfs)		45500.00	
Top Width (ft)	200.99	Top Width (ft)		200.99	

```
* Vel Total (ft/s)       *   12.50  * Avg. Vel. (ft/s)       *          *   12.50  *          *
* Max Chl Dpth (ft)      *   31.65  * Hydr. Depth (ft)       *          *   18.10  *          *
* Conv. Total (cfs)      *2479147.0  * Conv. (cfs)            *          *2479147.0  *          *
* Length Wtd. (ft)       *   79.00  * Wetted Per. (ft)       *          *  223.75  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.28  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  133.92  * 1311.68  *  185.48  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   50.91  *   67.97  *   46.29  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.48  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  746.76  * Reach Len. (ft)        *  104.00  *   79.00  *   62.00  *
* Crit W.S. (ft)         *  737.81  * Flow Area (sq ft)      *          * 4305.88  *          *
* E.G. Slope (ft/ft)     *0.000286  * Area (sq ft)           *          * 4305.88  *          *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *          *54400.00  *          *
* Top Width (ft)         *  201.00  * Top Width (ft)         *          *  201.00  *          *
* Vel Total (ft/s)       *   12.63  * Avg. Vel. (ft/s)       *          *   12.63  *          *
* Max Chl Dpth (ft)      *   34.96  * Hydr. Depth (ft)       *          *   21.42  *          *
* Conv. Total (cfs)      *3218202.0  * Conv. (cfs)            *          *3218202.0  *          *
* Length Wtd. (ft)       *   79.00  * Wetted Per. (ft)       *          *  230.43  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.21  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  216.95  * 1444.94  *  268.40  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   57.36  *   69.04  *   85.19  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.74  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  748.93  * Reach Len. (ft)        *  104.00  *   79.00  *   62.00  *
* Crit W.S. (ft)         *  739.50  * Flow Area (sq ft)      *          * 4741.58  *          *
* E.G. Slope (ft/ft)     *0.000285  * Area (sq ft)           *          * 4741.58  *          *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *          *63000.00  *          *
* Top Width (ft)         *  201.01  * Top Width (ft)         *          *  201.01  *          *
* Vel Total (ft/s)       *   13.29  * Avg. Vel. (ft/s)       *          *   13.29  *          *
* Max Chl Dpth (ft)      *   37.13  * Hydr. Depth (ft)       *          *   23.59  *          *
* Conv. Total (cfs)      *3733123.0  * Conv. (cfs)            *          *3733123.0  *          *
* Length Wtd. (ft)       *   79.00  * Wetted Per. (ft)       *          *  234.69  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.36  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.77  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  297.55  * 1552.56  *  445.92  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   62.26  *   69.27  *  217.95  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.91  * Wt. n-Val.              *   0.041  *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.84  * Reach Len. (ft)        *  104.00  *   79.00  *   62.00  *
* Crit W.S. (ft)         *  741.69  * Flow Area (sq ft)      *  201.98  * 5327.04  * 2071.92  *
* E.G. Slope (ft/ft)     *0.000266  * Area (sq ft)           *  201.98  * 5327.04  * 2582.75  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              *  201.61  *73863.27  * 1835.12  *
* Top Width (ft)         * 2104.30  * Top Width (ft)         *   90.40  *  201.01  * 1812.89  *
* Vel Total (ft/s)       *    9.99  * Avg. Vel. (ft/s)       *    1.00  *   13.87  *    0.89  *
* Max Chl Dpth (ft)      *   40.04  * Hydr. Depth (ft)       *    2.23  *   26.50  *    1.83  *
* Conv. Total (cfs)      *4652552.0  * Conv. (cfs)            * 12358.1  *4527703.0  *112490.2  *
* Length Wtd. (ft)       *   78.78  * Wetted Per. (ft)       *   92.08  *  235.07  * 1130.00  *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *    0.04  *    0.38  *    0.03  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.04  *    5.22  *    0.03  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  405.68  * 1678.91  *  969.74  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   65.94  *   69.59  *  376.72  *
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	744.53	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.88	Wt. n-Val.		0.014		
W.S. Elev (ft)	742.65	Reach Len. (ft)	104.00	79.00	62.00	
Crit W.S. (ft)	734.22	Flow Area (sq ft)		3479.56		
E.G. Slope (ft/ft)	0.000275	Area (sq ft)		3479.56		
Q Total (cfs)	38300.00	Flow (cfs)		38300.00		
Top Width (ft)	200.99	Top Width (ft)		200.99		
Vel Total (ft/s)	11.01	Avg. Vel. (ft/s)		11.01		
Max Chl Dpth (ft)	30.85	Hydr. Depth (ft)		17.31		
Conv. Total (cfs)	2311407.0	Conv. (cfs)		2311407.0		
Length Wtd. (ft)	79.00	Wetted Per. (ft)		222.23		
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.27		
Alpha	1.00	Stream Power (lb/ft s)		2.95		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	75.97	1201.13	118.49	
C & E Loss (ft)	0.02	Cum SA (acres)	30.28	67.31	37.13	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.783

INPUT
Description: COE River Station= 53157.84
Preliminary Model River Station
(miles)=2.77

KC Terminal RR Bridge. B5 (upstream). Normalized
to channel flow. Ineffective flow on right is due to buildings and
high ground. Obstructions are buildings.
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	754	171.3	752	190.81	750	192.98	748	194.72	746
196.24	744	211.42	742	230.68	740	240.91	740	248	742
257.11	744	258.55	746	263.31	748	267.47	750	271.7	752
296.64	754	331.05	754	724.66	754	753.2	754	900	753.853
953	753.8	953.01	743	963	743	1031	718.3	1058	717.3
1058.01	711.8	1074	711.8	1074.01	717.3	1101	718.3	1175	743
1179	743	1179.01	753.8	1195.49	753.3	1252.98	753	1277.72	752.5
1296	752	1528.91	752	1547.32	752	1584.15	752	2315.12	750
2672.74	748	2942.67	746	3201.97	746	3262.96	748	3301.47	750
3374.11	752	3430.63	754	3481.3	754	3566.55	752	3777.16	752
3912.21	754	3997.67	756	4054.5	756	4172.51	754	4222.98	754
4266.11	754	4288.69	752	4290.32	752	4332.25	754	4350.08	756

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	953	.014	1179.01	.041

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
953 1179.01 32 33 32 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
2315	4350.08	765	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	103	765	103.5	300	754	865	900	765

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	732.32	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.05	Wt. n-Val.		0.014		
W.S. Elev (ft)	731.27	Reach Len. (ft)	1.00	1.00	1.00	
Crit W.S. (ft)	725.82	Flow Area (sq ft)		1522.95		

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* E.G. Slope (ft/ft)     *0.000296  * Area (sq ft)           *          * 1522.95  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  144.58  * Top Width (ft)         *          *  144.58  *          *
* Vel Total (ft/s)       *    8.21  * Avg. Vel. (ft/s)       *          *    8.21  *          *
* Max Chl Dpth (ft)      *   19.47  * Hydr. Depth (ft)       *          *   10.53  *          *
* Conv. Total (cfs)      *726008.6  * Conv. (cfs)            *          *726008.6  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  159.99  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.45  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  582.96  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   54.82  *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  735.23  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  728.56  * Flow Area (sq ft)      *          * 2140.43  *          *
* E.G. Slope (ft/ft)     *0.000280  * Area (sq ft)           *          * 2140.43  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  167.35  * Top Width (ft)         *          *  167.35  *          *
* Vel Total (ft/s)       *    9.11  * Avg. Vel. (ft/s)       *          *    9.11  *          *
* Max Chl Dpth (ft)      *   23.43  * Hydr. Depth (ft)       *          *   12.79  *          *
* Conv. Total (cfs)      *1165945.0  * Conv. (cfs)            *          *1165945.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  184.09  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.85  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  *  796.26  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   61.66  *    6.45  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  739.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  738.42  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  730.87  * Flow Area (sq ft)      *          * 2703.26  *          *
* E.G. Slope (ft/ft)     *0.000273  * Area (sq ft)           *          * 2703.26  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  185.68  * Top Width (ft)         *          *  185.68  *          *
* Vel Total (ft/s)       *    9.84  * Avg. Vel. (ft/s)       *          *    9.84  *          *
* Max Chl Dpth (ft)      *   26.62  * Hydr. Depth (ft)       *          *   14.56  *          *
* Conv. Total (cfs)      *1609276.0  * Conv. (cfs)            *          *1609276.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  203.50  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.23  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  *  964.41  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.62  *   64.60  *   15.28  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.71  * Wt. n-Val.              *          *   0.014  *          *
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* W.S. Elev (ft)         *  741.29  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  732.98  * Flow Area (sq ft)      *          * 3259.91  *          *
* E.G. Slope (ft/ft)     *0.000270  * Area (sq ft)           *          * 3259.91  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  202.18  * Top Width (ft)         *          *  202.18  *          *
* Vel Total (ft/s)       *   10.49  * Avg. Vel. (ft/s)       *          *   10.49  *          *
* Max Chl Dpth (ft)      *   29.49  * Hydr. Depth (ft)       *          *   16.12  *          *
* Conv. Total (cfs)      *2081186.0  * Conv. (cfs)            *          *2081186.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  220.98  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.61  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   49.31  * 1118.81  *   81.63  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   21.37  *   66.31  *   29.06  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  745.81  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.32  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  743.50  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.68  * Flow Area (sq ft)      *          * 3726.04  *          *
* E.G. Slope (ft/ft)     *0.000354  * Area (sq ft)           *          * 3726.04  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  225.99  * Top Width (ft)         *          *  225.99  *          *
* Vel Total (ft/s)       *   12.21  * Avg. Vel. (ft/s)       *          *   12.21  *          *
* Max Chl Dpth (ft)      *   31.70  * Hydr. Depth (ft)       *          *   16.49  *          *
* Conv. Total (cfs)      *2418406.0  * Conv. (cfs)            *          *2418406.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  246.39  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.08  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  133.92  * 1305.00  *  185.48  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *   50.91  *   46.29  *   46.29  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.16  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.28  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  746.88  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  737.59  * Flow Area (sq ft)      *          * 4490.98  *          *
* E.G. Slope (ft/ft)     *0.000281  * Area (sq ft)           *          * 4490.98  *  292.99  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *54400.00  *          *
* Top Width (ft)         *  631.21  * Top Width (ft)         *          *  226.00  *  405.21  *
* Vel Total (ft/s)       *   12.11  * Avg. Vel. (ft/s)       *          *   12.11  *          *
* Max Chl Dpth (ft)      *   35.08  * Hydr. Depth (ft)       *          *   19.87  *          *
* Conv. Total (cfs)      *3242968.0  * Conv. (cfs)            *          *3242968.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  253.07  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.78  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  216.95  * 1436.96  *  268.19  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *   57.36  *   68.66  *   84.90  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  751.57  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.47  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  749.10  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  739.29  * Flow Area (sq ft)      *          * 4991.65  *          *
* E.G. Slope (ft/ft)     *0.000272  * Area (sq ft)           *          * 4991.65  * 1616.35  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *          *63000.00  *          *
* Top Width (ft)         * 1033.54  * Top Width (ft)         *          *  226.00  *  807.54  *
* Vel Total (ft/s)       *   12.62  * Avg. Vel. (ft/s)       *          *   12.62  *          *
* Max Chl Dpth (ft)      *   37.30  * Hydr. Depth (ft)       *          *   22.09  *          *
* Conv. Total (cfs)      *3822935.0  * Conv. (cfs)            *          *3822935.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  257.52  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.15  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  297.55  * 1543.73  *  444.77  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *   62.26  *   68.88  *  217.37  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical cross depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  754.69  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.78  * Wt. n-Val.             *          *   0.014  *   0.041  *
* W.S. Elev (ft)         *  751.91  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  741.58  * Flow Area (sq ft)      *          * 5627.26  *  666.17  *
* E.G. Slope (ft/ft)     *0.000269  * Area (sq ft)           *          * 5627.26  * 5042.25  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              *          *75515.79  *  384.21  *
* Top Width (ft)         * 1979.65  * Top Width (ft)         *          *  226.01  * 1753.64  *
* Vel Total (ft/s)       *   12.06  * Avg. Vel. (ft/s)       *          *   13.42  *    0.58  *
* Max Chl Dpth (ft)      *   40.11  * Hydr. Depth (ft)       *          *   24.90  *    0.95  *
* Conv. Total (cfs)      *4624100.0  * Conv. (cfs)            *          *4600693.0  * 23407.6  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  263.21  *  697.82  *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.36  *    0.02  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *          *    4.83  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  405.44  * 1668.97  *  964.31  *
* C & E Loss (ft)        *    0.34  * Cum SA (acres)         *   65.84  *   69.20  *  374.18  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical cross depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  744.49  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.81  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  742.68  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  734.01  * Flow Area (sq ft)      *          * 3546.31  *          *
* E.G. Slope (ft/ft)     *0.000269  * Area (sq ft)           *          * 3546.31  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *38300.00  *          *
* Top Width (ft)         *  210.16  * Top Width (ft)         *          *  210.16  *          *
* Vel Total (ft/s)       *   10.80  * Avg. Vel. (ft/s)       *          *   10.80  *          *
* Max Chl Dpth (ft)      *   30.88  * Hydr. Depth (ft)       *          *   16.87  *          *
* Conv. Total (cfs)      *2335558.0  * Conv. (cfs)            *          *2335558.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  229.43  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.80  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   75.97  * 1194.76  *  118.49  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   30.28  *   66.93  *   37.13  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Blue River
REACH: Main RS: 2.780

INPUT
Description: Bridge B5. KC Terminal Railway Bridge. Bridge is normalized to channel flow from 23 degree skew. Piers widths increased from true width of 6.5 feet to 12 feet to account for a skew to channel flow.
Distance from Upstream XS = 1
Deck/Roadway Width = 31
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
900	753.8	740	952.99	753.8	740
953	753.8	746.8	1179.01	753.8	746.8
1179.02	753.8	740	1195.49	753.3	740
1252.98	753	740			

Upstream Bridge Cross Section Data
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	754	171.3	752	190.81	750	192.98	748	194.72	746
196.24	744	211.42	742	230.68	740	240.91	740	248	742
257.11	744	258.55	746	263.31	748	267.47	750	271.7	752
296.64	754	331.05	754	724.66	754	753.2	754	900	753.853
953	753.8	953.01	743	963	743	1031	718.3	1058	717.3
1058.01	711.8	1074	711.8	1074.01	717.3	1101	718.3	1175	743
1179	743	1179.01	753.8	1195.49	753.3	1252.98	753	1277.72	752.5
1296	752	1528.91	752	1547.32	752	1584.15	752	2315.12	750
2672.74	748	2942.67	746	3201.97	746	3262.96	748	3301.47	750
3374.11	752	3430.63	754	3481.3	754	3566.55	752	3777.16	752
3912.21	754	3997.67	756	4054.5	756	4172.51	754	4222.98	754
4266.11	754	4288.69	752	4290.32	752	4332.25	754	4350.08	756

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	953	.014	1179.01	.041

Bank Sta: Left Right Coeff Contr. Expan.
953 1179.01 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
2315	4350.08	765	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	103	765	103.5	300	754	865	900	765

Downstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
900	753.8	740	952.99	753.8	740
953	753.8	746.8	1179.01	753.8	746.8
1179.02	753.8	740	1195.49	753.3	740
1252.98	753	740			

Downstream Bridge Cross Section Data
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	754	171.3	752	190.81	750	192.98	748	194.72	746
196.24	744	211.42	742	230.68	740	240.91	740	248	742
257.11	744	258.55	746	263.31	748	267.47	750	271.7	752
296.64	754	331.05	754	724.66	754	753.2	754	900	753.853
953	753.8	953.01	743	963	743	1031	718.3	1058	717.3
1058.01	711.8	1074	711.8	1074.01	717.3	1101	718.3	1175	743
1179	743	1179.01	753.8	1195.49	753.3	1252.98	753	1277.72	752.5

```
    1296     752 1528.91     752 1547.32     752 1584.15     752 2315.12     750
 2672.74     748 2942.67     746 3201.97     746 3262.96     748 3301.47     750
 3374.11     752 3430.63     754  3481.3     754 3566.55     752 3777.16     752
 3912.21     754 3997.67     756  4054.5     756 4172.51     754 4222.98     754
 4266.11     754 4288.69     752 4290.32     752 4332.25     754 4350.08     756

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041     953    .014 1179.01    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
           953 1179.01           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2315 4350.08     765       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
       0     103     765   103.5     300     754     865     900     765

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=    1028    Downstream=    1028
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
      12     715      12   746.8
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
      12     715      12   746.8

Pier Data
Pier Station     Upstream=    1104    Downstream=    1104
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
      12     715      12   746.8
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
      12     715      12   746.8

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     732.32  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     731.27  * E.G. Elev (ft)         *     731.85  *     731.85  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     729.66  *     729.66  *
```

```
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     727.00  *     727.00  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      17.86  *      17.86  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      11.88  *      11.88  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1052.63  *    1052.63  *
* Weir Submerg           *             * Froude # Chl           *       0.68  *       0.68  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   11107.21  *   11107.21  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *       9.46  *       9.46  *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     164.51  *     164.51  *
* Delta EG (ft)          *       1.22  * Conv. Total (cfs)      *   385060.1  *   385060.1  *
* Delta WS (ft)          *       1.61  * Top Width (ft)         *     111.32  *     111.32  *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      11.88  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.42  *       0.42  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       5.00  *       5.00  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

```
*****************************************************************************************
* E.G. US. (ft)          *     736.52  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     735.23  * E.G. Elev (ft)         *     736.00  *     736.00  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     733.41  *     733.41  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     730.10  *     730.10  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.61  *      21.61  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      12.91  *      12.91  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1510.61  *    1510.61  *
* Weir Submerg           *             * Froude # Chl           *       0.67  *       0.67  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   19096.55  *   19096.55  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *      11.37  *      11.37  *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     202.35  *     202.35  *
* Delta EG (ft)          *       1.37  * Conv. Total (cfs)      *   612426.1  *   612426.1  *
* Delta WS (ft)          *       1.82  * Top Width (ft)         *     132.88  *     132.88  *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      12.91  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.47  *       0.47  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       6.10  *       6.10  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. US. (ft)          *     739.92  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     738.42  * E.G. Elev (ft)         *     739.35  *     739.35  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     736.42  *     736.42  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     732.69  *     732.69  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.61  *      24.61  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      13.74  *      13.74  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1935.47  *    1935.47  *
* Weir Submerg           *             * Froude # Chl           *       0.67  *       0.67  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   27792.48  *   27792.48  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *      12.89  *      12.89  *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     232.63  *     232.63  *
* Delta EG (ft)          *       1.51  * Conv. Total (cfs)      *   843454.8  *   843454.8  *
* Delta WS (ft)          *       2.01  * Top Width (ft)         *     150.14  *     150.14  *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      13.74  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.52  *       0.52  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       7.10  *       7.10  *
*****************************************************************************************
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```
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*********************************************************************************************
* E.G. US. (ft)          *     743.00  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     741.29  * E.G. Elev (ft)         *     742.37  *     742.37  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     739.11  *     739.11  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     735.01  *     735.01  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.31  *      27.31  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      14.49  *      14.49  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2361.06  *    2361.06  *
* Weir Submerg           *             * Froude # Chl           *       0.68  *       0.68  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   37605.15  *   37605.15  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *      14.25  *      14.25  *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     259.82  *     259.82  *
* Delta EG (ft)          *       1.63  * Conv. Total (cfs)      *  1091255.0  *  1091255.0  *
* Delta WS (ft)          *       2.18  * Top Width (ft)         *     165.64  *     165.64  *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      14.49  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.56  *       0.56  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       8.07  *       8.07  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     745.81  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     743.50  * E.G. Elev (ft)         *     745.62  *     745.58  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     741.37  *     741.28  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     737.93  *     737.93  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.57  *      29.48  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      16.55  *      16.64  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2749.22  *    2734.67  *
* Weir Submerg           *             * Froude # Chl           *       0.74  *       0.75  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   51363.22  *   51264.02  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *      15.39  *      15.35  *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     282.57  *     281.75  *
* Delta EG (ft)          *       0.73  * Conv. Total (cfs)      *  1329828.0  *  1320687.0  *
* Delta WS (ft)          *       1.04  * Top Width (ft)         *     178.60  *     178.14  *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *      16.64  * C & E Loss (ft)        *       0.00  *       0.50  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.71  *       0.72  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      11.77  *      11.97  *
*********************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     749.16  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     746.88  * E.G. Elev (ft)         *     749.02  *     748.99  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     745.29  *     745.24  *
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* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     739.97  *     739.97  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.49  *      33.44  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      15.50  *      15.54  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3510.64  *    3501.31  *
* Weir Submerg           *             * Froude # Chl           *       0.66  *       0.66  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   66391.02  *   66298.93  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *      17.38  *      17.33  *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     326.78  *     326.43  *
* Delta EG (ft)          *       0.56  * Conv. Total (cfs)      *  1814134.0  *  1807436.0  *
* Delta WS (ft)          *       0.74  * Top Width (ft)         *     201.99  *     201.99  *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *      15.54  * C & E Loss (ft)        *       0.00  *       0.39  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.60  *       0.61  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.35  *       9.42  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     751.57  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     749.10  * E.G. Elev (ft)         *     751.39  *     751.34  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     747.16  *     747.11  *
* Q Bridge (cfs)         *   63000.00  * Crit W.S. (ft)         *     741.73  *     741.73  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.36  *      35.31  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      16.51  *      16.51  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3816.38  *    3816.38  *
* Weir Submerg           *             * Froude # Chl           *       0.66  *       0.66  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   79440.53  *   79230.66  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     537.85  *     537.85  *
* Delta EG (ft)          *       0.69  * Conv. Total (cfs)      *  1495709.0  *  1495709.0  *
* Delta WS (ft)          *       0.91  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *       0.05  *       0.00  *
* BR Open Vel (ft/s)     *      16.51  * C & E Loss (ft)        *       0.00  *       0.46  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.79  *       0.79  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      12.97  *      12.97  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     754.69  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     751.91  * E.G. Elev (ft)         *     754.36  *     754.28  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     748.22  *     748.14  *
* Q Bridge (cfs)         *   75900.00  * Crit W.S. (ft)         *     744.29  *     744.29  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      36.42  *      36.34  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      19.89  *      19.89  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3816.38  *    3816.38  *
* Weir Submerg           *             * Froude # Chl           *       0.78  *       0.78  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   98038.61  *   97733.93  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *             *             *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     537.85  *     537.85  *
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* Delta EG (ft)          *       1.28  * Conv. Total (cfs)      *  1495709.0  *  1495709.0  *
* Delta WS (ft)          *       1.77  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *       0.08  *       0.00  *
* BR Open Vel (ft/s)     *      19.89  * C & E Loss (ft)        *       0.00  *       0.86  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.14  *       1.14  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      22.69  *      22.69  *
*****************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     744.49  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.68  * E.G. Elev (ft)         *     743.83  *     743.83  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     740.42  *     740.42  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     736.11  *     736.11  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      28.62  *      28.62  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      14.83  *      14.83  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2582.75  *    2582.75  *
* Weir Submerg           *             * Froude # Chl           *       0.68  *       0.68  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   43092.66  *   43092.66  *
* Min El Weir Flow (ft)  *     750.01  * Hydr Depth (ft)        *      14.92  *      14.92  *
* Min El Prs (ft)        *     746.80  * W.P. Total (ft)        *     273.02  *     273.02  *
* Delta EG (ft)          *       1.68  * Conv. Total (cfs)      *  1226127.0  *  1226127.0  *
* Delta WS (ft)          *       2.26  * Top Width (ft)         *     173.16  *     173.16  *
* BR Open Area (sq ft)   *    3816.38  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      14.83  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.58  *       0.58  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       8.55  *       8.55  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.777

INPUT
Description: COE River Station= 53189.30
Preliminary Model River Station
             (miles)=2.76

KC Terminal Railway Bridge. B5 (downstream).
             Normalized to channel flow from 23 degree skew. Ineffective flow
             on right is due to buildings and high ground upstream.
             Obstructions are buildings.  Piers are slightly skewed to flow.
             Underwater channel shown on bridge plans.
Station Elevation Data    num=      60
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      754   171.3      752  190.81      750  192.98      748  194.72      746
  196.24      744  211.42      742  230.68      740  240.91      740     248      742
  257.11      744  258.55      746  263.31      748  267.47      750   271.7      752
  296.64      754  331.05      754  724.66      754   753.2      754     900  753.853
     953    753.8  953.01      743     963      743    1031    718.3    1058    717.3
 1058.01    711.8    1074    711.8 1074.01    717.3    1101    718.3    1175      743
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    1179     743 1179.01   753.8 1195.49   753.3 1252.98     753 1277.72   752.5
    1296     752 1528.91     752 1547.32     752 1584.15     752 2315.12     750
 2672.74     748 2942.67     746 3201.97     746 3262.96     748 3301.47     750
 3374.11     752 3430.63     754  3481.3     754 3566.55     752 3777.16     752
 3912.21     754 3997.67     756  4054.5     756 4172.51     754 4222.98     754
 4266.11     754 4288.69     752 4290.32     752 4332.25     754 4350.08     756

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041     953    .014 1179.01    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           953 1179.01              101      91      86             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2315 4350.08     765       F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
***********************************************************************
       0     103     765   103.5     300     754     865     900     765

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  731.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.44  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  729.66  * Reach Len. (ft)        *  101.00  *   91.00  *   86.00  *
* Crit W.S. (ft)         *  725.82  * Flow Area (sq ft)      *          * 1297.42  *          *
* E.G. Slope (ft/ft)     *0.000465  * Area (sq ft)           *          * 1297.42  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  135.32  * Top Width (ft)         *          *  135.32  *          *
* Vel Total (ft/s)       *    9.63  * Avg. Vel. (ft/s)       *          *    9.63  *          *
* Max Chl Dpth (ft)      *   17.86  * Hydr. Depth (ft)       *          *    9.59  *          *
* Conv. Total (cfs)      *579768.9  * Conv. (cfs)            *          *579768.9  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)       *          *  150.18  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.42  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *          *  582.15  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *          *   54.74  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  735.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.73  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  733.41  * Reach Len. (ft)        *  101.00  *   91.00  *   86.00  *
* Crit W.S. (ft)         *  728.56  * Flow Area (sq ft)      *          * 1845.42  *          *
* E.G. Slope (ft/ft)     *0.000422  * Area (sq ft)           *          * 1845.42  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  156.88  * Top Width (ft)         *          *  156.88  *          *
* Vel Total (ft/s)       *   10.57  * Avg. Vel. (ft/s)       *          *   10.57  *          *
* Max Chl Dpth (ft)      *   21.61  * Hydr. Depth (ft)       *          *   11.76  *          *
* Conv. Total (cfs)      *949075.9  * Conv. (cfs)            *          *949075.9  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)       *          *  173.02  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.97  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *    1.44  *  795.10  *    4.45  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.27  *   61.55  *    6.45  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  738.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.00  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  736.42  * Reach Len. (ft)        *  101.00  *   91.00  *   86.00  *
* Crit W.S. (ft)         *  730.87  * Flow Area (sq ft)      *          * 2342.33  *          *
* E.G. Slope (ft/ft)     *0.000406  * Area (sq ft)           *          * 2342.33  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  174.14  * Top Width (ft)         *          *  174.14  *          *
* Vel Total (ft/s)       *   11.36  * Avg. Vel. (ft/s)       *          *   11.36  *          *
```

```
* Max Chl Dpth (ft)      *   24.61  * Hydr. Depth (ft)       *          *   13.45  *          *
* Conv. Total (cfs)      *1320737.0  * Conv. (cfs)            *          *1320737.0  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)       *          *  191.29  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.52  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   14.56  *  962.94  *   31.58  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.62  *   64.48  *   15.28  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**************************************************************************************************
* E.G. Elev (ft)         *  741.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.26  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  739.11  * Reach Len. (ft)        *  101.00  *   91.00  *   86.00  *
* Crit W.S. (ft)         *  732.98  * Flow Area (sq ft)      *          * 2832.61  *          *
* E.G. Slope (ft/ft)     *0.000397  * Area (sq ft)           *          * 2832.61  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  189.64  * Top Width (ft)          *          *  189.64  *          *
* Vel Total (ft/s)       *   12.07  * Avg. Vel. (ft/s)        *          *   12.07  *          *
* Max Chl Dpth (ft)      *   27.31  * Hydr. Depth (ft)        *          *   14.94  *          *
* Conv. Total (cfs)      *1716149.0  * Conv. (cfs)            *          *1716149.0  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)        *          *  207.70  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.08  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   49.31  * 1117.01  *   81.63  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   21.37  *   66.19  *   29.06  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**************************************************************************************************
* E.G. Elev (ft)         *  745.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.63  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  742.45  * Reach Len. (ft)        *  101.00  *   91.00  *   86.00  *
* Crit W.S. (ft)         *  735.68  * Flow Area (sq ft)      *          * 3498.81  *          *
* E.G. Slope (ft/ft)     *0.000394  * Area (sq ft)           *          * 3498.81  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  208.86  * Top Width (ft)          *          *  208.86  *          *
* Vel Total (ft/s)       *   13.00  * Avg. Vel. (ft/s)        *          *   13.00  *          *
* Max Chl Dpth (ft)      *   30.65  * Hydr. Depth (ft)        *          *   16.75  *          *
* Conv. Total (cfs)      *2292851.0  * Conv. (cfs)            *          *2292851.0  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)        *          *  228.05  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.91  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *  133.92  * 1302.90  *  185.48  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   50.91  *   67.44  *   46.29  *
**************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**************************************************************************************************
* E.G. Elev (ft)         *  748.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.46  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  746.14  * Reach Len. (ft)        *  101.00  *   91.00  *   86.00  *
* Crit W.S. (ft)         *  737.59  * Flow Area (sq ft)      *          * 4323.29  *          *
* E.G. Slope (ft/ft)     *0.000317  * Area (sq ft)           *          * 4323.29  *   37.88  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *          *54400.00  *          *
* Top Width (ft)         *  508.43  * Top Width (ft)          *          *  226.00  *  282.44  *
* Vel Total (ft/s)       *   12.58  * Avg. Vel. (ft/s)        *          *   12.58  *          *
* Max Chl Dpth (ft)      *   34.34  * Hydr. Depth (ft)        *          *   19.13  *          *
* Conv. Total (cfs)      *3054955.0  * Conv. (cfs)            *          *3054955.0  *          *
* Length Wtd. (ft)       *   91.00  * Wetted Per. (ft)        *          *  251.67  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.28  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *  216.95  * 1434.29  *  268.19  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   57.36  *   68.50  *   84.89  *
**************************************************************************************************

Warning: Divided flow computed for this cross-section.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	750.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.69	Wt. n-Val.		0.014	
W.S. Elev (ft)	748.19	Reach Len. (ft)	101.00	91.00	86.00
Crit W.S. (ft)	739.29	Flow Area (sq ft)		4785.68	
E.G. Slope (ft/ft)	0.000310	Area (sq ft)		4785.68	962.63
Q Total (cfs)	63000.00	Flow (cfs)		63000.00	
Top Width (ft)	853.03	Top Width (ft)		226.00	627.03
Vel Total (ft/s)	13.16	Avg. Vel. (ft/s)		13.16	
Max Chl Dpth (ft)	36.39	Hydr. Depth (ft)		21.18	
Conv. Total (cfs)	3580672.0	Conv. (cfs)		3580672.0	
Length Wtd. (ft)	91.00	Wetted Per. (ft)		255.69	
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		4.76	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	297.55	1540.82	444.74
C & E Loss (ft)	0.18	Cum SA (acres)	62.26	68.88	217.36

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	753.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.27	Wt. n-Val.		0.014	0.041
W.S. Elev (ft)	750.14	Reach Len. (ft)	101.00	91.00	86.00
Crit W.S. (ft)	741.58	Flow Area (sq ft)		5228.11	3.75
E.G. Slope (ft/ft)	0.000341	Area (sq ft)		5228.11	2571.76
Q Total (cfs)	75900.00	Flow (cfs)		75899.56	0.43
Top Width (ft)	1270.01	Top Width (ft)		226.00	1044.01
Vel Total (ft/s)	14.51	Avg. Vel. (ft/s)		14.52	0.12
Max Chl Dpth (ft)	38.34	Hydr. Depth (ft)		23.13	0.07
Conv. Total (cfs)	4107557.0	Conv. (cfs)		4107534.0	23.4
Length Wtd. (ft)	91.00	Wetted Per. (ft)		259.59	52.32
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.43	0.00
Alpha	1.00	Stream Power (lb/ft s)		6.23	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	405.44	1666.04	964.23
C & E Loss (ft)	0.31	Cum SA (acres)	65.84	69.20	374.15

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	742.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.39	Wt. n-Val.		0.014	
W.S. Elev (ft)	740.42	Reach Len. (ft)	101.00	91.00	86.00
Crit W.S. (ft)	734.01	Flow Area (sq ft)		3085.71	
E.G. Slope (ft/ft)	0.000394	Area (sq ft)		3085.71	
Q Total (cfs)	38300.00	Flow (cfs)		38300.00	
Top Width (ft)	197.16	Top Width (ft)		197.16	
Vel Total (ft/s)	12.41	Avg. Vel. (ft/s)		12.41	
Max Chl Dpth (ft)	28.62	Hydr. Depth (ft)		15.65	
Conv. Total (cfs)	1930205.0	Conv. (cfs)		1930205.0	
Length Wtd. (ft)	91.00	Wetted Per. (ft)		215.67	
Min Ch El (ft)	711.80	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		4.37	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	75.97	1192.79	118.49
C & E Loss (ft)	0.00	Cum SA (acres)	30.28	66.80	37.13

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

```
RIVER: Blue River
REACH: Main                RS: 2.759

INPUT
Description: COE River Station= 53282.68
Preliminary Model River Station
              (miles)=2.75

KCT RR Flyover Bridge (upstream).  Ineffective
              flow on right is due to buildings and high ground upstream.
              Obstructions are buildings.
Station Elevation Data    num=      58
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     750   36.03     750   62.75     750   90.98     750   98.14     752
  580.07     752  594.64     752  617.86     754  636.41     754  656.72     752
     664     752     755     752     785     743     802     743     870   718.3
     897   717.3  897.01   711.8     913   711.8  913.01   717.3     940   718.3
    1014     743 1123.06     746 1139.07     748 1155.82     750 1190.88     752
 1199.03     752 1217.29     750 1232.51     748 1278.62     748 1287.44     750
 1292.16     752 1303.87     752 1370.95     750 1406.77     748 1418.57     748
 1453.28     750 1603.92     752 1618.21     752 2148.32     750 2750.19     748
 2884.72     746 3228.62     744  3281.9     744 3411.95     746 3470.95     748
 3515.05     750 3535.73     752 3570.92     754 3657.15     754 3871.14     754
 3893.32     756  3903.4     758 3920.47     760 3962.63     762 4001.87     764
 4038.09     766 4098.64     768 4109.78     768

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041     755    .014 1190.88    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            755 1190.88              36      35      32             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2170 4109.78     760       F
Left Levee      Station=  630.08      Elevation=  754.19
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
       0     200     754     200     255     760     255     615     754
     650     750     760    1195    1610     752

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)          *  731.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.46  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)          *  729.60  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  725.81  * Flow Area (sq ft)      *          * 1288.52  *          *
* E.G. Slope (ft/ft)      *0.000474  * Area (sq ft)           *          * 1288.52  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  134.94  * Top Width (ft)         *          *  134.94  *          *
* Vel Total (ft/s)        *    9.70  * Avg. Vel. (ft/s)        *          *    9.70  *          *
* Max Chl Dpth (ft)       *   17.80  * Hydr. Depth (ft)        *          *    9.55  *          *
* Conv. Total (cfs)       *574178.6  * Conv. (cfs)             *          *574178.6  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *          *  149.78  *          *
* Min Ch El (ft)          *  711.80  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *    2.47  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *          *  579.45  *          *
* C & E Loss (ft)         *          * Cum SA (acres)          *          *   54.45  *          *
*************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)          *  735.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.75  * Wt. n-Val.             *          *   0.014  *          *
```

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* W.S. Elev (ft)         *  733.35  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  728.57  * Flow Area (sq ft)      *          * 1836.13  *          *
* E.G. Slope (ft/ft)     *0.000428  * Area (sq ft)           *          * 1836.13  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  156.54  * Top Width (ft)         *          *  156.54  *          *
* Vel Total (ft/s)       *   10.62  * Avg. Vel. (ft/s)       *          *   10.62  *          *
* Max Chl Dpth (ft)      *   21.55  * Hydr. Depth (ft)       *          *   11.73  *          *
* Conv. Total (cfs)      *942439.3  * Conv. (cfs)            *          *942439.3  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  172.65  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.02  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  *  791.26  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   61.23  *    6.45  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.38  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.02  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  736.36  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  730.86  * Flow Area (sq ft)      *          * 2332.37  *          *
* E.G. Slope (ft/ft)     *0.000410  * Area (sq ft)           *          * 2332.37  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  173.81  * Top Width (ft)         *          *  173.81  *          *
* Vel Total (ft/s)       *   11.40  * Avg. Vel. (ft/s)       *          *   11.40  *          *
* Max Chl Dpth (ft)      *   24.56  * Hydr. Depth (ft)       *          *   13.42  *          *
* Conv. Total (cfs)      *1312984.0  * Conv. (cfs)            *          *1312984.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  190.94  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.57  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  *  958.05  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.62  *   64.12  *   15.28  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.33  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.28  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  739.05  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  732.98  * Flow Area (sq ft)      *          * 2821.92  *          *
* E.G. Slope (ft/ft)     *0.000401  * Area (sq ft)           *          * 2821.92  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  189.31  * Top Width (ft)         *          *  189.31  *          *
* Vel Total (ft/s)       *   12.12  * Avg. Vel. (ft/s)       *          *   12.12  *          *
* Max Chl Dpth (ft)      *   27.25  * Hydr. Depth (ft)       *          *   14.91  *          *
* Conv. Total (cfs)      *1707245.0  * Conv. (cfs)            *          *1707245.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  207.36  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.13  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   49.31  * 1111.10  *   81.63  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   21.37  *   65.79  *   29.06  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
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* E.G. Elev (ft)         *  745.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.64  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  742.40  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  735.67  * Flow Area (sq ft)      *          * 3486.96  *          *
* E.G. Slope (ft/ft)     *0.000397  * Area (sq ft)           *          * 3486.96  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  208.53  * Top Width (ft)         *          *  208.53  *          *
* Vel Total (ft/s)       *   13.05  * Avg. Vel. (ft/s)       *          *   13.05  *          *
* Max Chl Dpth (ft)      *   30.60  * Hydr. Depth (ft)       *          *   16.72  *          *
* Conv. Total (cfs)      *2282234.0  * Conv. (cfs)            *          *2282234.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  227.71  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.96  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  133.92  * 1295.60  *  185.48  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   50.91  *   67.01  *   46.29  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.19  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  746.30  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  737.61  * Flow Area (sq ft)      *          * 4582.57  *          *
* E.G. Slope (ft/ft)     *0.000439  * Area (sq ft)           *          * 4582.57  *  740.41  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *54400.00  *          *
* Top Width (ft)         *  907.21  * Top Width (ft)         *          *  351.41  *  555.80  *
* Vel Total (ft/s)       *   11.87  * Avg. Vel. (ft/s)       *          *   11.87  *          *
* Max Chl Dpth (ft)      *   34.50  * Hydr. Depth (ft)       *          *   13.04  *          *
* Conv. Total (cfs)      *2597426.0  * Conv. (cfs)            *          *2597426.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  371.33  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.01  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  216.95  * 1424.98  *  267.42  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   57.36  *   67.90  *   84.07  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.11  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  748.56  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  739.29  * Flow Area (sq ft)      *          * 5409.08  *          *
* E.G. Slope (ft/ft)     *0.000371  * Area (sq ft)           *          * 5409.08  * 2286.46  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *          *63000.00  *          *
* Top Width (ft)         * 1280.29  * Top Width (ft)         *          *  377.34  *  902.95  *
* Vel Total (ft/s)       *   11.65  * Avg. Vel. (ft/s)       *          *   11.65  *          *
* Max Chl Dpth (ft)      *   36.76  * Hydr. Depth (ft)       *          *   14.33  *          *
* Conv. Total (cfs)      *3270980.0  * Conv. (cfs)            *          *3270980.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  397.73  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.67  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  297.55  * 1530.17  *  441.53  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   62.26  *   68.25  *  215.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

```
CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  753.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.25  * Wt. n-Val.             *          *   0.014  *   0.041  *
* W.S. Elev (ft)         *  750.82  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  741.58  * Flow Area (sq ft)      *          * 6295.21  *  108.84  *
* E.G. Slope (ft/ft)     *0.000362  * Area (sq ft)           *          * 6295.21  * 5137.08  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *          *75855.72  *   44.28  *
* Top Width (ft)         * 2005.26  * Top Width (ft)         *          *  411.36  * 1593.90  *
* Vel Total (ft/s)       *   11.85  * Avg. Vel. (ft/s)       *          *   12.05  *    0.41  *
* Max Chl Dpth (ft)      *   39.02  * Hydr. Depth (ft)       *          *   15.30  *    0.45  *
* Conv. Total (cfs)      *3987341.0  * Conv. (cfs)            *          *3985014.0  *  2326.3  *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  432.20  *  240.32  *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.33  *    0.01  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *          *    3.97  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  405.44  * 1654.01  *  956.62  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   65.84  *   68.53  *  371.55  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  742.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.41  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  740.36  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  734.02  * Flow Area (sq ft)      *          * 3074.66  *          *
* E.G. Slope (ft/ft)     *0.000398  * Area (sq ft)           *          * 3074.66  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  196.84  * Top Width (ft)         *          *  196.84  *          *
* Vel Total (ft/s)       *   12.46  * Avg. Vel. (ft/s)       *          *   12.46  *          *
* Max Chl Dpth (ft)      *   28.56  * Hydr. Depth (ft)       *          *   15.62  *          *
* Conv. Total (cfs)      *1920727.0  * Conv. (cfs)            *          *1920727.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  215.33  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.35  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.42  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   75.97  * 1186.35  *  118.49  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   30.28  *   66.39  *   37.13  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 2.756

INPUT
Description: KCT RR Flyover Bridge.  This bridge is currently under
             construction.  It spans the entire floodplain.  Bridge is
             normalized to channel flow from 14 degree skew.  Top of side rail
             modeled as top of bridge.  Piers are aligned with channel flow.
Distance from Upstream XS =       1
Deck/Roadway Width        =      33
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=      12
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       0   798.5   785.5     129     798     785     660     796     783
 1157.73   792.5   779.5 1157.74   792.5   781.5    1230     792     781
    1900     788     776    2400     784     772    2789   781.2   769.2
    3349   776.7   764.7    3920 772.182   760.6    4120   770.6
```

```
Upstream Bridge Cross Section Data
Station Elevation Data    num=      58
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     750   36.03     750   62.75     750   90.98     750   98.14     752
  580.07     752  594.64     752  617.86     754  636.41     754  656.72     752
     664     752     755     752     785     743     802     743     870   718.3
     897   717.3  897.01   711.8     913   711.8  913.01   717.3     940   718.3
    1014     743 1123.06     746 1139.07     748 1155.82     750 1190.88     752
 1199.03     752 1217.29     750 1232.51     748 1278.62     748 1287.44     750
 1292.16     752 1303.87     752 1370.95     750 1406.77     748 1418.57     748
 1453.28     750 1603.92     752 1618.21     752 2148.32     750 2750.19     748
 2884.72     746 3228.62     744  3281.9     744 3411.95     746 3470.95     748
 3515.05     750 3535.73     752 3570.92     754 3657.15     754 3871.14     754
 3893.32     756  3903.4     758 3920.47     760 3962.63     762 4001.87     764
 4038.09     766 4098.64     768 4109.78     768

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041     755    .014 1190.88    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
           755 1190.88             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2170 4109.78     760       F
Left Levee      Station=  630.08      Elevation=  754.19
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
       0     200     754     200     255     760     255     615     754
     650     750     760    1195    1610     752

Downstream  Deck/Roadway Coordinates
    num=      12
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
       0   798.5   785.5      79     798     785     610     796     783
 1107.73   792.5     779 1107.74   792.5   781.5    1180     792     781
    1850     788     776    2350     784     772    2789   781.2   769.2
    3349   776.7   764.7    3920 772.182   760.6    4120   770.6

Downstream Bridge Cross Section Data
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     750      54     750    64.5     752  227.06     754  232.22     754
  539.26     752   560.2     752  583.73     754   598.5     754     614     752
   617.2     752     705     752     735     743     752     743     820   718.3
     847   717.3  847.01   711.8     863   711.8  863.01   717.3     890   718.3
     964     743  969.88     744  1062.7     746 1066.84     748 1082.12     750
 1094.64     750 1108.48     748 1124.41     746 1166.14     746 1182.49     748
  1191.9     750 1244.12     750 1253.63     748 1280.11     746 1336.51     746
 1342.02     748 1352.87     750 1357.63     750 1368.12     748  1379.2     746
 1398.13     746 1406.61     748 1431.42     750 1592.39     752 1597.17     752
 2076.51     750 2612.96     748 2895.26     746  3140.4     744 3301.78     744
 3499.25     746 3529.57     748 3544.27     750 3569.98     752 3598.24     754
 3703.42     754 3873.71     754 3892.09     756 3902.48     758 3916.63     760
  3928.6     762 3964.92     764 3996.81     766 4031.02     768 4069.69     770
 4136.14     770

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041     705    .014 1082.12    .041

Bank Sta: Left   Right    Coeff Contr.   Expan.
           705 1082.12             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2110 4136.14     760       F
Left Levee      Station=  593.71      Elevation=  754.19
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
```

```
       0     210     754     210     265     760     625     685     760
    1090    1430     750

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  49

Pier Data
Pier Station     Upstream=      54    Downstream=       4
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=     129    Downstream=      79
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=     209    Downstream=     159
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=     314    Downstream=     264
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=   371.5    Downstream=   321.5
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=     429    Downstream=     379
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
```

```
********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=     499    Downstream=     449
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=     569    Downstream=     519
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    6.25     740    6.25     810
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    6.25     740    6.25     810

Pier Data
Pier Station     Upstream=     664    Downstream=     614
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     710     6.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     701     6.5     790

Pier Data
Pier Station     Upstream=     761    Downstream=     711
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     710     6.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     701     6.5     790

Pier Data
Pier Station     Upstream=     868    Downstream=     818
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     710     6.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     701     6.5     790

Pier Data
Pier Station     Upstream=     947    Downstream=     897
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     710     6.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     701     6.5     790

Pier Data
Pier Station     Upstream=    1054    Downstream=    1004
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     6.5     710     6.5     790
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
     6.5     701     6.5     790

Pier Data
Pier Station     Upstream=    1161    Downstream=    1111
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     710     6.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     701     6.5     790

Pier Data
Pier Station     Upstream=    1225    Downstream=    1175
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     710     6.5     790
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     6.5     701     6.5     790

Pier Data
Pier Station     Upstream=    1365    Downstream=    1315
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1435    Downstream=    1385
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1512    Downstream=    1462
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1570    Downstream=    1520
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1635    Downstream=    1585
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
```

```
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1701    Downstream=    1651
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1749    Downstream=    1699
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1797    Downstream=    1747
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1845    Downstream=    1795
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1893    Downstream=    1843
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    1941    Downstream=    1891
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2001    Downstream=    1951
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
```

```
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2121    Downstream=    2071
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2241    Downstream=    2191
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2346    Downstream=    2296
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2413    Downstream=    2363
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2519    Downstream=    2469
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2599    Downstream=    2549
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2679    Downstream=    2629
Upstream     num=        2
    Width   Elev    Width   Elev
```

```
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2759    Downstream=    2709
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2839    Downstream=    2789
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2919    Downstream=    2869
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    2999    Downstream=    2949
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3079    Downstream=    3029
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3159    Downstream=    3109
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3239    Downstream=    3189
Upstream     num=       2
```

```
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3319    Downstream=    3269
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3399    Downstream=    3349
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3479    Downstream=    3429
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3559    Downstream=    3509
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3639    Downstream=    3589
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3719    Downstream=    3669
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3799    Downstream=    3749
```

```
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Pier Data
Pier Station     Upstream=    3879    Downstream=    3829
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    6.25     740    6.25     800

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =     1.2
       Yarnell                 KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     731.06  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     729.60  * E.G. Elev (ft)         *     730.88  *     730.88  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     728.70  *     728.70  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     726.32  *     726.32  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      16.90  *      16.90  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      11.85  *      11.85  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1054.66  *    1054.66  *
* Weir Submerg           *             * Froude # Chl           *       0.70  *       0.70  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   10656.31  *   10656.31  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *       9.03  *       9.03  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     165.69  *     165.69  *
* Delta EG (ft)          *       0.59  * Conv. Total (cfs)      *   384470.0  *   384470.0  *
* Delta WS (ft)          *       0.90  * Top Width (ft)         *     116.78  *     116.78  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      11.85  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.42  *       0.42  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.98  *       4.98  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     735.10  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     733.35  * E.G. Elev (ft)         *     734.91  *     734.91  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     732.36  *     732.36  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     729.26  *     729.26  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      20.56  *      20.56  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      12.82  *      12.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1521.06  *    1521.06  *
* Weir Submerg           *             * Froude # Chl           *       0.68  *       0.68  *
```

```
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   18513.56  *   18513.56  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      11.03  *      11.03  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     202.64  *     202.64  *
* Delta EG (ft)          *       0.66  * Conv. Total (cfs)      *   618909.8  *   618909.8  *
* Delta WS (ft)          *       0.99  * Top Width (ft)        *     137.84  *     137.84  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      12.82  * C & E Loss (ft)        *             *             *
* Coef of Q              *            * Shear Total (lb/sq ft) *       0.47  *       0.47  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       5.96  *       5.96  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. US. (ft)          *     738.38  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     736.36  * E.G. Elev (ft)         *     738.17  *     738.17  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     735.26  *     735.26  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     731.73  *     731.73  *
* Q Weir (cfs)           *            * Max Chl Dpth (ft)      *      23.46  *      23.46  *
* Weir Sta Lft (ft)      *            * Vel Total (ft/s)       *      13.68  *      13.68  *
* Weir Sta Rgt (ft)      *            * Flow Area (sq ft)      *    1944.85  *    1944.85  *
* Weir Submerg           *            * Froude # Chl           *       0.68  *       0.68  *
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   27060.90  *   27060.90  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      12.59  *      12.59  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     231.89  *     231.89  *
* Delta EG (ft)          *       0.73  * Conv. Total (cfs)      *   852103.8  *   852103.8  *
* Delta WS (ft)          *       1.10  * Top Width (ft)        *     154.51  *     154.51  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      13.68  * C & E Loss (ft)        *             *             *
* Coef of Q              *            * Shear Total (lb/sq ft) *       0.51  *       0.51  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       6.98  *       6.98  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. US. (ft)          *     741.33  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     739.05  * E.G. Elev (ft)         *     741.10  *     741.10  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     737.85  *     737.85  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     733.96  *     733.96  *
* Q Weir (cfs)           *            * Max Chl Dpth (ft)      *      26.05  *      26.05  *
* Weir Sta Lft (ft)      *            * Vel Total (ft/s)       *      14.46  *      14.46  *
* Weir Sta Rgt (ft)      *            * Flow Area (sq ft)      *    2364.39  *    2364.39  *
* Weir Submerg           *            * Froude # Chl           *       0.68  *       0.68  *
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   36698.64  *   36698.64  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      13.96  *      13.96  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     258.02  *     258.02  *
* Delta EG (ft)          *       0.79  * Conv. Total (cfs)      *  1098920.0  *  1098920.0  *
* Delta WS (ft)          *       1.20  * Top Width (ft)        *     169.40  *     169.40  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      14.46  * C & E Loss (ft)        *             *             *
* Coef of Q              *            * Shear Total (lb/sq ft) *       0.55  *       0.55  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       8.01  *       8.01  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
```

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         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*********************************************************************************************
* E.G. US. (ft)          *     745.04  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.40  * E.G. Elev (ft)         *     744.77  *     744.77  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     741.03  *     741.03  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     736.82  *     736.82  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.23  *      29.23  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      15.52  *      15.52  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2931.64  *    2931.64  *
* Weir Submerg           *             * Froude # Chl           *       0.69  *       0.69  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   51664.55  *   51664.55  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      15.62  *      15.62  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     290.07  *     290.07  *
* Delta EG (ft)          *       0.89  * Conv. Total (cfs)       *  1454511.0  *  1454511.0  *
* Delta WS (ft)          *       1.37  * Top Width (ft)         *     187.67  *     187.67  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      15.52  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.62  *       0.62  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       9.58  *       9.58  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. US. (ft)          *     748.48  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     746.30  * E.G. Elev (ft)         *     748.29  *     748.36  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     745.26  *     745.26  *
* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     738.78  *     738.78  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      33.46  *      33.46  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      13.96  *      14.12  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3895.51  *    3853.94  *
* Weir Submerg           *             * Froude # Chl           *       0.68  *       0.67  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   67598.14  *   67810.88  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      13.02  *      13.69  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     421.98  *     403.01  *
* Delta EG (ft)          *       0.60  * Conv. Total (cfs)       *  1819466.0  *  1842896.0  *
* Delta WS (ft)          *       1.03  * Top Width (ft)         *     626.77  *     690.50  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      14.12  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.52  *       0.52  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       7.19  *       7.34  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*********************************************************************************************
* E.G. US. (ft)          *     750.67  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     748.56  * E.G. Elev (ft)         *     750.50  *     750.59  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     747.72  *     747.72  *
* Q Bridge (cfs)         *   63000.00  * Crit W.S. (ft)         *     740.52  *     740.52  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      35.92  *      35.92  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      13.38  *      13.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4709.07  *    4630.52  *
* Weir Submerg           *             * Froude # Chl           *       0.64  *       0.64  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   80733.63  *   80991.36  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      13.53  *      14.14  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     485.98  *     464.49  *
* Delta EG (ft)          *       0.50  * Conv. Total (cfs)       *  2271666.0  *  2276471.0  *
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* Delta WS (ft)          *       0.84  * Top Width (ft)         *     991.78  *    1131.67  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      13.61  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.47  *       0.48  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       6.22  *       6.49  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*******************************************************************************************
* E.G. US. (ft)          *     753.08  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     750.82  * E.G. Elev (ft)         *     752.88  *     753.02  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     749.93  *     749.93  *
* Q Bridge (cfs)         *   75900.00  * Crit W.S. (ft)         *     744.14  *     743.41  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      38.13  *      38.13  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      13.79  *      14.12  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5504.54  *    5376.17  *
* Weir Submerg           *             * Froude # Chl           *       0.63  *       0.63  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   98318.48  *   98682.66  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      14.82  *      14.84  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     523.67  *     513.61  *
* Delta EG (ft)          *       0.49  * Conv. Total (cfs)      *  2803484.0  *  2782567.0  *
* Delta WS (ft)          *       0.90  * Top Width (ft)         *    1614.59  *    1689.70  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      14.12  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.48  *       0.49  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       6.63  *       6.86  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. US. (ft)          *     742.77  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     740.36  * E.G. Elev (ft)         *     742.53  *     742.53  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     739.11  *     739.11  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     735.06  *     735.06  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.31  *      27.31  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      14.83  *      14.83  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2582.56  *    2582.56  *
* Weir Submerg           *             * Froude # Chl           *       0.68  *       0.68  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   42093.20  *   42093.20  *
* Min El Weir Flow (ft)  *     770.69  * Hydr Depth (ft)        *      14.62  *      14.62  *
* Min El Prs (ft)        *     785.50  * W.P. Total (ft)        *     270.74  *     270.74  *
* Delta EG (ft)          *       0.82  * Conv. Total (cfs)      *  1232877.0  *  1232877.0  *
* Delta WS (ft)          *       1.25  * Top Width (ft)         *     176.65  *     176.65  *
* BR Open Area (sq ft)   *   91346.25  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      14.83  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.57  *       0.57  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       8.52  *       8.52  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
```

```
REACH: Main               RS: 2.753

INPUT
Description: COE River Station= 53316.02
Preliminary Model River Station
             (miles)=2.74

KCT RR Flyover Bridge. Normalized to channel flow
             from 14 degree skew. Top of side rail modeled as top of bridge.
             Piers are aligned with channel flow.  Ineffective flow on right is
             due to buildings and high ground upstream. Obstructions are
             buildings.
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     750      54     750    64.5     752  227.06     754  232.22     754
  539.26     752   560.2     752  583.73     754   598.5     754     614     752
   617.2     752     705     752     735     743     752     743     820   718.3
     847   717.3  847.01   711.8     863   711.8  863.01   717.3     890   718.3
     964     743  969.88     744  1062.7     746 1066.84     748 1082.12     750
 1094.64     750 1108.48     748 1124.41     746 1166.14     746 1182.49     748
  1191.9     750 1244.12     750 1253.63     748 1280.11     746 1336.51     746
 1342.02     748 1352.87     750 1357.63     750 1368.12     748  1379.2     746
 1398.13     746 1406.61     748 1431.42     750 1592.39     752 1597.17     752
 2076.51     750 2612.96     748 2895.26     746  3140.4     744 3301.78     744
 3499.25     746 3529.57     748 3544.27     750 3569.98     752 3598.24     754
 3703.42     754 3873.71     754 3892.09     756 3902.48     758 3916.63     760
  3928.6     762 3964.92     764 3996.81     766 4031.02     768 4069.69     770
 4136.14     770

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .041     705    .014 1082.12    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           705 1082.12            279.6     162     150             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2110 4136.14     760       F
Left Levee      Station=  593.71      Elevation=  754.19
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*******************************************************************************
       0     210     754     210     265     760     625     685     760
    1090    1430     750

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  730.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.77  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  728.70  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  725.82  * Flow Area (sq ft)      *          * 1169.67  *          *
* E.G. Slope (ft/ft)     *0.000623  * Area (sq ft)           *          * 1169.67  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  129.78  * Top Width (ft)          *          *  129.78  *          *
* Vel Total (ft/s)       *   10.69  * Avg. Vel. (ft/s)        *          *   10.69  *          *
* Max Chl Dpth (ft)      *   16.90  * Hydr. Depth (ft)        *          *    9.01  *          *
* Conv. Total (cfs)      *500913.9  * Conv. (cfs)             *          *500913.9  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)        *          *  144.32  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    3.37  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *          *  578.60  *          *
* C & E Loss (ft)        *    0.37  * Cum SA (acres)          *          *   54.36  *          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  734.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.08  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  732.36  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
```

```
* Crit W.S. (ft)         *  728.55  * Flow Area (sq ft)      *          * 1683.70  *          *
* E.G. Slope (ft/ft)     *0.000545  * Area (sq ft)           *          * 1683.70  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  150.84  * Top Width (ft)          *          *  150.84  *          *
* Vel Total (ft/s)       *   11.58  * Avg. Vel. (ft/s)        *          *   11.58  *          *
* Max Chl Dpth (ft)      *   20.56  * Hydr. Depth (ft)        *          *   11.16  *          *
* Conv. Total (cfs)      *835275.1  * Conv. (cfs)             *          *835275.1  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)        *          *  166.62  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.98  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *    1.44  *  790.03  *    4.45  *
* C & E Loss (ft)        *    0.47  * Cum SA (acres)          *    2.27  *   61.12  *    6.45  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  737.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.39  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  735.26  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  730.87  * Flow Area (sq ft)      *          * 2145.18  *          *
* E.G. Slope (ft/ft)     *0.000517  * Area (sq ft)           *          * 2145.18  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  167.51  * Top Width (ft)          *          *  167.51  *          *
* Vel Total (ft/s)       *   12.40  * Avg. Vel. (ft/s)        *          *   12.40  *          *
* Max Chl Dpth (ft)      *   23.46  * Hydr. Depth (ft)        *          *   12.81  *          *
* Conv. Total (cfs)      *1169523.0  * Conv. (cfs)            *          *1169523.0  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)        *          *  184.27  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.66  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)    *   14.56  *  956.48  *   31.58  *
* C & E Loss (ft)        *    0.59  * Cum SA (acres)          *    8.62  *   63.99  *   15.28  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  740.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.69  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  737.85  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  732.98  * Flow Area (sq ft)      *          * 2598.40  *          *
* E.G. Slope (ft/ft)     *0.000504  * Area (sq ft)           *          * 2598.40  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  182.40  * Top Width (ft)          *          *  182.40  *          *
* Vel Total (ft/s)       *   13.16  * Avg. Vel. (ft/s)        *          *   13.16  *          *
* Max Chl Dpth (ft)      *   26.05  * Hydr. Depth (ft)        *          *   14.25  *          *
* Conv. Total (cfs)      *1523954.0  * Conv. (cfs)            *          *1523954.0  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)        *          *  200.04  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.41  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.38  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *   49.31  * 1109.20  *   81.63  *
* C & E Loss (ft)        *    0.71  * Cum SA (acres)          *   21.37  *   65.66  *   29.06  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  744.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.13  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  741.03  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  735.71  * Flow Area (sq ft)      *          * 3206.95  *          *
* E.G. Slope (ft/ft)     *0.000500  * Area (sq ft)           *          * 3206.95  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  200.67  * Top Width (ft)          *          *  200.67  *          *
```

```
* Vel Total (ft/s)       *   14.19  * Avg. Vel. (ft/s)       *          *   14.19  *          *
* Max Chl Dpth (ft)      *   29.23  * Hydr. Depth (ft)       *          *   15.98  *          *
* Conv. Total (cfs)      *2034978.0  * Conv. (cfs)            *          *2034978.0  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)       *          *  219.38  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.47  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *  133.92  * 1293.24  *  185.48  *
* C & E Loss (ft)        *    0.86  * Cum SA (acres)         *   50.91  *   66.86  *   46.29  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  747.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.62  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  745.26  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  737.61  * Flow Area (sq ft)      *          * 4187.72  *          *
* E.G. Slope (ft/ft)     *0.000487  * Area (sq ft)           *          * 4187.72  *  380.14  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *          *54400.00  *          *
* Top Width (ft)         *  741.81  * Top Width (ft)         *          *  301.02  *  440.79  *
* Vel Total (ft/s)       *   12.99  * Avg. Vel. (ft/s)       *          *   12.99  *          *
* Max Chl Dpth (ft)      *   33.46  * Hydr. Depth (ft)       *          *   13.91  *          *
* Conv. Total (cfs)      *2464059.0  * Conv. (cfs)            *          *2464059.0  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)       *          *  320.83  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.16  *          *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *  216.95  * 1421.86  *  267.18  *
* C & E Loss (ft)        *    0.69  * Cum SA (acres)         *   57.36  *   67.67  *   83.77  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  750.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.45  * Wt. n-Val.              *          *   0.014  *          *
* W.S. Elev (ft)         *  747.72  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  739.29  * Flow Area (sq ft)      *          * 5012.22  *          *
* E.G. Slope (ft/ft)     *0.000430  * Area (sq ft)           *          * 5012.22  * 2035.85  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *          *63000.00  *          *
* Top Width (ft)         * 1219.91  * Top Width (ft)         *          *  347.00  *  872.92  *
* Vel Total (ft/s)       *   12.57  * Avg. Vel. (ft/s)       *          *   12.57  *          *
* Max Chl Dpth (ft)      *   35.92  * Hydr. Depth (ft)       *          *   14.44  *          *
* Conv. Total (cfs)      *3036411.0  * Conv. (cfs)            *          *3036411.0  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)       *          *  367.57  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)       *          *    0.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.61  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *  297.55  * 1526.40  *  440.16  *
* C & E Loss (ft)        *    0.58  * Cum SA (acres)         *   62.26  *   67.98  *  215.26  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  752.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.66  * Wt. n-Val.              *          *   0.014  *   0.041  *
* W.S. Elev (ft)         *  749.93  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  741.57  * Flow Area (sq ft)      *          * 5801.36  *    0.37  *
* E.G. Slope (ft/ft)     *0.000416  * Area (sq ft)           *          * 5801.36  * 4563.86  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              *          *75899.98  *    0.02  *
* Top Width (ft)         * 1817.79  * Top Width (ft)         *          *  369.65  * 1448.14  *
* Vel Total (ft/s)       *   13.08  * Avg. Vel. (ft/s)       *          *   13.08  *    0.06  *
* Max Chl Dpth (ft)      *   38.13  * Hydr. Depth (ft)       *          *   15.69  *    0.03  *
```

```
* Conv. Total (cfs)      *3719590.0  * Conv. (cfs)            *          *3719589.0  *     1.2  *
* Length Wtd. (ft)       *  161.99  * Wetted Per. (ft)        *          *  390.74  *   14.45  *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.39  *    0.00  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.05  *    0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)    *  405.44  * 1649.62  *  953.49  *
* C & E Loss (ft)        *    0.57  * Cum SA (acres)          *   65.84  *   68.24  *  370.50  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  741.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.84  * Wt. n-Val.             *          *   0.014  *          *
* W.S. Elev (ft)         *  739.11  * Reach Len. (ft)        *  279.60  *  162.00  *  150.00  *
* Crit W.S. (ft)         *  734.00  * Flow Area (sq ft)      *          * 2832.96  *          *
* E.G. Slope (ft/ft)     *0.000498  * Area (sq ft)           *          * 2832.96  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38300.00  *          *
* Top Width (ft)         *  189.65  * Top Width (ft)          *          *  189.65  *          *
* Vel Total (ft/s)       *   13.52  * Avg. Vel. (ft/s)       *          *   13.52  *          *
* Max Chl Dpth (ft)      *   27.31  * Hydr. Depth (ft)        *          *   14.94  *          *
* Conv. Total (cfs)      *1716438.0  * Conv. (cfs)            *          *1716438.0  *          *
* Length Wtd. (ft)       *  162.00  * Wetted Per. (ft)        *          *  207.71  *          *
* Min Ch El (ft)         *  711.80  * Shear (lb/sq ft)        *          *    0.42  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.73  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)    *   75.97  * 1184.27  *  118.49  *
* C & E Loss (ft)        *    0.76  * Cum SA (acres)          *   30.28  *   66.25  *   37.13  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.722

INPUT
Description: COE River Station= 53478.81
Preliminary Model River Station
             (miles)=2.71

 Ineffective flow on right is due to buildings
             and high ground upstream.
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     754  253.03     752  297.87     752  330.26     752  337.22     750
   341.3     748  344.93     746  349.84     744  354.84     742   361.4     740
  368.68     738  374.07     736  379.02     734  401.87     732  416.92     730
     426     728  435.79     726  457.47     724  463.61     722  469.96     720
  476.36     718  482.44     716  495.67  711.59  525.08  711.59  538.31     716
  544.42     718  551.46     720  554.77     722   562.4     724  565.89     726
  591.12     728  603.45     730  611.04     732  624.75     734  647.42     736
  653.06     738   656.6     740  663.22     742  669.51     744  685.54     746
  692.15     748  699.27     750  708.67     752  719.76     752  729.23     750
  736.47     748  738.87     746  748.66     746  770.37     746  788.23     746
  822.58     748   832.5     750  841.36     752  873.64     752   878.6     750
  886.76     748  893.01     746  904.58     744 1007.46     744  1030.5     746
 1033.13     748 1056.01     748 1069.55     746  1082.1     744  1143.9     744
 1171.48     746 1195.85     748 1209.74     750 1232.06     750 1232.25     750
 1519.04     750 1541.35     750 1710.26     750 2113.16     748 2186.97     748
 2295.14     748 2618.86     746 2821.56     744 2971.45     744 3251.54     746
 3267.21     748 3288.89     750 3312.78     752 3336.46     754  3359.3     756
  3392.5     756 3517.32     754 3582.16     754 3595.62     756 3606.73     758
 3618.93     760 3628.34     762  3641.1     764 3663.49     766 3695.61     768
 3730.37     770 3767.66     772 3802.18     772 3844.42     770

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .041  330.26    .018  708.67    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         330.26  708.67            470     414     340              .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1780 3844.42     765       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
     715     845     752     880    1208     750

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  730.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.04  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  728.97  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  723.62  * Flow Area (sq ft)      *          * 1525.03  *          *
* E.G. Slope (ft/ft)     *0.000574  * Area (sq ft)           *          * 1525.03  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  175.46  * Top Width (ft)         *          *  175.46  *          *
* Vel Total (ft/s)       *    8.20  * Avg. Vel. (ft/s)       *          *    8.20  *          *
* Max Chl Dpth (ft)      *   17.38  * Hydr. Depth (ft)       *          *    8.69  *          *
* Conv. Total (cfs)      *521960.7  * Conv. (cfs)            *          *521960.7  *          *
* Length Wtd. (ft)       *  414.00  * Wetted Per. (ft)       *          *  180.64  *          *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.48  *          *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   *          *  573.59  *          *
* C & E Loss (ft)        *    0.28  * Cum SA (acres)         *          *   53.79  *          *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  733.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.15  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  732.74  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  727.01  * Flow Area (sq ft)      *          * 2268.49  *          *
* E.G. Slope (ft/ft)     *0.000509  * Area (sq ft)           *          * 2268.49  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  222.76  * Top Width (ft)         *          *  222.76  *          *
* Vel Total (ft/s)       *    8.60  * Avg. Vel. (ft/s)       *          *    8.60  *          *
* Max Chl Dpth (ft)      *   21.15  * Hydr. Depth (ft)       *          *   10.18  *          *
* Conv. Total (cfs)      *864712.9  * Conv. (cfs)            *          *864712.9  *          *
* Length Wtd. (ft)       *  414.00  * Wetted Per. (ft)       *          *  228.62  *          *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.71  *          *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *    1.44  *  782.68  *    4.45  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *    2.27  *   60.42  *    6.45  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  736.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  735.77  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  729.27  * Flow Area (sq ft)      *          * 3019.84  *          *
* E.G. Slope (ft/ft)     *0.000470  * Area (sq ft)           *          * 3019.84  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  270.20  * Top Width (ft)         *          *  270.20  *          *
* Vel Total (ft/s)       *    8.81  * Avg. Vel. (ft/s)       *          *    8.81  *          *
```

```
* Max Chl Dpth (ft)      *   24.18  * Hydr. Depth (ft)       *          *   11.18  *          *
* Conv. Total (cfs)      *1226787.0  * Conv. (cfs)            *          *1226787.0  *          *
* Length Wtd. (ft)       *  414.00  * Wetted Per. (ft)       *          *  276.62  *          *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.82  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *   14.56  *  946.88  *   31.58  *
* C & E Loss (ft)        *    0.26  * Cum SA (acres)         *    8.62  *   63.18  *   15.28  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  739.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  738.49  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  731.17  * Flow Area (sq ft)      *          * 3778.76  *          *
* E.G. Slope (ft/ft)     *0.000400  * Area (sq ft)           *          * 3778.76  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  287.02  * Top Width (ft)         *          *  287.02  *          *
* Vel Total (ft/s)       *    9.05  * Avg. Vel. (ft/s)       *          *    9.05  *          *
* Max Chl Dpth (ft)      *   26.90  * Hydr. Depth (ft)       *          *   13.17  *          *
* Conv. Total (cfs)      *1710097.0  * Conv. (cfs)            *          *1710097.0  *          *
* Length Wtd. (ft)       *  414.00  * Wetted Per. (ft)       *          *  294.39  *          *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.90  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *   49.31  * 1097.34  *   81.63  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *   21.37  *   64.78  *   29.06  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  743.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.42  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  741.81  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  733.70  * Flow Area (sq ft)      *          * 4765.68  *          *
* E.G. Slope (ft/ft)     *0.000358  * Area (sq ft)           *          * 4765.68  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  307.16  * Top Width (ft)         *          *  307.16  *          *
* Vel Total (ft/s)       *    9.55  * Avg. Vel. (ft/s)       *          *    9.55  *          *
* Max Chl Dpth (ft)      *   30.22  * Hydr. Depth (ft)       *          *   15.52  *          *
* Conv. Total (cfs)      *2403094.0  * Conv. (cfs)            *          *2403094.0  *          *
* Length Wtd. (ft)       *  414.00  * Wetted Per. (ft)       *          *  315.68  *          *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.23  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *  133.92  * 1278.41  *  185.48  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *   50.91  *   65.91  *   46.29  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  747.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *          *   0.018  *          *
* W.S. Elev (ft)         *  745.89  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  735.31  * Flow Area (sq ft)      *          * 6074.78  *          *
* E.G. Slope (ft/ft)     *0.000261  * Area (sq ft)           *          * 6074.78  *  716.41  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *54400.00  *          *
* Top Width (ft)         *  946.40  * Top Width (ft)         *          *  339.49  *  606.91  *
* Vel Total (ft/s)       *    8.96  * Avg. Vel. (ft/s)       *          *    8.96  *          *
* Max Chl Dpth (ft)      *   34.30  * Hydr. Depth (ft)       *          *   17.89  *          *
* Conv. Total (cfs)      *3366539.0  * Conv. (cfs)            *          *3366539.0  *          *
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* Length Wtd. (ft)       *  414.00  * Wetted Per. (ft)       *          *  349.25  *          *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.54  *          *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  216.95  * 1402.78  *  265.29  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *   57.36  *   66.47  *   81.96  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.              *          *   0.018  *          *
* W.S. Elev (ft)         *  748.25  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  736.60  * Flow Area (sq ft)      *          * 6889.03  *          *
* E.G. Slope (ft/ft)     *0.000242  * Area (sq ft)           *          * 6889.03  * 2677.68  *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *          *63000.00  *          *
* Top Width (ft)         * 1558.51  * Top Width (ft)         *          *  352.23  * 1206.28  *
* Vel Total (ft/s)       *    9.14  * Avg. Vel. (ft/s)       *          *    9.14  *          *
* Max Chl Dpth (ft)      *   36.66  * Hydr. Depth (ft)       *          *   19.56  *          *
* Conv. Total (cfs)      *4046856.0  * Conv. (cfs)            *          *4046856.0  *          *
* Length Wtd. (ft)       *  413.96  * Wetted Per. (ft)       *          *  362.91  *          *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.63  *          *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   *  297.55  * 1504.27  *  432.04  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   62.26  *   66.68  *  211.68  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  751.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.51  * Wt. n-Val.              *          *   0.018  *   0.041  *
* W.S. Elev (ft)         *  750.45  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  738.25  * Flow Area (sq ft)      *          * 7678.99  *  417.93  *
* E.G. Slope (ft/ft)     *0.000257  * Area (sq ft)           *          * 7678.99  * 6205.25  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              *          *75754.77  *  145.23  *
* Top Width (ft)         * 2782.50  * Top Width (ft)         *          *  365.73  * 2416.77  *
* Vel Total (ft/s)       *    9.37  * Avg. Vel. (ft/s)       *          *    9.87  *    0.35  *
* Max Chl Dpth (ft)      *   38.86  * Hydr. Depth (ft)       *          *   21.00  *    0.46  *
* Conv. Total (cfs)      *4735539.0  * Conv. (cfs)            *          *4726478.0  *  9060.9  *
* Length Wtd. (ft)       *  413.48  * Wetted Per. (ft)       *          *  377.17  *  903.26  *
* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.33  *    0.01  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *          *    3.22  *    0.00  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *  405.44  * 1624.56  *  934.95  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *   65.84  *   66.87  *  363.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  741.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.32  * Wt. n-Val.              *          *   0.018  *          *
* W.S. Elev (ft)         *  739.80  * Reach Len. (ft)        *  470.00  *  414.00  *  340.00  *
* Crit W.S. (ft)         *  732.10  * Flow Area (sq ft)      *          * 4161.10  *          *
* E.G. Slope (ft/ft)     *0.000376  * Area (sq ft)           *          * 4161.10  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *38300.00  *          *
* Top Width (ft)         *  294.13  * Top Width (ft)         *          *  294.13  *          *
* Vel Total (ft/s)       *    9.20  * Avg. Vel. (ft/s)       *          *    9.20  *          *
* Max Chl Dpth (ft)      *   28.21  * Hydr. Depth (ft)       *          *   14.15  *          *
* Conv. Total (cfs)      *1974081.0  * Conv. (cfs)            *          *1974081.0  *          *
* Length Wtd. (ft)       *  414.00  * Wetted Per. (ft)       *          *  302.03  *          *
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* Min Ch El (ft)         *  711.59  * Shear (lb/sq ft)       *          *    0.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.98  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *   75.97  * 1171.26  *  118.49  *
* C & E Loss (ft)        *    0.24  * Cum SA (acres)         *   30.28  *   65.35  *   37.13  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.644

INPUT
Description: COE River Station=53892.92
Preliminary Model River Station
             (miles)=2.63

 Ineffective flow on right is due to buildings
             and high ground upstream. Obstructions are buildings.  (This note
             applies to sections 2.63 through 2.03.)
Station Elevation Data     num=     104
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      752   45.63      750   46.77      750   58.26      752   83.52      752
   88.65      750   93.21      748   98.15      746  102.83      744  106.35      742
   110.9      740  114.67      738  119.54      736  122.94      734  128.26      732
  133.04      730  140.49      728  149.23      726  164.51      724  172.96      722
     178      720  186.15      718   189.8      716   203.3    711.5  268.87    711.5
  282.37      716  289.64      718  299.34      720  309.61      722  315.52      724
  325.47      726  369.77      728  376.99      730  384.47      732  390.85      734
  398.38      736   404.3      738  412.33      740  419.76      742  424.13      744
  435.11      746  481.16      748  601.22      750  634.33      750  637.01      750
  642.25      750  654.13      750   680.5      750  716.56      748  737.16      746
   742.9      744  753.88      742  844.82      742  850.71      744  859.73      746
  865.29      748  947.14      744 1017.65      744 1028.54      746 1037.55      748
 1043.71      750 1071.81      750 1098.73      748 1108.32      748 1183.04      748
 1190.63      746 1202.99      746 1210.44      748 1257.33      750 1291.09      748
 1457.85      748  1535.1      748  1562.1      748 1619.79      748 1634.59      748
 2135.49      748 2332.47      748  2346.2      750 2381.58      750 2398.75      748
  2481.9      746 3197.92      746 3219.66      748 3234.04      750 3250.39      752
 3266.85      754 3290.14      756 3330.64      758 3350.39      758 3357.23      758
 3368.98      758 3401.02      756 3424.63      756 3448.94      758 3454.16      760
 3456.39      762 3461.48      764 3470.85      766 3478.48      768 3489.48      770
 3497.78      772 3514.77      774 3543.62      776 3584.41      778

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .041   83.52    .045  435.11    .041

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         83.52  435.11              870     793     725             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2200 3584.41     765       F
Left Levee      Station=   69.68      Elevation=     752
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************
     680    1255     750 1364.75    2200     765

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  729.37  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  728.90  * Reach Len. (ft)        *  870.00  *  793.00  *  725.00  *
* Crit W.S. (ft)         *  720.59  * Flow Area (sq ft)      *          * 2263.75  *          *
* E.G. Slope (ft/ft)     *0.001407  * Area (sq ft)           *          * 2263.75  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  235.86  * Top Width (ft)         *          *  235.86  *          *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)       *          *    5.52  *          *
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* Max Chl Dpth (ft)      *   17.40  * Hydr. Depth (ft)       *          *    9.60  *          *
* Conv. Total (cfs)      *333211.9  * Conv. (cfs)            *          *333211.9  *          *
* Length Wtd. (ft)       *  793.00  * Wetted Per. (ft)       *          *  240.53  *          *
* Min Ch El (ft)         *  711.50  * Shear (lb/sq ft)       *          *    0.83  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.57  *          *
* Frctn Loss (ft)        *    1.20  * Cum Volume (acre-ft)   *          *  555.58  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   51.84  *          *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  733.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  732.72  * Reach Len. (ft)        *  870.00  *  793.00  *  725.00  *
* Crit W.S. (ft)         *  723.15  * Flow Area (sq ft)      *          * 3214.70  *          *
* E.G. Slope (ft/ft)     *0.001219  * Area (sq ft)           *          * 3214.70  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  260.43  * Top Width (ft)         *          *  260.43  *          *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *          *    6.07  *          *
* Max Chl Dpth (ft)      *   21.22  * Hydr. Depth (ft)       *          *   12.34  *          *
* Conv. Total (cfs)      *558610.1  * Conv. (cfs)            *          *558610.1  *          *
* Length Wtd. (ft)       *  793.00  * Wetted Per. (ft)       *          *  266.29  *          *
* Min Ch El (ft)         *  711.50  * Shear (lb/sq ft)       *          *    0.92  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.57  *          *
* Frctn Loss (ft)        *    1.11  * Cum Volume (acre-ft)   *    1.44  *  756.63  *    4.45  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    2.27  *   58.13  *    6.45  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  736.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  735.74  * Reach Len. (ft)        *  870.00  *  793.00  *  725.00  *
* Crit W.S. (ft)         *  725.43  * Flow Area (sq ft)      *          * 4028.22  *          *
* E.G. Slope (ft/ft)     *0.001167  * Area (sq ft)           *          * 4028.22  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  277.44  * Top Width (ft)         *          *  277.44  *          *
* Vel Total (ft/s)       *    6.60  * Avg. Vel. (ft/s)       *          *    6.60  *          *
* Max Chl Dpth (ft)      *   24.24  * Hydr. Depth (ft)       *          *   14.52  *          *
* Conv. Total (cfs)      *778592.1  * Conv. (cfs)            *          *778592.1  *          *
* Length Wtd. (ft)       *  793.00  * Wetted Per. (ft)       *          *  284.44  *          *
* Min Ch El (ft)         *  711.50  * Shear (lb/sq ft)       *          *    1.03  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.81  *          *
* Frctn Loss (ft)        *    1.08  * Cum Volume (acre-ft)   *   14.56  *  913.39  *   31.58  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    8.62  *   60.58  *   15.28  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  739.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  738.47  * Reach Len. (ft)        *  870.00  *  793.00  *  725.00  *
* Crit W.S. (ft)         *  727.81  * Flow Area (sq ft)      *          * 4803.80  *          *
* E.G. Slope (ft/ft)     *0.001154  * Area (sq ft)           *          * 4803.80  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  292.39  * Top Width (ft)         *          *  292.39  *          *
* Vel Total (ft/s)       *    7.12  * Avg. Vel. (ft/s)       *          *    7.12  *          *
* Max Chl Dpth (ft)      *   26.97  * Hydr. Depth (ft)       *          *   16.43  *          *
* Conv. Total (cfs)      *1006867.0  * Conv. (cfs)            *          *1006867.0  *          *
* Length Wtd. (ft)       *  793.00  * Wetted Per. (ft)       *          *  300.39  *          *
* Min Ch El (ft)         *  711.50  * Shear (lb/sq ft)       *          *    1.15  *          *
```

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* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    8.20  *          *
* Frctn Loss (ft)        *    1.08  * Cum Volume (acre-ft)   *   49.31  * 1056.55  *   81.63  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   21.37  *   62.03  *   29.06  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.95  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  741.80  * Reach Len. (ft)        *  870.00  *  793.00  *  725.00  *
* Crit W.S. (ft)         *  729.89  * Flow Area (sq ft)      *          * 5810.92  *          *
* E.G. Slope (ft/ft)     *0.001185  * Area (sq ft)           *          * 5810.92  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  312.21  * Top Width (ft)         *          *  312.21  *          *
* Vel Total (ft/s)       *    7.83  * Avg. Vel. (ft/s)       *          *    7.83  *          *
* Max Chl Dpth (ft)      *   30.30  * Hydr. Depth (ft)       *          *   18.61  *          *
* Conv. Total (cfs)      *1321808.0  * Conv. (cfs)            *          *1321808.0  *          *
* Length Wtd. (ft)       *  792.89  * Wetted Per. (ft)       *          *  321.39  *          *
* Min Ch El (ft)         *  711.50  * Shear (lb/sq ft)       *          *    1.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.47  *          *
* Frctn Loss (ft)        *    1.09  * Cum Volume (acre-ft)   *  133.92  * 1228.15  *  185.48  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   50.91  *   62.97  *   46.29  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  745.88  * Reach Len. (ft)        *  870.00  *  793.00  *  725.00  *
* Crit W.S. (ft)         *  731.31  * Flow Area (sq ft)      *          * 7125.41  *          *
* E.G. Slope (ft/ft)     *0.000950  * Area (sq ft)           *          * 7125.41  *          *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *          *54400.00  *          *
* Top Width (ft)         *  336.00  * Top Width (ft)         *          *  336.00  *          *
* Vel Total (ft/s)       *    7.63  * Avg. Vel. (ft/s)       *          *    7.63  *          *
* Max Chl Dpth (ft)      *   34.38  * Hydr. Depth (ft)       *          *   21.21  *          *
* Conv. Total (cfs)      *1765107.0  * Conv. (cfs)            *          *1765107.0  *          *
* Length Wtd. (ft)       *  792.58  * Wetted Per. (ft)       *          *  346.77  *          *
* Min Ch El (ft)         *  711.50  * Shear (lb/sq ft)       *          *    1.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    9.30  *          *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *  216.95  * 1340.05  *  262.50  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   57.36  *   63.26  *   79.59  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  749.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.             *          *   0.045  *   0.041  *
* W.S. Elev (ft)         *  748.23  * Reach Len. (ft)        *  870.00  *  793.00  *  725.00  *
* Crit W.S. (ft)         *  732.58  * Flow Area (sq ft)      *          * 7924.74  *   75.80  *
* E.G. Slope (ft/ft)     *0.000916  * Area (sq ft)           *          * 7924.74  * 1833.87  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *          *62930.16  *   69.84  *
* Top Width (ft)         * 1438.55  * Top Width (ft)         *          *  342.43  * 1096.12  *
* Vel Total (ft/s)       *    7.87  * Avg. Vel. (ft/s)       *          *    7.94  *    0.92  *
* Max Chl Dpth (ft)      *   36.73  * Hydr. Depth (ft)       *          *   23.14  *    0.55  *
* Conv. Total (cfs)      *2082113.0  * Conv. (cfs)            *          *2079805.0  *  2308.1  *
* Length Wtd. (ft)       *  792.43  * Wetted Per. (ft)       *          *  353.67  *  137.78  *
* Min Ch El (ft)         *  711.50  * Shear (lb/sq ft)       *          *    1.28  *    0.03  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *          *   10.17  *    0.03  *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)   *  297.55  * 1433.88  *  414.44  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   62.26  *   63.37  *  202.70  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	751.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.045	0.041
W.S. Elev (ft)	750.45	Reach Len. (ft)	870.00	793.00	725.00
Crit W.S. (ft)	734.33	Flow Area (sq ft)		8688.93	854.58
E.G. Slope (ft/ft)	0.000977	Area (sq ft)		8688.93	4806.16
Q Total (cfs)	75900.00	Flow (cfs)		74986.60	913.39
Top Width (ft)	2314.94	Top Width (ft)		347.61	1967.33
Vel Total (ft/s)	7.95	Avg. Vel. (ft/s)		8.63	1.07
Max Chl Dpth (ft)	38.95	Hydr. Depth (ft)		25.00	0.92
Conv. Total (cfs)	2428519.0	Conv. (cfs)		2399293.0	29225.2
Length Wtd. (ft)	792.03	Wetted Per. (ft)		359.31	932.31
Min Ch El (ft)	711.50	Shear (lb/sq ft)		1.47	0.06
Alpha	1.16	Stream Power (lb/ft s)		12.73	0.06
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	405.44	1546.77	891.97
C & E Loss (ft)	0.03	Cum SA (acres)	65.84	63.48	346.74

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	740.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.045	
W.S. Elev (ft)	739.79	Reach Len. (ft)	870.00	793.00	725.00
Crit W.S. (ft)	728.64	Flow Area (sq ft)		5194.51	
E.G. Slope (ft/ft)	0.001156	Area (sq ft)		5194.51	
Q Total (cfs)	38300.00	Flow (cfs)		38300.00	
Top Width (ft)	300.17	Top Width (ft)		300.17	
Vel Total (ft/s)	7.37	Avg. Vel. (ft/s)		7.37	
Max Chl Dpth (ft)	28.29	Hydr. Depth (ft)		17.31	
Conv. Total (cfs)	1126438.0	Conv. (cfs)		1126438.0	
Length Wtd. (ft)	792.97	Wetted Per. (ft)		308.66	
Min Ch El (ft)	711.50	Shear (lb/sq ft)		1.21	
Alpha	1.00	Stream Power (lb/ft s)		8.96	
Frctn Loss (ft)	1.07	Cum Volume (acre-ft)	75.97	1126.80	118.49
C & E Loss (ft)	0.03	Cum SA (acres)	30.28	62.53	37.13

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.493

INPUT
Description: COE River Station= 54685.86
Preliminary Model River Station (miles)=2.48

Ineffective flow on right is due to buildings and high ground upstream. Obstructions are buildings.
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	750	38.51	748	46.15	748	51.12	750	54.97	752
59.43	754	65.14	754	96.35	752	121.35	750	156.43	748
189.32	746	220.87	744	247.66	742	273.76	740	279.85	738
286.28	736	291.79	734	298.23	732	306.75	730	313.66	728
333.41	726	346.89	724	354.32	722	357.84	720	363.63	718
375.84	716	389.85	711.33	459.52	711.33	473.53	716	477.82	718
483.24	720	489.93	722	496.93	724	499.72	726	505.01	728
510	730	518.95	732	524.24	734	531.19	736	551.53	738
573.95	740	606.3	742	636.36	744	665.02	746	734	748
760.65	748	766.11	746	773.04	744	773.45	742	780.33	740

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  793.28     740  797.49     742  800.28     744  818.74     746  851.41     746
  861.09     744  870.27     742  873.97     742  880.27     744  885.36     746
  926.34     748 1065.33     748 1139.34     748  1685.5     748 2239.81     748
 2300.37     748 2328.11     748 2575.74     746 2961.23     744 2986.98     744
 3198.78     746 3216.69     748 3234.95     750 3269.25     752 3281.63     754
 3294.31     756 3307.27     758 3378.14     758 3415.75     758 3420.31     760
 3425.03     762 3428.28     764  3437.4     766 3442.88     768 3452.25     770
 3459.87     772 3471.32     774 3483.55     776 3520.59     778

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .067  273.76    .045  531.19    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        273.76  531.19              315     254     230             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2300 3520.59     760       F
Left Levee      Station=   66.49      Elevation=     754
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
       0      51     750     763     925     748  1081.5    2300     760

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  728.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  727.53  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  720.03  * Flow Area (sq ft)      *          * 1975.19  *          *
* E.G. Slope (ft/ft)     *0.001629  * Area (sq ft)           *          * 1975.19  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  185.52  * Top Width (ft)         *          *  185.52  *          *
* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *          *    6.33  *          *
* Max Chl Dpth (ft)      *   16.20  * Hydr. Depth (ft)       *          *   10.65  *          *
* Conv. Total (cfs)      *309745.2  * Conv. (cfs)            *          *309745.2  *          *
* Length Wtd. (ft)       *  254.00  * Wetted Per. (ft)       *          *  190.85  *          *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)       *          *    1.05  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.66  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *          *  517.00  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *   48.00  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  732.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.78  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  731.38  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  722.58  * Flow Area (sq ft)      *          * 2746.74  *          *
* E.G. Slope (ft/ft)     *0.001613  * Area (sq ft)           *          * 2746.74  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  215.32  * Top Width (ft)         *          *  215.32  *          *
* Vel Total (ft/s)       *    7.10  * Avg. Vel. (ft/s)       *          *    7.10  *          *
* Max Chl Dpth (ft)      *   20.05  * Hydr. Depth (ft)       *          *   12.76  *          *
* Conv. Total (cfs)      *485565.7  * Conv. (cfs)            *          *485565.7  *          *
* Length Wtd. (ft)       *  254.00  * Wetted Per. (ft)       *          *  221.74  *          *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)       *          *    1.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    8.85  *          *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *    1.44  *  702.36  *    4.45  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    2.27  *   53.79  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  735.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *          *   0.045  *          *
* W.S. Elev (ft)         *  734.37  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  724.79  * Flow Area (sq ft)      *          * 3421.76  *          *
* E.G. Slope (ft/ft)     *0.001622  * Area (sq ft)           *          * 3421.76  *          *
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* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)         *  234.77  * Top Width (ft)          *          *  234.77  *          *
* Vel Total (ft/s)       *    7.77  * Avg. Vel. (ft/s)        *          *    7.77  *          *
* Max Chl Dpth (ft)      *   23.04  * Hydr. Depth (ft)        *          *   14.57  *          *
* Conv. Total (cfs)      *660458.6  * Conv. (cfs)             *          *660458.6  *          *
* Length Wtd. (ft)       *  254.00  * Wetted Per. (ft)        *          *  242.12  *          *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)        *          *    1.43  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   11.13  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)    *   14.56  *  845.57  *   31.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    8.62  *   55.92  *   15.28  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

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*****************************************************************************************
* E.G. Elev (ft)         *  738.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.10  * Wt. n-Val.              *          *   0.045  *   0.065  *
* W.S. Elev (ft)         *  737.05  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  726.92  * Flow Area (sq ft)      *          * 4071.31  *    5.62  *
* E.G. Slope (ft/ft)     *0.001620  * Area (sq ft)           *          * 4071.31  *    5.62  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34196.64  *    3.36  *
* Top Width (ft)         *  258.98  * Top Width (ft)          *          *  248.29  *   10.69  *
* Vel Total (ft/s)       *    8.39  * Avg. Vel. (ft/s)        *          *    8.40  *    0.60  *
* Max Chl Dpth (ft)      *   25.72  * Hydr. Depth (ft)        *          *   16.40  *    0.53  *
* Conv. Total (cfs)      *849579.0  * Conv. (cfs)             *          *849495.6  *    83.4  *
* Length Wtd. (ft)       *  254.00  * Wetted Per. (ft)        *          *  256.31  *   10.74  *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)        *          *    1.61  *    0.05  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   13.50  *    0.03  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)    *   49.31  *  975.77  *   81.59  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   21.37  *   57.11  *   28.97  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  741.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.33  * Wt. n-Val.              *   0.067  *   0.045  *   0.065  *
* W.S. Elev (ft)         *  740.29  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  729.45  * Flow Area (sq ft)      *    0.54  * 4891.44  *   96.47  *
* E.G. Slope (ft/ft)     *0.001624  * Area (sq ft)           *    0.54  * 4891.44  *   96.47  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    0.13  *45357.59  *  142.28  *
* Top Width (ft)         *  308.64  * Top Width (ft)          *    3.77  *  257.43  *   47.43  *
* Vel Total (ft/s)       *    9.12  * Avg. Vel. (ft/s)        *    0.25  *    9.27  *    1.47  *
* Max Chl Dpth (ft)      *   28.96  * Hydr. Depth (ft)        *    0.14  *   19.00  *    2.03  *
* Conv. Total (cfs)      *1129042.0  * Conv. (cfs)            *     3.3  *1125508.0  *  3530.5  *
* Length Wtd. (ft)       *  253.96  * Wetted Per. (ft)        *    3.78  *  265.92  *   47.63  *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)        *    0.01  *    1.87  *    0.21  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.00  *   17.29  *    0.30  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)    *  133.92  * 1130.74  *  184.67  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   50.87  *   57.78  *   45.90  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  745.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.              *   0.067  *   0.045  *   0.065  *
* W.S. Elev (ft)         *  744.76  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  731.17  * Flow Area (sq ft)      *  149.53  * 6041.17  *  465.10  *
* E.G. Slope (ft/ft)     *0.001110  * Area (sq ft)           *  149.53  * 6041.17  *  569.71  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  192.60  *53315.02  *  892.38  *
* Top Width (ft)         *  689.51  * Top Width (ft)          *   64.80  *  257.43  *  367.27  *
* Vel Total (ft/s)       *    8.17  * Avg. Vel. (ft/s)        *    1.29  *    8.83  *    1.92  *
* Max Chl Dpth (ft)      *   33.43  * Hydr. Depth (ft)        *    2.31  *   23.47  *    4.01  *
* Conv. Total (cfs)      *1632694.0  * Conv. (cfs)            *  5780.4  *1600131.0  * 26782.7  *
* Length Wtd. (ft)       *  253.91  * Wetted Per. (ft)        *   64.98  *  265.92  *  116.33  *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)        *    0.16  *    1.57  *    0.28  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    0.21  *   13.90  *    0.53  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)    *  215.46  * 1220.20  *  257.76  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   56.72  *   57.86  *   76.54  *
```

```
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  748.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *   0.067  *   0.045  *   0.065  *
* W.S. Elev (ft)         *  747.16  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  732.66  * Flow Area (sq ft)      *  351.11  * 6659.44  *  798.49  *
* E.G. Slope (ft/ft)     *0.001044  * Area (sq ft)           *  351.11  * 6659.44  * 2256.90  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  567.14  *60805.29  * 1627.57  *
* Top Width (ft)         * 1311.31  * Top Width (ft)         *  103.46  *  257.43  *  950.41  *
* Vel Total (ft/s)       *    8.07  * Avg. Vel. (ft/s)       *    1.62  *    9.13  *    2.04  *
* Max Chl Dpth (ft)      *   35.83  * Hydr. Depth (ft)       *    3.39  *   25.87  *    4.59  *
* Conv. Total (cfs)      *1950212.0  * Conv. (cfs)           * 17556.3  *1882273.0  * 50382.6  *
* Length Wtd. (ft)       *  254.02  * Wetted Per. (ft)       *  103.71  *  265.92  *  174.20  *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)       *    0.22  *    1.63  *    0.30  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    0.36  *   14.90  *    0.61  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *  294.04  * 1301.12  *  380.39  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   61.22  *   57.91  *  185.67  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  750.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.48  * Wt. n-Val.             *   0.067  *   0.045  *   0.065  *
* W.S. Elev (ft)         *  749.24  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  734.66  * Flow Area (sq ft)      *  603.19  * 7195.74  * 1640.77  *
* E.G. Slope (ft/ft)     *0.001133  * Area (sq ft)           *  603.19  * 7195.74  * 4945.05  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1195.87  *72097.03  * 2607.10  *
* Top Width (ft)         * 1874.84  * Top Width (ft)         *  139.08  *  257.43  * 1478.32  *
* Vel Total (ft/s)       *    8.04  * Avg. Vel. (ft/s)       *    1.98  *   10.02  *    1.59  *
* Max Chl Dpth (ft)      *   37.91  * Hydr. Depth (ft)       *    4.34  *   27.95  *    2.98  *
* Conv. Total (cfs)      *2254606.0  * Conv. (cfs)           * 35523.4  *2141639.0  * 77443.6  *
* Length Wtd. (ft)       *  254.62  * Wetted Per. (ft)       *  139.39  *  265.92  *  553.04  *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)       *    0.31  *    1.91  *    0.21  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *    0.61  *   19.18  *    0.33  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  399.41  * 1402.19  *  810.83  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   64.45  *   57.98  *  318.07  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  739.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.18  * Wt. n-Val.             *          *   0.045  *   0.065  *
* W.S. Elev (ft)         *  738.35  * Reach Len. (ft)        *  315.00  *  254.00  *  230.00  *
* Crit W.S. (ft)         *  727.95  * Flow Area (sq ft)      *          * 4395.65  *   28.07  *
* E.G. Slope (ft/ft)     *0.001607  * Area (sq ft)           *          * 4395.65  *   28.07  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *          *38271.71  *   28.29  *
* Top Width (ft)         *  276.63  * Top Width (ft)         *          *  252.40  *   24.23  *
* Vel Total (ft/s)       *    8.66  * Avg. Vel. (ft/s)       *          *    8.71  *    1.01  *
* Max Chl Dpth (ft)      *   27.02  * Hydr. Depth (ft)       *          *   17.42  *    1.16  *
* Conv. Total (cfs)      *955301.3  * Conv. (cfs)           *          *954595.6  *   705.7  *
* Length Wtd. (ft)       *  253.99  * Wetted Per. (ft)       *          *  260.62  *   24.34  *
* Min Ch El (ft)         *  711.33  * Shear (lb/sq ft)       *          *    1.69  *    0.12  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *          *   14.74  *    0.12  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *   75.97  * 1039.51  *  118.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   30.28  *   57.50  *   36.93  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION
```

```
RIVER: Blue River
REACH: Main                RS: 2.445

INPUT
Description: COE River Station= 54940.32
Preliminary Model River Station
             (miles)=2.43

Norfolk Southern RR.  B4 (upstream).  Ineffective
             flow on right is due to buildings and high ground upstream.
             Obstructions are buildings.
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     746    8.43     748   16.59     750   39.34     750   52.43     748
    62.4     746  432.99   746.4     433     740     464   725.9     482   725.7
     524     711     604     711     695  741.25  695.01   746.4  808.05     748
  915.56     748  939.49     748  951.61     748  960.85     746  981.47     746
 1013.07     748  1051.4     748 1240.45     748 2708.82     746 3107.71     744
 3162.38     744 3285.63     746 3339.63     748 3349.04     750 3359.88     752
 3370.18     754 3380.48     756 3388.13     758 3420.42     760 3438.88     760
 3463.18     758 3465.04     758  3468.8     760  3475.8     762 3477.18     764
 3485.72     766 3488.95     768  3496.4     770 3503.09     772 3510.59     774
  3516.8     776 3534.07     778 3567.96     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .067     433     .05     695    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             433     695             26      26      26              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
    2350 3567.96     760       F
Left Levee      Station=    25.1      Elevation=     750
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1133    2350     760

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  727.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  727.15  * Reach Len. (ft)        *    2.50  *    2.50  *    2.50  *
* Crit W.S. (ft)         *  719.21  * Flow Area (sq ft)      *          * 2079.28  *          *
* E.G. Slope (ft/ft)     *0.001764  * Area (sq ft)           *          * 2079.28  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  191.31  * Top Width (ft)         *          *  191.31  *          *
* Vel Total (ft/s)       *    6.01  * Avg. Vel. (ft/s)       *          *    6.01  *          *
* Max Chl Dpth (ft)      *   16.15  * Hydr. Depth (ft)       *          *   10.87  *          *
* Conv. Total (cfs)      *297633.3  * Conv. (cfs)            *          *297633.3  *          *
* Length Wtd. (ft)       *    2.50  * Wetted Per. (ft)       *          *  196.70  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    7.00  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  505.18  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   46.90  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  731.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  731.00  * Reach Len. (ft)        *    2.50  *    2.50  *    2.50  *
* Crit W.S. (ft)         *  721.67  * Flow Area (sq ft)      *          * 2855.29  *          *
* E.G. Slope (ft/ft)     *0.001713  * Area (sq ft)           *          * 2855.29  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  211.38  * Top Width (ft)         *          *  211.38  *          *
* Vel Total (ft/s)       *    6.83  * Avg. Vel. (ft/s)       *          *    6.83  *          *
* Max Chl Dpth (ft)      *   20.00  * Hydr. Depth (ft)       *          *   13.51  *          *
* Conv. Total (cfs)      *471165.6  * Conv. (cfs)            *          *471165.6  *          *
```

```
* Length Wtd. (ft)       *    2.50  * Wetted Per. (ft)       *          *  218.22  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    9.56  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.44  *  686.03  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    2.27  *   52.55  *    6.45  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  734.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.89  * Wt. n-Val.             *          *    0.050  *          *
* W.S. Elev (ft)         *  733.97  * Reach Len. (ft)        *    2.50  *    2.50  *    2.50  *
* Crit W.S. (ft)         *  723.82  * Flow Area (sq ft)      *          * 3506.78  *          *
* E.G. Slope (ft/ft)     *0.001772  * Area (sq ft)           *          * 3506.78  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  226.86  * Top Width (ft)         *          *  226.86  *          *
* Vel Total (ft/s)       *    7.59  * Avg. Vel. (ft/s)       *          *    7.59  *          *
* Max Chl Dpth (ft)      *   22.97  * Hydr. Depth (ft)       *          *   15.46  *          *
* Conv. Total (cfs)      *631980.5  * Conv. (cfs)            *          *631980.5  *          *
* Length Wtd. (ft)       *    2.50  * Wetted Per. (ft)       *          *  234.83  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.65  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   12.53  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.56  *  825.37  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    8.62  *   54.57  *   15.28  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  737.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.07  * Wt. n-Val.             *          *    0.050  *          *
* W.S. Elev (ft)         *  736.63  * Reach Len. (ft)        *    2.50  *    2.50  *    2.50  *
* Crit W.S. (ft)         *  726.14  * Flow Area (sq ft)      *          * 4128.64  *          *
* E.G. Slope (ft/ft)     *0.001844  * Area (sq ft)           *          * 4128.64  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  240.71  * Top Width (ft)         *          *  240.71  *          *
* Vel Total (ft/s)       *    8.28  * Avg. Vel. (ft/s)       *          *    8.28  *          *
* Max Chl Dpth (ft)      *   25.63  * Hydr. Depth (ft)       *          *   17.15  *          *
* Conv. Total (cfs)      *796352.6  * Conv. (cfs)            *          *796352.6  *          *
* Length Wtd. (ft)       *    2.50  * Wetted Per. (ft)       *          *  249.69  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.90  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   15.77  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   49.31  *  951.86  *   81.57  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   21.37  *   55.68  *   28.94  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  741.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.32  * Wt. n-Val.             *          *    0.050  *          *
* W.S. Elev (ft)         *  739.84  * Reach Len. (ft)        *    2.50  *    2.50  *    2.50  *
* Crit W.S. (ft)         *  728.48  * Flow Area (sq ft)      *          * 4926.90  *          *
* E.G. Slope (ft/ft)     *0.001986  * Area (sq ft)           *          * 4926.90  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *          *45500.00  *          *
* Top Width (ft)         *  257.40  * Top Width (ft)         *          *  257.40  *          *
* Vel Total (ft/s)       *    9.24  * Avg. Vel. (ft/s)       *          *    9.24  *          *
* Max Chl Dpth (ft)      *   28.84  * Hydr. Depth (ft)       *          *   19.14  *          *
* Conv. Total (cfs)      *1020944.0  * Conv. (cfs)            *          *1020944.0  *          *
* Length Wtd. (ft)       *    2.50  * Wetted Per. (ft)       *          *  267.59  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    2.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   21.08  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *  133.91  * 1102.11  *  184.42  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   50.86  *   56.28  *   45.77  *
*****************************************************************************************
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	745.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.	0.001	0.050	0.000
W.S. Elev (ft)	744.39	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	730.12	Flow Area (sq ft)	0.02	6116.79	0.01
E.G. Slope (ft/ft)	0.001414	Area (sq ft)	0.02	6116.79	41.50
Q Total (cfs)	54400.00	Flow (cfs)	0.00	54400.00	0.00
Top Width (ft)	419.03	Top Width (ft)		262.00	157.02
Vel Total (ft/s)	8.89	Avg. Vel. (ft/s)	0.02	8.89	0.02
Max Chl Dpth (ft)	33.39	Hydr. Depth (ft)	2.20	23.35	1.57
Conv. Total (cfs)	1446676.0	Conv. (cfs)	0.0	1446676.0	0.0
Length Wtd. (ft)	2.50	Wetted Per. (ft)	4.39	272.45	3.14
Min Ch El (ft)	711.00	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)		17.63	
Frctn Loss (ft)		Cum Volume (acre-ft)	214.92	1184.75	256.14
C & E Loss (ft)		Cum SA (acres)	56.48	56.35	75.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	748.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.35	Wt. n-Val.	0.067	0.050	0.065
W.S. Elev (ft)	746.74	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	731.59	Flow Area (sq ft)	203.11	6733.07	25.22
E.G. Slope (ft/ft)	0.001372	Area (sq ft)	203.11	6733.07	1272.85
Q Total (cfs)	63000.00	Flow (cfs)	109.73	62876.86	13.41
Top Width (ft)	1652.18	Top Width (ft)	374.31	262.00	1015.87
Vel Total (ft/s)	9.05	Avg. Vel. (ft/s)	0.54	9.34	0.53
Max Chl Dpth (ft)	35.74	Hydr. Depth (ft)	0.54	25.70	0.42
Conv. Total (cfs)	1700999.0	Conv. (cfs)	2962.7	1697675.0	362.1
Length Wtd. (ft)	2.50	Wetted Per. (ft)	380.77	272.45	65.39
Min Ch El (ft)	711.00	Shear (lb/sq ft)	0.05	2.12	0.03
Alpha	1.06	Stream Power (lb/ft s)	0.02	19.76	0.02
Frctn Loss (ft)		Cum Volume (acre-ft)	292.04	1262.08	371.08
C & E Loss (ft)		Cum SA (acres)	59.50	56.40	180.48

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	750.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.	0.067	0.050	0.065
W.S. Elev (ft)	748.84	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	733.64	Flow Area (sq ft)	998.81	7281.99	540.19
E.G. Slope (ft/ft)	0.001455	Area (sq ft)	998.81	7281.99	3841.56
Q Total (cfs)	75900.00	Flow (cfs)	1574.30	73789.12	536.59
Top Width (ft)	2079.64	Top Width (ft)	386.06	262.00	1431.58
Vel Total (ft/s)	8.60	Avg. Vel. (ft/s)	1.58	10.13	0.99
Max Chl Dpth (ft)	37.84	Hydr. Depth (ft)	2.59	27.79	1.23
Conv. Total (cfs)	1989901.0	Conv. (cfs)	41273.9	1934560.0	14067.9
Length Wtd. (ft)	2.50	Wetted Per. (ft)	392.72	272.45	444.27
Min Ch El (ft)	711.00	Shear (lb/sq ft)	0.23	2.43	0.11
Alpha	1.35	Stream Power (lb/ft s)	0.36	24.60	0.11
Frctn Loss (ft)		Cum Volume (acre-ft)	393.62	1359.98	787.63
C & E Loss (ft)		Cum SA (acres)	62.55	56.46	310.38

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	739.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.		0.050	
W.S. Elev (ft)	737.92	Reach Len. (ft)	2.50	2.50	2.50
Crit W.S. (ft)	727.04	Flow Area (sq ft)		4443.00	
E.G. Slope (ft/ft)	0.001881	Area (sq ft)		4443.00	
Q Total (cfs)	38300.00	Flow (cfs)		38300.00	

```
* Top Width (ft)         *  247.42  * Top Width (ft)         *          *  247.42  *          *
* Vel Total (ft/s)       *    8.62  * Avg. Vel. (ft/s)       *          *    8.62  *          *
* Max Chl Dpth (ft)      *   26.92  * Hydr. Depth (ft)       *          *   17.96  *          *
* Conv. Total (cfs)      *883074.1  * Conv. (cfs)            *          *883074.1  *          *
* Length Wtd. (ft)       *    2.50  * Wetted Per. (ft)       *          *  256.88  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    2.03  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   17.51  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   75.97  * 1013.74  *  118.18  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   30.28  *   56.04  *   36.87  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 2.443

INPUT
Description: Bridge B4.  Norfolk Southern RR Bridge.  Bridge is normal to flow.
               Piers are aligned with channel flow
Distance from Upstream XS =     2.5
Deck/Roadway Width        =      21
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**************************************************
  432.99   746.4   739.9  695.01   746.4   739.9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     746    8.43     748   16.59     750   39.34     750   52.43     748
    62.4     746  432.99   746.4     433     740     464   725.9     482   725.7
     524     711     604     711     695  741.25  695.01   746.4  808.05     748
  915.56     748  939.49     748  951.61     748  960.85     746  981.47     746
 1013.07     748  1051.4     748 1240.45     748 2708.82     746 3107.71     744
 3162.38     744 3285.63     746 3339.63     748 3349.04     750 3359.88     752
 3370.18     754 3380.48     756 3388.13     758 3420.42     760 3438.88     760
 3463.18     758 3465.04     758  3468.8     760  3475.8     762 3477.18     764
 3485.72     766 3488.95     768  3496.4     770 3503.09     772 3510.59     774
  3516.8     776 3534.07     778 3567.96     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .067     433     .05     695    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
            433     695          .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
    2350 3567.96     760        F
Left Levee      Station=    25.1      Elevation=     750
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1133    2350     760

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
  432.99   746.4   739.9     433   746.4   739.9     564   746.4   739.9
     695   746.4   739.9  695.01   746.4   739.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     746   12.39     748   23.08     750   31.44     749   35.64     748
   39.94     746  402.96     746  432.99   746.4     433   741.4     464   725.9
```

```
     482   725.7     524     711     604     711     695  741.25  695.01   746.4
  747.91     748  931.53     748 1205.45     748 1536.86     748 1550.18     748
 2813.68     746 2971.45     744 3005.61     744 3133.53     744 3184.63     744
 3281.47     746 3341.89     748 3359.34     750 3368.61     752 3378.64     754
 3389.03     756 3399.02     758 3419.33     760 3449.13     760 3464.78     760
 3473.33     762 3478.42     764 3485.09     766 3489.56     768 3496.43     770
 3501.97     772 3509.59     774 3515.04     776 3522.84     778 3530.85     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0    .067     433     .05     695    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
           433     695            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2350 3530.85     760       F
Left Levee      Station=   21.92      Elevation=     750
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
 1107.25    2350     760

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=     514    Downstream=     514
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
****************************************************************
      11     711      11     733    12.5  733.01    12.5     745
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
****************************************************************
      11     711      11     733    12.5  733.01    12.5     745

Pier Data
Pier Station     Upstream=     614    Downstream=     614
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
****************************************************************
      11     711      11     733    12.5  733.01    12.5     745
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
****************************************************************
      11     711      11     733    12.5  733.01    12.5     745

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.39
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =    .468
           Submerged Inlet + Outlet Cd =    .768
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

BRIDGE OUTPUT Profile #2-yr

E.G. US. (ft)	727.71	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	727.15	E.G. Elev (ft)	727.75	727.75
Q Total (cfs)	12500.00	W.S. Elev (ft)	726.98	726.98
Q Bridge (cfs)	12500.00	Crit W.S. (ft)	719.78	719.78
Q Weir (cfs)		Max Chl Dpth (ft)	15.98	15.98
Weir Sta Lft (ft)		Vel Total (ft/s)	7.06	7.06
Weir Sta Rgt (ft)		Flow Area (sq ft)	1770.71	1770.60
Weir Submerg		Froude # Chl	0.38	0.38
Weir Max Depth (ft)		Specif Force (cu ft)	15202.64	15202.78
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	10.51	10.53
Min El Prs (ft)	739.90	W.P. Total (ft)	222.78	222.58
Delta EG (ft)	0.15	Conv. Total (cfs)	209584.3	209682.9
Delta WS (ft)	0.17	Top Width (ft)	168.44	168.22
BR Open Area (sq ft)	4341.75	Frctn Loss (ft)		
BR Open Vel (ft/s)	7.06	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	1.77	1.76
Br Sel Method	Yarnell	Power Total (lb/ft s)	12.46	12.46

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #5-yr

E.G. US. (ft)	731.72	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	731.00	E.G. Elev (ft)	731.77	731.78
Q Total (cfs)	19500.00	W.S. Elev (ft)	730.79	730.79
Q Bridge (cfs)	19500.00	Crit W.S. (ft)	722.60	722.60
Q Weir (cfs)		Max Chl Dpth (ft)	19.79	19.79
Weir Sta Lft (ft)		Vel Total (ft/s)	7.96	7.96
Weir Sta Rgt (ft)		Flow Area (sq ft)	2450.78	2448.41
Weir Submerg		Froude # Chl	0.39	0.39
Weir Max Depth (ft)		Specif Force (cu ft)	25304.51	25305.31
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	13.02	13.07
Min El Prs (ft)	739.90	W.P. Total (ft)	259.32	258.45
Delta EG (ft)	0.19	Conv. Total (cfs)	325564.9	325773.9
Delta WS (ft)	0.21	Top Width (ft)	188.29	187.32
BR Open Area (sq ft)	4341.75	Frctn Loss (ft)		
BR Open Vel (ft/s)	7.96	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	2.12	2.12
Br Sel Method	Yarnell	Power Total (lb/ft s)	16.84	16.88

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #10-yr

E.G. US. (ft)	734.87	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	733.97	E.G. Elev (ft)	734.92	734.92
Q Total (cfs)	26600.00	W.S. Elev (ft)	733.71	733.71
Q Bridge (cfs)	26600.00	Crit W.S. (ft)	724.95	724.95
Q Weir (cfs)		Max Chl Dpth (ft)	22.71	22.71
Weir Sta Lft (ft)		Vel Total (ft/s)	8.81	8.82
Weir Sta Rgt (ft)		Flow Area (sq ft)	3020.96	3014.90
Weir Submerg		Froude # Chl	0.44	0.44
Weir Max Depth (ft)		Specif Force (cu ft)	35744.09	35742.93
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	15.07	15.15
Min El Prs (ft)	739.90	W.P. Total (ft)	290.29	288.89
Delta EG (ft)	0.23	Conv. Total (cfs)	427938.2	427885.6
Delta WS (ft)	0.26	Top Width (ft)	200.50	198.95
BR Open Area (sq ft)	4341.75	Frctn Loss (ft)		
BR Open Vel (ft/s)	8.82	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	2.51	2.52
Br Sel Method	Yarnell	Power Total (lb/ft s)	22.10	22.22

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #20-yr

E.G. US. (ft)	737.70	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	736.63	E.G. Elev (ft)	737.75	737.75	
Q Total (cfs)	34200.00	W.S. Elev (ft)	736.31	736.31	
Q Bridge (cfs)	34200.00	Crit W.S. (ft)	727.38	727.37	
Q Weir (cfs)		Max Chl Dpth (ft)	25.31	25.31	
Weir Sta Lft (ft)		Vel Total (ft/s)	9.61	9.64	
Weir Sta Rgt (ft)		Flow Area (sq ft)	3559.93	3549.16	
Weir Submerg		Froude # Chl	0.44	0.44	
Weir Max Depth (ft)		Specif Force (cu ft)	47222.36	47215.95	
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	16.63	16.74	
Min El Prs (ft)	739.90	W.P. Total (ft)	315.21	313.35	
Delta EG (ft)	0.27	Conv. Total (cfs)	532546.8	531967.3	
Delta WS (ft)	0.32	Top Width (ft)	214.04	211.97	
BR Open Area (sq ft)	4341.75	Frctn Loss (ft)			
BR Open Vel (ft/s)	9.64	C & E Loss (ft)			
Coef of Q		Shear Total (lb/sq ft)	2.91	2.92	
Br Sel Method	Yarnell	Power Total (lb/ft s)	27.94	28.16	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #50-yr

E.G. US. (ft)	741.16	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	739.84	E.G. Elev (ft)	741.11	741.00	
Q Total (cfs)	45500.00	W.S. Elev (ft)	739.31	739.16	
Q Bridge (cfs)	45500.00	Crit W.S. (ft)	729.87	729.85	
Q Weir (cfs)		Max Chl Dpth (ft)	28.31	28.16	
Weir Sta Lft (ft)		Vel Total (ft/s)	10.77	10.90	
Weir Sta Rgt (ft)		Flow Area (sq ft)	4223.95	4172.64	
Weir Submerg		Froude # Chl	0.45	0.45	
Weir Max Depth (ft)		Specif Force (cu ft)	63878.17	63366.81	
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	18.39	18.44	
Min El Prs (ft)	739.90	W.P. Total (ft)	343.90	340.11	
Delta EG (ft)	0.30	Conv. Total (cfs)	668238.3	659621.3	
Delta WS (ft)	0.37	Top Width (ft)	229.63	226.23	
BR Open Area (sq ft)	4341.75	Frctn Loss (ft)	0.10	0.01	
BR Open Vel (ft/s)	10.90	C & E Loss (ft)	0.00	0.14	
Coef of Q		Shear Total (lb/sq ft)	3.55	3.64	
Br Sel Method	Energy only	Power Total (lb/ft s)	38.29	39.74	

Warning: The sluice gate calculations did not converge during the pressure flow only calculation.
Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	745.62	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	744.39	E.G. Elev (ft)	745.62	743.10	
Q Total (cfs)	54400.00	W.S. Elev (ft)	739.90	739.90	
Q Bridge (cfs)	54400.00	Crit W.S. (ft)	731.63	731.60	
Q Weir (cfs)		Max Chl Dpth (ft)	28.90	28.90	
Weir Sta Lft (ft)		Vel Total (ft/s)	12.47	12.53	
Weir Sta Rgt (ft)		Flow Area (sq ft)	4361.21	4341.75	
Weir Submerg		Froude # Chl	0.51	0.51	
Weir Max Depth (ft)		Specif Force (cu ft)	72279.04	72282.68	
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	2232940.00	1481984.00	
Min El Prs (ft)	739.90	W.P. Total (ft)	582.31	577.02	
Delta EG (ft)	2.52	Conv. Total (cfs)	496134.3	495455.5	

```
* Delta WS (ft)          *       2.90  * Top Width (ft)         *             *             *
* BR Open Area (sq ft)   *    4341.75  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      12.53  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       5.62  *       5.66  *
* Br Sel Method          * Press Only  * Power Total (lb/ft s)  *      70.12  *      70.96  *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*******************************************************************************************
* E.G. US. (ft)          *     748.10  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     746.74  * E.G. Elev (ft)         *     748.10  *     747.84  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     746.74  *     746.74  *
* Q Bridge (cfs)         *   58560.64  * Crit W.S. (ft)         *     733.11  *     733.07  *
* Q Weir (cfs)           *    4439.36  * Max Chl Dpth (ft)      *      35.74  *      35.74  *
* Weir Sta Lft (ft)      *      51.80  * Vel Total (ft/s)       *      13.46  *      13.34  *
* Weir Sta Rgt (ft)      *    1133.00  * Flow Area (sq ft)      *    4679.67  *    4721.03  *
* Weir Submerg           *       0.00  * Froude # Chl           *       0.47  *       0.47  *
* Weir Max Depth (ft)    *       2.10  * Specif Force (cu ft)   *  108404.60  *  108128.20  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *       6.72  *       7.07  *
* Min El Prs (ft)        *     739.90  * W.P. Total (ft)        *    1278.95  *    1245.25  *
* Delta EG (ft)          *       2.96  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       3.44  * Top Width (ft)         *    1652.18  *    1622.01  *
* BR Open Area (sq ft)   *    4341.75  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      13.49  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*******************************************************************************************

Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is above the minimum elevation required for orifice flow.  The
         orifice flow equation was used for pressure flow.
Note:    For the cross section inside the bridge at the upstream end, the water surface and energy have
         been projected from the upstream cross section.  The selected bridge modeling method does
         not compute answers inside the bridge.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    For the cross section inside the bridge at the downstream end, the energy is based on critical
         depth over the weir.  The water surface has been projected.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*******************************************************************************************
* E.G. US. (ft)          *     750.39  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     748.84  * E.G. Elev (ft)         *     750.39  *     750.18  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     748.84  *     748.84  *
* Q Bridge (cfs)         *   57257.06  * Crit W.S. (ft)         *     735.29  *     735.26  *
* Q Weir (cfs)           *   18642.94  * Max Chl Dpth (ft)      *      37.84  *      37.84  *
* Weir Sta Lft (ft)      *       0.00  * Vel Total (ft/s)       *      11.61  *      11.70  *
* Weir Sta Rgt (ft)      *    1133.00  * Flow Area (sq ft)      *    6539.26  *    6488.63  *
* Weir Submerg           *       0.00  * Froude # Chl           *       0.39  *       0.39  *
* Weir Max Depth (ft)    *       4.39  * Specif Force (cu ft)   *  122769.60  *  122601.70  *
* Min El Weir Flow (ft)  *     746.01  * Hydr Depth (ft)        *       6.02  *       6.04  *
* Min El Prs (ft)        *     739.90  * W.P. Total (ft)        *    1669.77  *    1653.57  *
* Delta EG (ft)          *       2.44  * Conv. Total (cfs)      *             *             *
* Delta WS (ft)          *       3.03  * Top Width (ft)         *    2079.64  *    2074.35  *
* BR Open Area (sq ft)   *    4341.75  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      13.19  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *             *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *             *             *
*******************************************************************************************
```

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.
Note: For the cross section inside the bridge at the upstream end, the water surface and energy have been projected from the upstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: For the cross section inside the bridge at the downstream end, the energy is based on critical depth over the weir. The water surface has been projected.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	739.08	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	737.92	E.G. Elev (ft)	739.12	739.13
Q Total (cfs)	38300.00	W.S. Elev (ft)	737.57	737.57
Q Bridge (cfs)	38300.00	Crit W.S. (ft)	728.32	728.29
Q Weir (cfs)		Max Chl Dpth (ft)	26.57	26.57
Weir Sta Lft (ft)		Vel Total (ft/s)	9.99	10.03
Weir Sta Rgt (ft)		Flow Area (sq ft)	3833.04	3819.52
Weir Submerg		Froude # Chl	0.44	0.44
Weir Max Depth (ft)		Specif Force (cu ft)	53548.48	53537.95
Min El Weir Flow (ft)	746.01	Hydr Depth (ft)	17.38	17.50
Min El Prs (ft)	739.90	W.P. Total (ft)	327.26	325.17
Delta EG (ft)	0.30	Conv. Total (cfs)	587493.0	586545.0
Delta WS (ft)	0.35	Top Width (ft)	220.59	218.27
BR Open Area (sq ft)	4341.75	Frctn Loss (ft)		
BR Open Vel (ft/s)	10.03	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	3.11	3.13
Br Sel Method	Yarnell	Power Total (lb/ft s)	31.05	31.35

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.440

INPUT
Description: COE River Station= 54966.02
Preliminary Model River Station
(miles)=2.42

Norfolk Southern RR. B4 (downstream).
Ineffective flow on right is due to buildings and high ground upstream. Obstructions are buildings. Piers are aligned with flow. Underwater channel shown on bridge plans.

Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	746	12.39	748	23.08	750	31.44	749	35.64	748
39.94	746	402.96	746	432.99	746.4	433	741.4	464	725.9
482	725.7	524	711	604	711	695	741.25	695.01	746.4
747.91	748	931.53	748	1205.45	748	1536.86	748	1550.18	748
2813.68	746	2971.45	744	3005.61	744	3133.53	744	3184.63	744
3281.47	746	3341.89	748	3359.34	750	3368.61	752	3378.64	754
3389.03	756	3399.02	758	3419.33	760	3449.13	760	3464.78	760
3473.33	762	3478.42	764	3485.09	766	3489.56	768	3496.43	770
3501.97	772	3509.59	774	3515.04	776	3522.84	778	3530.85	780

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.067	433	.05	695	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
           433     695              239     272     302             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    2350 3530.85     760       F
Left Levee      Station=   21.92      Elevation=     750
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
 1107.25    2350     760

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  727.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  726.98  * Reach Len. (ft)        *  239.00  *  272.00  *  302.00  *
* Crit W.S. (ft)         *  719.21  * Flow Area (sq ft)      *          * 2047.06  *          *
* E.G. Slope (ft/ft)     *0.001844  * Area (sq ft)           *          * 2047.06  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  190.22  * Top Width (ft)         *          *  190.22  *          *
* Vel Total (ft/s)       *    6.11  * Avg. Vel. (ft/s)       *          *    6.11  *          *
* Max Chl Dpth (ft)      *   15.98  * Hydr. Depth (ft)       *          *   10.76  *          *
* Conv. Total (cfs)      *291104.4  * Conv. (cfs)             *          *291104.4  *          *
* Length Wtd. (ft)       *  272.00  * Wetted Per. (ft)       *          *  195.56  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.20  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    7.36  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *          *  504.11  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   46.80  *          *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)         *  731.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  730.79  * Reach Len. (ft)        *  239.00  *  272.00  *  302.00  *
* Crit W.S. (ft)         *  721.70  * Flow Area (sq ft)      *          * 2808.75  *          *
* E.G. Slope (ft/ft)     *0.001787  * Area (sq ft)           *          * 2808.75  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  209.32  * Top Width (ft)         *          *  209.32  *          *
* Vel Total (ft/s)       *    6.94  * Avg. Vel. (ft/s)       *          *    6.94  *          *
* Max Chl Dpth (ft)      *   19.79  * Hydr. Depth (ft)       *          *   13.42  *          *
* Conv. Total (cfs)      *461324.8  * Conv. (cfs)             *          *461324.8  *          *
* Length Wtd. (ft)       *  272.00  * Wetted Per. (ft)       *          *  216.18  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.45  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.06  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *    1.44  *  684.55  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.27  *   52.44  *    6.45  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)         *  734.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.93  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  733.71  * Reach Len. (ft)        *  239.00  *  272.00  *  302.00  *
* Crit W.S. (ft)         *  723.82  * Flow Area (sq ft)      *          * 3441.64  *          *
* E.G. Slope (ft/ft)     *0.001855  * Area (sq ft)           *          * 3441.64  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  223.95  * Top Width (ft)         *          *  223.95  *          *
* Vel Total (ft/s)       *    7.73  * Avg. Vel. (ft/s)       *          *    7.73  *          *
* Max Chl Dpth (ft)      *   22.71  * Hydr. Depth (ft)       *          *   15.37  *          *
* Conv. Total (cfs)      *617558.0  * Conv. (cfs)             *          *617558.0  *          *
* Length Wtd. (ft)       *  271.98  * Wetted Per. (ft)       *          *  231.97  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.72  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   13.28  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *   14.56  *  823.55  *   31.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    8.62  *   54.45  *   15.28  *
*********************************************************************************************
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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  737.43  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  736.31  * Reach Len. (ft)        *  239.00  *  272.00  *  302.00  *
* Crit W.S. (ft)         *  726.16  * Flow Area (sq ft)      *          * 4040.90  *          *
* E.G. Slope (ft/ft)     *0.001943  * Area (sq ft)           *          * 4040.90  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *34200.00  *          *
* Top Width (ft)         *  236.97  * Top Width (ft)         *          *  236.97  *          *
* Vel Total (ft/s)       *    8.46  * Avg. Vel. (ft/s)       *          *    8.46  *          *
* Max Chl Dpth (ft)      *   25.31  * Hydr. Depth (ft)       *          *   17.05  *          *
* Conv. Total (cfs)      *775947.4  * Conv. (cfs)            *          *775947.4  *          *
* Length Wtd. (ft)       *  271.76  * Wetted Per. (ft)       *          *  246.03  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.99  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   16.86  *          *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *   49.31  *  949.71  *   81.57  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   21.37  *   55.55  *   28.94  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  740.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.39  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  739.47  * Reach Len. (ft)        *  239.00  *  272.00  *  302.00  *
* Crit W.S. (ft)         *  728.46  * Flow Area (sq ft)      *          * 4814.68  *          *
* E.G. Slope (ft/ft)     *0.002097  * Area (sq ft)           *          * 4814.68  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)         *  252.80  * Top Width (ft)         *          *  252.80  *          *
* Vel Total (ft/s)       *    9.45  * Avg. Vel. (ft/s)       *          *    9.45  *          *
* Max Chl Dpth (ft)      *   28.47  * Hydr. Depth (ft)       *          *   19.05  *          *
* Conv. Total (cfs)      *993599.9  * Conv. (cfs)            *          *993599.9  *          *
* Length Wtd. (ft)       *  271.08  * Wetted Per. (ft)       *          *  263.11  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    2.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   22.64  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *  133.91  * 1099.57  *  184.42  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   50.86  *   56.15  *   45.77  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  743.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.62  * Wt. n-Val.             *          *   0.050  *          *
* W.S. Elev (ft)         *  741.49  * Reach Len. (ft)        *  239.00  *  272.00  *  302.00  *
* Crit W.S. (ft)         *  730.10  * Flow Area (sq ft)      *          * 5334.18  *          *
* E.G. Slope (ft/ft)     *0.002238  * Area (sq ft)           *    0.00  * 5334.18  *    0.00  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              *          *54400.00  *          *
* Top Width (ft)         *  262.00  * Top Width (ft)         *          *  262.00  *          *
* Vel Total (ft/s)       *   10.20  * Avg. Vel. (ft/s)       *          *   10.20  *          *
* Max Chl Dpth (ft)      *   30.49  * Hydr. Depth (ft)       *          *   20.36  *          *
* Conv. Total (cfs)      *1149841.0  * Conv. (cfs)            *          *1149841.0  *          *
* Length Wtd. (ft)       *  270.64  * Wetted Per. (ft)       *          *  273.05  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    2.73  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   27.84  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *  214.92  * 1182.08  *  256.14  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   56.48  *   56.33  *   75.15  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

energy was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	745.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.83	Wt. n-Val.	0.000	0.050	0.000
W.S. Elev (ft)	743.31	Reach Len. (ft)	239.00	272.00	302.00
Crit W.S. (ft)	731.58	Flow Area (sq ft)	0.00	5810.65	0.00
E.G. Slope (ft/ft)	0.002257	Area (sq ft)	0.00	5810.65	0.00
Q Total (cfs)	63000.00	Flow (cfs)	0.00	63000.00	0.00
Top Width (ft)	262.01	Top Width (ft)		262.00	
Vel Total (ft/s)	10.84	Avg. Vel. (ft/s)	0.02	10.84	0.02
Max Chl Dpth (ft)	32.31	Hydr. Depth (ft)	0.95	22.18	1.04
Conv. Total (cfs)	1326071.0	Conv. (cfs)	0.0	1326071.0	0.0
Length Wtd. (ft)	270.26	Wetted Per. (ft)	1.91	273.05	2.04
Min Ch El (ft)	711.00	Shear (lb/sq ft)		3.00	
Alpha	1.00	Stream Power (lb/ft s)		32.51	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	291.90	1259.32	370.37
C & E Loss (ft)	0.15	Cum SA (acres)	59.28	56.24	179.91

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	747.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.14	Wt. n-Val.	0.067	0.050	0.065
W.S. Elev (ft)	745.81	Reach Len. (ft)	239.00	272.00	302.00
Crit W.S. (ft)	733.63	Flow Area (sq ft)	0.02	6467.11	0.02
E.G. Slope (ft/ft)	0.002293	Area (sq ft)	0.02	6467.11	595.27
Q Total (cfs)	75900.00	Flow (cfs)	0.00	75900.00	0.00
Top Width (ft)	705.87	Top Width (ft)		262.00	443.86
Vel Total (ft/s)	11.74	Avg. Vel. (ft/s)	0.03	11.74	0.03
Max Chl Dpth (ft)	34.81	Hydr. Depth (ft)	2.21	24.68	2.29
Conv. Total (cfs)	1585047.0	Conv. (cfs)	0.0	1585047.0	0.0
Length Wtd. (ft)	269.79	Wetted Per. (ft)	4.41	273.05	4.55
Min Ch El (ft)	711.00	Shear (lb/sq ft)	0.00	3.39	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	39.79	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	393.02	1356.89	785.48
C & E Loss (ft)	0.23	Cum SA (acres)	62.32	56.31	309.56

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	738.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.050	
W.S. Elev (ft)	737.57	Reach Len. (ft)	239.00	272.00	302.00
Crit W.S. (ft)	727.02	Flow Area (sq ft)		4342.68	
E.G. Slope (ft/ft)	0.001987	Area (sq ft)		4342.68	
Q Total (cfs)	38300.00	Flow (cfs)		38300.00	
Top Width (ft)	243.27	Top Width (ft)		243.27	
Vel Total (ft/s)	8.82	Avg. Vel. (ft/s)		8.82	
Max Chl Dpth (ft)	26.57	Hydr. Depth (ft)		17.85	
Conv. Total (cfs)	859167.0	Conv. (cfs)		859167.0	
Length Wtd. (ft)	271.50	Wetted Per. (ft)		252.82	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		2.13	
Alpha	1.00	Stream Power (lb/ft s)		18.79	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	75.97	1011.43	118.18
C & E Loss (ft)	0.02	Cum SA (acres)	30.28	55.91	36.87

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.389

INPUT
Description: COE River Station= 55237.84
Preliminary Model River Station
(miles)=2.38

Ineffective flow on right is due to buildings and
high ground upstream.

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	748	8.99	750	16.87	750	24.33	748	31.78	746
39.2	744	47.11	742	98.09	736	279.46	734	413.4	732
421.25	730	427.11	728	434.68	726	442.3	724	449.41	722
457.46	720	462.31	718	469.2	716	483.54	711.22	557.46	711.22
571.8	716	578.17	718	585.41	720	591.83	722	596.78	724
603.93	726	614.86	728	637.95	730	643.62	732	649.41	734
655.58	736	661.77	738	667.57	740	674.12	742	679.79	744
685.57	746	690.94	748	759.61	748	782.17	748	811.53	748
1340.91	746	1378.77	746	1489.2	746	1493.02	746	1541.62	746
1550.96	746	1572.76	746	1877.51	746	2194.03	746	2283.84	746
2560.09	746	2674.56	746	2743.34	746	2814.76	744	2905.87	744
3121.36	746	3180.36	748	3185.33	750	3193.21	752	3203.1	752
3212.58	752	3221.6	754	3230.76	756	3240.65	758	3251.12	760
3299.99	762	3305.53	764	3310.93	766	3315.79	768	3321.07	770
3325.91	772	3333.8	774	3338.67	776	3345.72	778	3351.97	780

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.067	413.4	.027	690.94	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
413.4 690.94 348 385 485 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1080	3351.97	760	F

Left Levee Station= 12.86 Elevation= 750

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	727.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.		0.027	
W.S. Elev (ft)	726.58	Reach Len. (ft)	348.00	385.00	485.00
Crit W.S. (ft)	719.74	Flow Area (sq ft)		1874.84	
E.G. Slope (ft/ft)	0.000642	Area (sq ft)		1874.84	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	174.61	Top Width (ft)		174.61	
Vel Total (ft/s)	6.67	Avg. Vel. (ft/s)		6.67	
Max Chl Dpth (ft)	15.36	Hydr. Depth (ft)		10.74	
Conv. Total (cfs)	493388.0	Conv. (cfs)		493388.0	
Length Wtd. (ft)	385.00	Wetted Per. (ft)		179.30	
Min Ch El (ft)	711.22	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		2.79	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		491.86	
C & E Loss (ft)	0.02	Cum SA (acres)		45.66	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	731.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.027	
W.S. Elev (ft)	730.38	Reach Len. (ft)	348.00	385.00	485.00
Crit W.S. (ft)	722.29	Flow Area (sq ft)		2619.90	
E.G. Slope (ft/ft)	0.000692	Area (sq ft)		2619.90	

```
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  219.28  * Top Width (ft)          *          *  219.28  *          *
* Vel Total (ft/s)       *    7.44  * Avg. Vel. (ft/s)        *          *    7.44  *          *
* Max Chl Dpth (ft)      *   19.16  * Hydr. Depth (ft)        *          *   11.95  *          *
* Conv. Total (cfs)      *741126.1  * Conv. (cfs)             *          *741126.1  *          *
* Length Wtd. (ft)       *  385.00  * Wetted Per. (ft)        *          *  224.81  *          *
* Min Ch El (ft)         *  711.22  * Shear (lb/sq ft)        *          *    0.50  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.75  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)    *    1.44  *  667.60  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    2.27  *   51.10  *    6.45  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  734.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.01  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  733.34  * Reach Len. (ft)        *  348.00  *  385.00  *  485.00  *
* Crit W.S. (ft)         *  724.40  * Flow Area (sq ft)      *   60.41  * 3295.35  *          *
* E.G. Slope (ft/ft)     *0.000654  * Area (sq ft)           *   60.41  * 3295.35  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *   26.28  *26573.72  *          *
* Top Width (ft)         *  324.06  * Top Width (ft)          *   89.95  *  234.11  *          *
* Vel Total (ft/s)       *    7.93  * Avg. Vel. (ft/s)        *    0.43  *    8.06  *          *
* Max Chl Dpth (ft)      *   22.12  * Hydr. Depth (ft)        *    0.67  *   14.08  *          *
* Conv. Total (cfs)      *1039945.0  * Conv. (cfs)             *  1027.3  *1038918.0  *          *
* Length Wtd. (ft)       *  384.98  * Wetted Per. (ft)        *   89.96  *  240.34  *          *
* Min Ch El (ft)         *  711.22  * Shear (lb/sq ft)        *    0.03  *    0.56  *          *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.01  *    4.52  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)    *   14.39  *  802.51  *   31.58  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    8.38  *   53.02  *   15.28  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  737.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.12  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  736.03  * Reach Len. (ft)        *  348.00  *  385.00  *  485.00  *
* Crit W.S. (ft)         *  726.42  * Flow Area (sq ft)      *  592.22  * 3934.88  *          *
* E.G. Slope (ft/ft)     *0.000611  * Area (sq ft)           *  592.22  * 3934.88  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *  493.82  *33706.18  *          *
* Top Width (ft)         *  557.82  * Top Width (ft)          *  315.55  *  242.27  *          *
* Vel Total (ft/s)       *    7.55  * Avg. Vel. (ft/s)        *    0.83  *    8.57  *          *
* Max Chl Dpth (ft)      *   24.81  * Hydr. Depth (ft)        *    1.88  *   16.24  *          *
* Conv. Total (cfs)      *1383920.0  * Conv. (cfs)             * 19982.6  *1363938.0  *          *
* Length Wtd. (ft)       *  384.73  * Wetted Per. (ft)        *  315.58  *  248.93  *          *
* Min Ch El (ft)         *  711.22  * Shear (lb/sq ft)        *    0.07  *    0.60  *          *
* Alpha                  *    1.27  * Stream Power (lb/ft s) *    0.06  *    5.16  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)    *   47.69  *  924.81  *   81.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   20.50  *   54.06  *   28.94  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  740.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  739.34  * Reach Len. (ft)        *  348.00  *  385.00  *  485.00  *
* Crit W.S. (ft)         *  729.18  * Flow Area (sq ft)      * 1684.02  * 4754.14  *          *
* E.G. Slope (ft/ft)     *0.000558  * Area (sq ft)           * 1684.02  * 4754.14  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)              * 2543.99  *42956.01  *          *
* Top Width (ft)         *  595.96  * Top Width (ft)          *  343.70  *  252.26  *          *
* Vel Total (ft/s)       *    7.07  * Avg. Vel. (ft/s)        *    1.51  *    9.04  *          *
* Max Chl Dpth (ft)      *   28.12  * Hydr. Depth (ft)        *    4.90  *   18.85  *          *
* Conv. Total (cfs)      *1926161.0  * Conv. (cfs)             *107695.1  *1818465.0  *          *
* Length Wtd. (ft)       *  384.09  * Wetted Per. (ft)        *  343.92  *  259.46  *          *
* Min Ch El (ft)         *  711.22  * Shear (lb/sq ft)        *    0.17  *    0.64  *          *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.26  *    5.77  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)    *  129.29  * 1069.69  *  184.42  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *   49.92  *   54.57  *   45.77  *
```

```
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  742.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  741.47  * Reach Len. (ft)        *  348.00  *  385.00  *  485.00  *
* Crit W.S. (ft)         *  730.91  * Flow Area (sq ft)      * 2433.32  * 5296.96  *          *
* E.G. Slope (ft/ft)     *0.000545  * Area (sq ft)           * 2433.32  * 5296.96  *          *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 4484.62  *49915.38  *          *
* Top Width (ft)         *  620.71  * Top Width (ft)         *  361.75  *  258.97  *          *
* Vel Total (ft/s)       *    7.04  * Avg. Vel. (ft/s)       *    1.84  *    9.42  *          *
* Max Chl Dpth (ft)      *   30.25  * Hydr. Depth (ft)       *    6.73  *   20.45  *          *
* Conv. Total (cfs)      *2331193.0  * Conv. (cfs)           *192178.6  *2139014.0  *          *
* Length Wtd. (ft)       *  383.75  * Wetted Per. (ft)       *  362.09  *  266.50  *          *
* Min Ch El (ft)         *  711.22  * Shear (lb/sq ft)       *    0.23  *    0.68  *          *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *    0.42  *    6.37  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *  208.24  * 1148.88  *  256.14  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   55.49  *   54.71  *   75.15  *
*****************************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  744.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.32  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  743.40  * Reach Len. (ft)        *  348.00  *  385.00  *  485.00  *
* Crit W.S. (ft)         *  732.34  * Flow Area (sq ft)      * 3145.98  * 5804.64  *          *
* E.G. Slope (ft/ft)     *0.000527  * Area (sq ft)           * 3145.98  * 5804.64  *          *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 6644.83  *56355.17  *          *
* Top Width (ft)         *  636.54  * Top Width (ft)         *  371.84  *  264.70  *          *
* Vel Total (ft/s)       *    7.04  * Avg. Vel. (ft/s)       *    2.11  *    9.71  *          *
* Max Chl Dpth (ft)      *   32.18  * Hydr. Depth (ft)       *    8.46  *   21.93  *          *
* Conv. Total (cfs)      *2743895.0  * Conv. (cfs)           *289408.3  *2454487.0  *          *
* Length Wtd. (ft)       *  383.48  * Wetted Per. (ft)       *  372.39  *  272.55  *          *
* Min Ch El (ft)         *  711.22  * Shear (lb/sq ft)       *    0.28  *    0.70  *          *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *    0.59  *    6.81  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *  283.27  * 1223.06  *  370.37  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   58.26  *   54.60  *  179.91  *
*****************************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  747.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.38  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  746.09  * Reach Len. (ft)        *  348.00  *  385.00  *  485.00  *
* Crit W.S. (ft)         *  734.59  * Flow Area (sq ft)      * 4159.98  * 6527.04  *          *
* E.G. Slope (ft/ft)     *0.000505  * Area (sq ft)           * 4159.98  * 6527.04  *  636.79  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *10166.79  *65733.21  *          *
* Top Width (ft)         * 2462.33  * Top Width (ft)         *  381.97  *  272.42  * 1807.94  *
* Vel Total (ft/s)       *    7.10  * Avg. Vel. (ft/s)       *    2.44  *   10.07  *          *
* Max Chl Dpth (ft)      *   34.87  * Hydr. Depth (ft)       *   10.89  *   23.96  *          *
* Conv. Total (cfs)      *3378786.0  * Conv. (cfs)           *452587.7  *2926198.0  *          *
* Length Wtd. (ft)       *  383.17  * Wetted Per. (ft)       *  382.87  *  280.73  *          *
* Min Ch El (ft)         *  711.22  * Shear (lb/sq ft)       *    0.34  *    0.73  *          *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *    0.84  *    7.38  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *  381.61  * 1316.32  *  781.21  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   61.28  *   54.64  *  301.76  *
*****************************************************************************************
```

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	738.49	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.15	Wt. n-Val.	0.067	0.027		
W.S. Elev (ft)	737.35	Reach Len. (ft)	348.00	385.00	485.00	
Crit W.S. (ft)	727.43	Flow Area (sq ft)	1015.14	4256.61		
E.G. Slope (ft/ft)	0.000584	Area (sq ft)	1015.14	4256.61		
Q Total (cfs)	38300.00	Flow (cfs)	1157.95	37142.05		
Top Width (ft)	573.09	Top Width (ft)	326.74	246.34		
Vel Total (ft/s)	7.27	Avg. Vel. (ft/s)	1.14	8.73		
Max Chl Dpth (ft)	26.13	Hydr. Depth (ft)	3.11	17.28		
Conv. Total (cfs)	1585166.0	Conv. (cfs)	47925.3	1537241.0		
Length Wtd. (ft)	384.45	Wetted Per. (ft)	326.85	253.22		
Min Ch El (ft)	711.22	Shear (lb/sq ft)	0.11	0.61		
Alpha	1.40	Stream Power (lb/ft s)	0.13	5.35		
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	73.19	984.58	118.18	
C & E Loss (ft)	0.02	Cum SA (acres)	29.39	54.38	36.87	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.316

INPUT
Description: COE River Station= 55623.05
Preliminary Model River Station (miles)=2.3

Illinois Central RR Bridge. B3 (upstream).
Normalized to channel flow. Ineffective flow on right is due to buildings and high ground upstream.

Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	748	110	750	150	750	170	748	200	746
220	744	230	742	270	742	280	744	330	746
480	746	492	734	496	732	561	711	641	711
716	736	761.2	736.6	794	750	794.01	754	795.01	764
925	764	995	764	1135	762	1305	760	1525	758
1765	756	2135	754	2545	752	3084.74	750	3091.65	752
3099.54	754	3105.28	756	3113.37	758	3120.85	760	3161.58	762
3167.36	764	3172.01	766	3175.95	768	3180.91	770	3185.76	772
3191.64	774	3197.22	776	3204.37	778	3210.25	780	3219.49	782
3244.57	784	3271.07	784	3280.59	782	3287.6	780	3296.3	778
3308.81	776	3317.19	774	3321.35	774				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.067	492	.027	716	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
492	716	29	29	29	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1320	3321.35	760	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
202	327	746

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	727.02	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.64	Wt. n-Val.		0.027		
W.S. Elev (ft)	726.39	Reach Len. (ft)	3.50	3.50	3.50	
Crit W.S. (ft)	719.18	Flow Area (sq ft)		1952.57		
E.G. Slope (ft/ft)	0.000558	Area (sq ft)		1952.57		
Q Total (cfs)	12500.00	Flow (cfs)		12500.00		

```
* Top Width (ft)          *  173.79  * Top Width (ft)          *           *  173.79  *           *
* Vel Total (ft/s)        *    6.40  * Avg. Vel. (ft/s)        *           *    6.40  *           *
* Max Chl Dpth (ft)       *   15.39  * Hydr. Depth (ft)        *           *   11.24  *           *
* Conv. Total (cfs)       *529106.1  * Conv. (cfs)             *           *529106.1  *           *
* Length Wtd. (ft)        *    3.50  * Wetted Per. (ft)        *           *  178.71  *           *
* Min Ch El (ft)          *  711.00  * Shear (lb/sq ft)        *           *    0.38  *           *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *           *    2.44  *           *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *           *  474.95  *           *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *           *   44.12  *           *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  730.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.84  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)          *  730.15  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)          *  721.65  * Flow Area (sq ft)      *          * 2650.02  *          *
* E.G. Slope (ft/ft)      *0.000581  * Area (sq ft)            *          * 2650.02  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)          *  196.74  * Top Width (ft)          *          *  196.74  *          *
* Vel Total (ft/s)        *    7.36  * Avg. Vel. (ft/s)        *          *    7.36  *          *
* Max Chl Dpth (ft)       *   19.15  * Hydr. Depth (ft)        *          *   13.47  *          *
* Conv. Total (cfs)       *808936.4  * Conv. (cfs)             *          *808936.4  *          *
* Length Wtd. (ft)        *    3.50  * Wetted Per. (ft)        *          *  202.86  *          *
* Min Ch El (ft)          *  711.00  * Shear (lb/sq ft)        *          *    0.47  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    3.49  *          *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *    1.44  *  644.31  *    4.45  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *    2.27  *   49.26  *    6.45  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  734.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.04  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)          *  733.06  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)          *  723.74  * Flow Area (sq ft)      *          * 3248.02  *          *
* E.G. Slope (ft/ft)      *0.000613  * Area (sq ft)            *          * 3248.02  *          *
* Q Total (cfs)           *26600.00  * Flow (cfs)              *          *26600.00  *          *
* Top Width (ft)          *  213.32  * Top Width (ft)          *          *  213.32  *          *
* Vel Total (ft/s)        *    8.19  * Avg. Vel. (ft/s)        *          *    8.19  *          *
* Max Chl Dpth (ft)       *   22.06  * Hydr. Depth (ft)        *          *   15.23  *          *
* Conv. Total (cfs)       *1074269.0  * Conv. (cfs)             *          *1074269.0  *          *
* Length Wtd. (ft)        *    3.50  * Wetted Per. (ft)        *          *  220.46  *          *
* Min Ch El (ft)          *  711.00  * Shear (lb/sq ft)        *          *    0.56  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    4.62  *          *
* Frctn Loss (ft)         *    0.00  * Cum Volume (acre-ft)    *   14.15  *  773.60  *   31.58  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)          *    8.02  *   51.04  *   15.28  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  736.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.25  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)          *  735.65  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)          *  725.71  * Flow Area (sq ft)      *    1.36  * 3814.28  *          *
* E.G. Slope (ft/ft)      *0.000630  * Area (sq ft)            *    1.36  * 3814.28  *          *
* Q Total (cfs)           *34200.00  * Flow (cfs)              *    0.53  *34199.47  *          *
* Top Width (ft)          *  224.61  * Top Width (ft)          *    1.65  *  222.96  *          *
* Vel Total (ft/s)        *    8.96  * Avg. Vel. (ft/s)        *    0.39  *    8.97  *          *
* Max Chl Dpth (ft)       *   24.65  * Hydr. Depth (ft)        *    0.83  *   17.11  *          *
* Conv. Total (cfs)       *1362219.0  * Conv. (cfs)             *    21.2  *1362198.0  *          *
* Length Wtd. (ft)        *    3.50  * Wetted Per. (ft)        *    2.34  *  230.74  *          *
* Min Ch El (ft)          *  711.00  * Shear (lb/sq ft)        *    0.02  *    0.65  *          *
```

```
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.01  *    5.83  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   45.31  *  890.56  *   81.57  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   19.23  *   52.00  *   28.94  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.27  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.58  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  738.69  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  728.25  * Flow Area (sq ft)      *   11.01  * 4495.29  *  113.54  *
* E.G. Slope (ft/ft)     *0.000646  * Area (sq ft)           *   11.01  * 4495.29  *  113.54  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    8.70  *45378.45  *  112.85  *
* Top Width (ft)         *  279.02  * Top Width (ft)         *    4.69  *  224.00  *   50.32  *
* Vel Total (ft/s)       *    9.85  * Avg. Vel. (ft/s)       *    0.79  *   10.09  *    0.99  *
* Max Chl Dpth (ft)      *   27.69  * Hydr. Depth (ft)       *    2.35  *   20.07  *    2.26  *
* Conv. Total (cfs)      *1790330.0  * Conv. (cfs)           *   342.3  *1785547.0  *  4440.4  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *    6.64  *  231.84  *   50.74  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.07  *    0.78  *    0.09  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.05  *    7.89  *    0.09  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  122.52  * 1028.82  *  183.79  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   48.53  *   52.46  *   45.49  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.44  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.87  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  740.58  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  730.00  * Flow Area (sq ft)      *   21.62  * 4916.93  *  212.60  *
* E.G. Slope (ft/ft)     *0.000680  * Area (sq ft)           *   21.62  * 4916.93  *  212.60  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   21.94  *54068.57  *  309.49  *
* Top Width (ft)         *  285.51  * Top Width (ft)         *    6.58  *  224.00  *   54.93  *
* Vel Total (ft/s)       *   10.56  * Avg. Vel. (ft/s)       *    1.01  *   11.00  *    1.46  *
* Max Chl Dpth (ft)      *   29.58  * Hydr. Depth (ft)       *    3.29  *   21.95  *    3.87  *
* Conv. Total (cfs)      *2086025.0  * Conv. (cfs)           *   841.4  *2073316.0  * 11867.7  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *    9.30  *  231.84  *   55.72  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.10  *    0.90  *    0.16  *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.10  *    9.90  *    0.24  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  198.43  * 1103.75  *  254.96  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   54.02  *   52.57  *   74.84  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.40  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.14  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  742.27  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  731.59  * Flow Area (sq ft)      *   34.19  * 5296.36  *  309.16  *
* E.G. Slope (ft/ft)     *0.000707  * Area (sq ft)           *   34.19  * 5296.36  *  309.16  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *   41.23  *62399.37  *  559.40  *
* Top Width (ft)         *  291.35  * Top Width (ft)         *    8.27  *  224.00  *   59.08  *
* Vel Total (ft/s)       *   11.17  * Avg. Vel. (ft/s)       *    1.21  *   11.78  *    1.81  *
* Max Chl Dpth (ft)      *   31.27  * Hydr. Depth (ft)       *    4.13  *   23.64  *    5.23  *
* Conv. Total (cfs)      *2369367.0  * Conv. (cfs)           *  1550.5  *2346778.0  * 21038.5  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *   11.69  *  231.84  *   60.19  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.13  *    1.01  *    0.23  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.16  *   11.88  *    0.41  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  270.56  * 1174.00  *  368.65  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   56.74  *   52.44  *  179.58  *
*****************************************************************************************
```

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*********************************************************************************************
* E.G. Elev (ft)         *  747.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.53  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  744.59  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  733.71  * Flow Area (sq ft)      *   56.05  * 5815.63  *  452.69  *
* E.G. Slope (ft/ft)     *0.000744  * Area (sq ft)           *   56.05  * 5815.63  *  452.69  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              *   81.73  *74802.70  * 1015.58  *
* Top Width (ft)         *  299.34  * Top Width (ft)         *   10.59  *  224.00  *   64.75  *
* Vel Total (ft/s)       *   12.00  * Avg. Vel. (ft/s)       *    1.46  *   12.86  *    2.24  *
* Max Chl Dpth (ft)      *   33.59  * Hydr. Depth (ft)       *    5.29  *   25.96  *    6.99  *
* Conv. Total (cfs)      *2782887.0  * Conv. (cfs)            *  2996.8  *2742654.0  * 37236.2  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *   14.97  *  231.84  *   66.32  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.17  *    1.16  *    0.32  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *    0.25  *   14.98  *    0.71  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  364.77  * 1261.77  *  775.14  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   59.71  *   52.44  *  291.33  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*********************************************************************************************
* E.G. Elev (ft)         *  738.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.36  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  736.88  * Reach Len. (ft)        *    3.50  *    3.50  *    3.50  *
* Crit W.S. (ft)         *  726.67  * Flow Area (sq ft)      *    4.14  * 4088.36  *   26.16  *
* E.G. Slope (ft/ft)     *0.000631  * Area (sq ft)           *    4.14  * 4088.36  *   26.16  *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *    2.33  *38287.35  *   10.32  *
* Top Width (ft)         *  272.75  * Top Width (ft)         *    2.88  *  224.00  *   45.88  *
* Vel Total (ft/s)       *    9.30  * Avg. Vel. (ft/s)       *    0.56  *    9.36  *    0.39  *
* Max Chl Dpth (ft)      *   25.88  * Hydr. Depth (ft)       *    1.44  *   18.25  *    0.57  *
* Conv. Total (cfs)      *1524874.0  * Conv. (cfs)            *    92.8  *1524370.0  *   410.8  *
* Length Wtd. (ft)       *    3.50  * Wetted Per. (ft)       *    4.07  *  231.84  *   45.94  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.04  *    0.69  *    0.02  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.02  *    6.50  *    0.01  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   69.12  *  947.70  *  118.04  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   28.07  *   52.30  *   36.61  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 2.313

INPUT
Description: Bridge B3.  Illinois Central RR Bridge.  Bridge has been
             normalized to channel flow from 37 degree skew.  Piers are aligned
             with channel flow.  The top of side rail was modeled as the top of
             bridge.  The piers in the left floodplain were measured in the
             field, and the spacing has been normalized to channel flow.
Distance from Upstream XS =     3.5
Deck/Roadway Width        =      22
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
```

```
***********************************************************************
       0     767     759     400     767     759     492     767     759
  559.51768.2387     759  559.52768.2389     753     601     769     753
  731.51766.3091     752  731.52766.3089     754     795     765     754
  795.01     764     764

Upstream Bridge Cross Section Data
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     748     110     750     150     750     170     748     200     746
     220     744     230     742     270     742     280     744     330     746
     480     746     492     734     496     732     561     711     641     711
     716     736   761.2   736.6     794     750  794.01     754  795.01     764
     925     764     995     764    1135     762    1305     760    1525     758
    1765     756    2135     754    2545     752 3084.74     750 3091.65     752
 3099.54     754 3105.28     756 3113.37     758 3120.85     760 3161.58     762
 3167.36     764 3172.01     766 3175.95     768 3180.91     770 3185.76     772
 3191.64     774 3197.22     776 3204.37     778 3210.25     780 3219.49     782
 3244.57     784 3271.07     784 3280.59     782  3287.6     780  3296.3     778
 3308.81     776 3317.19     774 3321.35     774

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .067     492    .027     716    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
           492     716            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1320 3321.35     760       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
*************************
     202     327     746

Downstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
       0     767     759     492     767     759  559.51768.2387     759
  559.52768.2389     753     601     769     753  731.48766.3097     752
  731.49766.3095     754     795     765     754  795.01     764     764

Downstream Bridge Cross Section Data
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     748   41.36     750   86.03     750     110     750     150     750
     170     748     200     746     220     744     230     742     270     742
     280     744     330     746     480     746     492     734     496     732
     561     711     641     711     716     736   761.2   736.6     794     750
  794.01     754  795.01     764     925     764     995     764    1135     762
    1305     760    1525     758    1765     756    2135     754    2545     752
 3097.09     750 3101.49     752 3108.26     754 3114.58     756 3120.89     758
 3126.95     760 3159.66     762 3169.44     764 3173.64     766 3178.89     768
 3183.97     770 3188.37     772 3188.83     774  3194.8     776 3203.68     778
 3212.59     780 3218.97     782 3226.02     784 3254.18     786  3277.8     786
 3287.03     784 3297.48     782  3305.1     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .067     492    .027     716    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
           492     716            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1325  3305.1     760       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
*************************
     200     326     746
```

```
Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  10

Pier Data
Pier Station     Upstream=      62    Downstream=      62
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759

Pier Data
Pier Station     Upstream=     137    Downstream=     137
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759

Pier Data
Pier Station     Upstream=     212    Downstream=     212
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759

Pier Data
Pier Station     Upstream=     287    Downstream=     287
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759

Pier Data
Pier Station     Upstream=     362    Downstream=     362
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759

Pier Data
Pier Station     Upstream=     437    Downstream=     437
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
       6     730       6     753       7  753.01       7     759
```

```
Pier Data
Pier Station     Upstream=     512    Downstream=     512
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6     720       6     753       7  753.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6     720       6     753       7  753.01       7     759

Pier Data
Pier Station     Upstream=     556    Downstream=     556
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6     710       6     750       7  750.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6     710       6     750       7  750.01       7     759

Pier Data
Pier Station     Upstream=     646    Downstream=     646
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6     710       6     750       7  750.01       7     759
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6     710       6     750       7  750.01       7     759

Pier Data
Pier Station     Upstream=     735    Downstream=     735
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6   732.5       6     748       7  748.01       7     754
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
*****************************************************************
        6   732.5       6     748       7  748.01       7     754

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
        Energy
        Momentum                Cd   =    1.39
Selected Low Flow Methods = Energy

High Flow Method
        Pressure and Weir flow
            Submerged Inlet Cd          =      .5
            Submerged Inlet + Outlet Cd =      .8
            Max Low Cord                =

Additional Bridge Parameters
        Add Friction component to Momentum
        Do not add Weight component to Momentum
        Class B flow critical depth computations use critical depth
            inside the bridge at the upstream end
        Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     727.02  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     726.39  * E.G. Elev (ft)         *     727.01  *     726.98  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     726.22  *     726.20  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     719.67  *     719.67  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      15.22  *      15.20  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.10  *       7.11  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1761.11  *    1757.06  *
* Weir Submerg           *             * Froude # Chl           *       0.38  *       0.38  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   14502.12  *   14463.91  *
* Min El Weir Flow (ft)  *     759.87  * Hydr Depth (ft)        *      11.03  *      11.01  *
```

```
* Min El Prs (ft)        *     759.00  * W.P. Total (ft)        *     218.55  *     218.34  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *   389559.5  *   388315.0  *
* Delta WS (ft)          *       0.09  * Top Width (ft)         *     159.67  *     159.60  *
* BR Open Area (sq ft)   *   13697.71  * Frctn Loss (ft)        *       0.02  *       0.00  *
* BR Open Vel (ft/s)     *       7.11  * C & E Loss (ft)        *       0.00  *       0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.52  *       0.52  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       3.68  *       3.70  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. US. (ft)          *     730.99  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     730.15  * E.G. Elev (ft)         *     730.97  *     730.94  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     729.93  *     729.90  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     722.27  *     722.27  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      18.93  *      18.90  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.19  *       8.21  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2379.97  *    2374.72  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.40  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   24355.36  *   24295.95  *
* Min El Weir Flow (ft)  *     759.87  * Hydr Depth (ft)        *      13.42  *      13.40  *
* Min El Prs (ft)        *     759.00  * W.P. Total (ft)        *     257.82  *     257.46  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *   576371.2  *   574801.1  *
* Delta WS (ft)          *       0.12  * Top Width (ft)         *     177.37  *     177.19  *
* BR Open Area (sq ft)   *   13697.71  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       8.21  * C & E Loss (ft)        *       0.00  *       0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.66  *       0.66  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       5.40  *       5.44  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. US. (ft)          *     734.10  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     733.06  * E.G. Elev (ft)         *     734.08  *     734.05  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     732.78  *     732.75  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     724.46  *     724.46  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      21.78  *      21.75  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.14  *       9.16  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2910.19  *    2903.63  *
* Weir Submerg           *             * Froude # Chl           *       0.42  *       0.42  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   34475.43  *   34394.03  *
* Min El Weir Flow (ft)  *     759.87  * Hydr Depth (ft)        *      15.01  *      14.99  *
* Min El Prs (ft)        *     759.00  * W.P. Total (ft)        *     292.43  *     292.05  *
* Delta EG (ft)          *       0.13  * Conv. Total (cfs)      *   740995.8  *   738862.3  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *     193.89  *     193.73  *
* BR Open Area (sq ft)   *   13697.71  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *       9.16  * C & E Loss (ft)        *       0.00  *       0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.80  *       0.80  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       7.32  *       7.37  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     736.90  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     735.65  * E.G. Elev (ft)         *     736.87  *     736.84  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     735.31  *     735.27  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     726.45  *     726.45  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      24.31  *      24.27  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.01  *      10.03  *
```

```
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3415.93  *    3408.31  *
* Weir Submerg           *             * Froude # Chl           *       0.43  *       0.43  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   45558.10  *   45454.95  *
* Min El Weir Flow (ft)  *     759.87  * Hydr Depth (ft)        *      16.64  *      16.62  *
* Min El Prs (ft)        *     759.00  * W.P. Total (ft)        *     320.20  *     319.80  *
* Delta EG (ft)          *       0.15  * Conv. Total (cfs)      *  914192.3  *   911463.1  *
* Delta WS (ft)          *       0.18  * Top Width (ft)         *     205.24  *     205.09  *
* BR Open Area (sq ft)   *   13697.71  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *      10.03  * C & E Loss (ft)        *       0.00  *       0.09  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.93  *       0.94  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.33  *       9.40  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     740.27  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     738.69  * E.G. Elev (ft)         *     740.23  *     740.20  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     738.25  *     738.21  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     729.08  *     729.08  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.25  *      27.21  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      11.07  *      11.10  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4109.93  *    4099.23  *
* Weir Submerg           *             * Froude # Chl           *       0.45  *       0.45  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   61877.36  *   61740.78  *
* Min El Weir Flow (ft)  *     759.87  * Hydr Depth (ft)        *      16.21  *      16.18  *
* Min El Prs (ft)        *     759.00  * W.P. Total (ft)        *     391.81  *     391.30  *
* Delta EG (ft)          *       0.19  * Conv. Total (cfs)      *  1155685.0  *  1152007.0  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *     253.51  *     253.36  *
* BR Open Area (sq ft)   *   13697.71  * Frctn Loss (ft)        *       0.03  *       0.00  *
* BR Open Vel (ft/s)     *      11.10  * C & E Loss (ft)        *       0.00  *       0.11  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.02  *       1.02  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      11.24  *      11.32  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     742.44  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     740.58  * E.G. Elev (ft)         *     742.39  *     742.35  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     740.05  *     740.00  *
* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     730.97  *     730.97  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.05  *      29.00  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      11.90  *      11.93  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4570.97  *    4558.62  *
* Weir Submerg           *             * Froude # Chl           *       0.47  *       0.47  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   74449.37  *   74282.65  *
* Min El Weir Flow (ft)  *     759.87  * Hydr Depth (ft)        *      17.60  *      17.56  *
* Min El Prs (ft)        *     759.00  * W.P. Total (ft)        *     413.47  *     412.90  *
* Delta EG (ft)          *       0.22  * Conv. Total (cfs)      *  1315594.0  *  1311278.0  *
* Delta WS (ft)          *       0.27  * Top Width (ft)         *     259.70  *     259.54  *
* BR Open Area (sq ft)   *   13697.71  * Frctn Loss (ft)        *       0.04  *       0.00  *
* BR Open Vel (ft/s)     *      11.93  * C & E Loss (ft)        *       0.00  *       0.13  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.18  *       1.19  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      14.04  *      14.16  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

BRIDGE OUTPUT Profile #200-yr

E.G. US. (ft)	744.40	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	742.27	E.G. Elev (ft)	744.35	744.30
Q Total (cfs)	63000.00	W.S. Elev (ft)	741.67	741.61
Q Bridge (cfs)	63000.00	Crit W.S. (ft)	732.61	732.61
Q Weir (cfs)		Max Chl Dpth (ft)	30.67	30.61
Weir Sta Lft (ft)		Vel Total (ft/s)	12.61	12.65
Weir Sta Rgt (ft)		Flow Area (sq ft)	4994.70	4979.65
Weir Submerg		Froude # Chl	0.49	0.49
Weir Max Depth (ft)		Specif Force (cu ft)	87096.23	86883.16
Min El Weir Flow (ft)	759.87	Hydr Depth (ft)	18.83	18.79
Min El Prs (ft)	759.00	W.P. Total (ft)	432.94	432.25
Delta EG (ft)	0.25	Conv. Total (cfs)	1464619.0	1459298.0
Delta WS (ft)	0.32	Top Width (ft)	265.27	265.07
BR Open Area (sq ft)	13697.71	Frctn Loss (ft)	0.04	0.00
BR Open Vel (ft/s)	12.65	C & E Loss (ft)	0.00	0.15
Coef of Q		Shear Total (lb/sq ft)	1.33	1.34
Br Sel Method	Energy only	Power Total (lb/ft s)	16.81	16.96

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #500-yr

E.G. US. (ft)	747.12	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	744.59	E.G. Elev (ft)	747.05	747.00
Q Total (cfs)	75900.00	W.S. Elev (ft)	743.87	743.80
Q Bridge (cfs)	75900.00	Crit W.S. (ft)	734.80	734.80
Q Weir (cfs)		Max Chl Dpth (ft)	32.87	32.80
Weir Sta Lft (ft)		Vel Total (ft/s)	13.59	13.63
Weir Sta Rgt (ft)		Flow Area (sq ft)	5586.52	5568.65
Weir Submerg		Froude # Chl	0.51	0.51
Weir Max Depth (ft)		Specif Force (cu ft)	106703.10	106435.80
Min El Weir Flow (ft)	759.87	Hydr Depth (ft)	20.47	20.43
Min El Prs (ft)	759.00	W.P. Total (ft)	459.46	458.67
Delta EG (ft)	0.30	Conv. Total (cfs)	1675099.0	1668714.0
Delta WS (ft)	0.38	Top Width (ft)	272.85	272.62
BR Open Area (sq ft)	13697.71	Frctn Loss (ft)	0.05	0.00
BR Open Vel (ft/s)	13.63	C & E Loss (ft)	0.00	0.18
Coef of Q		Shear Total (lb/sq ft)	1.56	1.57
Br Sel Method	Energy only	Power Total (lb/ft s)	21.17	21.37

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE OUTPUT Profile #Design Discharge

E.G. US. (ft)	738.24	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	736.88	E.G. Elev (ft)	738.20	738.17
Q Total (cfs)	38300.00	W.S. Elev (ft)	736.50	736.46
Q Bridge (cfs)	38300.00	Crit W.S. (ft)	727.42	727.42
Q Weir (cfs)		Max Chl Dpth (ft)	25.50	25.46
Weir Sta Lft (ft)		Vel Total (ft/s)	10.43	10.46
Weir Sta Rgt (ft)		Flow Area (sq ft)	3671.00	3661.74
Weir Submerg		Froude # Chl	0.44	0.44
Weir Max Depth (ft)		Specif Force (cu ft)	51585.45	51470.98
Min El Weir Flow (ft)	759.87	Hydr Depth (ft)	15.28	15.43
Min El Prs (ft)	759.00	W.P. Total (ft)	363.47	360.18
Delta EG (ft)	0.17	Conv. Total (cfs)	1006567.0	1003367.0
Delta WS (ft)	0.20	Top Width (ft)	240.25	237.29
BR Open Area (sq ft)	13697.71	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	10.46	C & E Loss (ft)	0.00	0.09
Coef of Q		Shear Total (lb/sq ft)	0.91	0.92

```
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *       9.52  *       9.67  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.310

INPUT
Description: COE River Station= 55651.98
Preliminary Model River Station
             (miles)=2.29

Illinois Central RR Bridge. B3 (downstream).
             Normalized to channel flow from 37 degree skew.  Piers are aligned
             with channel flow.  Top of side rail modeled as top of bridge.
             Underwater channel shown on bridge plans. Piers in left floodplain
             were measured in the field, and have been normalized.  Road
             embankment on right is normalized to flow.  Ineffective flow on
             right is due to buildings and high ground upstream.
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     748   41.36     750   86.03     750     110     750     150     750
     170     748     200     746     220     744     230     742     270     742
     280     744     330     746     480     746     492     734     496     732
     561     711     641     711     716     736   761.2   736.6     794     750
  794.01     754  795.01     764     925     764     995     764    1135     762
    1305     760    1525     758    1765     756    2135     754    2545     752
 3097.09     750 3101.49     752 3108.26     754 3114.58     756 3120.89     758
 3126.95     760 3159.66     762 3169.44     764 3173.64     766 3178.89     768
 3183.97     770 3188.37     772 3188.83     774  3194.8     776 3203.68     778
 3212.59     780 3218.97     782 3226.02     784 3254.18     786  3277.8     786
 3287.03     784 3297.48     782  3305.1     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .067     492    .027     716    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           492     716             320     342     330             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1325  3305.1     760       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     200     326     746

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  726.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  726.29  * Reach Len. (ft)        *  320.00  *  342.00  *  330.00  *
* Crit W.S. (ft)         *  719.18  * Flow Area (sq ft)      *          * 1936.27  *          *
* E.G. Slope (ft/ft)     *0.000571  * Area (sq ft)           *          * 1936.27  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  173.22  * Top Width (ft)          *          *  173.22  *          *
* Vel Total (ft/s)       *    6.46  * Avg. Vel. (ft/s)        *          *    6.46  *          *
* Max Chl Dpth (ft)      *   15.29  * Hydr. Depth (ft)        *          *   11.18  *          *
* Conv. Total (cfs)      *522942.3  * Conv. (cfs)             *          *522942.3  *          *
* Length Wtd. (ft)       *  342.00  * Wetted Per. (ft)        *          *  178.11  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)        *          *    0.39  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    2.50  *          *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)    *          *  473.76  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *   44.02  *          *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	730.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.027	
W.S. Elev (ft)	730.03	Reach Len. (ft)	320.00	342.00	330.00
Crit W.S. (ft)	721.65	Flow Area (sq ft)		2625.75	
E.G. Slope (ft/ft)	0.000596	Area (sq ft)		2625.75	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	195.98	Top Width (ft)		195.98	
Vel Total (ft/s)	7.43	Avg. Vel. (ft/s)		7.43	
Max Chl Dpth (ft)	19.03	Hydr. Depth (ft)		13.40	
Conv. Total (cfs)	798709.4	Conv. (cfs)		798709.4	
Length Wtd. (ft)	341.99	Wetted Per. (ft)		202.07	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)		3.59	
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	1.44	642.70	4.45
C & E Loss (ft)	0.01	Cum SA (acres)	2.27	49.14	6.45

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	733.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.		0.027	
W.S. Elev (ft)	732.91	Reach Len. (ft)	320.00	342.00	330.00
Crit W.S. (ft)	723.74	Flow Area (sq ft)		3215.41	
E.G. Slope (ft/ft)	0.000631	Area (sq ft)		3215.41	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	212.55	Top Width (ft)		212.55	
Vel Total (ft/s)	8.27	Avg. Vel. (ft/s)		8.27	
Max Chl Dpth (ft)	21.91	Hydr. Depth (ft)		15.13	
Conv. Total (cfs)	1059004.0	Conv. (cfs)		1059004.0	
Length Wtd. (ft)	341.93	Wetted Per. (ft)		219.63	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		4.77	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	14.15	771.63	31.58
C & E Loss (ft)	0.01	Cum SA (acres)	8.02	50.91	15.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	736.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.067	0.027	
W.S. Elev (ft)	735.47	Reach Len. (ft)	320.00	342.00	330.00
Crit W.S. (ft)	725.71	Flow Area (sq ft)	1.08	3773.93	
E.G. Slope (ft/ft)	0.000651	Area (sq ft)	1.08	3773.93	
Q Total (cfs)	34200.00	Flow (cfs)	0.40	34199.61	
Top Width (ft)	223.88	Top Width (ft)	1.47	222.41	
Vel Total (ft/s)	9.06	Avg. Vel. (ft/s)	0.37	9.06	
Max Chl Dpth (ft)	24.47	Hydr. Depth (ft)	0.74	16.97	
Conv. Total (cfs)	1340499.0	Conv. (cfs)	15.5	1340484.0	
Length Wtd. (ft)	341.82	Wetted Per. (ft)	2.08	230.16	
Min Ch El (ft)	711.00	Shear (lb/sq ft)	0.02	0.67	
Alpha	1.00	Stream Power (lb/ft s)	0.01	6.04	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	45.31	888.26	81.57
C & E Loss (ft)	0.01	Cum SA (acres)	19.23	51.86	28.94

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	740.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.62	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	738.47	Reach Len. (ft)	320.00	342.00	330.00
Crit W.S. (ft)	728.25	Flow Area (sq ft)	9.97	4444.26	102.14

```
* E.G. Slope (ft/ft)     *0.000671  * Area (sq ft)           *    9.97  * 4444.26  *  102.14  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *    7.77  *45395.00  *   97.23  *
* Top Width (ft)         *  278.23  * Top Width (ft)         *    4.47  *  224.00  *   49.77  *
* Vel Total (ft/s)       *    9.99  * Avg. Vel. (ft/s)       *    0.78  *   10.21  *    0.95  *
* Max Chl Dpth (ft)      *   27.47  * Hydr. Depth (ft)       *    2.23  *   19.84  *    2.05  *
* Conv. Total (cfs)      *1755949.0  * Conv. (cfs)            *   299.8  *1751897.0  *  3752.3  *
* Length Wtd. (ft)       *  341.63  * Wetted Per. (ft)       *    6.32  *  231.84  *   50.14  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.07  *    0.80  *    0.09  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    0.05  *    8.21  *    0.08  *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *  122.52  * 1026.10  *  183.73  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   48.52  *   52.33  *   45.46  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  742.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.92  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  740.30  * Reach Len. (ft)        *  320.00  *  342.00  *  330.00  *
* Crit W.S. (ft)         *  730.00  * Flow Area (sq ft)      *   19.87  * 4856.11  *  197.78  *
* E.G. Slope (ft/ft)     *0.000710  * Area (sq ft)           *   19.87  * 4856.11  *  197.78  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   20.03  *54097.27  *  282.70  *
* Top Width (ft)         *  284.57  * Top Width (ft)         *    6.30  *  224.00  *   54.27  *
* Vel Total (ft/s)       *   10.72  * Avg. Vel. (ft/s)       *    1.01  *   11.14  *    1.43  *
* Max Chl Dpth (ft)      *   29.30  * Hydr. Depth (ft)       *    3.15  *   21.68  *    3.64  *
* Conv. Total (cfs)      *2042118.0  * Conv. (cfs)            *   751.9  *2030754.0  * 10612.3  *
* Length Wtd. (ft)       *  341.50  * Wetted Per. (ft)       *    8.92  *  231.84  *   55.00  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.10  *    0.93  *    0.16  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.10  *   10.34  *    0.23  *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *  198.42  * 1100.79  *  254.85  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   54.01  *   52.43  *   74.81  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  744.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.20  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  741.95  * Reach Len. (ft)        *  320.00  *  342.00  *  330.00  *
* Crit W.S. (ft)         *  731.59  * Flow Area (sq ft)      *   31.62  * 5225.40  *  290.57  *
* E.G. Slope (ft/ft)     *0.000740  * Area (sq ft)           *   31.62  * 5225.40  *  290.57  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *   38.02  *62440.86  *  521.12  *
* Top Width (ft)         *  290.25  * Top Width (ft)         *    7.95  *  224.00  *   58.30  *
* Vel Total (ft/s)       *   11.36  * Avg. Vel. (ft/s)       *    1.20  *   11.95  *    1.79  *
* Max Chl Dpth (ft)      *   30.95  * Hydr. Depth (ft)       *    3.98  *   23.33  *    4.98  *
* Conv. Total (cfs)      *2315159.0  * Conv. (cfs)            *  1397.1  *2294611.0  * 19150.5  *
* Length Wtd. (ft)       *  341.37  * Wetted Per. (ft)       *   11.25  *  231.84  *   59.36  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.13  *    1.04  *    0.23  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.16  *   12.45  *    0.41  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *  270.54  * 1170.82  *  368.48  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   56.73  *   52.30  *  179.55  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  746.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.62  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  744.21  * Reach Len. (ft)        *  320.00  *  342.00  *  330.00  *
* Crit W.S. (ft)         *  733.71  * Flow Area (sq ft)      *   52.09  * 5730.43  *  428.24  *
* E.G. Slope (ft/ft)     *0.000783  * Area (sq ft)           *   52.09  * 5730.43  *  428.24  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *   76.05  *74864.59  *  959.37  *
* Top Width (ft)         *  298.03  * Top Width (ft)         *   10.21  *  224.00  *   63.82  *
* Vel Total (ft/s)       *   12.22  * Avg. Vel. (ft/s)       *    1.46  *   13.06  *    2.24  *
* Max Chl Dpth (ft)      *   33.21  * Hydr. Depth (ft)       *    5.10  *   25.58  *    6.71  *
* Conv. Total (cfs)      *2713022.0  * Conv. (cfs)            *  2718.2  *2676011.0  * 34292.2  *
* Length Wtd. (ft)       *  341.24  * Wetted Per. (ft)       *   14.44  *  231.84  *   65.32  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.18  *    1.21  *    0.32  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *    0.26  *   15.78  *    0.72  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *  364.73  * 1258.28  *  774.90  *
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* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   59.70  *   52.30  *  291.29  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  738.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.39  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  736.68  * Reach Len. (ft)        *  320.00  *  342.00  *  330.00  *
* Crit W.S. (ft)         *  726.67  * Flow Area (sq ft)      *    3.59  * 4044.29  *   17.18  *
* E.G. Slope (ft/ft)     *0.000654  * Area (sq ft)           *    3.59  * 4044.29  *   17.18  *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *    1.97  *38292.78  *    5.25  *
* Top Width (ft)         *  272.08  * Top Width (ft)         *    2.68  *  224.00  *   45.40  *
* Vel Total (ft/s)       *    9.42  * Avg. Vel. (ft/s)       *    0.55  *    9.47  *    0.31  *
* Max Chl Dpth (ft)      *   25.68  * Hydr. Depth (ft)       *    1.34  *   18.05  *    0.38  *
* Conv. Total (cfs)      *1497368.0  * Conv. (cfs)            *    76.8  *1497086.0  *   205.4  *
* Length Wtd. (ft)       *  341.75  * Wetted Per. (ft)       *    3.79  *  231.84  *   45.42  *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *    0.04  *    0.71  *    0.02  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.02  *    6.75  *    0.00  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *   69.12  *  945.23  *  118.03  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   28.07  *   52.16  *   36.59  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.246

INPUT
Description: COE River Station= 55993.98
Preliminary Model River Station
             (miles)=2.23

Ineffective flow on right is due to buildings and
             high ground upstream.
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
       0     740   41.82     742   49.89     744   53.31     746   59.36     748
   85.08     748   93.22     746   96.34     744  125.99     742  137.52     740
  148.04     738  159.76     736  183.68     734   206.3     732  238.66     730
  272.57     728  280.25     726  285.83     724  293.55     722  298.32     720
  305.29     718  310.88     716  325.73  711.05  402.52  711.05  417.39     716
  423.18     718   429.1     720  434.59     722  439.42     724  445.05     726
  452.37     728  457.64     730   464.3     732  470.58     734  477.73     736
  512.02     738  528.39     740  533.97     742  613.63     744   657.5     746
  686.13     748  719.14     750  786.97     750  799.75     750  842.96     752
  854.09     754  862.88     756  888.76     756  900.81     754   909.6     754
  932.81     756  947.12     758  991.78     758 1006.58     756 1022.02     754
 1036.62     752 1051.35     750 1064.46     748  1231.4     748 1242.63     750
 1251.79     752 1261.87     754 1297.36     756 1297.57     756 1315.05     754
 1318.76     752 1323.73     750 1325.68     748 1799.63     746 1878.73     746
 1928.72     746 1968.14     746 1974.82     748 1982.93     750 1988.93     752
 1996.77     754 2010.17     756 2012.49     756  2015.7     754 2031.16     754
 2035.14     754 2041.39     752 2046.94     750 2066.95     748 2129.69     746
 2192.88     746 2202.14     748 2217.28     750 2230.36     752 2230.39     752
 2240.73     750 2242.89     748 2425.72     746 2445.61     744 2537.33     744
 2588.33     744 2621.28     744 2684.33     746 2733.78     748 2780.13     750
 2785.49     752 2789.58     754 2796.48     756 2801.93     758 2807.38     760
 2825.91     762 2840.69     764 2844.63     766 2848.79     768 2854.39     770
 2858.57     772 2863.31     774 2867.18     776 2874.71     778 2879.98     780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .067  272.57    .027  477.73    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        272.57  477.73              426     413     400              .1       .3
Ineffective Flow     num=       1
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   Sta L   Sta R    Elev  Permanent
     590 2879.98     760       F
Left Levee      Station=   81.09      Elevation=  747.85

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  726.72  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  725.98  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  719.41  * Flow Area (sq ft)      *          * 1807.76  *          *
* E.G. Slope (ft/ft)     *0.000673  * Area (sq ft)           *          * 1807.76  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  164.67  * Top Width (ft)         *          *  164.67  *          *
* Vel Total (ft/s)       *    6.91  * Avg. Vel. (ft/s)       *          *    6.91  *          *
* Max Chl Dpth (ft)      *   14.93  * Hydr. Depth (ft)       *          *   10.98  *          *
* Conv. Total (cfs)      *481738.8  * Conv. (cfs)            *          *481738.8  *          *
* Length Wtd. (ft)       *  413.00  * Wetted Per. (ft)       *          *  169.66  *          *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *          *    0.45  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.10  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *          *  459.06  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   42.69  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  730.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  729.68  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  721.91  * Flow Area (sq ft)      *   24.05  * 2462.74  *          *
* E.G. Slope (ft/ft)     *0.000679  * Area (sq ft)           *   24.05  * 2462.74  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *   12.38  *19487.62  *          *
* Top Width (ft)         *  212.79  * Top Width (ft)         *   28.56  *  184.24  *          *
* Vel Total (ft/s)       *    7.84  * Avg. Vel. (ft/s)       *    0.51  *    7.91  *          *
* Max Chl Dpth (ft)      *   18.63  * Hydr. Depth (ft)       *    0.84  *   13.37  *          *
* Conv. Total (cfs)      *748161.4  * Conv. (cfs)            *   475.0  *747686.4  *          *
* Length Wtd. (ft)       *  413.01  * Wetted Per. (ft)       *   28.61  *  190.07  *          *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.04  *    0.55  *          *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.02  *    4.35  *          *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *    1.35  *  622.73  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.16  *   47.65  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  732.54  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  724.07  * Flow Area (sq ft)      *  171.45  * 3001.64  *          *
* E.G. Slope (ft/ft)     *0.000690  * Area (sq ft)           *  171.45  * 3001.64  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *  177.23  *26422.77  *          *
* Top Width (ft)         *  265.79  * Top Width (ft)         *   72.37  *  193.42  *          *
* Vel Total (ft/s)       *    8.38  * Avg. Vel. (ft/s)       *    1.03  *    8.80  *          *
* Max Chl Dpth (ft)      *   21.49  * Hydr. Depth (ft)       *    2.37  *   15.52  *          *
* Conv. Total (cfs)      *1012888.0  * Conv. (cfs)            *  6748.5  *1006139.0  *          *
* Length Wtd. (ft)       *  413.07  * Wetted Per. (ft)       *   72.51  *  199.69  *          *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.10  *    0.65  *          *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *    0.11  *    5.70  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *   13.52  *  747.23  *   31.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    7.75  *   49.32  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  735.10  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  726.04  * Flow Area (sq ft)      *  393.98  * 3506.99  *          *
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* E.G. Slope (ft/ft)     *0.000705  * Area (sq ft)           *  393.98  * 3506.99  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  570.07  *33629.93  *          *
* Top Width (ft)         *  303.94  * Top Width (ft)         *  102.01  *  201.93  *          *
* Vel Total (ft/s)       *    8.77  * Avg. Vel. (ft/s)       *    1.45  *    9.59  *          *
* Max Chl Dpth (ft)      *   24.05  * Hydr. Depth (ft)       *    3.86  *   17.37  *          *
* Conv. Total (cfs)      *1288185.0  * Conv. (cfs)            * 21472.4  *1266712.0  *          *
* Length Wtd. (ft)       *  413.18  * Wetted Per. (ft)       *  102.27  *  208.58  *          *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.17  *    0.74  *          *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.25  *    7.09  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *   43.86  *  859.68  *   81.57  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   18.85  *   50.20  *   28.94  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  739.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.71  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  738.12  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  728.65  * Flow Area (sq ft)      *  743.55  * 4126.15  *   38.54  *
* E.G. Slope (ft/ft)     *0.000718  * Area (sq ft)           *  743.55  * 4126.15  *   38.54  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1445.44  *44029.56  *   25.00  *
* Top Width (ft)         *  365.62  * Top Width (ft)         *  125.17  *  205.16  *   35.29  *
* Vel Total (ft/s)       *    9.27  * Avg. Vel. (ft/s)       *    1.94  *   10.67  *    0.65  *
* Max Chl Dpth (ft)      *   27.07  * Hydr. Depth (ft)       *    5.94  *   20.11  *    1.09  *
* Conv. Total (cfs)      *1698296.0  * Conv. (cfs)            * 53951.2  *1643412.0  *   933.2  *
* Length Wtd. (ft)       *  413.32  * Wetted Per. (ft)       *  125.65  *  211.93  *   35.36  *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.27  *    0.87  *    0.05  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    0.52  *    9.31  *    0.03  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *  119.75  *  992.46  *  183.20  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   48.05  *   50.64  *   45.14  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.98  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  739.98  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  730.44  * Flow Area (sq ft)      *  985.72  * 4508.13  *  118.43  *
* E.G. Slope (ft/ft)     *0.000746  * Area (sq ft)           *  985.72  * 4508.13  *  118.43  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 2240.71  *52029.11  *  130.19  *
* Top Width (ft)         *  390.66  * Top Width (ft)         *  134.97  *  205.16  *   50.53  *
* Vel Total (ft/s)       *    9.69  * Avg. Vel. (ft/s)       *    2.27  *   11.54  *    1.10  *
* Max Chl Dpth (ft)      *   28.93  * Hydr. Depth (ft)       *    7.30  *   21.97  *    2.34  *
* Conv. Total (cfs)      *1991521.0  * Conv. (cfs)            * 82029.6  *1904726.0  *  4766.0  *
* Length Wtd. (ft)       *  413.41  * Wetted Per. (ft)       *  135.61  *  211.93  *   50.71  *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.34  *    0.99  *    0.11  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.77  *   11.44  *    0.12  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  194.73  * 1064.03  *  253.65  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   53.50  *   50.75  *   74.41  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  743.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.22  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  741.67  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  732.13  * Flow Area (sq ft)      * 1222.15  * 4855.01  *  208.00  *
* E.G. Slope (ft/ft)     *0.000764  * Area (sq ft)           * 1222.15  * 4855.01  *  208.00  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 3096.58  *59587.38  *  316.05  *
* Top Width (ft)         *  405.20  * Top Width (ft)         *  144.71  *  205.16  *   55.33  *
* Vel Total (ft/s)       *   10.02  * Avg. Vel. (ft/s)       *    2.53  *   12.27  *    1.52  *
* Max Chl Dpth (ft)      *   30.62  * Hydr. Depth (ft)       *    8.45  *   23.66  *    3.76  *
* Conv. Total (cfs)      *2278639.0  * Conv. (cfs)            *111999.8  *2155208.0  * 11431.0  *
* Length Wtd. (ft)       *  413.47  * Wetted Per. (ft)       *  145.50  *  211.93  *   55.80  *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.40  *    1.09  *    0.18  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    1.02  *   13.42  *    0.27  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *  265.94  * 1131.24  *  366.59  *
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* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   56.17  *   50.62  *  179.12  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  746.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.59  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  743.95  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  734.36  * Flow Area (sq ft)      * 1584.34  * 5322.75  *  406.19  *
* E.G. Slope (ft/ft)     *0.000799  * Area (sq ft)           * 1584.34  * 5322.75  *  412.17  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4289.60  *70993.99  *  616.41  *
* Top Width (ft)         *  514.81  * Top Width (ft)         *  175.56  *  205.16  *  134.10  *
* Vel Total (ft/s)       *   10.38  * Avg. Vel. (ft/s)       *    2.71  *   13.34  *    1.52  *
* Max Chl Dpth (ft)      *   32.90  * Hydr. Depth (ft)       *    9.02  *   25.94  *    3.62  *
* Conv. Total (cfs)      *2685869.0  * Conv. (cfs)           *151796.0  *2512260.0  * 21812.8  *
* Length Wtd. (ft)       *  413.52  * Wetted Per. (ft)       *  176.45  *  211.93  *  112.82  *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.45  *    1.25  *    0.18  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    1.21  *   16.70  *    0.27  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *  358.72  * 1214.89  *  771.71  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   59.02  *   50.62  *  290.54  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  737.83  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.51  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  736.32  * Reach Len. (ft)        *  426.00  *  413.00  *  400.00  *
* Crit W.S. (ft)         *  727.04  * Flow Area (sq ft)      *  527.11  * 3755.97  *    0.87  *
* E.G. Slope (ft/ft)     *0.000710  * Area (sq ft)           *  527.11  * 3755.97  *    0.87  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  859.54  *37440.30  *    0.15  *
* Top Width (ft)         *  325.28  * Top Width (ft)         *  114.67  *  205.16  *    5.45  *
* Vel Total (ft/s)       *    8.94  * Avg. Vel. (ft/s)       *    1.63  *    9.97  *    0.18  *
* Max Chl Dpth (ft)      *   25.27  * Hydr. Depth (ft)       *    4.60  *   18.31  *    0.16  *
* Conv. Total (cfs)      *1437370.0  * Conv. (cfs)           * 32258.0  *1405106.0  *     5.8  *
* Length Wtd. (ft)       *  413.23  * Wetted Per. (ft)       *  114.99  *  211.93  *    5.46  *
* Min Ch El (ft)         *  711.05  * Shear (lb/sq ft)       *    0.20  *    0.79  *    0.01  *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    0.33  *    7.83  *    0.00  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *   67.17  *  914.61  *  117.96  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   27.64  *   50.48  *   36.40  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.167

INPUT
Description: COE River Station= 56406.49
Preliminary Model River Station
             (miles)=2.15

Ineffective flow on right is due to buildings and
              high ground upstream.
Station Elevation Data    num=     108
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     742   16.37     744   27.45     746   40.87     748   53.93     748
   61.26     746   70.45     744   90.84     742  107.26     740  123.49     738
  157.17     736  184.06     734   198.2     732   210.1     730  240.24     728
  246.29     726  253.83     724  261.05     722  267.06     720  275.06     718
   279.9     716  295.02  710.96  370.74  710.96  385.86     716  390.34     718
  395.79     720   402.3     722  407.59     724  414.16     726  419.09     728
   425.9     730  432.41     732   438.7     734  447.47     736  486.42     738
  539.99     740   545.3     742  549.68     744  553.91     746  560.76     746
  616.44     746  727.08     748  767.01     748  777.03     748  779.98     750
  781.97     752  783.34     754  791.61     756  835.17     762  849.34     760
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  866.56     758  882.61     756  899.41     754  905.77     752  918.11     750
 1000.38     750 1010.25     752 1018.49     754  1035.6     756  1037.6     758
 1056.35     758 1060.79     756 1065.84     754 1071.29     752 1077.73     750
 1126.73     750 1140.38     752 1154.42     754  1172.8     756 1191.79     756
 1206.51     754 1224.73     752 1272.14     752 1306.65     752 1319.59     750
 1327.28     748 1541.93     746 1561.86     746 1570.16     748 1580.38     750
 1592.87     752 1596.65     752 1611.08     750 1619.47     748 1673.99     746
 1767.34     746 1931.57     746 1968.67     746 2002.47     746  2305.4     746
 2351.63     744  2437.5     744 2470.02     744 2510.19     744 2545.89     744
 2570.92     744 2581.79     746 2624.37     748 2665.62     750 2670.87     752
 2674.62     754 2681.28     756 2686.45     758 2691.62     760 2706.93     762
 2721.13     764  2725.1     766 2730.18     768

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .067  240.24    .027  447.47    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         240.24  447.47             540     527     505             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     564 2730.18     760       F
Left Levee      Station=   52.81      Elevation=  747.82

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  726.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  725.63  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  719.40  * Flow Area (sq ft)      *          * 1747.33  *          *
* E.G. Slope (ft/ft)     *0.000756  * Area (sq ft)           *          * 1747.33  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  165.23  * Top Width (ft)         *          *  165.23  *          *
* Vel Total (ft/s)       *    7.15  * Avg. Vel. (ft/s)       *          *    7.15  *          *
* Max Chl Dpth (ft)      *   14.67  * Hydr. Depth (ft)       *          *   10.58  *          *
* Conv. Total (cfs)      *454586.0  * Conv. (cfs)            *          *454586.0  *          *
* Length Wtd. (ft)       *  527.00  * Wetted Per. (ft)       *          *  170.00  *          *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)       *          *    0.49  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.47  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *          *  442.21  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   41.13  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  730.36  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.03  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  729.33  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  721.94  * Flow Area (sq ft)      *   13.39  * 2397.84  *          *
* E.G. Slope (ft/ft)     *0.000738  * Area (sq ft)           *   13.39  * 2397.84  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *    6.15  *19493.85  *          *
* Top Width (ft)         *  203.48  * Top Width (ft)         *   20.09  *  183.39  *          *
* Vel Total (ft/s)       *    8.09  * Avg. Vel. (ft/s)       *    0.46  *    8.13  *          *
* Max Chl Dpth (ft)      *   18.37  * Hydr. Depth (ft)       *    0.67  *   13.08  *          *
* Conv. Total (cfs)      *717623.9  * Conv. (cfs)            *   226.2  *717397.7  *          *
* Length Wtd. (ft)       *  527.00  * Wetted Per. (ft)       *   20.13  *  189.17  *          *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)       *    0.03  *    0.58  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.01  *    4.75  *          *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *    1.17  *  599.69  *    4.45  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    1.92  *   45.91  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.43  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  732.17  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  724.11  * Flow Area (sq ft)      *  109.61  * 2931.65  *          *
* E.G. Slope (ft/ft)     *0.000745  * Area (sq ft)           *  109.61  * 2931.65  *          *
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```
* Q Total (cfs)          *26600.00  * Flow (cfs)              *  122.90  *26477.10  *          *
* Top Width (ft)         *  235.96  * Top Width (ft)          *   43.25  *  192.71  *          *
* Vel Total (ft/s)       *    8.75  * Avg. Vel. (ft/s)        *    1.12  *    9.03  *          *
* Max Chl Dpth (ft)      *   21.21  * Hydr. Depth (ft)        *    2.53  *   15.21  *          *
* Conv. Total (cfs)      *974356.6  * Conv. (cfs)             *  4501.7  *969854.9  *          *
* Length Wtd. (ft)       *  527.03  * Wetted Per. (ft)        *   43.49  *  198.91  *          *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)        *    0.12  *    0.69  *          *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.13  *    6.19  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)    *   12.15  *  719.10  *   31.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    7.19  *   47.49  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  734.69  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  726.12  * Flow Area (sq ft)      *  242.48  * 3427.30  *          *
* E.G. Slope (ft/ft)     *0.000768  * Area (sq ft)           *  242.48  * 3427.30  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *  355.41  *33844.59  *          *
* Top Width (ft)         *  266.94  * Top Width (ft)          *   65.45  *  201.48  *          *
* Vel Total (ft/s)       *    9.32  * Avg. Vel. (ft/s)        *    1.47  *    9.88  *          *
* Max Chl Dpth (ft)      *   23.73  * Hydr. Depth (ft)        *    3.70  *   17.01  *          *
* Conv. Total (cfs)      *1233974.0  * Conv. (cfs)            * 12823.5  *1221151.0  *          *
* Length Wtd. (ft)       *  527.10  * Wetted Per. (ft)        *   65.85  *  208.05  *          *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)        *    0.18  *    0.79  *          *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    0.26  *    7.80  *          *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)    *   40.75  *  826.80  *   81.57  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *   18.03  *   48.29  *   28.94  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  739.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.86  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  737.64  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  728.64  * Flow Area (sq ft)      *  498.90  * 4035.36  *   26.25  *
* E.G. Slope (ft/ft)     *0.000804  * Area (sq ft)           *  498.90  * 4035.36  *   26.25  *
* Q Total (cfs)          *45500.00  * Flow (cfs)              *  853.55  *44631.54  *   14.91  *
* Top Width (ft)         *  349.93  * Top Width (ft)          *  110.72  *  207.23  *   31.98  *
* Vel Total (ft/s)       *    9.98  * Avg. Vel. (ft/s)        *    1.71  *   11.06  *    0.57  *
* Max Chl Dpth (ft)      *   26.68  * Hydr. Depth (ft)        *    4.51  *   19.47  *    0.82  *
* Conv. Total (cfs)      *1604237.0  * Conv. (cfs)            * 30094.4  *1573617.0  *   525.8  *
* Length Wtd. (ft)       *  527.22  * Wetted Per. (ft)        *  111.22  *  213.95  *   32.02  *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)        *    0.23  *    0.95  *    0.04  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.39  *   10.48  *    0.02  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)    *  113.67  *  953.77  *  182.90  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *   46.89  *   48.69  *   44.83  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  741.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.17  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  739.45  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  730.45  * Flow Area (sq ft)      *  717.94  * 4410.85  *  123.90  *
* E.G. Slope (ft/ft)     *0.000838  * Area (sq ft)           *  717.94  * 4410.85  *  123.90  *
* Q Total (cfs)          *54400.00  * Flow (cfs)              * 1446.63  *52841.71  *  111.66  *
* Top Width (ft)         *  413.67  * Top Width (ft)          *  128.55  *  207.23  *   77.89  *
* Vel Total (ft/s)       *   10.36  * Avg. Vel. (ft/s)        *    2.01  *   11.98  *    0.90  *
* Max Chl Dpth (ft)      *   28.49  * Hydr. Depth (ft)        *    5.58  *   21.28  *    1.59  *
* Conv. Total (cfs)      *1878975.0  * Conv. (cfs)            * 49966.7  *1825151.0  *  3856.6  *
* Length Wtd. (ft)       *  527.31  * Wetted Per. (ft)        *  129.15  *  213.95  *   77.97  *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)        *    0.29  *    1.08  *    0.08  *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *    0.59  *   12.92  *    0.07  *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)    *  186.40  * 1021.75  *  252.54  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *   52.21  *   48.79  *   73.82  *
```

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*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  743.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.41  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  741.13  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  732.04  * Flow Area (sq ft)      *  944.68  * 4757.93  *  276.55  *
* E.G. Slope (ft/ft)     *0.000853  * Area (sq ft)           *  944.68  * 4757.93  *  276.55  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2154.63  *60471.11  *  374.27  *
* Top Width (ft)         *  444.99  * Top Width (ft)         *  142.25  *  207.23  *   95.52  *
* Vel Total (ft/s)       *   10.54  * Avg. Vel. (ft/s)       *    2.28  *   12.71  *    1.35  *
* Max Chl Dpth (ft)      *   30.17  * Hydr. Depth (ft)       *    6.64  *   22.96  *    2.90  *
* Conv. Total (cfs)      *2157338.0  * Conv. (cfs)           * 73781.8  *2070740.0  * 12816.4  *
* Length Wtd. (ft)       *  527.37  * Wetted Per. (ft)       *  142.95  *  213.95  *   95.81  *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)       *    0.35  *    1.18  *    0.15  *
* Alpha                  *    1.40  * Stream Power (lb/ft s) *    0.80  *   15.05  *    0.21  *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *  255.34  * 1085.67  *  364.37  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   54.77  *   48.66  *  178.42  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  746.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.74  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  743.45  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  734.15  * Flow Area (sq ft)      * 1299.19  * 5239.10  *  505.00  *
* E.G. Slope (ft/ft)     *0.000866  * Area (sq ft)           * 1299.19  * 5239.10  *  505.00  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3355.96  *71555.65  *  988.39  *
* Top Width (ft)         *  472.43  * Top Width (ft)         *  164.19  *  207.23  *  101.01  *
* Vel Total (ft/s)       *   10.78  * Avg. Vel. (ft/s)       *    2.58  *   13.66  *    1.96  *
* Max Chl Dpth (ft)      *   32.49  * Hydr. Depth (ft)       *    7.91  *   25.28  *    5.00  *
* Conv. Total (cfs)      *2579016.0  * Conv. (cfs)           *114032.7  *2431399.0  * 33584.6  *
* Length Wtd. (ft)       *  527.40  * Wetted Per. (ft)       *  165.01  *  213.95  *  101.78  *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)       *    0.43  *    1.32  *    0.27  *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    1.10  *   18.08  *    0.53  *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *  344.62  * 1164.82  *  767.50  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   57.36  *   48.66  *  289.46  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

```
*****************************************************************************************
* E.G. Elev (ft)         *  737.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.62  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  735.88  * Reach Len. (ft)        *  540.00  *  527.00  *  505.00  *
* Crit W.S. (ft)         *  727.09  * Flow Area (sq ft)      *  330.27  * 3671.14  *          *
* E.G. Slope (ft/ft)     *0.000787  * Area (sq ft)           *  330.27  * 3671.14  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  520.51  *37779.49  *          *
* Top Width (ft)         *  288.24  * Top Width (ft)         *   81.51  *  206.72  *          *
* Vel Total (ft/s)       *    9.57  * Avg. Vel. (ft/s)       *    1.58  *   10.29  *          *
* Max Chl Dpth (ft)      *   24.92  * Hydr. Depth (ft)       *    4.05  *   17.76  *          *
* Conv. Total (cfs)      *1364828.0  * Conv. (cfs)           * 18548.5  *1346280.0  *          *
* Length Wtd. (ft)       *  527.15  * Wetted Per. (ft)       *   81.96  *  213.43  *          *
* Min Ch El (ft)         *  710.96  * Shear (lb/sq ft)       *    0.20  *    0.85  *          *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *    0.31  *    8.70  *          *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *   62.97  *  879.40  *  117.96  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   26.68  *   48.52  *   36.37  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 2.068

```
INPUT
Description: COE River Station= 56933.93
Preliminary Model River Station
             (miles)=2.05

Ineffective flow on right is due to buildings and
             high ground upstream.
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     736    22.6     738   39.29     740   50.65     742   61.45     744
   68.51     746   77.11     748  101.93     748  110.65     746  122.57     744
  136.86     742  149.65     740  163.79     738  202.76     736   236.8     734
  263.95     732  307.53     730  314.28     728  321.83     726  327.91     724
  335.81     722  341.19     720  347.42     718  353.58     716     369  710.86
  442.45  710.86  457.87     716  463.03     718  468.29     720  472.86     722
   478.9     724  484.62     726  489.87     728  495.64     730  502.77     732
  508.98     734  514.95     736  528.38     738  581.09     740  637.72     742
   659.9     744  691.94     746  748.65     748  779.92     748  987.96     748
 1000.25     750 1011.28     752 1012.33     752 1022.54     750  1041.1     748
 1113.94     748  1125.5     748 1192.88     748 1197.15     750 1197.26     752
 1198.39     754 1200.22     756 1204.07     754 1205.04     750 1206.08     752
 1208.06     748 1221.99     748 1342.93     750 1494.22     752 1536.18     752
 1549.22     750 1587.89     748 1605.89     746 1611.77     746 1644.38     746
 1654.87     746 2163.56     748 2171.48     750 2173.99     752 2179.38     754
 2186.82     754 2193.04     752 2198.45     750 2205.53     748 2213.53     746
 2223.96     746 2294.15     746 2394.51     744 2533.88     744 2567.25     744
 2597.81     744 2606.02     746 2644.61     748 2680.19     750 2685.22     752
 2688.72     754 2694.84     756 2699.63     758  2704.4     760 2718.02     762
 2731.37     764 2736.12     766 2740.35     768 2744.97     770

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0    .067  307.53    .027  528.38    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        307.53  528.38              146     139     127              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     736 2744.97     760       F
Left Levee      Station=  104.52      Elevation=  747.82

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  725.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  725.07  * Reach Len. (ft)        *  146.00  *  139.00  *  127.00  *
* Crit W.S. (ft)         *  719.41  * Flow Area (sq ft)      *          * 1637.22  *          *
* E.G. Slope (ft/ft)     *0.000881  * Area (sq ft)           *          * 1637.22  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  157.33  * Top Width (ft)         *          *  157.33  *          *
* Vel Total (ft/s)       *    7.63  * Avg. Vel. (ft/s)       *          *    7.63  *          *
* Max Chl Dpth (ft)      *   14.21  * Hydr. Depth (ft)        *          *   10.41  *          *
* Conv. Total (cfs)      *421053.5  * Conv. (cfs)             *          *421053.5  *          *
* Length Wtd. (ft)       *  139.00  * Wetted Per. (ft)        *          *  162.07  *          *
* Min Ch El (ft)         *  710.86  * Shear (lb/sq ft)        *          *    0.56  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.24  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *          *  421.74  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   39.17  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  729.92  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  728.77  * Reach Len. (ft)        *  146.00  *  139.00  *  127.00  *
* Crit W.S. (ft)         *  721.93  * Flow Area (sq ft)      *          * 2259.99  *          *
* E.G. Slope (ft/ft)     *0.000882  * Area (sq ft)           *          * 2259.99  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  180.38  * Top Width (ft)         *          *  180.38  *          *
* Vel Total (ft/s)       *    8.63  * Avg. Vel. (ft/s)       *          *    8.63  *          *
```

```
* Max Chl Dpth (ft)      *   17.91  * Hydr. Depth (ft)       *          *   12.53  *          *
* Conv. Total (cfs)      *656651.3  * Conv. (cfs)            *          *656651.3  *          *
* Length Wtd. (ft)       *  139.00  * Wetted Per. (ft)       *          *  186.30  *          *
* Min Ch El (ft)         *  710.86  * Shear (lb/sq ft)       *          *    0.67  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.76  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    1.09  *  571.51  *    4.45  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    1.80  *   43.71  *    6.45  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  732.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.41  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  731.58  * Reach Len. (ft)        *  146.00  *  139.00  *  127.00  *
* Crit W.S. (ft)         *  724.16  * Flow Area (sq ft)      *   27.07  * 2788.41  *          *
* E.G. Slope (ft/ft)     *0.000896  * Area (sq ft)           *   27.07  * 2788.41  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *   15.32  *26584.68  *          *
* Top Width (ft)         *  228.08  * Top Width (ft)         *   34.35  *  193.73  *          *
* Vel Total (ft/s)       *    9.45  * Avg. Vel. (ft/s)       *    0.57  *    9.53  *          *
* Max Chl Dpth (ft)      *   20.72  * Hydr. Depth (ft)       *    0.79  *   14.39  *          *
* Conv. Total (cfs)      *888708.6  * Conv. (cfs)            *   512.0  *888196.6  *          *
* Length Wtd. (ft)       *  139.00  * Wetted Per. (ft)       *   34.38  *  200.25  *          *
* Min Ch El (ft)         *  710.86  * Shear (lb/sq ft)       *    0.04  *    0.78  *          *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.02  *    7.42  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   11.30  *  684.50  *   31.58  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    6.70  *   45.15  *   15.28  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  735.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.66  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  734.08  * Reach Len. (ft)        *  146.00  *  139.00  *  127.00  *
* Crit W.S. (ft)         *  726.18  * Flow Area (sq ft)      *  163.45  * 3283.20  *          *
* E.G. Slope (ft/ft)     *0.000898  * Area (sq ft)           *  163.45  * 3283.20  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  187.36  *34012.64  *          *
* Top Width (ft)         *  273.74  * Top Width (ft)         *   72.06  *  201.68  *          *
* Vel Total (ft/s)       *    9.92  * Avg. Vel. (ft/s)       *    1.15  *   10.36  *          *
* Max Chl Dpth (ft)      *   23.22  * Hydr. Depth (ft)       *    2.27  *   16.28  *          *
* Conv. Total (cfs)      *1141087.0  * Conv. (cfs)            *  6251.4  *1134836.0  *          *
* Length Wtd. (ft)       *  139.02  * Wetted Per. (ft)       *   72.18  *  208.59  *          *
* Min Ch El (ft)         *  710.86  * Shear (lb/sq ft)       *    0.13  *    0.88  *          *
* Alpha                  *    1.08  * Stream Power (lb/ft s) *    0.15  *    9.14  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   38.23  *  786.21  *   81.57  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   17.18  *   45.85  *   28.94  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  739.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.03  * Wt. n-Val.              *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  737.00  * Reach Len. (ft)        *  146.00  *  139.00  *  127.00  *
* Crit W.S. (ft)         *  728.79  * Flow Area (sq ft)      *  447.68  * 3886.76  *          *
* E.G. Slope (ft/ft)     *0.000961  * Area (sq ft)           *  447.68  * 3886.76  *          *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  722.53  *44777.47  *          *
* Top Width (ft)         *  338.34  * Top Width (ft)         *  124.22  *  214.12  *          *
* Vel Total (ft/s)       *   10.50  * Avg. Vel. (ft/s)       *    1.61  *   11.52  *          *
* Max Chl Dpth (ft)      *   26.14  * Hydr. Depth (ft)       *    3.60  *   18.15  *          *
* Conv. Total (cfs)      *1468100.0  * Conv. (cfs)            * 23313.1  *1444787.0  *          *
* Length Wtd. (ft)       *  139.06  * Wetted Per. (ft)       *  124.42  *  221.42  *          *
* Min Ch El (ft)         *  710.86  * Shear (lb/sq ft)       *    0.22  *    1.05  *          *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *    0.35  *   12.13  *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  107.81  *  905.85  *  182.75  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   45.44  *   46.14  *   44.65  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	741.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.32	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	738.80	Reach Len. (ft)	146.00	139.00	127.00
Crit W.S. (ft)	730.60	Flow Area (sq ft)	698.54	4280.41	8.35
E.G. Slope (ft/ft)	0.001016	Area (sq ft)	698.54	4280.41	8.35
Q Total (cfs)	54400.00	Flow (cfs)	1379.52	53017.19	3.29
Top Width (ft)	391.19	Top Width (ft)	149.37	220.85	20.98
Vel Total (ft/s)	10.91	Avg. Vel. (ft/s)	1.97	12.39	0.39
Max Chl Dpth (ft)	27.94	Hydr. Depth (ft)	4.68	19.38	0.40
Conv. Total (cfs)	1706300.0	Conv. (cfs)	43269.8	1662927.0	103.2
Length Wtd. (ft)	139.09	Wetted Per. (ft)	149.65	228.22	20.99
Min Ch El (ft)	710.86	Shear (lb/sq ft)	0.30	1.19	0.03
Alpha	1.26	Stream Power (lb/ft s)	0.58	14.74	0.01
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	177.62	969.17	251.77
C & E Loss (ft)	0.04	Cum SA (acres)	50.48	46.21	73.25

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	743.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.55	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	740.49	Reach Len. (ft)	146.00	139.00	127.00
Crit W.S. (ft)	732.24	Flow Area (sq ft)	961.48	4654.32	81.87
E.G. Slope (ft/ft)	0.001008	Area (sq ft)	961.48	4654.32	81.87
Q Total (cfs)	63000.00	Flow (cfs)	2224.71	60707.11	68.19
Top Width (ft)	448.41	Top Width (ft)	161.01	220.85	66.55
Vel Total (ft/s)	11.06	Avg. Vel. (ft/s)	2.31	13.04	0.83
Max Chl Dpth (ft)	29.63	Hydr. Depth (ft)	5.97	21.07	1.23
Conv. Total (cfs)	1984231.0	Conv. (cfs)	70068.9	1912015.0	2147.6
Length Wtd. (ft)	139.12	Wetted Per. (ft)	161.42	228.22	66.60
Min Ch El (ft)	710.86	Shear (lb/sq ft)	0.37	1.28	0.08
Alpha	1.34	Stream Power (lb/ft s)	0.87	16.74	0.06
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	243.53	1028.74	362.29
C & E Loss (ft)	0.01	Cum SA (acres)	52.89	46.07	177.49

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	745.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.83	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	742.86	Reach Len. (ft)	146.00	139.00	127.00
Crit W.S. (ft)	734.50	Flow Area (sq ft)	1362.27	5178.94	313.42
E.G. Slope (ft/ft)	0.000987	Area (sq ft)	1362.27	5178.94	313.42
Q Total (cfs)	75900.00	Flow (cfs)	3694.21	71776.56	429.23
Top Width (ft)	516.62	Top Width (ft)	176.85	220.85	118.93
Vel Total (ft/s)	11.07	Avg. Vel. (ft/s)	2.71	13.86	1.37
Max Chl Dpth (ft)	32.00	Hydr. Depth (ft)	7.70	23.45	2.64
Conv. Total (cfs)	2415790.0	Conv. (cfs)	117581.6	2284546.0	13661.7
Length Wtd. (ft)	139.14	Wetted Per. (ft)	177.43	228.22	119.04
Min Ch El (ft)	710.86	Shear (lb/sq ft)	0.47	1.40	0.16
Alpha	1.48	Stream Power (lb/ft s)	1.28	19.38	0.22
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	328.13	1101.80	762.76
C & E Loss (ft)	0.02	Cum SA (acres)	55.24	46.08	288.19

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	737.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.79	Wt. n-Val.	0.067	0.027	
W.S. Elev (ft)	735.26	Reach Len. (ft)	146.00	139.00	127.00
Crit W.S. (ft)	727.16	Flow Area (sq ft)	260.64	3523.96	
E.G. Slope (ft/ft)	0.000905	Area (sq ft)	260.64	3523.96	
Q Total (cfs)	38300.00	Flow (cfs)	347.19	37952.81	

```
* Top Width (ft)          *  297.41  * Top Width (ft)          *   92.20  *  205.22  *          *
* Vel Total (ft/s)        *   10.12  * Avg. Vel. (ft/s)        *    1.33  *   10.77  *          *
* Max Chl Dpth (ft)       *   24.40  * Hydr. Depth (ft)        *    2.83  *   17.17  *          *
* Conv. Total (cfs)       *1273455.0  * Conv. (cfs)            * 11543.9  *1261911.0  *          *
* Length Wtd. (ft)        *  139.03  * Wetted Per. (ft)        *   92.35  *  212.31  *          *
* Min Ch El (ft)          *  710.86  * Shear (lb/sq ft)        *    0.16  *    0.94  *          *
* Alpha                   *    1.12  * Stream Power (lb/ft s) *    0.21  *   10.09  *          *
* Frctn Loss (ft)         *    0.12  * Cum Volume (acre-ft)    *   59.31  *  835.88  *  117.96  *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)          *   25.60  *   46.03  *   36.37  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.041

INPUT
Description: COE River Station= 57074.15
Preliminary Model River Station
             (miles)=2.03

KC Southern RR, Missouri Pacific RR.  B1 & B2
             (upstream side).  Bridges modeled together.  Composite deck and
             piers.  Ineffective flow on right is due to buildings and high
             ground upstream.
Station Elevation Data    num=      92
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     748   59.74     748  131.66   748.5  217.68     749  315.49     749
   315.5   744.5     320     729     375     711     452     711   492.5   724.5
   512.3   724.5   540.4     735   543.5   738.5  545.84     749  684.65     750
  697.03     750   726.9   749.5  922.93     748  952.82     746  968.01     744
  970.23     744  988.26     746  1223.5     748 1295.61     748 1310.43     748
 1361.96     754 1364.49     756 1368.52     758  1376.7     758 1382.43     756
 1389.43     754 1393.53     754 1398.57     756 1404.04     758 1422.78     760
 1438.23     760 1447.72     758  1459.3     756 1474.18     754 1480.89     752
 1487.29     750 1496.36     750 1572.57     752 1608.49     752 1619.23     750
  1651.3     748 1669.01     746 1690.75     746 1705.39     746 1726.98     746
 2065.28     746 2108.48     746  2110.1     746 2150.41     746 2217.12     754
 2224.77     756  2229.9     756 2236.92     754 2242.68     752 2249.96     750
 2257.33     748 2275.04     746 2300.92     746 2318.26     746 2393.01     744
  2586.1     744 2594.42     746 2632.05     748 2637.71     748 2659.77     748
 2665.27     750 2670.39     752 2673.88     754 2679.88     756 2684.62     758
 2689.33     760 2702.16     762 2717.25     764 2721.66     766 2725.28     768
 2729.72     770 2733.66     772 2737.38     774  2742.3     776 2746.21     778
 2752.23     780 2757.43     782 2762.24     784 2768.17     786 2773.22     788
 2779.33     790 2836.24     790

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .067  315.49    .027  545.84    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        315.49  545.84               91      92      91             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     600 2836.24     760        F

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  725.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.86  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  724.98  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  719.34  * Flow Area (sq ft)      *          * 1676.79  *          *
* E.G. Slope (ft/ft)      *0.000976  * Area (sq ft)           *          * 1676.79  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  181.27  * Top Width (ft)          *          *  181.27  *          *
* Vel Total (ft/s)        *    7.45  * Avg. Vel. (ft/s)        *          *    7.45  *          *
* Max Chl Dpth (ft)       *   13.98  * Hydr. Depth (ft)        *          *    9.25  *          *
* Conv. Total (cfs)       *400035.2  * Conv. (cfs)            *          *400035.2  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *          *  185.78  *          *
```

```
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    0.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.10  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  416.45  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   38.63  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  729.76  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.03  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  728.74  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  721.85  * Flow Area (sq ft)      *          * 2399.29  *          *
* E.G. Slope (ft/ft)     *0.000840  * Area (sq ft)           *          * 2399.29  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  202.84  * Top Width (ft)         *          *  202.84  *          *
* Vel Total (ft/s)       *    8.13  * Avg. Vel. (ft/s)       *          *    8.13  *          *
* Max Chl Dpth (ft)      *   17.74  * Hydr. Depth (ft)       *          *   11.83  *          *
* Conv. Total (cfs)      *672766.1  * Conv. (cfs)            *          *672766.1  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  208.62  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    0.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.90  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.09  *  564.08  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    1.80  *   43.09  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  732.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  731.59  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  723.96  * Flow Area (sq ft)      *          * 2991.21  *          *
* E.G. Slope (ft/ft)     *0.000806  * Area (sq ft)           *          * 2991.21  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  212.01  * Top Width (ft)         *          *  212.01  *          *
* Vel Total (ft/s)       *    8.89  * Avg. Vel. (ft/s)       *          *    8.89  *          *
* Max Chl Dpth (ft)      *   20.59  * Hydr. Depth (ft)       *          *   14.11  *          *
* Conv. Total (cfs)      *936917.4  * Conv. (cfs)            *          *936917.4  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  220.30  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    0.68  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.08  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   11.25  *  675.28  *   31.58  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    6.65  *   44.50  *   15.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  735.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  734.10  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  726.19  * Flow Area (sq ft)      *          * 3533.91  *          *
* E.G. Slope (ft/ft)     *0.000810  * Area (sq ft)           *          * 3533.91  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  219.48  * Top Width (ft)         *          *  219.48  *          *
* Vel Total (ft/s)       *    9.68  * Avg. Vel. (ft/s)       *          *    9.68  *          *
* Max Chl Dpth (ft)      *   23.10  * Hydr. Depth (ft)       *          *   16.10  *          *
* Conv. Total (cfs)      *1201635.0  * Conv. (cfs)            *          *1201635.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  230.10  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    0.78  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    7.52  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   37.96  *  775.33  *   81.57  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   17.06  *   45.18  *   28.94  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #50-yr
```

```
*********************************************************************************************
* E.G. Elev (ft)          *  738.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.84  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)          *  737.00  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  728.50  * Flow Area (sq ft)      *          * 4179.86  *          *
* E.G. Slope (ft/ft)      *0.000859  * Area (sq ft)           *          * 4179.86  *          *
* Q Total (cfs)           *45500.00  * Flow (cfs)              *          *45500.00  *          *
* Top Width (ft)          *  224.50  * Top Width (ft)          *          *  224.50  *          *
* Vel Total (ft/s)        *   10.89  * Avg. Vel. (ft/s)        *          *   10.89  *          *
* Max Chl Dpth (ft)       *   26.00  * Hydr. Depth (ft)        *          *   18.62  *          *
* Conv. Total (cfs)       *1552619.0  * Conv. (cfs)            *          *1552619.0  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *          *  238.37  *          *
* Min Ch El (ft)          *  711.00  * Shear (lb/sq ft)        *          *    0.94  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   10.23  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *  107.06  *  892.98  *  182.75  *
* C & E Loss (ft)         *          * Cum SA (acres)          *   45.23  *   45.44  *   44.65  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

```
*********************************************************************************************
* E.G. Elev (ft)          *  740.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.20  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)          *  738.75  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  730.08  * Flow Area (sq ft)      *          * 4573.32  *          *
* E.G. Slope (ft/ft)      *0.000930  * Area (sq ft)           *          * 4573.32  *          *
* Q Total (cfs)           *54400.00  * Flow (cfs)              *          *54400.00  *          *
* Top Width (ft)          *  226.39  * Top Width (ft)          *          *  226.39  *          *
* Vel Total (ft/s)        *   11.90  * Avg. Vel. (ft/s)        *          *   11.90  *          *
* Max Chl Dpth (ft)       *   27.75  * Hydr. Depth (ft)        *          *   20.20  *          *
* Conv. Total (cfs)       *1783529.0  * Conv. (cfs)            *          *1783529.0  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *          *  242.44  *          *
* Min Ch El (ft)          *  711.00  * Shear (lb/sq ft)        *          *    1.10  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   13.03  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *  176.45  *  955.04  *  251.76  *
* C & E Loss (ft)         *          * Cum SA (acres)          *   50.23  *   45.49  *   73.22  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #200-yr

```
*********************************************************************************************
* E.G. Elev (ft)          *  742.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.53  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)          *  740.37  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  731.48  * Flow Area (sq ft)      *          * 4940.36  *          *
* E.G. Slope (ft/ft)      *0.000982  * Area (sq ft)           *          * 4940.36  *          *
* Q Total (cfs)           *63000.00  * Flow (cfs)              *          *63000.00  *          *
* Top Width (ft)          *  227.22  * Top Width (ft)          *          *  227.22  *          *
* Vel Total (ft/s)        *   12.75  * Avg. Vel. (ft/s)        *          *   12.75  *          *
* Max Chl Dpth (ft)       *   29.37  * Hydr. Depth (ft)        *          *   21.74  *          *
* Conv. Total (cfs)       *2009989.0  * Conv. (cfs)            *          *2009989.0  *          *
* Length Wtd. (ft)        *    1.00  * Wetted Per. (ft)        *          *  245.78  *          *
* Min Ch El (ft)          *  711.00  * Shear (lb/sq ft)        *          *    1.23  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   15.72  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *  241.92  * 1013.43  *  362.17  *
* C & E Loss (ft)         *          * Cum SA (acres)          *   52.62  *   45.36  *  177.39  *
*********************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #500-yr

```
*********************************************************************************************
* E.G. Elev (ft)          *  745.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    3.04  * Wt. n-Val.              *          *   0.027  *          *
* W.S. Elev (ft)          *  742.48  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)          *  733.45  * Flow Area (sq ft)      *          * 5422.39  *          *
* E.G. Slope (ft/ft)      *0.001070  * Area (sq ft)           *          * 5422.39  *          *
* Q Total (cfs)           *75900.00  * Flow (cfs)              *          *75900.00  *          *
* Top Width (ft)          *  228.30  * Top Width (ft)          *          *  228.30  *          *
* Vel Total (ft/s)        *   14.00  * Avg. Vel. (ft/s)        *          *   14.00  *          *
* Max Chl Dpth (ft)       *   31.48  * Hydr. Depth (ft)        *          *   23.75  *          *
```

```
* Conv. Total (cfs)      *2319933.0  * Conv. (cfs)            *          *2319933.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  250.16  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.45  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   20.27  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *  325.84  * 1084.89  *  762.30  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *   54.95  *   45.36  *  288.02  *
*******************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*******************************************************************************************
* E.G. Elev (ft)         *  736.87  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.58  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  735.28  * Reach Len. (ft)        *    1.00  *    1.00  *    1.00  *
* Crit W.S. (ft)         *  727.03  * Flow Area (sq ft)      *          * 3795.48  *          *
* E.G. Slope (ft/ft)     *0.000820  * Area (sq ft)           *          * 3795.48  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *38300.00  *          *
* Top Width (ft)         *  222.48  * Top Width (ft)         *          *  222.48  *          *
* Vel Total (ft/s)       *   10.09  * Avg. Vel. (ft/s)       *          *   10.09  *          *
* Max Chl Dpth (ft)      *   24.28  * Hydr. Depth (ft)       *          *   17.06  *          *
* Conv. Total (cfs)      *1337363.0  * Conv. (cfs)            *          *1337363.0  *          *
* Length Wtd. (ft)       *    1.00  * Wetted Per. (ft)       *          *  234.28  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    0.83  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    8.37  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   58.87  *  824.20  *  117.96  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   25.45  *   45.35  *   36.37  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 2.033

INPUT
Description: Bridge B1 and B2.  KC Southern RR, MO Pacific RR.  Bridges modeled
             together using composite of both decks and all piers.  A small
             opening on the left abutment is completely clogged with debris, so
             the inside of the leftmost pier of B2 (sta 3+15) is modeled as the
             abutment since no flow can pass behind it.
Distance from Upstream XS =       1
Deck/Roadway Width        =      90
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
  315.49     749   744.5  466.26     749   744.5  466.27     749   738.5
  545.83     749   738.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=      92
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0     748   59.74     748  131.66   748.5  217.68     749  315.49     749
   315.5   744.5     320     729     375     711     452     711   492.5   724.5
   512.3   724.5   540.4     735   543.5   738.5  545.84     749  684.65     750
  697.03     750   726.9   749.5  922.93     748  952.82     746  968.01     744
  970.23     744  988.26     746  1223.5     748 1295.61     748 1310.43     748
 1361.96     754 1364.49     756 1368.52     758  1376.7     758 1382.43     756
 1389.43     754 1393.53     754 1398.57     756 1404.04     758 1422.78     760
 1438.23     760 1447.72     758  1459.3     756 1474.18     754 1480.89     752
 1487.29     750 1496.36     750 1572.57     752 1608.49     752 1619.23     750
  1651.3     748 1669.01     746 1690.75     746 1705.39     746 1726.98     746
 2065.28     746 2108.48     746  2110.1     746 2150.41     746 2217.12     754
 2224.77     756  2229.9     756 2236.92     754 2242.68     752 2249.96     750
 2257.33     748 2275.04     746 2300.92     746 2318.26     746 2393.01     744
```

```
  2586.1     744 2594.42     746 2632.05     748 2637.71     748 2659.77     748
 2665.27     750 2670.39     752 2673.88     754 2679.88     756 2684.62     758
 2689.33     760 2702.16     762 2717.25     764 2721.66     766 2725.28     768
 2729.72     770 2733.66     772 2737.38     774  2742.3     776 2746.21     778
 2752.23     780 2757.43     782 2762.24     784 2768.17     786 2773.22     788
 2779.33     790 2836.24     790

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .067  315.49    .027  545.84    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
        315.49  545.84            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     600 2836.24     760        F

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
   315.5     749   744.5  466.28     749   744.5  466.29     749     739
  543.51     749     739

Downstream Bridge Cross Section Data
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
***************************************************************************************
       0   748.5  315.49     749   315.5   744.5     320     729     375     711
     452     711   492.5   724.5   512.3   724.5   540.4     735   543.5   738.5
  543.51     749     800   748.5 1048.07     747  1252.8     746 1261.64     744
    1277     742 1288.09     740 1302.29     740 1306.75     742 1311.49     744
 1334.89     746 1412.36     748 1430.85     750 1461.55     750 1590.21     748
 1608.93     748 1639.31     750 1704.36     752 1717.71     752 1737.38     750
 1770.58     748 1779.73     746 1788.77     744 1830.88     742  1836.6     742
 1845.93     744 1852.84     746 2015.27     748 2029.28     748 2133.55     746
 2140.84     746 2152.56     750 2158.59     756 2158.92     754 2159.22     752
 2164.21     756 2172.87     754 2210.46     748 2368.26     746 2405.76     744
 2529.72     744 2562.36     744 2586.78     744 2597.39     746 2633.16     748
 2641.17     750  2653.1     750 2660.83     748 2661.99     748 2665.68     750
 2670.08     752 2673.76     754  2679.9     756 2683.94     758 2688.32     760
 2691.98     762 2722.05     764 2728.06     766 2734.56     768 2739.86     770
 2746.53     772 2755.02     774    2759     776 2765.47     778 2770.48     780
 2777.92     782 2786.03     784  2789.4     786 2795.92     788 2799.63     790
 2803.41     792 2806.54     794 2810.06     796 2815.63     798 2817.16     800
 2818.61     802

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .067  315.49    .027  543.51    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
        315.49  543.51            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     600 2818.61     760        F

Upstream Embankment side slope              =         horiz. to 1.0 vertical
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=   350.9    Downstream=   350.9
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
   10.45     715    9.75   744.5
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
*******************************
   10.45     715    9.75   744.5

Pier Data
Pier Station     Upstream=   462.5    Downstream=   462.5
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
     8.5     710     7.5   744.5
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
     8.5     710     7.5   744.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.35
       Yarnell                KVal =       1
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =      .5
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     725.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     724.98  * E.G. Elev (ft)         *     725.84  *     725.84  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     724.75  *     724.75  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     719.46  *     719.46  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      13.75  *      13.75  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.38  *       8.38  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1491.29  *    1491.29  *
* Weir Submerg           *             * Froude # Chl           *       0.49  *       0.49  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   12535.44  *   12535.44  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *       9.22  *       9.22  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     196.93  *     196.93  *
* Delta EG (ft)          *       0.18  * Conv. Total (cfs)      *   316484.9  *   316485.7  *
* Delta WS (ft)          *       0.23  * Top Width (ft)         *     161.68  *     161.68  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.38  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.74  *       0.74  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       6.18  *       6.18  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. US. (ft)          *     729.76  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     728.74  * E.G. Elev (ft)         *     729.77  *     729.77  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     728.48  *     728.48  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     722.19  *     722.19  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      17.48  *      17.48  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.14  *       9.14  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2134.48  *    2134.48  *
* Weir Submerg           *             * Froude # Chl           *       0.47  *       0.47  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   21549.85  *   21549.85  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      11.65  *      11.65  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     234.50  *     234.50  *
* Delta EG (ft)          *       0.21  * Conv. Total (cfs)      *   512110.1  *   512108.8  *
```

```
* Delta WS (ft)          *       0.26  * Top Width (ft)         *     183.26  *     183.26  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       9.14  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.82  *       0.82  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       7.53  *       7.53  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. US. (ft)          *     732.81  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     731.59  * E.G. Elev (ft)         *     732.83  *     732.83  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     731.28  *     731.28  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     725.00  *     725.00  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      20.28  *      20.28  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.99  *       9.99  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2662.89  *    2662.89  *
* Weir Submerg           *             * Froude # Chl           *       0.47  *       0.47  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   30976.95  *   30976.95  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      13.79  *      13.79  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     257.74  *     257.74  *
* Delta EG (ft)          *       0.25  * Conv. Total (cfs)      *   695187.6  *   695187.6  *
* Delta WS (ft)          *       0.31  * Top Width (ft)         *     193.15  *     193.15  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       9.99  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.94  *       0.94  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       9.43  *       9.43  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*******************************************************************************************
* E.G. US. (ft)          *     735.56  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     734.10  * E.G. Elev (ft)         *     735.56  *     735.56  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     733.73  *     733.73  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     726.90  *     726.90  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      22.73  *      22.73  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.87  *      10.87  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3145.44  *    3145.44  *
* Weir Submerg           *             * Froude # Chl           *       0.48  *       0.48  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   41388.69  *   41388.69  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      15.68  *      15.68  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     277.10  *     277.10  *
* Delta EG (ft)          *       0.30  * Conv. Total (cfs)      *   874337.5  *   874336.5  *
* Delta WS (ft)          *       0.37  * Top Width (ft)         *     200.55  *     200.55  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      10.87  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.08  *       1.08  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *      11.79  *      11.79  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*******************************************************************************************
* E.G. US. (ft)          *     738.84  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     737.00  * E.G. Elev (ft)         *     738.83  *     738.83  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     736.50  *     736.50  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     729.34  *     729.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.50  *      25.50  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      12.26  *      12.26  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3710.66  *    3710.66  *
* Weir Submerg           *             * Froude # Chl           *       0.51  *       0.51  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   56661.25  *   56661.25  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      17.99  *      17.99  *
```

```
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     296.70  *     296.70  *
* Delta EG (ft)          *       0.40  * Conv. Total (cfs)      *  1100278.0  *  1100276.0  *
* Delta WS (ft)          *       0.51  * Top Width (ft)         *     206.23  *     206.23  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      12.26  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.34  *       1.34  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *      16.37  *      16.37  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     740.95  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     738.75  * E.G. Elev (ft)         *     740.91  *     740.91  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     738.09  *     738.09  *
* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     730.98  *     730.98  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.09  *      27.09  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      13.46  *      13.46  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4040.70  *    4040.70  *
* Weir Submerg           *             * Froude # Chl           *       0.54  *       0.54  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   68252.18  *   68252.18  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      19.41  *      19.41  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     306.86  *     306.86  *
* Delta EG (ft)          *       0.51  * Conv. Total (cfs)      *  1240028.0  *  1240027.0  *
* Delta WS (ft)          *       0.66  * Top Width (ft)         *     208.19  *     208.19  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      13.46  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.58  *       1.58  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *      21.30  *      21.30  *
*****************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     742.89  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     740.37  * E.G. Elev (ft)         *     742.94  *     742.88  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     739.55  *     739.55  *
* Q Bridge (cfs)         *   63000.00  * Crit W.S. (ft)         *     732.48  *     732.47  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      28.55  *      28.55  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      14.78  *      14.64  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4263.69  *    4302.28  *
* Weir Submerg           *             * Froude # Chl           *       0.57  *       0.57  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   80475.52  *   80247.01  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      32.33  *      32.62  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     390.86  *     391.87  *
* Delta EG (ft)          *       0.62  * Conv. Total (cfs)      *  1154146.0  *  1169596.0  *
* Delta WS (ft)          *       0.82  * Top Width (ft)         *     131.87  *     131.87  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      14.78  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.03  *       1.99  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *      29.98  *      29.12  *
*****************************************************************************************

Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     745.53  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.48  * E.G. Elev (ft)         *     745.37  *     745.02  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     740.82  *     740.45  *
* Q Bridge (cfs)         *   75900.00  * Crit W.S. (ft)         *     734.56  *     734.56  *
```

```
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.82  *      29.45  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      17.13  *      17.17  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4431.63  *    4421.19  *
* Weir Submerg           *             * Froude # Chl           *       0.65  *       0.65  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   97464.52  *   95991.28  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      33.50  *      33.45  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     396.00  *     395.51  *
* Delta EG (ft)          *       0.87  * Conv. Total (cfs)      *  1220231.0  *  1216452.0  *
* Delta WS (ft)          *       1.20  * Top Width (ft)         *     132.29  *     132.17  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *       0.35  *       0.00  *
* BR Open Vel (ft/s)     *      17.17  * C & E Loss (ft)        *       0.00  *       0.36  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.70  *       2.72  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *      46.30  *      46.64  *
*****************************************************************************************

Warning: The sluice gate calculations did not converge during the pressure flow only calculation.
Note:    Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is below the minimum elevation for pressure flow.  The sluice
         gate equations were used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     736.87  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     735.28  * E.G. Elev (ft)         *     736.87  *     736.87  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     734.87  *     734.87  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     727.82  *     727.82  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.87  *      23.87  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      11.34  *      11.34  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3376.61  *    3376.61  *
* Weir Submerg           *             * Froude # Chl           *       0.49  *       0.49  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   47058.40  *   47058.39  *
* Min El Weir Flow (ft)  *     748.01  * Hydr Depth (ft)        *      16.55  *      16.55  *
* Min El Prs (ft)        *     744.50  * W.P. Total (ft)        *     286.13  *     286.13  *
* Delta EG (ft)          *       0.33  * Conv. Total (cfs)      *   963224.6  *   963223.3  *
* Delta WS (ft)          *       0.41  * Top Width (ft)         *     204.00  *     204.00  *
* BR Open Area (sq ft)   *    4920.90  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      11.34  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.16  *       1.16  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *      13.21  *      13.21  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main                RS: 2.024

INPUT
Description: COE River Station= 57164.53
Preliminary Model River Station
             (miles)=2.01

KC Southern RR, Missouri Pacific RR, B1 & B2
             (downstream). Bridges modeled together.  Composite deck and piers.
             Small opening at left abutment clogged with debris.  Inside of
             leftmost pier of B2 at station 3+15 modeled as ground surface
             since there's no flow through the area outside of the pier.
             Ineffective flow on right is due to buildings and high ground
             upstream.
Station Elevation Data    num=      86
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	748.5	315.49	749	315.5	744.5	320	729	375	711
452	711	492.5	724.5	512.3	724.5	540.4	735	543.5	738.5
543.51	749	800	748.5	1048.07	747	1252.8	746	1261.64	744
1277	742	1288.09	740	1302.29	740	1306.75	742	1311.49	744
1334.89	746	1412.36	748	1430.85	750	1461.55	750	1590.21	748
1608.93	748	1639.31	750	1704.36	752	1717.71	752	1737.38	750
1770.58	748	1779.73	746	1788.77	744	1830.88	742	1836.6	742
1845.93	744	1852.84	746	2015.27	748	2029.28	748	2133.55	746
2140.84	746	2152.56	750	2158.59	756	2158.92	754	2159.22	752
2164.21	756	2172.87	754	2210.46	748	2368.26	746	2405.76	744
2529.72	744	2562.36	744	2586.78	744	2597.39	746	2633.16	748
2641.17	750	2653.1	750	2660.83	748	2661.99	748	2665.68	750
2670.08	752	2673.76	754	2679.9	756	2683.94	758	2688.32	760
2691.98	762	2722.05	764	2728.06	766	2734.56	768	2739.86	770
2746.53	772	2755.02	774	2759	776	2765.47	778	2770.48	780
2777.92	782	2786.03	784	2789.4	786	2795.92	788	2799.63	790
2803.41	792	2806.54	794	2810.06	796	2815.63	798	2817.16	800
2818.61	802								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.067	315.49	.027	543.51	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
315.49	543.51	110	104	82	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
600	2818.61	760	F

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	725.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.027	
W.S. Elev (ft)	724.75	Reach Len. (ft)	110.00	104.00	82.00
Crit W.S. (ft)	719.34	Flow Area (sq ft)		1635.91	
E.G. Slope (ft/ft)	0.001050	Area (sq ft)		1635.91	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	179.98	Top Width (ft)		179.98	
Vel Total (ft/s)	7.64	Avg. Vel. (ft/s)		7.64	
Max Chl Dpth (ft)	13.75	Hydr. Depth (ft)		9.09	
Conv. Total (cfs)	385818.3	Conv. (cfs)		385818.3	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		184.40	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		4.44	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		413.30	
C & E Loss (ft)	0.05	Cum SA (acres)		38.29	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	729.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.07	Wt. n-Val.		0.027	
W.S. Elev (ft)	728.48	Reach Len. (ft)	110.00	104.00	82.00
Crit W.S. (ft)	721.85	Flow Area (sq ft)		2346.95	
E.G. Slope (ft/ft)	0.000895	Area (sq ft)		2346.95	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	201.35	Top Width (ft)		201.35	
Vel Total (ft/s)	8.31	Avg. Vel. (ft/s)		8.31	
Max Chl Dpth (ft)	17.48	Hydr. Depth (ft)		11.66	
Conv. Total (cfs)	651764.7	Conv. (cfs)		651764.7	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		207.05	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		5.26	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	1.09	559.56	4.45
C & E Loss (ft)	0.03	Cum SA (acres)	1.80	42.71	6.45

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	732.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.		0.027	
W.S. Elev (ft)	731.28	Reach Len. (ft)	110.00	104.00	82.00
Crit W.S. (ft)	723.96	Flow Area (sq ft)		2925.80	
E.G. Slope (ft/ft)	0.000861	Area (sq ft)		2925.80	
Q Total (cfs)	26600.00	Flow (cfs)		26600.00	
Top Width (ft)	211.10	Top Width (ft)		211.10	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	20.28	Hydr. Depth (ft)		13.86	
Conv. Total (cfs)	906327.0	Conv. (cfs)		906327.0	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		219.09	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		6.53	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	11.25	669.65	31.58
C & E Loss (ft)	0.02	Cum SA (acres)	6.65	44.09	15.28

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	735.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.027	
W.S. Elev (ft)	733.73	Reach Len. (ft)	110.00	104.00	82.00
Crit W.S. (ft)	726.19	Flow Area (sq ft)		3452.18	
E.G. Slope (ft/ft)	0.000868	Area (sq ft)		3452.18	
Q Total (cfs)	34200.00	Flow (cfs)		34200.00	
Top Width (ft)	218.37	Top Width (ft)		218.37	
Vel Total (ft/s)	9.91	Avg. Vel. (ft/s)		9.91	
Max Chl Dpth (ft)	22.73	Hydr. Depth (ft)		15.81	
Conv. Total (cfs)	1160578.0	Conv. (cfs)		1160578.0	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		228.65	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)		8.11	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	37.96	768.68	81.57
C & E Loss (ft)	0.03	Cum SA (acres)	17.06	44.75	28.94

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	738.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.94	Wt. n-Val.		0.027	
W.S. Elev (ft)	736.50	Reach Len. (ft)	110.00	104.00	82.00
Crit W.S. (ft)	728.50	Flow Area (sq ft)		4066.57	
E.G. Slope (ft/ft)	0.000935	Area (sq ft)		4066.57	
Q Total (cfs)	45500.00	Flow (cfs)		45500.00	
Top Width (ft)	223.90	Top Width (ft)		223.90	
Vel Total (ft/s)	11.19	Avg. Vel. (ft/s)		11.19	
Max Chl Dpth (ft)	25.50	Hydr. Depth (ft)		18.16	
Conv. Total (cfs)	1488121.0	Conv. (cfs)		1488121.0	
Length Wtd. (ft)	103.96	Wetted Per. (ft)		237.17	
Min Ch El (ft)	711.00	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)		11.20	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	107.06	885.13	182.75
C & E Loss (ft)	0.06	Cum SA (acres)	45.23	45.00	44.65

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	740.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.35	Wt. n-Val.		0.027	
W.S. Elev (ft)	738.09	Reach Len. (ft)	110.00	104.00	82.00
Crit W.S. (ft)	730.08	Flow Area (sq ft)		4424.69	
E.G. Slope (ft/ft)	0.001030	Area (sq ft)		4424.69	
Q Total (cfs)	54400.00	Flow (cfs)		54400.00	
Top Width (ft)	225.78	Top Width (ft)		225.78	
Vel Total (ft/s)	12.29	Avg. Vel. (ft/s)		12.29	

```
* Max Chl Dpth (ft)      *   27.09  * Hydr. Depth (ft)       *          *   19.60  *          *
* Conv. Total (cfs)      *1694899.0  * Conv. (cfs)            *          *1694899.0  *          *
* Length Wtd. (ft)       *  103.90  * Wetted Per. (ft)       *          *  240.96  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   14.52  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *  176.45  *  946.50  *  251.76  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   50.23  *   45.05  *   73.22  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  742.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.73  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  739.55  * Reach Len. (ft)        *  110.00  *  104.00  *   82.00  *
* Crit W.S. (ft)         *  731.48  * Flow Area (sq ft)      *          * 4754.01  *          *
* E.G. Slope (ft/ft)     *0.001106  * Area (sq ft)           *          * 4754.01  *          *
* Q Total (cfs)          *63000.00  * Flow (cfs)              *          *63000.00  *          *
* Top Width (ft)         *  226.56  * Top Width (ft)         *          *  226.56  *          *
* Vel Total (ft/s)       *   13.25  * Avg. Vel. (ft/s)       *          *   13.25  *          *
* Max Chl Dpth (ft)      *   28.55  * Hydr. Depth (ft)       *          *   20.98  *          *
* Conv. Total (cfs)      *1894189.0  * Conv. (cfs)            *          *1894189.0  *          *
* Length Wtd. (ft)       *  103.84  * Wetted Per. (ft)       *          *  244.04  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.35  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   17.83  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  241.92  * 1004.37  *  362.17  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   52.62  *   45.08  *  177.39  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  744.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.37  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  741.29  * Reach Len. (ft)        *  110.00  *  104.00  *   82.00  *
* Crit W.S. (ft)         *  733.45  * Flow Area (sq ft)      *          * 5148.53  *          *
* E.G. Slope (ft/ft)     *0.001255  * Area (sq ft)           *          * 5148.53  *   24.70  *
* Q Total (cfs)          *75900.00  * Flow (cfs)              *          *75900.00  *          *
* Top Width (ft)         *  251.27  * Top Width (ft)         *          *  227.07  *   24.20  *
* Vel Total (ft/s)       *   14.74  * Avg. Vel. (ft/s)       *          *   14.74  *          *
* Max Chl Dpth (ft)      *   30.29  * Hydr. Depth (ft)       *          *   22.67  *          *
* Conv. Total (cfs)      *2142319.0  * Conv. (cfs)            *          *2142319.0  *          *
* Length Wtd. (ft)       *  103.77  * Wetted Per. (ft)       *          *  247.65  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    1.63  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   24.02  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *  325.84  * 1075.52  *  762.30  *
* C & E Loss (ft)        *    0.26  * Cum SA (acres)         *   54.95  *   45.08  *  288.02  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  736.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.66  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  734.87  * Reach Len. (ft)        *  110.00  *  104.00  *   82.00  *
* Crit W.S. (ft)         *  727.03  * Flow Area (sq ft)      *          * 3703.68  *          *
* E.G. Slope (ft/ft)     *0.000884  * Area (sq ft)           *          * 3703.68  *          *
* Q Total (cfs)          *38300.00  * Flow (cfs)              *          *38300.00  *          *
* Top Width (ft)         *  221.76  * Top Width (ft)         *          *  221.76  *          *
* Vel Total (ft/s)       *   10.34  * Avg. Vel. (ft/s)       *          *   10.34  *          *
* Max Chl Dpth (ft)      *   23.87  * Hydr. Depth (ft)       *          *   16.70  *          *
* Conv. Total (cfs)      *1288209.0  * Conv. (cfs)            *          *1288209.0  *          *
* Length Wtd. (ft)       *  104.00  * Wetted Per. (ft)       *          *  233.10  *          *
* Min Ch El (ft)         *  711.00  * Shear (lb/sq ft)       *          *    0.88  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    9.07  *          *
```

```
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   58.87  *  817.06  *  117.96  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   25.45  *   44.92  *   36.37  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 2.004

INPUT
Description: COE River Station= 57269.26
Preliminary Model River Station
             (miles)=1.99

FEMA XSEC C. Left IFA (ineffective flow area)
             will fill if water reaches 746.  Ineffective flow on right is due
             to buildings and high ground upstream.
Station Elevation Data    num=     133
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     734    2.85     734   19.88     736   64.45     738   69.22     740
   80.22     742   88.61     744   98.04     746  123.75     746   129.7     744
  136.62     742  146.59     740  154.16     738  195.83     736  232.28     734
  278.59     732  339.33     730  353.33     728  363.32     726   368.5     724
  374.46     722  378.91     720  384.28     718  389.57     716  405.23  710.78
  493.65  710.78  509.31     716  514.75     718   520.8     720  526.32     722
  530.17     724  534.71     726   540.6     728  545.85     730  549.54     732
   557.3     732  584.01     732  594.49     734  681.24     736  686.11     738
  693.18     740  696.36     742   699.4     744  735.03     744  740.18     742
  745.18     740  750.19     738  756.18     736  761.41     734  764.04     732
  996.74     730 1001.31     730  1022.6     732  1040.6     734 1056.94     736
 1076.47     738 1101.98     740 1156.29     742 1175.14     744 1400.57     746
 1463.05     746 1476.94     744 1488.28     742  1499.4     740 1516.82     738
 1524.59     736 1554.59     736 1601.99     738 1629.68     744 1639.54     746
 1645.98     748  1658.9     748 1667.76     746 1684.15     746 1699.45     748
 1735.31     750 1855.64     748 1871.64     746 1879.83     744 1886.48     742
 1903.53     742 1910.55     742 1937.06     742 1946.03     744 1955.07     746
 2226.17     748 2236.63     750 2244.55     752 2256.57     752 2265.13     750
  2273.5     748 2288.91     748 2310.99     748 2417.31     746 2445.07     744
 2491.62     744 2493.01     744 2564.64     744 2606.44     744 2622.73     744
 2633.14     746  2641.3     748 2667.99     748 2670.43     748 2676.77     750
 2693.08     750 2698.85     750 2704.08     752 2708.08     754  2713.6     756
 2716.91     758 2721.39     760 2724.34     762 2761.38     764 2767.47     766
 2773.73     768 2782.53     770 2786.47     772 2793.91     774 2796.53     776
 2802.21     778 2804.92     780 2809.48     782 2813.88     784 2818.28     786
 2821.13     788 2824.01     790 2829.47     792 2832.18     794 2834.79     796
 2837.69     798 2839.08     800 2842.53     802

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .067  339.33    .027  549.54    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         339.33  549.54              317     333     350             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     725 2842.53     760       F
Left Levee      Station=  101.86      Elevation=  746.12

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  725.52  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  724.77  * Reach Len. (ft)        *  317.00  *  333.00  *  350.00  *
* Crit W.S. (ft)         *  718.55  * Flow Area (sq ft)      *          * 1799.30  *          *
* E.G. Slope (ft/ft)     *0.000688  * Area (sq ft)           *          * 1799.30  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  165.42  * Top Width (ft)         *          *  165.42  *          *
* Vel Total (ft/s)       *    6.95  * Avg. Vel. (ft/s)       *          *    6.95  *          *
* Max Chl Dpth (ft)      *   13.99  * Hydr. Depth (ft)       *          *   10.88  *          *
* Conv. Total (cfs)      *476568.8  * Conv. (cfs)            *          *476568.8  *          *
```

```
* Length Wtd. (ft)       *  333.00  * Wetted Per. (ft)       *          *  170.42  *          *
* Min Ch El (ft)         *  710.78  * Shear (lb/sq ft)       *          *    0.45  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.15  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *          *  409.20  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *   37.88  *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  729.44  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.             *          *    0.027  *          *
* W.S. Elev (ft)         *  728.46  * Reach Len. (ft)        *  317.00  *  333.00  *  350.00  *
* Crit W.S. (ft)         *  720.95  * Flow Area (sq ft)      *          * 2451.44  *          *
* E.G. Slope (ft/ft)     *0.000728  * Area (sq ft)           *          * 2451.44  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  191.67  * Top Width (ft)         *          *  191.67  *          *
* Vel Total (ft/s)       *    7.95  * Avg. Vel. (ft/s)       *          *    7.95  *          *
* Max Chl Dpth (ft)      *   17.68  * Hydr. Depth (ft)       *          *   12.79  *          *
* Conv. Total (cfs)      *722517.5  * Conv. (cfs)            *          *722517.5  *          *
* Length Wtd. (ft)       *  333.00  * Wetted Per. (ft)       *          *  197.80  *          *
* Min Ch El (ft)         *  710.78  * Shear (lb/sq ft)       *          *    0.56  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.48  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *    1.09  *  553.84  *    4.45  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    1.80  *   42.24  *    6.45  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  732.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  731.25  * Reach Len. (ft)        *  317.00  *  333.00  *  350.00  *
* Crit W.S. (ft)         *  722.99  * Flow Area (sq ft)      *   23.64  * 3017.79  *          *
* E.G. Slope (ft/ft)     *0.000760  * Area (sq ft)           *   23.64  * 3017.79  *  104.57  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *   10.55  *26589.45  *          *
* Top Width (ft)         *  409.75  * Top Width (ft)         *   37.90  *  208.82  *  163.03  *
* Vel Total (ft/s)       *    8.75  * Avg. Vel. (ft/s)       *    0.45  *    8.81  *          *
* Max Chl Dpth (ft)      *   20.47  * Hydr. Depth (ft)       *    0.62  *   14.45  *          *
* Conv. Total (cfs)      *964790.3  * Conv. (cfs)            *   382.7  *964407.5  *          *
* Length Wtd. (ft)       *  332.99  * Wetted Per. (ft)       *   37.92  *  215.66  *          *
* Min Ch El (ft)         *  710.78  * Shear (lb/sq ft)       *    0.03  *    0.66  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    0.01  *    5.85  *          *
* Frctn Loss (ft)        *    0.24  * Cum Volume (acre-ft)   *   11.22  *  662.55  *   31.48  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    6.60  *   43.59  *   15.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  735.14  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.42  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  733.72  * Reach Len. (ft)        *  317.00  *  333.00  *  350.00  *
* Crit W.S. (ft)         *  724.90  * Flow Area (sq ft)      *  199.15  * 3536.30  *   66.91  *
* E.G. Slope (ft/ft)     *0.000738  * Area (sq ft)           *  199.15  * 3536.30  *  789.17  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  189.20  *33955.55  *   55.25  *
* Top Width (ft)         *  630.44  * Top Width (ft)         *  100.50  *  210.21  *  319.74  *
* Vel Total (ft/s)       *    8.99  * Avg. Vel. (ft/s)       *    0.95  *    9.60  *    0.83  *
* Max Chl Dpth (ft)      *   22.94  * Hydr. Depth (ft)       *    1.98  *   16.82  *    1.54  *
* Conv. Total (cfs)      *1259017.0  * Conv. (cfs)            *  6965.2  *1250018.0  *  2033.9  *
* Length Wtd. (ft)       *  332.89  * Wetted Per. (ft)       *  100.57  *  217.24  *   43.63  *
* Min Ch El (ft)         *  710.78  * Shear (lb/sq ft)       *    0.09  *    0.75  *    0.07  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *    0.09  *    7.20  *    0.06  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *   37.71  *  760.34  *   80.83  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   16.93  *   44.24  *   28.64  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	738.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.74	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	736.55	Reach Len. (ft)	317.00	333.00	350.00
Crit W.S. (ft)	727.54	Flow Area (sq ft)	561.91	4132.86	329.52
E.G. Slope (ft/ft)	0.000748	Area (sq ft)	561.91	4132.86	1900.09
Q Total (cfs)	45500.00	Flow (cfs)	803.42	44320.14	376.44
Top Width (ft)	851.47	Top Width (ft)	155.06	210.21	486.20
Vel Total (ft/s)	9.06	Avg. Vel. (ft/s)	1.43	10.72	1.14
Max Chl Dpth (ft)	25.77	Hydr. Depth (ft)	3.62	19.66	2.48
Conv. Total (cfs)	1664039.0	Conv. (cfs)	29383.0	1620889.0	13767.1
Length Wtd. (ft)	332.82	Wetted Per. (ft)	155.20	217.24	133.37
Min Ch El (ft)	710.78	Shear (lb/sq ft)	0.17	0.89	0.12
Alpha	1.37	Stream Power (lb/ft s)	0.24	9.52	0.13
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	106.35	875.34	180.96
C & E Loss (ft)	0.05	Cum SA (acres)	45.03	44.48	44.19

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	740.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.00	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	738.24	Reach Len. (ft)	317.00	333.00	350.00
Crit W.S. (ft)	729.46	Flow Area (sq ft)	852.74	4487.59	557.54
E.G. Slope (ft/ft)	0.000783	Area (sq ft)	852.74	4487.59	2781.15
Q Total (cfs)	54400.00	Flow (cfs)	1459.13	52036.32	904.56
Top Width (ft)	952.10	Top Width (ft)	186.09	210.21	555.80
Vel Total (ft/s)	9.22	Avg. Vel. (ft/s)	1.71	11.60	1.62
Max Chl Dpth (ft)	27.46	Hydr. Depth (ft)	4.58	21.35	4.06
Conv. Total (cfs)	1943791.0	Conv. (cfs)	52136.7	1859333.0	32321.2
Length Wtd. (ft)	332.82	Wetted Per. (ft)	186.30	217.24	138.07
Min Ch El (ft)	710.78	Shear (lb/sq ft)	0.22	1.01	0.20
Alpha	1.51	Stream Power (lb/ft s)	0.38	11.71	0.32
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	175.37	935.86	249.14
C & E Loss (ft)	0.05	Cum SA (acres)	50.00	44.53	72.70

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	742.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.19	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	739.83	Reach Len. (ft)	317.00	333.00	350.00
Crit W.S. (ft)	730.99	Flow Area (sq ft)	1152.03	4820.32	779.50
E.G. Slope (ft/ft)	0.000795	Area (sq ft)	1152.03	4820.32	3701.13
Q Total (cfs)	63000.00	Flow (cfs)	2375.12	59074.73	1550.15
Top Width (ft)	1008.93	Top Width (ft)	192.08	210.21	606.65
Vel Total (ft/s)	9.33	Avg. Vel. (ft/s)	2.06	12.26	1.99
Max Chl Dpth (ft)	29.05	Hydr. Depth (ft)	6.00	22.93	5.45
Conv. Total (cfs)	2233914.0	Conv. (cfs)	84219.4	2094728.0	54966.7
Length Wtd. (ft)	332.81	Wetted Per. (ft)	192.49	217.24	143.88
Min Ch El (ft)	710.78	Shear (lb/sq ft)	0.30	1.10	0.27
Alpha	1.62	Stream Power (lb/ft s)	0.61	13.50	0.53
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	240.46	992.94	358.69
C & E Loss (ft)	0.05	Cum SA (acres)	52.38	44.56	176.82

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	744.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.51	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	741.78	Reach Len. (ft)	317.00	333.00	350.00

```
* Crit W.S. (ft)         *  733.26  * Flow Area (sq ft)      * 1537.29  * 5231.92  * 1063.23  *
* E.G. Slope (ft/ft)     *0.000837  * Area (sq ft)           * 1537.29  * 5231.92  * 4965.34  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3813.06  *69467.50  * 2619.44  *
* Top Width (ft)         * 1097.96  * Top Width (ft)         *  201.63  *  210.21  *  686.12  *
* Vel Total (ft/s)       *    9.69  * Avg. Vel. (ft/s)       *    2.48  *   13.28  *    2.46  *
* Max Chl Dpth (ft)      *   31.00  * Hydr. Depth (ft)       *    7.62  *   24.89  *    7.26  *
* Conv. Total (cfs)      *2623598.0  * Conv. (cfs)           *131804.1  *2401249.0  * 90544.8  *
* Length Wtd. (ft)       *  332.77  * Wetted Per. (ft)       *  202.25  *  217.24  *  147.87  *
* Min Ch El (ft)         *  710.78  * Shear (lb/sq ft)       *    0.40  *    1.26  *    0.38  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *    0.99  *   16.71  *    0.93  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *  323.90  * 1063.13  *  757.60  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   54.69  *   44.56  *  287.35  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  736.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.             *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  734.88  * Reach Len. (ft)        *  317.00  *  333.00  *  350.00  *
* Crit W.S. (ft)         *  725.87  * Flow Area (sq ft)      *  329.41  * 3780.14  *  135.51  *
* E.G. Slope (ft/ft)     *0.000732  * Area (sq ft)           *  329.41  * 3780.14  * 1185.36  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  380.99  *37802.95  *  116.06  *
* Top Width (ft)         *  704.87  * Top Width (ft)         *  123.03  *  210.21  *  371.63  *
* Vel Total (ft/s)       *    9.02  * Avg. Vel. (ft/s)       *    1.16  *   10.00  *    0.86  *
* Max Chl Dpth (ft)      *   24.10  * Hydr. Depth (ft)       *    2.68  *   17.98  *    1.63  *
* Conv. Total (cfs)      *1415316.0  * Conv. (cfs)           * 14078.8  *1396949.0  *  4289.0  *
* Length Wtd. (ft)       *  332.85  * Wetted Per. (ft)       *  123.13  *  217.24  *   83.18  *
* Min Ch El (ft)         *  710.78  * Shear (lb/sq ft)       *    0.12  *    0.80  *    0.07  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.14  *    7.96  *    0.06  *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *   58.46  *  808.13  *  116.84  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   25.29  *   44.40  *   36.02  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 1.941

INPUT
Description: COE River Station= 57601.85
Preliminary Model River Station
              (miles)=1.92

Inerffective flow area due to  I-435 embankment
              and high ground on right floodplain. (Sections 1.92 through 1.71)
Station Elevation Data    num=     127
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     736   19.52     736   29.16     738   58.07     740   74.82     742
   81.25     744   90.68     746  135.59     746  143.32     744  149.39     742
  158.83     740  194.21     738  213.97     736  228.67     734  245.02     732
  336.07     730  355.74     728  362.58     726  367.07     724  372.18     722
  382.05     720  388.31     718  404.92  710.72  500.75  710.72     516     718
  528.76     720  538.14     722  542.29     724  548.56     726   554.1     728
  562.94     730  569.13     732  685.16     734  696.14     736  703.71     738
  713.34     740 1104.68     740 1110.12     740 1486.09     738 1560.35     736
 1588.83     736 1594.57     738 1599.89     738  1609.9     736 1628.03     734
    1636     734 1645.24     736 1651.46     738  1661.7     740 1669.27     742
 1688.09     742 1695.56     740 1710.24     738 1734.37     738 1747.98     740
 1755.62     742  1761.9     744 1791.11     746 1840.34     746 1865.82     746
 1882.69     748 1919.79     750 1965.25     750 1991.65     748 1996.46     746
 2002.58     744 2008.53     742  2013.5     740 2018.87     738 2046.24     738
 2055.55     740 2059.53     742  2064.8     744 2070.14     746 2077.24     748
 2079.88     750 2091.58     752 2245.58     748 2258.45     750 2263.29     750
  2266.5     748 2303.21     748 2308.08     750 2311.32     752 2320.99     754
 2325.22     756 2328.51     756 2347.11     754 2359.73     752 2368.39     750
 2375.44     748 2383.29     746 2419.82     744 2522.87     744 2581.01     744
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 2593.95     744 2604.56     746 2619.08     748 2665.52     750 2670.44     752
 2674.34     754 2678.21     756 2682.02     758 2686.34     760 2689.89     762
 2695.51     764 2704.23     764 2735.63     764 2740.39     766 2743.52     768
 2748.36     770 2753.34     772  2758.9     774 2764.07     776 2768.35     778
 2773.43     780  2775.2     782 2778.43     784 2779.45     786 2780.79     788
 2781.25     790 2783.14     792  2784.5     794 2786.36     796 2787.94     798
 2789.25     800 2790.37     802

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0    .067  355.74    .027  569.13    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        355.74  569.13              125     167     110             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     725 2790.37     760       F
Left Levee      Station=  136.43      Elevation=  745.85

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  725.28  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.72  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  724.56  * Reach Len. (ft)        *  125.00  *  167.00  *  110.00  *
* Crit W.S. (ft)         *  718.38  * Flow Area (sq ft)      *          * 1841.44  *          *
* E.G. Slope (ft/ft)     *0.000702  * Area (sq ft)           *          * 1841.44  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  178.25  * Top Width (ft)         *          *  178.25  *          *
* Vel Total (ft/s)       *    6.79  * Avg. Vel. (ft/s)       *          *    6.79  *          *
* Max Chl Dpth (ft)      *   13.84  * Hydr. Depth (ft)       *          *   10.33  *          *
* Conv. Total (cfs)      *471752.4  * Conv. (cfs)             *          *471752.4  *          *
* Length Wtd. (ft)       *  167.00  * Wetted Per. (ft)       *          *  183.35  *          *
* Min Ch El (ft)         *  710.72  * Shear (lb/sq ft)       *          *    0.44  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.99  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *          *  395.28  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *   36.57  *          *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*************************************************************************************************
* E.G. Elev (ft)         *  729.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  728.27  * Reach Len. (ft)        *  125.00  *  167.00  *  110.00  *
* Crit W.S. (ft)         *  720.90  * Flow Area (sq ft)      *    0.36  * 2540.96  *          *
* E.G. Slope (ft/ft)     *0.000682  * Area (sq ft)           *    0.36  * 2540.96  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *    0.05  *19499.95  *          *
* Top Width (ft)         *  202.20  * Top Width (ft)         *    2.65  *  199.55  *          *
* Vel Total (ft/s)       *    7.67  * Avg. Vel. (ft/s)       *    0.15  *    7.67  *          *
* Max Chl Dpth (ft)      *   17.55  * Hydr. Depth (ft)       *    0.13  *   12.73  *          *
* Conv. Total (cfs)      *746922.5  * Conv. (cfs)             *     2.1  *746920.4  *          *
* Length Wtd. (ft)       *  167.00  * Wetted Per. (ft)       *    2.66  *  205.84  *          *
* Min Ch El (ft)         *  710.72  * Shear (lb/sq ft)       *    0.01  *    0.53  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    4.03  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *    1.08  *  534.75  *    4.45  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    1.79  *   40.74  *    6.45  *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*************************************************************************************************
* E.G. Elev (ft)         *  732.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.             *   0.067  *   0.027  *          *
* W.S. Elev (ft)         *  731.06  * Reach Len. (ft)        *  125.00  *  167.00  *  110.00  *
* Crit W.S. (ft)         *  722.91  * Flow Area (sq ft)      *   66.10  * 3114.34  *          *
* E.G. Slope (ft/ft)     *0.000689  * Area (sq ft)           *   66.10  * 3114.34  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *   37.75  *26562.25  *          *
* Top Width (ft)         *  278.41  * Top Width (ft)         *   67.93  *  210.48  *          *
* Vel Total (ft/s)       *    8.36  * Avg. Vel. (ft/s)       *    0.57  *    8.53  *          *
* Max Chl Dpth (ft)      *   20.34  * Hydr. Depth (ft)       *    0.97  *   14.80  *          *
* Conv. Total (cfs)      *1013233.0  * Conv. (cfs)            *  1437.8  *1011795.0  *          *
```

```
* Length Wtd. (ft)       *  166.86  * Wetted Per. (ft)       *   68.04  *  217.13  *          *
* Min Ch El (ft)         *  710.72  * Shear (lb/sq ft)       *    0.04  *    0.62  *          *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    0.02  *    5.26  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   10.90  *  639.11  *   31.06  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    6.21  *   41.99  *   14.47  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  734.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.32  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  733.55  * Reach Len. (ft)        *  125.00  *  167.00  *  110.00  *
* Crit W.S. (ft)         *  724.72  * Flow Area (sq ft)      *  332.01  * 3645.19  *   70.06  *
* E.G. Slope (ft/ft)     *0.000673  * Area (sq ft)           *  332.01  * 3645.19  *   70.06  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  368.93  *33795.96  *   35.11  *
* Top Width (ft)         *  426.98  * Top Width (ft)         *  123.43  *  213.39  *   90.16  *
* Vel Total (ft/s)       *    8.45  * Avg. Vel. (ft/s)       *    1.11  *    9.27  *    0.50  *
* Max Chl Dpth (ft)      *   22.83  * Hydr. Depth (ft)       *    2.69  *   17.08  *    0.78  *
* Conv. Total (cfs)      *1318653.0  * Conv. (cfs)           * 14225.0  *1303075.0  *  1353.6  *
* Length Wtd. (ft)       *  166.11  * Wetted Per. (ft)       *  123.64  *  220.19  *   90.18  *
* Min Ch El (ft)         *  710.72  * Shear (lb/sq ft)       *    0.11  *    0.70  *    0.03  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *    0.13  *    6.45  *    0.02  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   35.78  *  732.89  *   77.38  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   16.12  *   42.62  *   26.99  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.01  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.58  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  736.43  * Reach Len. (ft)        *  125.00  *  167.00  *  110.00  *
* Crit W.S. (ft)         *  727.13  * Flow Area (sq ft)      *  718.85  * 4259.29  *  414.28  *
* E.G. Slope (ft/ft)     *0.000672  * Area (sq ft)           *  718.85  * 4259.29  *  489.65  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1193.29  *43772.21  *  534.50  *
* Top Width (ft)         *  572.68  * Top Width (ft)         *  146.04  *  213.39  *  213.25  *
* Vel Total (ft/s)       *    8.44  * Avg. Vel. (ft/s)       *    1.66  *   10.28  *    1.29  *
* Max Chl Dpth (ft)      *   25.71  * Hydr. Depth (ft)       *    4.92  *   19.96  *    3.22  *
* Conv. Total (cfs)      *1755806.0  * Conv. (cfs)           * 46047.8  *1689132.0  * 20625.9  *
* Length Wtd. (ft)       *  164.22  * Wetted Per. (ft)       *  146.44  *  220.19  *  128.90  *
* Min Ch El (ft)         *  710.72  * Shear (lb/sq ft)       *    0.21  *    0.81  *    0.13  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.34  *    8.33  *    0.17  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  101.69  *  843.27  *  171.36  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   43.94  *   42.86  *   41.38  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  739.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.82  * Wt. n-Val.              *   0.067  *   0.027  *   0.065  *
* W.S. Elev (ft)         *  738.12  * Reach Len. (ft)        *  125.00  *  167.00  *  110.00  *
* Crit W.S. (ft)         *  728.83  * Flow Area (sq ft)      *  979.42  * 4619.40  *  636.78  *
* E.G. Slope (ft/ft)     *0.000707  * Area (sq ft)           *  979.42  * 4619.40  *  931.41  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1900.01  *51414.79  * 1085.20  *
* Top Width (ft)         *  754.70  * Top Width (ft)         *  163.64  *  213.39  *  377.67  *
* Vel Total (ft/s)       *    8.72  * Avg. Vel. (ft/s)       *    1.94  *   11.13  *    1.70  *
* Max Chl Dpth (ft)      *   27.40  * Hydr. Depth (ft)       *    5.99  *   21.65  *    4.71  *
* Conv. Total (cfs)      *2046075.0  * Conv. (cfs)           * 71462.5  *1933796.0  * 40816.3  *
* Length Wtd. (ft)       *  163.01  * Wetted Per. (ft)       *  164.13  *  220.19  *  135.63  *
* Min Ch El (ft)         *  710.72  * Shear (lb/sq ft)       *    0.26  *    0.93  *    0.21  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *    0.51  *   10.30  *    0.35  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *  168.70  *  901.05  *  234.22  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   48.73  *   42.91  *   68.95  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	741.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.03	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	739.69	Reach Len. (ft)	125.00	167.00	110.00
Crit W.S. (ft)	730.35	Flow Area (sq ft)	1257.30	4953.48	854.28
E.G. Slope (ft/ft)	0.000728	Area (sq ft)	1257.30	4953.48	1791.59
Q Total (cfs)	63000.00	Flow (cfs)	2635.32	58632.01	1732.67
Top Width (ft)	1125.90	Top Width (ft)	191.34	213.39	721.17
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)	2.10	11.84	2.03
Max Chl Dpth (ft)	28.97	Hydr. Depth (ft)	6.57	23.21	5.99
Conv. Total (cfs)	2334311.0	Conv. (cfs)	97645.2	2172465.0	64200.0
Length Wtd. (ft)	162.01	Wetted Per. (ft)	191.87	220.19	143.32
Min Ch El (ft)	710.72	Shear (lb/sq ft)	0.30	1.02	0.27
Alpha	1.64	Stream Power (lb/ft s)	0.62	12.11	0.55
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	231.70	955.58	336.62
C & E Loss (ft)	0.12	Cum SA (acres)	50.98	42.94	171.48

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	743.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.35	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	741.63	Reach Len. (ft)	125.00	167.00	110.00
Crit W.S. (ft)	732.78	Flow Area (sq ft)	1646.38	5369.25	1154.06
E.G. Slope (ft/ft)	0.000772	Area (sq ft)	1646.38	5369.25	3989.66
Q Total (cfs)	75900.00	Flow (cfs)	4065.25	69057.30	2777.44
Top Width (ft)	1630.88	Top Width (ft)	204.62	213.39	1212.87
Vel Total (ft/s)	9.29	Avg. Vel. (ft/s)	2.47	12.86	2.41
Max Chl Dpth (ft)	30.91	Hydr. Depth (ft)	8.05	25.16	7.40
Conv. Total (cfs)	2731005.0	Conv. (cfs)	146274.4	2484794.0	99936.9
Length Wtd. (ft)	160.00	Wetted Per. (ft)	205.33	220.19	156.53
Min Ch El (ft)	710.72	Shear (lb/sq ft)	0.39	1.18	0.36
Alpha	1.75	Stream Power (lb/ft s)	0.95	15.12	0.86
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	312.32	1022.61	721.63
C & E Loss (ft)	0.21	Cum SA (acres)	53.22	42.94	279.72

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	736.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.41	Wt. n-Val.	0.067	0.027	0.065
W.S. Elev (ft)	734.73	Reach Len. (ft)	125.00	167.00	110.00
Crit W.S. (ft)	725.63	Flow Area (sq ft)	483.12	3897.01	202.70
E.G. Slope (ft/ft)	0.000662	Area (sq ft)	483.12	3897.01	212.24
Q Total (cfs)	38300.00	Flow (cfs)	652.28	37478.74	168.98
Top Width (ft)	483.93	Top Width (ft)	132.47	213.39	138.08
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)	1.35	9.62	0.83
Max Chl Dpth (ft)	24.01	Hydr. Depth (ft)	3.65	18.26	1.69
Conv. Total (cfs)	1488448.0	Conv. (cfs)	25349.6	1456532.0	6566.9
Length Wtd. (ft)	165.41	Wetted Per. (ft)	132.76	220.19	120.14
Min Ch El (ft)	710.72	Shear (lb/sq ft)	0.15	0.73	0.07
Alpha	1.30	Stream Power (lb/ft s)	0.20	7.04	0.06
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	55.50	778.78	111.23
C & E Loss (ft)	0.04	Cum SA (acres)	24.36	42.78	33.98

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

```
RIVER: Blue River
REACH: Main               RS: 1.910

INPUT
Description: COE River Station= 57768.60
Preliminary Model River Station
             (miles)=1.89

I-435 Bridge (upstream).  Normalized to channel
             flow.
Top of side rail modeled as top of bridge. Inerffective
             flow area due to  I-435 embankment and high ground on right
             floodplain.
Station Elevation Data    num=     134
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     760      93     760   107.3     758   109.2     756   114.9     754
   121.5     752   128.2     750   135.8     748   153.9     746   162.4     744
     170     742   178.6     740   218.5     738   235.7     736   254.7     734
   271.8     732   330.8     730   371.7     728   375.5     726   379.3     724
     384     722   390.7     720   397.3     718   405.9     716  416.04  710.68
  518.42  710.68   528.6     716     539     718   546.7     720   552.4     722
   558.1     724   562.8     726   569.5     728   574.2     730   620.8     732
   709.3     734   722.6     736   729.3     738   742.6     740   796.8     740
   800.6     738   804.4     736   810.1     734   812.9     734   828.2     736
   854.8     736     890     736   896.6     738   901.4     740   905.2     742
     910     744   913.8     746   917.6     748   920.4     750   924.2     752
     928     754   931.8     756   940.4     758   950.9     760   976.9     764
  1092.9     766  1317.9     768  1580.9   768.1  1659.9     770  1834.9     774
  1901.9     774  1907.9     772  1911.9     770  1914.9     768  1918.9     766
  1921.9     764  1924.9     762  1927.9     760  1931.9     758  1935.9     756
  1940.9     754  1945.9     752  1951.9     750  1956.9     748  1960.9     746
  1962.9     744  1966.9     742  1980.9     742  2002.9     742  2016.9     740
  2025.9     738  2037.9     736  2049.9     734  2055.9     734  2061.9     736
  2066.9     738  2071.9     740  2075.9     742  2091.9     744  2152.9     746
  2176.9     748  2214.9     750  2228.9     750  2275.9     748  2286.9     746
  2291.9     744  2297.9     742  2304.9     740  2310.9     738  2317.9     736
  2326.9     734  2333.9     732  2382.9     732  2387.9     734  2393.9     736
  2398.9     738  2404.9     740  2410.9     742  2416.9     744  2422.9     746
  2474.9     746  2542.9     744  2660.9     744  2719.9     744  2724.9     744
  2769.9     746  2782.9     748  2787.9     750  2791.9     752  2796.9     754
  2800.9     756  2805.9     758  2809.9     760  2813.9     762  2818.9     764
  2823.9     766  2849.9     7662884.853     7662895.853     768

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .067      93    .035   371.7    .027   574.2    .035   976.9    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          371.7   574.2              147     144     147             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     743     905   740.5       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1920    2820     755

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)         *  725.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  724.49  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  718.17  * Flow Area (sq ft)      *          * 1921.25  *          *
* E.G. Slope (ft/ft)     *0.000622  * Area (sq ft)           *          * 1921.25  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  180.90  * Top Width (ft)         *          *  180.90  *          *
* Vel Total (ft/s)       *    6.51  * Avg. Vel. (ft/s)       *          *    6.51  *          *
* Max Chl Dpth (ft)      *   13.81  * Hydr. Depth (ft)       *          *   10.62  *          *
* Conv. Total (cfs)      *501324.8  * Conv. (cfs)            *          *501324.8  *          *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *          *  186.09  *          *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *          *    0.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.61  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *  388.07  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *   35.88  *          *
```

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*****************************************************************************************
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  729.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.86  * Wt. n-Val.             *   0.035  *   0.027  *          *
* W.S. Elev (ft)         *  728.20  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  720.46  * Flow Area (sq ft)      *    0.41  * 2623.48  *          *
* E.G. Slope (ft/ft)     *0.000609  * Area (sq ft)           *    0.41  * 2623.48  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *    0.09  *19499.91  *          *
* Top Width (ft)         *  202.39  * Top Width (ft)         *    4.12  *  198.27  *          *
* Vel Total (ft/s)       *    7.43  * Avg. Vel. (ft/s)       *    0.23  *    7.43  *          *
* Max Chl Dpth (ft)      *   17.52  * Hydr. Depth (ft)       *    0.10  *   13.23  *          *
* Conv. Total (cfs)      *790007.6  * Conv. (cfs)            *     3.8  *790003.8  *          *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *    4.12  *  204.97  *          *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.00  *    0.49  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    3.62  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    1.08  *  524.85  *    4.45  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    1.78  *   39.98  *    6.45  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  732.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.07  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  731.00  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  722.42  * Flow Area (sq ft)      *   96.20  * 3185.41  *   11.54  *
* E.G. Slope (ft/ft)     *0.000605  * Area (sq ft)           *   96.20  * 3185.41  *   11.54  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *  123.85  *26468.59  *    7.56  *
* Top Width (ft)         *  295.94  * Top Width (ft)         *   70.25  *  202.50  *   23.18  *
* Vel Total (ft/s)       *    8.08  * Avg. Vel. (ft/s)       *    1.29  *    8.31  *    0.66  *
* Max Chl Dpth (ft)      *   20.32  * Hydr. Depth (ft)       *    1.37  *   15.73  *    0.50  *
* Conv. Total (cfs)      *1081044.0  * Conv. (cfs)           *  5033.3  *1075704.0  *   307.3  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *   70.32  *  209.57  *   23.21  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.05  *    0.57  *    0.02  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.07  *    4.77  *    0.01  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   10.67  *  627.04  *   31.05  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    6.02  *   41.20  *   14.44  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  734.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  733.52  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  724.21  * Flow Area (sq ft)      *  343.24  * 3696.38  *  168.36  *
* E.G. Slope (ft/ft)     *0.000582  * Area (sq ft)           *  343.24  * 3696.38  *  168.36  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  736.79  *33239.47  *  223.74  *
* Top Width (ft)         *  429.17  * Top Width (ft)         *  112.88  *  202.50  *  113.79  *
* Vel Total (ft/s)       *    8.13  * Avg. Vel. (ft/s)       *    2.15  *    8.99  *    1.33  *
* Max Chl Dpth (ft)      *   22.84  * Hydr. Depth (ft)       *    3.04  *   18.25  *    1.48  *
* Conv. Total (cfs)      *1418242.0  * Conv. (cfs)           * 30554.2  *1378410.0  *  9278.1  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  113.05  *  209.57  *  113.85  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.11  *    0.64  *    0.05  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *    0.24  *    5.76  *    0.07  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   34.81  *  718.82  *   77.08  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   15.78  *   41.82  *   26.73  *
*****************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

```
*****************************************************************************************
* E.G. Elev (ft)         *  737.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.37  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  736.48  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
```

```
* Crit W.S. (ft)         *  726.52  * Flow Area (sq ft)      *  717.41  * 4295.44  *  582.92  *
* E.G. Slope (ft/ft)     *0.000560  * Area (sq ft)           *  717.41  * 4295.44  *  650.92  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 2138.77  *41914.87  * 1446.36  *
* Top Width (ft)         *  580.68  * Top Width (ft)         *  140.10  *  202.50  *  238.08  *
* Vel Total (ft/s)       *    8.13  * Avg. Vel. (ft/s)       *    2.98  *    9.76  *    2.48  *
* Max Chl Dpth (ft)      *   25.80  * Hydr. Depth (ft)       *    5.12  *   21.21  *    3.89  *
* Conv. Total (cfs)      *1921940.0  * Conv. (cfs)           * 90342.7  *1770502.0  * 61095.0  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  140.43  *  209.57  *  150.28  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.18  *    0.72  *    0.14  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *    0.53  *    7.00  *    0.34  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   99.63  *  826.87  *  169.92  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   43.53  *   42.07  *   40.81  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  739.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.51  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  738.23  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  728.23  * Flow Area (sq ft)      *  976.70  * 4650.66  *  851.28  *
* E.G. Slope (ft/ft)     *0.000573  * Area (sq ft)           *  976.70  * 4650.66  * 1081.75  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 3340.56  *48390.69  * 2668.75  *
* Top Width (ft)         *  613.93  * Top Width (ft)         *  157.81  *  202.50  *  253.63  *
* Vel Total (ft/s)       *    8.40  * Avg. Vel. (ft/s)       *    3.42  *   10.41  *    3.13  *
* Max Chl Dpth (ft)      *   27.55  * Hydr. Depth (ft)       *    6.19  *   22.97  *    5.43  *
* Conv. Total (cfs)      *2272188.0  * Conv. (cfs)           *139529.0  *2021190.0  *111468.9  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  158.23  *  209.57  *  157.16  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.22  *    0.79  *    0.19  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.76  *    8.26  *    0.61  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  165.90  *  883.28  *  231.68  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   48.27  *   42.11  *   68.15  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  741.49  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.63  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  739.86  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  729.90  * Flow Area (sq ft)      * 1259.96  * 4980.24  * 1115.02  *
* E.G. Slope (ft/ft)     *0.000578  * Area (sq ft)           * 1259.96  * 4980.24  * 1509.05  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4526.60  *54456.46  * 4016.94  *
* Top Width (ft)         *  664.22  * Top Width (ft)         *  190.28  *  202.50  *  271.45  *
* Vel Total (ft/s)       *    8.57  * Avg. Vel. (ft/s)       *    3.59  *   10.93  *    3.60  *
* Max Chl Dpth (ft)      *   29.18  * Hydr. Depth (ft)       *    6.62  *   24.59  *    6.66  *
* Conv. Total (cfs)      *2620946.0  * Conv. (cfs)           *188316.9  *2265515.0  *167113.9  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  190.74  *  209.57  *  168.10  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.24  *    0.86  *    0.24  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.86  *    9.37  *    0.86  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  228.08  *  936.54  *  332.46  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   50.44  *   42.14  *  170.23  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  743.66  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.64  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  742.02  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  732.74  * Flow Area (sq ft)      * 1686.33  * 5418.36  * 2213.07  *
* E.G. Slope (ft/ft)     *0.000551  * Area (sq ft)           * 1686.33  * 5418.36  * 2213.07  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 6906.31  *61217.20  * 7776.50  *
* Top Width (ft)         *  735.34  * Top Width (ft)         *  201.78  *  202.50  *  331.05  *
* Vel Total (ft/s)       *    8.15  * Avg. Vel. (ft/s)       *    4.10  *   11.30  *    3.51  *
* Max Chl Dpth (ft)      *   31.34  * Hydr. Depth (ft)       *    8.36  *   26.76  *    6.68  *
* Conv. Total (cfs)      *3232698.0  * Conv. (cfs)           *294150.2  *2607335.0  *331213.0  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)       *  202.49  *  209.57  *  334.36  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.29  *    0.89  *    0.23  *
* Alpha                  *    1.59  * Stream Power (lb/ft s) *    1.17  *   10.05  *    0.80  *
```

```
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *  307.54  * 1001.93  *  713.80  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   52.63  *   42.14  *  277.77  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  736.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.27  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  734.73  * Reach Len. (ft)        *   13.00  *   13.00  *   13.00  *
* Crit W.S. (ft)         *  725.09  * Flow Area (sq ft)      *  486.09  * 3940.99  *  328.18  *
* E.G. Slope (ft/ft)     *0.000566  * Area (sq ft)           *  486.09  * 3940.99  *  332.98  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             * 1219.90  *36495.22  *  584.88  *
* Top Width (ft)         *  476.76  * Top Width (ft)          *  123.90  *  202.50  *  150.36  *
* Vel Total (ft/s)       *    8.05  * Avg. Vel. (ft/s)        *    2.51  *    9.26  *    1.78  *
* Max Chl Dpth (ft)      *   24.05  * Hydr. Depth (ft)        *    3.92  *   19.46  *    2.35  *
* Conv. Total (cfs)      *1609615.0  * Conv. (cfs)            * 51267.9  *1533767.0  * 24580.5  *
* Length Wtd. (ft)       *   13.00  * Wetted Per. (ft)        *  124.14  *  209.57  *  140.05  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)        *    0.14  *    0.66  *    0.08  *
* Alpha                  *    1.26  * Stream Power (lb/ft s) *    0.35  *    6.16  *    0.15  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   54.11  *  763.76  *  110.54  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   24.00  *   41.99  *   33.61  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE


RIVER: Blue River
REACH: Main               RS: 1.896

INPUT
Description: I-435 Bridge.  Bridge has been normalized to channel flow from a
             23 degree skew.  The top of side rail is modeled as the top of
             bridge.
Distance from Upstream XS =      13
Deck/Roadway Width        =     118
Weir Coefficient          =     2.5
Upstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
       0     762             120 762.628     750     153   762.8   750.9
     966   765.9   755.1    1000 765.958     755    1025     766
  1092.9     766

Upstream Bridge Cross Section Data
Station Elevation Data    num=     134
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     760      93     760   107.3     758   109.2     756   114.9     754
   121.5     752   128.2     750   135.8     748   153.9     746   162.4     744
     170     742   178.6     740   218.5     738   235.7     736   254.7     734
   271.8     732   330.8     730   371.7     728   375.5     726   379.3     724
     384     722   390.7     720   397.3     718   405.9     716  416.04  710.68
  518.42  710.68   528.6     716     539     718   546.7     720   552.4     722
   558.1     724   562.8     726   569.5     728   574.2     730   620.8     732
   709.3     734   722.6     736   729.3     738   742.6     740   796.8     740
   800.6     738   804.4     736   810.1     734   812.9     734   828.2     736
   854.8     736     890     736   896.6     738   901.4     740   905.2     742
     910     744   913.8     746   917.6     748   920.4     750   924.2     752
     928     754   931.8     756   940.4     758   950.9     760   976.9     764
  1092.9     766  1317.9     768  1580.9   768.1  1659.9     770  1834.9     774
  1901.9     774  1907.9     772  1911.9     770  1914.9     768  1918.9     766
  1921.9     764  1924.9     762  1927.9     760  1931.9     758  1935.9     756
  1940.9     754  1945.9     752  1951.9     750  1956.9     748  1960.9     746
  1962.9     744  1966.9     742  1980.9     742  2002.9     742  2016.9     740
  2025.9     738  2037.9     736  2049.9     734  2055.9     734  2061.9     736
  2066.9     738  2071.9     740  2075.9     742  2091.9     744  2152.9     746
  2176.9     748  2214.9     750  2228.9     750  2275.9     748  2286.9     746
  2291.9     744  2297.9     742  2304.9     740  2310.9     738  2317.9     736
  2326.9     734  2333.9     732  2382.9     732  2387.9     734  2393.9     736
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  2398.9     738  2404.9     740  2410.9     742  2416.9     744  2422.9     746
  2474.9     746  2542.9     744  2660.9     744  2719.9     744  2724.9     744
  2769.9     746  2782.9     748  2787.9     750  2791.9     752  2796.9     754
  2800.9     756  2805.9     758  2809.9     760  2813.9     762  2818.9     764
  2823.9     766  2849.9     7662884.853     7662895.853     768

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .067      93    .035   371.7    .027   574.2    .035   976.9    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
         371.7   574.2           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     743     905   740.5       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1920    2820     755

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
       0     762              135   762.8   750.9     976   765.9   755.1
  1092.9     766

Downstream Bridge Cross Section Data
Station Elevation Data    num=     134
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     760     124     760   127.8     758   131.6     756   134.5     754
   138.3     752   140.2     750   145.9     748   164.9     746   172.5     744
   180.1     742   187.7     740   226.7     738   243.8     736   259.1     734
   274.3     732   295.2     730     377     728   380.8     726   384.6     724
   387.4     722   395.1     720   401.7     718   407.4     716   417.6  710.68
  526.71  710.68   536.8     716   545.3     718   552.9     720   558.6     722
   565.3     724     571     726   574.8     728   579.6     730   667.1     732
   723.2     734   738.4     736   749.8     738   759.3     740   782.1     742
   799.3     742   806.9     740   816.4     738   824.9     736   832.5     734
   840.1     734   916.2     736     920     738   924.8     740   927.6     742
   930.5     744   932.4     746   938.1     748   941.9     750   945.7     752
   949.5     754   954.3     756     959     758   961.9     760   976.9     764
  1092.9     766  1317.9     768  1580.9   768.1  1659.9     770  1834.9     774
  1901.9     774  1907.9     772  1911.9     770  1914.9     768  1918.9     766
  1921.9     764  1924.9     762  1927.9     760  1931.9     758  1935.9     756
  1940.9     754  1945.9     752  1951.9     750  1956.9     748  1960.9     746
  1962.9     744  1966.9     742  1980.9     742  2002.9     742  2016.9     740
  2025.9     738  2037.9     736  2049.9     734  2055.9     734  2061.9     736
  2066.9     738  2071.9     740  2075.9     742  2091.9     744  2152.9     746
  2176.9     748  2214.9     750  2228.9     750  2275.9     748  2286.9     746
  2291.9     744  2297.9     742  2304.9     740  2310.9     738  2317.9     736
  2326.9     734  2333.9     732  2382.9     732  2387.9     734  2393.9     736
  2398.9     738  2404.9     740  2410.9     742  2416.9     744  2422.9     746
  2474.9     746  2542.9     744  2660.9     744  2719.9     744  2724.9     744
  2769.9     746  2782.9     748  2787.9     750  2791.9     752  2796.9     754
  2800.9     756  2805.9     758  2809.9     760  2813.9     762  2818.9     764
  2823.9     766  2849.9     766  2884.9     766  2895.9     768

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .067     124    .035     377    .027   579.6    .035   976.9    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
           377   579.6           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     800     930     740       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1920    2820     755

Upstream Embankment side slope              =         horiz. to 1.0 vertical
```

```
Downstream Embankment side slope            =         horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  10

Pier Data
Pier Station     Upstream=     153    Downstream=     153
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     710       3     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     710       3     765

Pier Data
Pier Station     Upstream=     227    Downstream=     227
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     710       3     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3     710       3     765

Pier Data
Pier Station     Upstream=     302    Downstream=     302
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.2     710     4.2     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.2     710     4.2     765

Pier Data
Pier Station     Upstream=     413    Downstream=     413
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.67     710    4.67     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.67     710    4.67     765

Pier Data
Pier Station     Upstream=     551    Downstream=     551
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.67     710    4.67     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    4.67     710    4.67     765

Pier Data
Pier Station     Upstream=     661    Downstream=     661
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.2     710     4.2     765
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
     4.2     710     4.2     765

Pier Data
```

```
Pier Station     Upstream=     738    Downstream=     738
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     715       3     765
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     715       3     765

Pier Data
Pier Station     Upstream=     832    Downstream=     832
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     715       3     765
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     715       3     765

Pier Data
Pier Station     Upstream=     908    Downstream=     908
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     715       3     765
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
       3     715       3     765

Pier Data
Pier Station     Upstream=     960    Downstream=     960
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
     3.5     715     3.5     765
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
     3.5     715     3.5     765

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =      .5
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. US. (ft)          *     725.15  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     724.49  * E.G. Elev (ft)         *     725.16  *     725.12  *
* Q Total (cfs)          *   12500.00  * W.S. Elev (ft)         *     724.44  *     724.44  *
* Q Bridge (cfs)         *   12500.00  * Crit W.S. (ft)         *     718.26  *     717.94  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      13.76  *      13.76  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.79  *       6.60  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1841.70  *    1894.30  *
* Weir Submerg           *             * Froude # Chl           *       0.36  *       0.35  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   14074.01  *   14513.71  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      10.75  *      10.92  *
```

```
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     205.84  *     210.75  *
* Delta EG (ft)          *       0.08  * Conv. Total (cfs)      *   436820.6  *   450685.5  *
* Delta WS (ft)          *       0.05  * Top Width (ft)         *     171.35  *     173.47  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       6.79  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.46  *       0.43  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       3.10  *       2.85  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. US. (ft)          *     729.06  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     728.20  * E.G. Elev (ft)         *     729.07  *     729.02  *
* Q Total (cfs)          *   19500.00  * W.S. Elev (ft)         *     728.13  *     728.13  *
* Q Bridge (cfs)         *   19500.00  * Crit W.S. (ft)         *     720.64  *     720.25  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      17.45  *      17.45  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.79  *       7.61  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    2503.80  *    2563.37  *
* Weir Submerg           *             * Froude # Chl           *       0.38  *       0.36  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   24135.40  *   24748.02  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      13.09  *      13.22  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     242.08  *     247.59  *
* Delta EG (ft)          *       0.11  * Conv. Total (cfs)      *   658749.4  *   679468.5  *
* Delta WS (ft)          *       0.08  * Top Width (ft)         *     191.33  *     193.92  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       7.79  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.57  *       0.53  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.41  *       4.05  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. US. (ft)          *     732.06  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     731.00  * E.G. Elev (ft)         *     732.06  *     731.99  *
* Q Total (cfs)          *   26600.00  * W.S. Elev (ft)         *     730.88  *     730.88  *
* Q Bridge (cfs)         *   26600.00  * Crit W.S. (ft)         *     722.51  *     722.30  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      20.20  *      20.20  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.50  *       8.16  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3128.49  *    3261.09  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.37  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   34296.58  *   35046.82  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      11.15  *      10.24  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     342.68  *     385.71  *
* Delta EG (ft)          *       0.16  * Conv. Total (cfs)      *   872974.6  *   900163.8  *
* Delta WS (ft)          *       0.12  * Top Width (ft)         *     280.47  *     318.50  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.50  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.53  *       0.46  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.50  *       3.76  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. US. (ft)          *     734.74  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     733.52  * E.G. Elev (ft)         *     734.72  *     734.62  *
* Q Total (cfs)          *   34200.00  * W.S. Elev (ft)         *     733.39  *     733.39  *
* Q Bridge (cfs)         *   34200.00  * Crit W.S. (ft)         *     724.44  *     724.15  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      22.71  *      22.71  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.58  *       8.13  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    3987.13  *    4207.46  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.37  *
```

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* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *   45713.72  *   46725.65  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *       9.85  *       9.91  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     482.85  *     510.14  *
* Delta EG (ft)          *       0.19  * Conv. Total (cfs)      *  1122213.0  *  1163949.0  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *     404.66  *     424.62  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.58  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.48  *       0.44  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.11  *       3.61  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. US. (ft)          *     737.85  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     736.48  * E.G. Elev (ft)         *     737.79  *     737.68  *
* Q Total (cfs)          *   45500.00  * W.S. Elev (ft)         *     736.35  *     736.35  *
* Q Bridge (cfs)         *   45500.00  * Crit W.S. (ft)         *     726.91  *     726.57  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      25.67  *      25.67  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.56  *       8.18  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    5315.87  *    5564.04  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.37  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   63066.20  *   64602.62  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      11.23  *      11.62  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     575.63  *     589.20  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *  1496469.0  *  1553813.0  *
* Delta WS (ft)          *       0.12  * Top Width (ft)         *     557.80  *     566.35  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.56  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.53  *       0.51  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.56  *       4.13  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. US. (ft)          *     739.74  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     738.23  * E.G. Elev (ft)         *     739.65  *     739.53  *
* Q Total (cfs)          *   54400.00  * W.S. Elev (ft)         *     738.10  *     738.10  *
* Q Bridge (cfs)         *   54400.00  * Crit W.S. (ft)         *     728.65  *     728.32  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      27.42  *      27.42  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.84  *       8.47  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6156.67  *    6420.74  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.38  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   76232.32  *   78109.02  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      12.50  *      12.80  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     611.35  *     630.06  *
* Delta EG (ft)          *       0.22  * Conv. Total (cfs)      *  1756166.0  *  1820737.0  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *     586.06  *     600.01  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.84  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.60  *       0.57  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       5.33  *       4.81  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. US. (ft)          *     741.49  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     739.86  * E.G. Elev (ft)         *     741.34  *     741.22  *
* Q Total (cfs)          *   63000.00  * W.S. Elev (ft)         *     739.72  *     739.72  *
* Q Bridge (cfs)         *   63000.00  * Crit W.S. (ft)         *     730.44  *     730.56  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      29.04  *      29.04  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.02  *       8.67  *
```

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* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    6987.61  *    7264.51  *
* Weir Submerg           *             * Froude # Chl           *       0.39  *       0.38  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   89858.07  *   92072.92  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      13.12  *      13.43  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     668.52  *     688.93  *
* Delta EG (ft)          *       0.23  * Conv. Total (cfs)      *  2020146.0  *  2093075.0  *
* Delta WS (ft)          *       0.14  * Top Width (ft)         *     633.07  *     650.83  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       9.02  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.63  *       0.60  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       5.72  *       5.17  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. US. (ft)          *     743.66  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     742.02  * E.G. Elev (ft)         *     743.47  *     743.34  *
* Q Total (cfs)          *   75900.00  * W.S. Elev (ft)         *     741.89  *     741.89  *
* Q Bridge (cfs)         *   75900.00  * Crit W.S. (ft)         *     733.80  *     733.45  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      31.21  *      31.21  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.56  *       8.26  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    8866.94  *    9191.19  *
* Weir Submerg           *             * Froude # Chl           *       0.38  *       0.37  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *  111600.70  *  114723.30  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      12.53  *      13.16  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     884.45  *     902.78  *
* Delta EG (ft)          *       0.24  * Conv. Total (cfs)      *  2488540.0  *  2582767.0  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *     707.81  *     698.41  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.56  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.58  *       0.55  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.98  *       4.53  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

BRIDGE OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. US. (ft)          *     736.00  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     734.73  * E.G. Elev (ft)         *     735.96  *     735.86  *
* Q Total (cfs)          *   38300.00  * W.S. Elev (ft)         *     734.60  *     734.60  *
* Q Bridge (cfs)         *   38300.00  * Crit W.S. (ft)         *     725.36  *     725.08  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      23.92  *      23.92  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.49  *       8.07  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4509.35  *    4744.21  *
* Weir Submerg           *             * Froude # Chl           *       0.38  *       0.37  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   52118.48  *   53334.29  *
* Min El Weir Flow (ft)  *     755.01  * Hydr Depth (ft)        *      10.10  *      10.41  *
* Min El Prs (ft)        *     754.91  * W.P. Total (ft)        *     534.57  *     550.87  *
* Delta EG (ft)          *       0.20  * Conv. Total (cfs)      *  1264896.0  *  1313241.0  *
* Delta WS (ft)          *       0.13  * Top Width (ft)         *     455.69  *     485.29  *
* BR Open Area (sq ft)   *   16957.94  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       8.49  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.48  *       0.46  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *       4.10  *       3.69  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 1.882
```

```
INPUT
Description: COE River Station= 57913.01
Preliminary Model River Station
             (miles)=1.87

I-435 Bridge.  Normalized to channel flow from 23
             degree skew. Top of side rail modeled as top of bridge.
             Inerffective flow area due to  I-435 embankment and high ground on
             right floodplain.
Station Elevation Data    num=     134
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     760     124     760   127.8     758   131.6     756   134.5     754
   138.3     752   140.2     750   145.9     748   164.9     746   172.5     744
   180.1     742   187.7     740   226.7     738   243.8     736   259.1     734
   274.3     732   295.2     730     377     728   380.8     726   384.6     724
   387.4     722   395.1     720   401.7     718   407.4     716   417.6  710.68
  526.71  710.68   536.8     716   545.3     718   552.9     720   558.6     722
   565.3     724     571     726   574.8     728   579.6     730   667.1     732
   723.2     734   738.4     736   749.8     738   759.3     740   782.1     742
   799.3     742   806.9     740   816.4     738   824.9     736   832.5     734
   840.1     734   916.2     736     920     738   924.8     740   927.6     742
   930.5     744   932.4     746   938.1     748   941.9     750   945.7     752
   949.5     754   954.3     756     959     758   961.9     760   976.9     764
  1092.9     766  1317.9     768  1580.9   768.1  1659.9     770  1834.9     774
  1901.9     774  1907.9     772  1911.9     770  1914.9     768  1918.9     766
  1921.9     764  1924.9     762  1927.9     760  1931.9     758  1935.9     756
  1940.9     754  1945.9     752  1951.9     750  1956.9     748  1960.9     746
  1962.9     744  1966.9     742  1980.9     742  2002.9     742  2016.9     740
  2025.9     738  2037.9     736  2049.9     734  2055.9     734  2061.9     736
  2066.9     738  2071.9     740  2075.9     742  2091.9     744  2152.9     746
  2176.9     748  2214.9     750  2228.9     750  2275.9     748  2286.9     746
  2291.9     744  2297.9     742  2304.9     740  2310.9     738  2317.9     736
  2326.9     734  2333.9     732  2382.9     732  2387.9     734  2393.9     736
  2398.9     738  2404.9     740  2410.9     742  2416.9     744  2422.9     746
  2474.9     746  2542.9     744  2660.9     744  2719.9     744  2724.9     744
  2769.9     746  2782.9     748  2787.9     750  2791.9     752  2796.9     754
  2800.9     756  2805.9     758  2809.9     760  2813.9     762  2818.9     764
  2823.9     766  2849.9     766  2884.9     766  2895.9     768

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .067     124    .035     377    .027   579.6    .035   976.9    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             377   579.6             265     222     250              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
     800     930     740       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1920    2820     755

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)          *  725.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.62  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)          *  724.44  * Reach Len. (ft)        *  265.00  *  222.00  *  250.00  *
* Crit W.S. (ft)          *  717.85  * Flow Area (sq ft)      *          * 1970.45  *          *
* E.G. Slope (ft/ft)      *0.000580  * Area (sq ft)           *          * 1970.45  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)          *  182.81  * Top Width (ft)          *          *  182.81  *          *
* Vel Total (ft/s)        *    6.34  * Avg. Vel. (ft/s)        *          *    6.34  *          *
* Max Chl Dpth (ft)       *   13.76  * Hydr. Depth (ft)        *          *   10.78  *          *
* Conv. Total (cfs)       *518859.7  * Conv. (cfs)             *          *518859.7  *          *
* Length Wtd. (ft)        *  222.00  * Wetted Per. (ft)        *          *  188.27  *          *
* Min Ch El (ft)          *  710.68  * Shear (lb/sq ft)        *          *    0.38  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *    2.41  *          *
* Frctn Loss (ft)         *    0.12  * Cum Volume (acre-ft)    *          *  381.87  *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *          *   35.31  *          *
*************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
```

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	728.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.035	0.027	
W.S. Elev (ft)	728.13	Reach Len. (ft)	265.00	222.00	250.00
Crit W.S. (ft)	720.17	Flow Area (sq ft)	0.32	2673.59	
E.G. Slope (ft/ft)	0.000573	Area (sq ft)	0.32	2673.59	
Q Total (cfs)	19500.00	Flow (cfs)	0.05	19499.95	
Top Width (ft)	203.26	Top Width (ft)	5.15	198.10	
Vel Total (ft/s)	7.29	Avg. Vel. (ft/s)	0.16	7.29	
Max Chl Dpth (ft)	17.45	Hydr. Depth (ft)	0.06	13.50	
Conv. Total (cfs)	814636.9	Conv. (cfs)	2.2	814634.7	
Length Wtd. (ft)	222.00	Wetted Per. (ft)	5.16	205.23	
Min Ch El (ft)	710.68	Shear (lb/sq ft)	0.00	0.47	
Alpha	1.00	Stream Power (lb/ft s)	0.00	3.40	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	1.08	516.44	4.45
C & E Loss (ft)	0.01	Cum SA (acres)	1.77	39.35	6.45

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	731.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.	0.035	0.027	0.035
W.S. Elev (ft)	730.88	Reach Len. (ft)	265.00	222.00	250.00
Crit W.S. (ft)	722.11	Flow Area (sq ft)	157.73	3227.10	16.90
E.G. Slope (ft/ft)	0.000577	Area (sq ft)	157.73	3227.10	16.90
Q Total (cfs)	26600.00	Flow (cfs)	231.99	26358.05	9.96
Top Width (ft)	332.04	Top Width (ft)	90.98	202.60	38.45
Vel Total (ft/s)	7.82	Avg. Vel. (ft/s)	1.47	8.17	0.59
Max Chl Dpth (ft)	20.20	Hydr. Depth (ft)	1.73	15.93	0.44
Conv. Total (cfs)	1107480.0	Conv. (cfs)	9659.0	1097406.0	414.6
Length Wtd. (ft)	222.25	Wetted Per. (ft)	91.05	210.10	38.46
Min Ch El (ft)	710.68	Shear (lb/sq ft)	0.06	0.55	0.02
Alpha	1.08	Stream Power (lb/ft s)	0.09	4.52	0.01
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	10.26	616.87	31.01
C & E Loss (ft)	0.01	Cum SA (acres)	5.76	40.56	14.34

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	734.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.	0.035	0.027	0.035
W.S. Elev (ft)	733.39	Reach Len. (ft)	265.00	222.00	250.00
Crit W.S. (ft)	723.85	Flow Area (sq ft)	416.41	3735.88	236.24
E.G. Slope (ft/ft)	0.000550	Area (sq ft)	416.41	3735.88	236.24
Q Total (cfs)	34200.00	Flow (cfs)	986.62	32856.67	356.71
Top Width (ft)	442.36	Top Width (ft)	113.27	202.60	126.49
Vel Total (ft/s)	7.79	Avg. Vel. (ft/s)	2.37	8.79	1.51
Max Chl Dpth (ft)	22.71	Hydr. Depth (ft)	3.68	18.44	1.87
Conv. Total (cfs)	1457929.0	Conv. (cfs)	42059.1	1400664.0	15206.5
Length Wtd. (ft)	223.03	Wetted Per. (ft)	113.48	210.10	126.54
Min Ch El (ft)	710.68	Shear (lb/sq ft)	0.13	0.61	0.06
Alpha	1.23	Stream Power (lb/ft s)	0.30	5.37	0.10
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	33.61	707.04	76.44
C & E Loss (ft)	0.02	Cum SA (acres)	15.42	41.18	26.36

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	737.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.	0.035	0.027	0.035
W.S. Elev (ft)	736.35	Reach Len. (ft)	265.00	222.00	250.00
Crit W.S. (ft)	726.25	Flow Area (sq ft)	785.48	4336.05	677.33
E.G. Slope (ft/ft)	0.000529	Area (sq ft)	785.48	4336.05	808.79
Q Total (cfs)	45500.00	Flow (cfs)	2462.67	41313.18	1724.15
Top Width (ft)	593.09	Top Width (ft)	136.21	202.60	254.28

```
* Vel Total (ft/s)       *    7.85  * Avg. Vel. (ft/s)       *    3.14  *    9.53  *    2.55  *
* Max Chl Dpth (ft)      *   25.67  * Hydr. Depth (ft)       *    5.77  *   21.40  *    4.21  *
* Conv. Total (cfs)      *1977390.0  * Conv. (cfs)           *107025.5  *1795434.0  * 74929.9  *
* Length Wtd. (ft)       *  224.43  * Wetted Per. (ft)       *  136.62  *  210.10  *  161.03  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.19  *    0.68  *    0.14  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    0.60  *    6.50  *    0.35  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   97.24  *  813.19  *  167.62  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   43.09  *   41.43  *   40.03  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  739.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  738.10  * Reach Len. (ft)        *  265.00  *  222.00  *  250.00  *
* Crit W.S. (ft)         *  727.91  * Flow Area (sq ft)      * 1036.17  * 4689.49  *  966.53  *
* E.G. Slope (ft/ft)     *0.000543  * Area (sq ft)           * 1036.17  * 4689.49  * 1270.41  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 3675.42  *47689.97  * 3034.61  *
* Top Width (ft)         *  629.75  * Top Width (ft)         *  152.19  *  202.60  *  274.95  *
* Vel Total (ft/s)       *    8.13  * Avg. Vel. (ft/s)       *    3.55  *   10.17  *    3.14  *
* Max Chl Dpth (ft)      *   27.42  * Hydr. Depth (ft)       *    6.81  *   23.15  *    5.66  *
* Conv. Total (cfs)      *2333780.0  * Conv. (cfs)           *157676.9  *2045917.0  *130185.7  *
* Length Wtd. (ft)       *  225.29  * Wetted Per. (ft)       *  152.69  *  210.10  *  171.03  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.23  *    0.76  *    0.19  *
* Alpha                  *    1.39  * Stream Power (lb/ft s) *    0.82  *    7.70  *    0.60  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  162.70  *  868.49  *  227.97  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   47.78  *   41.47  *   67.31  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  741.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.54  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  739.72  * Reach Len. (ft)        *  265.00  *  222.00  *  250.00  *
* Crit W.S. (ft)         *  729.69  * Flow Area (sq ft)      * 1308.03  * 5017.39  * 1248.96  *
* E.G. Slope (ft/ft)     *0.000549  * Area (sq ft)           * 1308.03  * 5017.39  * 1731.00  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 4805.68  *53655.70  * 4538.61  *
* Top Width (ft)         *  680.57  * Top Width (ft)         *  183.75  *  202.60  *  294.21  *
* Vel Total (ft/s)       *    8.32  * Avg. Vel. (ft/s)       *    3.67  *   10.69  *    3.63  *
* Max Chl Dpth (ft)      *   29.04  * Hydr. Depth (ft)       *    7.12  *   24.77  *    7.00  *
* Conv. Total (cfs)      *2688644.0  * Conv. (cfs)           *205091.6  *2289859.0  *193693.9  *
* Length Wtd. (ft)       *  226.17  * Wetted Per. (ft)       *  184.29  *  210.10  *  178.89  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.24  *    0.82  *    0.24  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.89  *    8.75  *    0.87  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  224.02  *  920.71  *  327.33  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   49.84  *   41.50  *  169.33  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  743.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  741.89  * Reach Len. (ft)        *  265.00  *  222.00  *  250.00  *
* Crit W.S. (ft)         *  732.57  * Flow Area (sq ft)      * 1726.57  * 5458.88  * 2408.82  *
* E.G. Slope (ft/ft)     *0.000518  * Area (sq ft)           * 1726.57  * 5458.88  * 2408.82  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 7082.61  *59963.63  * 8853.76  *
* Top Width (ft)         *  728.15  * Top Width (ft)         *  196.50  *  202.60  *  329.05  *
* Vel Total (ft/s)       *    7.91  * Avg. Vel. (ft/s)       *    4.10  *   10.98  *    3.68  *
* Max Chl Dpth (ft)      *   31.21  * Hydr. Depth (ft)       *    8.79  *   26.94  *    7.32  *
* Conv. Total (cfs)      *3335845.0  * Conv. (cfs)           *311284.4  *2635433.0  *389127.6  *
* Length Wtd. (ft)       *  227.64  * Wetted Per. (ft)       *  197.29  *  210.10  *  332.18  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.28  *    0.84  *    0.23  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    1.16  *    9.22  *    0.86  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *  302.12  *  984.70  *  706.47  *
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* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   52.00  *   41.50  *  276.71  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  735.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.035  *   0.027  *   0.035  *
* W.S. Elev (ft)         *  734.60  * Reach Len. (ft)        *  265.00  *  222.00  *  250.00  *
* Crit W.S. (ft)         *  724.80  * Flow Area (sq ft)      *  559.18  * 3981.27  *  406.32  *
* E.G. Slope (ft/ft)     *0.000535  * Area (sq ft)           *  559.18  * 3981.27  *  418.46  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             * 1508.18  *36010.68  *  781.15  *
* Top Width (ft)         *  506.04  * Top Width (ft)         *  122.50  *  202.60  *  180.94  *
* Vel Total (ft/s)       *    7.74  * Avg. Vel. (ft/s)       *    2.70  *    9.05  *    1.92  *
* Max Chl Dpth (ft)      *   23.92  * Hydr. Depth (ft)       *    4.56  *   19.65  *    2.74  *
* Conv. Total (cfs)      *1656336.0  * Conv. (cfs)           * 65223.2  *1557331.0  * 33781.7  *
* Length Wtd. (ft)       *  223.56  * Wetted Per. (ft)       *  122.79  *  210.10  *  148.27  *
* Min Ch El (ft)         *  710.68  * Shear (lb/sq ft)       *    0.15  *    0.63  *    0.09  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    0.41  *    5.72  *    0.18  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   52.46  *  751.21  *  109.35  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   23.60  *   41.34  *   33.09  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 1.840

INPUT
Description: COE River Station=58135.03
Preliminary Model River Station
             (miles)=1.83

Inerffective flow area due to  I-435 embankment
             and high ground on right floodplain.
Station Elevation Data    num=     130
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
       0      732   19.26      734   41.44      736   73.85      738   88.08      740
    95.9      742  104.13      744  110.81      746  121.45      748  135.66      748
  142.06      746  146.67      744  156.46      742  166.13      740  182.85      738
  213.97      736  231.25      734  301.31      732  319.85      730  323.16      728
  328.39      726  332.04      724  336.68      722  346.18      720  350.45      718
  368.63   710.62  474.38   710.62  491.37      718  495.76      720  502.94      722
  506.09      724   511.3      726  515.62      728  523.61      730  560.04      730
  605.64      728  607.74      728  638.81      730  648.35      732  663.72      734
  682.29      736  687.72      738  693.62      740  700.82      742  708.05      744
  714.21      746  730.32      748  745.69      748  751.13      746  754.08      744
  757.99      742  763.99      740  771.71      738  783.99      736  787.48      734
  797.81      734  875.74      736  879.77      738  889.54      740  903.93      742
 1055.39      742 1105.32      744  1134.3      746 1137.03      746 1189.45      744
 1291.69      744 1310.28      744 1367.01      742 1409.03      740 1448.81      738
 1473.55      736 1541.79      734  1594.6      732 1749.66      732 1813.64      734
 1899.36      732 1961.28      732 1985.83      734 1997.23      736 2004.93      738
 2013.38      740 2021.45      742 2039.78      742 2052.66      740 2066.86      738
 2078.59      736 2089.51      736  2093.8      738 2098.85      740 2102.52      742
 2127.23      744    2198      746 2233.39      748 2297.03      748 2300.81      746
 2305.86      744 2311.22      742 2315.84      740  2320.5      738 2325.51      736
 2330.43      734 2335.36      732 2340.23      730 2345.07      728 2372.56      728
 2378.31      730 2382.95      732 2390.43      734  2393.3      736 2402.49      738
 2411.26      740  2420.7      742  2429.5      744 2445.79      744 2472.63      744
 2489.16      744 2548.37      744 2591.37      744 2617.22      744  2653.2      746
 2659.04      748 2664.98      750 2670.97      752 2677.33      754 2684.12      756
  2690.9      758 2695.61      760 2699.91      762 2704.21      764  2708.5      766

Manning's n Values        num=       3
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```
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0    .038  319.85    .025  523.61    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         319.85  523.61             775     756     750              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     762     890     739       F
     900    2700     755       F
Left Levee      Station=  136.43      Elevation=  747.94
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1900    1950     750

CROSS SECTION OUTPUT  Profile #2-yr
*********************************************************************************************
* E.G. Elev (ft)          *  724.94  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.67  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)          *  724.27  * Reach Len. (ft)        *  775.00  *  756.00  *  750.00  *
* Crit W.S. (ft)          *  717.77  * Flow Area (sq ft)      *          * 1904.52  *          *
* E.G. Slope (ft/ft)      *0.000528  * Area (sq ft)           *          * 1904.52  *          *
* Q Total (cfs)           *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)          *  175.26  * Top Width (ft)         *          *  175.26  *          *
* Vel Total (ft/s)        *    6.56  * Avg. Vel. (ft/s)       *          *    6.56  *          *
* Max Chl Dpth (ft)       *   13.65  * Hydr. Depth (ft)       *          *   10.87  *          *
* Conv. Total (cfs)       *544143.3  * Conv. (cfs)            *          *544143.3  *          *
* Length Wtd. (ft)        *  756.00  * Wetted Per. (ft)       *          *  180.71  *          *
* Min Ch El (ft)          *  710.62  * Shear (lb/sq ft)       *          *    0.35  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    2.28  *          *
* Frctn Loss (ft)         *    0.36  * Cum Volume (acre-ft)   *          *  371.99  *          *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)         *          *   34.39  *          *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*********************************************************************************************
* E.G. Elev (ft)          *  728.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.89  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)          *  727.93  * Reach Len. (ft)        *  775.00  *  756.00  *  750.00  *
* Crit W.S. (ft)          *  720.07  * Flow Area (sq ft)      *          * 2576.39  *          *
* E.G. Slope (ft/ft)      *0.000534  * Area (sq ft)           *          * 2576.39  *          *
* Q Total (cfs)           *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)          *  192.14  * Top Width (ft)         *          *  192.14  *          *
* Vel Total (ft/s)        *    7.57  * Avg. Vel. (ft/s)       *          *    7.57  *          *
* Max Chl Dpth (ft)       *   17.31  * Hydr. Depth (ft)       *          *   13.41  *          *
* Conv. Total (cfs)       *843928.9  * Conv. (cfs)            *          *843928.9  *          *
* Length Wtd. (ft)        *  756.00  * Wetted Per. (ft)       *          *  199.14  *          *
* Min Ch El (ft)          *  710.62  * Shear (lb/sq ft)       *          *    0.43  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    3.26  *          *
* Frctn Loss (ft)         *    0.37  * Cum Volume (acre-ft)   *    1.08  *  503.07  *    4.45  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *    1.75  *   38.36  *    6.45  *
*********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*********************************************************************************************
* E.G. Elev (ft)          *  731.77  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.12  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)          *  730.65  * Reach Len. (ft)        *  775.00  *  756.00  *  750.00  *
* Crit W.S. (ft)          *  722.14  * Flow Area (sq ft)      *    1.98  * 3118.50  *  157.13  *
* E.G. Slope (ft/ft)      *0.000565  * Area (sq ft)           *    1.98  * 3118.50  *  248.58  *
* Q Total (cfs)           *26600.00  * Flow (cfs)             *    0.87  *26496.03  *  103.10  *
* Top Width (ft)          *  369.32  * Top Width (ft)         *    6.05  *  203.76  *  159.50  *
* Vel Total (ft/s)        *    8.12  * Avg. Vel. (ft/s)       *    0.44  *    8.50  *    0.66  *
* Max Chl Dpth (ft)       *   20.03  * Hydr. Depth (ft)       *    0.33  *   15.30  *    1.33  *
* Conv. Total (cfs)       *1118597.0  * Conv. (cfs)            *    36.5  *1114225.0  *  4335.6  *
* Length Wtd. (ft)        *  755.96  * Wetted Per. (ft)       *    6.09  *  211.59  *  118.49  *
* Min Ch El (ft)          *  710.62  * Shear (lb/sq ft)       *    0.01  *    0.52  *    0.05  *
* Alpha                   *    1.09  * Stream Power (lb/ft s) *    0.01  *    4.42  *    0.03  *
* Frctn Loss (ft)         *    0.38  * Cum Volume (acre-ft)   *    9.78  *  600.70  *   30.25  *
```

```
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    5.47  *   39.52  *   13.77  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  734.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)         *  733.09  * Reach Len. (ft)        *  775.00  *  756.00  *  750.00  *
* Crit W.S. (ft)         *  723.96  * Flow Area (sq ft)      *   59.73  * 3615.63  *  461.74  *
* E.G. Slope (ft/ft)     *0.000555  * Area (sq ft)           *   59.73  * 3615.63  *  919.01  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *   56.77  *33574.81  *  568.42  *
* Top Width (ft)         *  739.16  * Top Width (ft)         *   56.83  *  203.76  *  478.57  *
* Vel Total (ft/s)       *    8.27  * Avg. Vel. (ft/s)       *    0.95  *    9.29  *    1.23  *
* Max Chl Dpth (ft)      *   22.47  * Hydr. Depth (ft)       *    1.05  *   17.74  *    3.47  *
* Conv. Total (cfs)      *1452281.0  * Conv. (cfs)           *  2410.8  *1425733.0  * 24137.6  *
* Length Wtd. (ft)       *  755.96  * Wetted Per. (ft)       *   56.95  *  211.59  *  133.53  *
* Min Ch El (ft)         *  710.62  * Shear (lb/sq ft)       *    0.04  *    0.59  *    0.12  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    0.03  *    5.49  *    0.15  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *   32.16  *  688.31  *   73.13  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   14.90  *   40.15  *   24.62  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  737.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.60  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)         *  735.89  * Reach Len. (ft)        *  775.00  *  756.00  *  750.00  *
* Crit W.S. (ft)         *  726.38  * Flow Area (sq ft)      *  308.76  * 4185.94  *  867.34  *
* E.G. Slope (ft/ft)     *0.000570  * Area (sq ft)           *  308.76  * 4185.94  * 2716.79  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  590.76  *43437.93  * 1471.31  *
* Top Width (ft)         * 1090.47  * Top Width (ft)         *  104.95  *  203.76  *  781.76  *
* Vel Total (ft/s)       *    8.49  * Avg. Vel. (ft/s)       *    1.91  *   10.38  *    1.70  *
* Max Chl Dpth (ft)      *   25.27  * Hydr. Depth (ft)       *    2.94  *   20.54  *    5.50  *
* Conv. Total (cfs)      *1906312.0  * Conv. (cfs)           * 24751.0  *1819918.0  * 61643.5  *
* Length Wtd. (ft)       *  756.12  * Wetted Per. (ft)       *  105.19  *  211.59  *  158.22  *
* Min Ch El (ft)         *  710.62  * Shear (lb/sq ft)       *    0.10  *    0.70  *    0.19  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.20  *    7.30  *    0.33  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   *   93.92  *  791.48  *  157.50  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   42.35  *   40.39  *   37.05  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  739.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.86  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)         *  737.50  * Reach Len. (ft)        *  775.00  *  756.00  *  750.00  *
* Crit W.S. (ft)         *  728.10  * Flow Area (sq ft)      *  496.19  * 4513.15  * 1125.16  *
* E.G. Slope (ft/ft)     *0.000609  * Area (sq ft)           *  496.19  * 4513.15  * 4051.64  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1172.91  *50930.47  * 2296.62  *
* Top Width (ft)         * 1198.97  * Top Width (ft)         *  129.18  *  203.76  *  866.02  *
* Vel Total (ft/s)       *    8.87  * Avg. Vel. (ft/s)       *    2.36  *   11.28  *    2.04  *
* Max Chl Dpth (ft)      *   26.88  * Hydr. Depth (ft)       *    3.84  *   22.15  *    6.91  *
* Conv. Total (cfs)      *2203699.0  * Conv. (cfs)           * 47513.6  *2063151.0  * 93034.0  *
* Length Wtd. (ft)       *  756.22  * Wetted Per. (ft)       *  129.48  *  211.59  *  163.57  *
* Min Ch El (ft)         *  710.62  * Shear (lb/sq ft)       *    0.15  *    0.81  *    0.26  *
* Alpha                  *    1.52  * Stream Power (lb/ft s) *    0.34  *    9.16  *    0.53  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *  158.04  *  845.04  *  212.69  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   46.92  *   40.44  *   64.04  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	741.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.98	Wt. n-Val.	0.038	0.025	0.065
W.S. Elev (ft)	739.10	Reach Len. (ft)	775.00	756.00	750.00
Crit W.S. (ft)	729.91	Flow Area (sq ft)	719.45	4840.54	1816.87
E.G. Slope (ft/ft)	0.000609	Area (sq ft)	719.45	4840.54	5503.67
Q Total (cfs)	63000.00	Flow (cfs)	2005.17	57227.88	3766.95
Top Width (ft)	1294.81	Top Width (ft)	146.23	203.76	944.82
Vel Total (ft/s)	8.54	Avg. Vel. (ft/s)	2.79	11.82	2.07
Max Chl Dpth (ft)	28.48	Hydr. Depth (ft)	4.92	23.76	6.37
Conv. Total (cfs)	2552432.0	Conv. (cfs)	81239.1	2318575.0	152617.2
Length Wtd. (ft)	756.34	Wetted Per. (ft)	146.62	211.59	287.62
Min Ch El (ft)	710.62	Shear (lb/sq ft)	0.19	0.87	0.24
Alpha	1.75	Stream Power (lb/ft s)	0.52	10.29	0.50
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	217.85	895.59	306.57
C & E Loss (ft)	0.06	Cum SA (acres)	48.84	40.46	165.78

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	743.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.26	Wt. n-Val.	0.038	0.025	0.065
W.S. Elev (ft)	740.96	Reach Len. (ft)	775.00	756.00	750.00
Crit W.S. (ft)	732.20	Flow Area (sq ft)	1002.99	5217.89	2365.85
E.G. Slope (ft/ft)	0.000648	Area (sq ft)	1002.99	5217.89	7343.75
Q Total (cfs)	75900.00	Flow (cfs)	3409.15	66865.57	5625.27
Top Width (ft)	1405.41	Top Width (ft)	158.34	203.76	1043.31
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)	3.40	12.81	2.38
Max Chl Dpth (ft)	30.34	Hydr. Depth (ft)	6.33	25.61	7.66
Conv. Total (cfs)	2982603.0	Conv. (cfs)	133967.8	2627582.0	221053.5
Length Wtd. (ft)	756.50	Wetted Per. (ft)	158.88	211.59	311.99
Min Ch El (ft)	710.62	Shear (lb/sq ft)	0.26	1.00	0.31
Alpha	1.86	Stream Power (lb/ft s)	0.87	12.78	0.73
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	293.82	957.49	678.48
C & E Loss (ft)	0.06	Cum SA (acres)	50.92	40.46	272.77

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	735.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.41	Wt. n-Val.	0.038	0.025	0.065
W.S. Elev (ft)	734.25	Reach Len. (ft)	775.00	756.00	750.00
Crit W.S. (ft)	724.87	Flow Area (sq ft)	147.89	3850.92	620.65
E.G. Slope (ft/ft)	0.000552	Area (sq ft)	147.89	3850.92	1558.10
Q Total (cfs)	38300.00	Flow (cfs)	188.04	37224.09	887.88
Top Width (ft)	922.19	Top Width (ft)	90.74	203.76	627.69
Vel Total (ft/s)	8.29	Avg. Vel. (ft/s)	1.27	9.67	1.43
Max Chl Dpth (ft)	23.63	Hydr. Depth (ft)	1.63	18.90	4.36
Conv. Total (cfs)	1629471.0	Conv. (cfs)	8000.1	1583696.0	37774.6
Length Wtd. (ft)	756.00	Wetted Per. (ft)	90.89	211.59	142.87
Min Ch El (ft)	710.62	Shear (lb/sq ft)	0.06	0.63	0.15
Alpha	1.32	Stream Power (lb/ft s)	0.07	6.07	0.21
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	50.31	731.25	103.68
C & E Loss (ft)	0.06	Cum SA (acres)	22.95	40.31	30.76

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 1.697

INPUT

Description: COE River Station= 58891.15
Preliminary Model River Station
(miles)=1.69

RM 1.69
Obstructions: I-435 embankment, small
building
Station Elevation Data num= 139

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	732	9.76	734	20.55	736	47.09	738	72.31	740
81.18	742	90.23	744	99.61	746	125.12	746	130.89	744
138.25	742	146.26	740	163.95	738	197.5	736	209.73	734
241.88	732	281.14	730	314.56	728	319.45	726	326.28	724
331.73	722	332.9	720	339.01	718	355.46	710.48	476.08	710.48
495.66	718	498.71	720	505.69	722	508.63	724	512.35	726
622.04	728	635.78	730	656.09	732	675.66	734	681.13	736
690.94	738	696.24	740	702.04	742	738.79	742	748.85	740
753.69	738	758.46	736	797.46	736	803.18	738	812.1	740
825.34	742	863.48	742	870.05	740	1757.82	740	1796.73	740
1854.66	734	1871.44	732	1882.95	732	1886.99	734	1891.76	736
1896.52	738	1900.41	740	1904.43	742	1913.76	742	1919.19	740
1925.44	738	1933.72	736	1977.76	736	1980.59	738	1983.47	740
1984.81	742	1995.16	744	2028.94	744	2036.89	744	2065.23	746
2075.13	746	2089.77	746	2142.22	748	2146.91	748	2150.23	746
2152.94	744	2154.9	742	2156.66	740	2159.81	738	2166.05	734
2166.87	732	2169.72	730	2172.47	728	2175.87	726	2195.77	726
2204.86	728	2209.55	730	2216.46	732	2223.12	734	2228.24	736
2234.49	738	2238.84	740	2248.22	744	2266.56	744	2278.05	744
2306.28	744	2383.88	744	2433.48	746	2450.6	748	2459.52	750
2462.73	752	2468.61	754	2473.16	756	2479.13	758	2482.57	760
2485.05	762	2490.3	764	2492.79	766	2494.31	768	2504.78	770
2528.66	770	2531.76	770	2534.13	772	2535.4	774	2539.19	776
2539.76	778	2542.22	780	2546.77	782	2549.6	784	2550.55	786
2552.64	788	2554.58	790	2556.28	792	2558.73	794	2560.96	796
2562.45	798	2564.55	800	2566.93	802	2568.92	804	2571.17	806
2575	808	2577.69	810	2580.42	812	2584.09	814	2590.31	818
2591.56	816	2601.76	820	2607.88	822	2616.17	824		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.038	314.56	.025	512.35	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
314.56 512.35 789 780 768 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
748	812	739	F
1087	2470	755	F

Left Levee Station= 126.87 Elevation= 745.81
Blocked Obstructions num= 1

Sta L	Sta R	Elev
1800	1850	755

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	724.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.025	
W.S. Elev (ft)	723.98	Reach Len. (ft)	789.00	780.00	768.00
Crit W.S. (ft)	717.12	Flow Area (sq ft)		2057.41	
E.G. Slope (ft/ft)	0.000432	Area (sq ft)		2057.41	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	182.27	Top Width (ft)		182.27	
Vel Total (ft/s)	6.08	Avg. Vel. (ft/s)		6.08	
Max Chl Dpth (ft)	13.50	Hydr. Depth (ft)		11.29	
Conv. Total (cfs)	601482.3	Conv. (cfs)		601482.3	
Length Wtd. (ft)	780.00	Wetted Per. (ft)		188.60	
Min Ch El (ft)	710.48	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.79	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)		337.61	
C & E Loss (ft)	0.00	Cum SA (acres)		31.29	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	728.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.		0.025	0.065
W.S. Elev (ft)	727.65	Reach Len. (ft)	789.00	780.00	768.00
Crit W.S. (ft)	719.26	Flow Area (sq ft)		2757.97	74.67
E.G. Slope (ft/ft)	0.000439	Area (sq ft)		2757.97	116.01
Q Total (cfs)	19500.00	Flow (cfs)		19468.54	31.46
Top Width (ft)	317.64	Top Width (ft)		196.93	120.71
Vel Total (ft/s)	6.88	Avg. Vel. (ft/s)		7.06	0.42
Max Chl Dpth (ft)	17.17	Hydr. Depth (ft)		14.00	0.83
Conv. Total (cfs)	930585.9	Conv. (cfs)		929084.5	1501.5
Length Wtd. (ft)	779.99	Wetted Per. (ft)		204.40	90.52
Min Ch El (ft)	710.48	Shear (lb/sq ft)		0.37	0.02
Alpha	1.05	Stream Power (lb/ft s)		2.61	0.01
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	1.08	456.78	3.45
C & E Loss (ft)	0.00	Cum SA (acres)	1.75	34.98	5.41

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	731.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.	0.038	0.025	0.065
W.S. Elev (ft)	730.39	Reach Len. (ft)	789.00	780.00	768.00
Crit W.S. (ft)	721.13	Flow Area (sq ft)	47.83	3299.20	391.37
E.G. Slope (ft/ft)	0.000439	Area (sq ft)	47.83	3299.20	531.67
Q Total (cfs)	26600.00	Flow (cfs)	43.37	26160.82	395.82
Top Width (ft)	407.89	Top Width (ft)	41.02	197.79	169.08
Vel Total (ft/s)	7.12	Avg. Vel. (ft/s)	0.91	7.93	1.01
Max Chl Dpth (ft)	19.91	Hydr. Depth (ft)	1.17	16.68	3.07
Conv. Total (cfs)	1269629.0	Conv. (cfs)	2069.9	1248667.0	18892.5
Length Wtd. (ft)	779.92	Wetted Per. (ft)	41.09	205.32	127.54
Min Ch El (ft)	710.48	Shear (lb/sq ft)	0.03	0.44	0.08
Alpha	1.22	Stream Power (lb/ft s)	0.03	3.49	0.09
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	9.34	545.01	23.53
C & E Loss (ft)	0.01	Cum SA (acres)	5.05	36.04	10.94

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	733.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.	0.038	0.025	0.065
W.S. Elev (ft)	732.85	Reach Len. (ft)	789.00	780.00	768.00
Crit W.S. (ft)	722.90	Flow Area (sq ft)	207.34	3786.84	736.11
E.G. Slope (ft/ft)	0.000438	Area (sq ft)	207.34	3786.84	1007.28
Q Total (cfs)	34200.00	Flow (cfs)	303.92	32889.51	1006.57
Top Width (ft)	509.43	Top Width (ft)	86.39	197.79	225.25
Vel Total (ft/s)	7.23	Avg. Vel. (ft/s)	1.47	8.69	1.37
Max Chl Dpth (ft)	22.37	Hydr. Depth (ft)	2.40	19.15	4.84
Conv. Total (cfs)	1633791.0	Conv. (cfs)	14518.6	1571186.0	48085.7
Length Wtd. (ft)	779.88	Wetted Per. (ft)	86.52	205.32	152.39
Min Ch El (ft)	710.48	Shear (lb/sq ft)	0.07	0.50	0.13
Alpha	1.39	Stream Power (lb/ft s)	0.10	4.38	0.18
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	29.79	624.07	56.54
C & E Loss (ft)	0.01	Cum SA (acres)	13.63	36.66	18.56

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	737.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.	0.038	0.025	0.065
W.S. Elev (ft)	735.67	Reach Len. (ft)	789.00	780.00	768.00

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* Crit W.S. (ft)         *  725.30  * Flow Area (sq ft)      *  500.54  * 4343.92  * 1193.45  *
* E.G. Slope (ft/ft)     *0.000457  * Area (sq ft)           *  500.54  * 4343.92  * 1722.82  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1113.54  *42235.01  * 2151.45  *
* Top Width (ft)         *  585.62  * Top Width (ft)         *  115.04  *  197.79  *  272.79  *
* Vel Total (ft/s)       *    7.54  * Avg. Vel. (ft/s)       *    2.22  *    9.72  *    1.80  *
* Max Chl Dpth (ft)      *   25.19  * Hydr. Depth (ft)       *    4.35  *   21.96  *    7.11  *
* Conv. Total (cfs)      *2127689.0  * Conv. (cfs)           * 52071.9  *1975010.0  *100606.9  *
* Length Wtd. (ft)       *  779.87  * Wetted Per. (ft)       *  115.35  *  205.32  *  168.53  *
* Min Ch El (ft)         *  710.48  * Shear (lb/sq ft)       *    0.12  *    0.60  *    0.20  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    0.28  *    5.87  *    0.36  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   *   86.72  *  717.46  *  119.28  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   40.40  *   36.91  *   27.97  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  738.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.61  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)         *  737.26  * Reach Len. (ft)        *  789.00  *  780.00  *  768.00  *
* Crit W.S. (ft)         *  727.07  * Flow Area (sq ft)      *  699.35  * 4658.00  * 1465.19  *
* E.G. Slope (ft/ft)     *0.000498  * Area (sq ft)           *  699.35  * 4658.00  * 2282.75  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1796.60  *49529.63  * 3073.78  *
* Top Width (ft)         *  723.46  * Top Width (ft)         *  138.15  *  197.79  *  387.52  *
* Vel Total (ft/s)       *    7.97  * Avg. Vel. (ft/s)       *    2.57  *   10.63  *    2.10  *
* Max Chl Dpth (ft)      *   26.78  * Hydr. Depth (ft)       *    5.06  *   23.55  *    8.38  *
* Conv. Total (cfs)      *2436872.0  * Conv. (cfs)           * 80479.3  *2218702.0  *137691.2  *
* Length Wtd. (ft)       *  779.88  * Wetted Per. (ft)       *  138.52  *  205.32  *  175.79  *
* Min Ch El (ft)         *  710.48  * Shear (lb/sq ft)       *    0.16  *    0.71  *    0.26  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *    0.40  *    7.51  *    0.54  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *  147.41  *  765.45  *  158.16  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   44.55  *   36.95  *   53.24  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  740.60  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.78  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)         *  738.82  * Reach Len. (ft)        *  789.00  *  780.00  *  768.00  *
* Crit W.S. (ft)         *  728.85  * Flow Area (sq ft)      *  932.50  * 4966.40  * 1743.18  *
* E.G. Slope (ft/ft)     *0.000518  * Area (sq ft)           *  932.50  * 4966.40  * 2913.65  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2707.57  *56198.77  * 4093.66  *
* Top Width (ft)         *  776.21  * Top Width (ft)         *  157.83  *  197.79  *  420.59  *
* Vel Total (ft/s)       *    8.24  * Avg. Vel. (ft/s)       *    2.90  *   11.32  *    2.35  *
* Max Chl Dpth (ft)      *   28.34  * Hydr. Depth (ft)       *    5.91  *   25.11  *    9.64  *
* Conv. Total (cfs)      *2767679.0  * Conv. (cfs)           *118947.2  *2468892.0  *179840.2  *
* Length Wtd. (ft)       *  779.89  * Wetted Per. (ft)       *  158.27  *  205.32  *  181.82  *
* Min Ch El (ft)         *  710.48  * Shear (lb/sq ft)       *    0.19  *    0.78  *    0.31  *
* Alpha                  *    1.69  * Stream Power (lb/ft s) *    0.55  *    8.85  *    0.73  *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *  203.16  *  810.49  *  234.10  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   46.13  *   36.98  *  154.02  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  742.70  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.06  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)         *  740.64  * Reach Len. (ft)        *  789.00  *  780.00  *  768.00  *
* Crit W.S. (ft)         *  731.06  * Flow Area (sq ft)      * 1234.23  * 5327.32  * 2461.43  *
* E.G. Slope (ft/ft)     *0.000560  * Area (sq ft)           * 1234.23  * 5327.32  * 4312.26  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 4259.34  *65692.36  * 5948.30  *
* Top Width (ft)         * 1759.58  * Top Width (ft)         *  170.87  *  197.79  * 1390.92  *
* Vel Total (ft/s)       *    8.41  * Avg. Vel. (ft/s)       *    3.45  *   12.33  *    2.42  *
* Max Chl Dpth (ft)      *   30.16  * Hydr. Depth (ft)       *    7.22  *   26.93  *    5.18  *
* Conv. Total (cfs)      *3206325.0  * Conv. (cfs)           *179931.7  *2775113.0  *251280.5  *
```

```
* Length Wtd. (ft)       *  779.78  * Wetted Per. (ft)       *  171.45  *  205.32  *  478.48  *
* Min Ch El (ft)         *  710.48  * Shear (lb/sq ft)       *    0.25  *    0.91  *    0.18  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *    0.87  *   11.19  *    0.43  *
* Frctn Loss (ft)        *    0.46  * Cum Volume (acre-ft)   *  273.91  *  865.99  *  578.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   47.99  *   36.98  *  251.82  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  735.23  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.038  *   0.025  *   0.065  *
* W.S. Elev (ft)         *  734.02  * Reach Len. (ft)        *  789.00  *  780.00  *  768.00  *
* Crit W.S. (ft)         *  723.80  * Flow Area (sq ft)      *  318.84  * 4017.17  *  919.85  *
* E.G. Slope (ft/ft)     *0.000440  * Area (sq ft)           *  318.84  * 4017.17  * 1285.83  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  547.91  *36358.38  * 1393.72  *
* Top Width (ft)         *  555.76  * Top Width (ft)         *  104.94  *  197.79  *  253.04  *
* Vel Total (ft/s)       *    7.29  * Avg. Vel. (ft/s)       *    1.72  *    9.05  *    1.52  *
* Max Chl Dpth (ft)      *   23.54  * Hydr. Depth (ft)       *    3.04  *   20.31  *    5.63  *
* Conv. Total (cfs)      *1826257.0  * Conv. (cfs)            * 26126.1  *1733675.0  * 66456.5  *
* Length Wtd. (ft)       *  779.87  * Wetted Per. (ft)       *  105.11  *  205.32  *  163.72  *
* Min Ch El (ft)         *  710.48  * Shear (lb/sq ft)       *    0.08  *    0.54  *    0.15  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.14  *    4.86  *    0.23  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *   46.16  *  662.97  *   79.20  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   21.21  *   36.82  *   23.18  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 1.549

INPUT
Description: COE River Station= 59670.74
Preliminary Model River Station
              (miles)=1.53

FEMA XSEC B. Ineffective flow due to high ground

upstream on right floodplain. (Sections 1.53 and 1.43)
Station Elevation Data    num=     149
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0     732   19.77     734   38.24     736   56.53     738   70.46     740
   84.59     742   93.27     744  102.17     746  125.99     746   136.2     744
  144.89     742  154.88     740  172.52     738  202.17     736  214.66     734
  238.48     732  318.73     730  340.18     728  344.95     726  351.02     724
  354.25     722  361.21     720  367.43     718  386.98  710.31  505.74  710.31
  522.37     718  528.89     720  532.13     722  535.11     724  540.08     726
  543.66     728  545.75     730  552.31     732  558.21     732  565.76     730
  580.39     730   591.3     732  611.59     732  621.66     730  633.03     728
  635.09     728  649.44     730  662.22     732   671.4     734  697.05     736
  705.47     738  723.46     738  768.11     736  803.86     736  822.91     738
  873.86     738  894.85     736  910.18     734  922.46     734 1006.81     734
 1035.69     732 1180.47     732 1203.08     732 1690.11     730 1725.05     730
 1743.51     732 1760.08     734 1777.38     736 1794.51     738 1817.89     738
 1827.14     736 1836.09     734 1844.34     732 1852.58     730 1884.14     728
 1897.28     726 1901.35     724 1906.53     722 1921.26     722 1934.13     722
    1950     720 1970.08     724 1973.97     722 1980.85     726 1986.57     728
 1992.35     730  1999.5     732 2003.56     734 2010.55     736 2016.64     738
 2049.57     740 2082.56     740 2087.68     738 2098.17     736 2121.31     736
 2132.65     738 2144.49     740 2153.68     742  2302.1     742 2307.72     742
 2332.25     744 2403.43     746 2413.24     748 2417.12     748 2423.61     746
 2429.14     744 2436.99     744 2446.15     746 2455.88     748 2491.92     750
  2501.7     752 2508.71     754 2515.76     756 2522.06     758 2527.62     760
 2534.49     762 2540.97     764 2545.36     766 2550.07     768 2554.17     770
 2558.99     772  2563.3     774 2583.73     774 2592.14     772 2592.74     772
 2593.44     774 2593.91     776 2596.32     778 2597.69     780 2599.09     782
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 2600.33     784 2601.91     786 2603.33     788 2604.59     790 2606.13     792
 2607.52     794 2608.99     796 2610.45     798 2611.92     800 2613.35     802
 2614.76     804 2616.43     806 2616.96     808 2620.15     810 2620.51     812
 2622.98     814 2624.75     816 2628.08     818 2630.05     820 2630.34     822
 2634.48     824 2635.61     826 2730.05     828 2780.38     830

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .038  340.18    .025  552.31     .09  873.86     .07 2153.68     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         340.18  552.31             540     542     540             .1       .3
Left Levee      Station=  131.41      Elevation=  745.85
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     709    2500  738.25

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  724.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  723.60  * Reach Len. (ft)        *  540.00  *  542.00  *  540.00  *
* Crit W.S. (ft)         *  717.01  * Flow Area (sq ft)      *          * 2008.84  *          *
* E.G. Slope (ft/ft)     *0.000467  * Area (sq ft)           *          * 2008.84  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  182.84  * Top Width (ft)          *          *  182.84  *          *
* Vel Total (ft/s)       *    6.22  * Avg. Vel. (ft/s)        *          *    6.22  *          *
* Max Chl Dpth (ft)      *   13.29  * Hydr. Depth (ft)        *          *   10.99  *          *
* Conv. Total (cfs)      *578428.2  * Conv. (cfs)             *          *578428.2  *          *
* Length Wtd. (ft)       *  542.00  * Wetted Per. (ft)        *          *  188.40  *          *
* Min Ch El (ft)         *  710.31  * Shear (lb/sq ft)        *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.93  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)    *          *  301.21  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *   28.02  *          *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  728.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  727.26  * Reach Len. (ft)        *  540.00  *  542.00  *  540.00  *
* Crit W.S. (ft)         *  719.19  * Flow Area (sq ft)      *          * 2710.77  *          *
* E.G. Slope (ft/ft)     *0.000476  * Area (sq ft)           *          * 2710.77  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  200.39  * Top Width (ft)          *          *  200.39  *          *
* Vel Total (ft/s)       *    7.19  * Avg. Vel. (ft/s)        *          *    7.19  *          *
* Max Chl Dpth (ft)      *   16.95  * Hydr. Depth (ft)        *          *   13.53  *          *
* Conv. Total (cfs)      *893804.1  * Conv. (cfs)             *          *893804.1  *          *
* Length Wtd. (ft)       *  542.00  * Wetted Per. (ft)        *          *  207.47  *          *
* Min Ch El (ft)         *  710.31  * Shear (lb/sq ft)        *          *    0.39  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    2.79  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)    *    1.08  *  407.81  *    2.43  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    1.75  *   31.42  *    4.35  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. Elev (ft)         *  730.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.03  * Wt. n-Val.             *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  729.95  * Reach Len. (ft)        *  540.00  *  542.00  *  540.00  *
* Crit W.S. (ft)         *  721.10  * Flow Area (sq ft)      *   20.29  * 3258.17  *   28.34  *
* E.G. Slope (ft/ft)     *0.000498  * Area (sq ft)           *   20.29  * 3258.17  *   28.34  *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *   17.33  *26571.98  *   10.68  *
* Top Width (ft)         *  253.45  * Top Width (ft)          *   20.86  *  205.51  *   27.08  *
* Vel Total (ft/s)       *    8.04  * Avg. Vel. (ft/s)        *    0.85  *    8.16  *    0.38  *
* Max Chl Dpth (ft)      *   19.64  * Hydr. Depth (ft)        *    0.97  *   15.85  *    1.05  *
* Conv. Total (cfs)      *1191911.0  * Conv. (cfs)             *   776.7  *1190656.0  *   478.8  *
* Length Wtd. (ft)       *  542.00  * Wetted Per. (ft)        *   20.95  *  213.72  *   27.38  *
```

```
* Min Ch El (ft)         *  710.31  * Shear (lb/sq ft)       *    0.03  *    0.47  *    0.03  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    0.03  *    3.87  *    0.01  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *    8.72  *  486.30  *   18.59  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    4.49  *   32.43  *    9.21  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  733.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  732.35  * Reach Len. (ft)        *  540.00  *  542.00  *  540.00  *
* Crit W.S. (ft)         *  722.86  * Flow Area (sq ft)      *  180.85  * 3761.21  *  194.64  *
* E.G. Slope (ft/ft)     *0.000523  * Area (sq ft)           *  180.85  * 3761.21  *  194.64  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *  230.94  *33863.24  *  105.82  *
* Top Width (ft)         *  429.50  * Top Width (ft)         *  105.86  *  212.13  *  111.51  *
* Vel Total (ft/s)       *    8.27  * Avg. Vel. (ft/s)       *    1.28  *    9.00  *    0.54  *
* Max Chl Dpth (ft)      *   22.04  * Hydr. Depth (ft)       *    1.71  *   17.73  *    1.75  *
* Conv. Total (cfs)      *1495402.0  * Conv. (cfs)           * 10097.8  *1480677.0  *  4627.0  *
* Length Wtd. (ft)       *  541.98  * Wetted Per. (ft)       *  105.99  *  220.65  *  112.66  *
* Min Ch El (ft)         *  710.31  * Shear (lb/sq ft)       *    0.06  *    0.56  *    0.06  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    0.07  *    5.01  *    0.03  *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *   26.27  *  556.50  *   45.95  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   11.89  *   32.99  *   15.59  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.63  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.52  * Wt. n-Val.             *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  735.11  * Reach Len. (ft)        *  540.00  *  542.00  *  540.00  *
* Crit W.S. (ft)         *  725.21  * Flow Area (sq ft)      *  514.75  * 4346.44  *  524.81  *
* E.G. Slope (ft/ft)     *0.000541  * Area (sq ft)           *  514.75  * 4346.44  *  524.81  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 1156.12  *43844.58  *  499.30  *
* Top Width (ft)         *  477.87  * Top Width (ft)         *  132.44  *  212.13  *  133.30  *
* Vel Total (ft/s)       *    8.45  * Avg. Vel. (ft/s)       *    2.25  *   10.09  *    0.95  *
* Max Chl Dpth (ft)      *   24.80  * Hydr. Depth (ft)       *    3.89  *   20.49  *    3.94  *
* Conv. Total (cfs)      *1955391.0  * Conv. (cfs)           * 49685.0  *1884248.0  * 21457.8  *
* Length Wtd. (ft)       *  541.93  * Wetted Per. (ft)       *  132.73  *  220.65  *  134.67  *
* Min Ch El (ft)         *  710.31  * Shear (lb/sq ft)       *    0.13  *    0.67  *    0.13  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *    0.29  *    6.72  *    0.13  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   *   77.52  *  639.65  *   99.47  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   38.15  *   33.23  *   24.39  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.80  * Wt. n-Val.             *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  736.62  * Reach Len. (ft)        *  540.00  *  542.00  *  540.00  *
* Crit W.S. (ft)         *  726.89  * Flow Area (sq ft)      *  724.04  * 4667.55  *  739.63  *
* E.G. Slope (ft/ft)     *0.000590  * Area (sq ft)           *  724.04  * 4667.55  *  739.63  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1985.68  *51550.39  *  863.93  *
* Top Width (ft)         *  506.72  * Top Width (ft)         *  147.23  *  212.13  *  147.36  *
* Vel Total (ft/s)       *    8.87  * Avg. Vel. (ft/s)       *    2.74  *   11.04  *    1.17  *
* Max Chl Dpth (ft)      *   26.31  * Hydr. Depth (ft)       *    4.92  *   22.00  *    5.02  *
* Conv. Total (cfs)      *2239220.0  * Conv. (cfs)           * 81734.6  *2121924.0  * 35561.1  *
* Length Wtd. (ft)       *  541.90  * Wetted Per. (ft)       *  147.61  *  220.65  *  148.83  *
* Min Ch El (ft)         *  710.31  * Shear (lb/sq ft)       *    0.18  *    0.78  *    0.18  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *    0.50  *    8.61  *    0.21  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)   *  134.52  *  681.96  *  131.52  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   41.96  *   33.28  *   48.53  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	740.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.01	Wt. n-Val.	0.038	0.025	0.090
W.S. Elev (ft)	738.13	Reach Len. (ft)	540.00	542.00	540.00
Crit W.S. (ft)	728.36	Flow Area (sq ft)	962.18	4986.57	966.41
E.G. Slope (ft/ft)	0.000614	Area (sq ft)	962.18	4986.57	966.41
Q Total (cfs)	63000.00	Flow (cfs)	2970.44	58709.63	1319.93
Top Width (ft)	537.59	Top Width (ft)	168.77	212.13	156.69
Vel Total (ft/s)	9.11	Avg. Vel. (ft/s)	3.09	11.77	1.37
Max Chl Dpth (ft)	27.82	Hydr. Depth (ft)	5.70	23.51	6.17
Conv. Total (cfs)	2542240.0	Conv. (cfs)	119866.3	2369111.0	53263.0
Length Wtd. (ft)	541.87	Wetted Per. (ft)	169.20	220.65	158.45
Min Ch El (ft)	710.31	Shear (lb/sq ft)	0.22	0.87	0.23
Alpha	1.56	Stream Power (lb/ft s)	0.67	10.20	0.32
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	186.00	721.38	199.90
C & E Loss (ft)	0.03	Cum SA (acres)	43.18	33.31	148.93

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	742.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.21	Wt. n-Val.	0.038	0.025	0.081
W.S. Elev (ft)	740.02	Reach Len. (ft)	540.00	542.00	540.00
Crit W.S. (ft)	730.61	Flow Area (sq ft)	1296.98	5387.58	3702.01
E.G. Slope (ft/ft)	0.000632	Area (sq ft)	1296.98	5387.58	3702.01
Q Total (cfs)	75900.00	Flow (cfs)	4656.61	67779.47	3463.92
Top Width (ft)	1989.77	Top Width (ft)	185.38	212.13	1592.25
Vel Total (ft/s)	7.31	Avg. Vel. (ft/s)	3.59	12.58	0.94
Max Chl Dpth (ft)	29.71	Hydr. Depth (ft)	7.00	25.40	2.33
Conv. Total (cfs)	3017969.0	Conv. (cfs)	185158.1	2695077.0	137733.9
Length Wtd. (ft)	541.80	Wetted Per. (ft)	185.92	220.65	1594.67
Min Ch El (ft)	710.31	Shear (lb/sq ft)	0.28	0.96	0.09
Alpha	2.66	Stream Power (lb/ft s)	0.99	12.13	0.09
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	250.99	770.05	507.49
C & E Loss (ft)	0.03	Cum SA (acres)	44.76	33.31	225.52

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	734.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.34	Wt. n-Val.	0.038	0.025	0.090
W.S. Elev (ft)	733.51	Reach Len. (ft)	540.00	542.00	540.00
Crit W.S. (ft)	723.71	Flow Area (sq ft)	311.20	4006.45	326.63
E.G. Slope (ft/ft)	0.000521	Area (sq ft)	311.20	4006.45	326.63
Q Total (cfs)	38300.00	Flow (cfs)	524.61	37532.94	242.44
Top Width (ft)	448.58	Top Width (ft)	119.63	212.13	116.82
Vel Total (ft/s)	8.25	Avg. Vel. (ft/s)	1.69	9.37	0.74
Max Chl Dpth (ft)	23.20	Hydr. Depth (ft)	2.60	18.89	2.80
Conv. Total (cfs)	1678682.0	Conv. (cfs)	22993.8	1645062.0	10626.2
Length Wtd. (ft)	541.97	Wetted Per. (ft)	119.81	220.65	118.09
Min Ch El (ft)	710.31	Shear (lb/sq ft)	0.08	0.59	0.09
Alpha	1.27	Stream Power (lb/ft s)	0.14	5.53	0.07
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	40.45	591.13	64.99
C & E Loss (ft)	0.02	Cum SA (acres)	19.18	33.15	19.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 1.447

INPUT
Description: COE River Station= 60212.87
Preliminary Model River Station
(miles)=1.43

Obstructions: High ground upstream on right
floodplain.
(Sections 1.53 and 1.43)

Station Elevation Data num= 164

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	732	27.11	732	36.23	734	49.77	736	59.45	738
68.06	740	79.67	742	89.86	744	99.7	746	120.85	746
128.51	744	135.56	742	143.36	740	175.02	738	203.25	736
210.61	734	222	732	301.92	730	322.75	728	327.67	726
335.01	724	340.93	722	344.61	720	349.5	718	365.95	710.2
477.76	710.2	496.53	718	508.58	720	512.49	722	515.38	724
519.61	726	522.37	728	526.8	730	531.81	732	541.47	732
638.97	730	651.75	732	661.41	734	673.15	736	678.92	738
688.07	740	698.3	742	710.15	744	741.33	744	749.66	742
756.83	740	762.63	738	768.37	736	807.03	736	814.94	738
823.68	740	831.69	742	839.62	744	847.17	746	855.49	748
863.08	750	941.92	750	948.4	748	955.9	746	962.98	744
972.21	742	978.13	740	991.29	738	994.74	736	1000.61	734
1005.3	734	1016.41	736	1030.29	738	1047.07	740	1075.09	742
1180.41	744	1196.55	744	1252.96	742	1260.14	740	1272.46	738
1287.05	736	1298.19	734	1311.67	732	1438.55	730	1555.27	730
1575.92	730	1612.31	728	1624.13	728	1636.77	730	1645.63	732
1655.84	734	1668.03	736	1680.76	738	1710.12	738	1719.24	736
1727.95	734	1737.55	732	1749.19	730	1763.82	728	1779.82	728
1795.34	728	1820.01	728	1832.27	730	1843.39	732	1855.5	734
1863.24	736	1871.96	738	1896.75	738	2000	736	2098.69	730
2113.34	732	2148.78	732	2219.31	732	2244.7	734	2251.65	736
2261.83	738	2267.17	740	2273.32	742	2286.48	744	2347.86	744
2399.68	744	2449.88	746	2472.73	746	2483.45	746	2504.68	748
2525.91	748	2526.18	748	2534.61	750	2542.2	752	2545.31	754
2550.89	756	2556.47	758	2561.6	760	2569.55	762	2574.24	764
2578.73	766	2583.26	768	2589.19	770	2604.6	772	2633.49	772
2637.43	772	2638	774	2638.67	776	2640.12	778	2641.91	780
2643.14	782	2643.47	784	2643.86	786	2647.96	788	2649.19	790
2650.2	792	2651.38	794	2652.11	796	2652.64	798	2653.21	800
2655.39	802	2656.68	804	2663.86	806	2669.54	808	2674.96	810
2681.85	812	2684.3	814	2689.73	816	2698.61	818	2711.07	820
2731.04	822	2784.84	822	2791.76	820	2814.83	820		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.038	322.75	.025	531.81	.09	710.15	.07	2286.48	.13

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
322.75	531.81	870	810	770	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
2269	2537	750	F

Left Levee Station= 120.03 Elevation= 745.68

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
760	962	737.3	962	1190	745	1190	2260	737.3
1710	1870	738						

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	723.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.025	
W.S. Elev (ft)	723.22	Reach Len. (ft)	870.00	810.00	770.00
Crit W.S. (ft)	717.16	Flow Area (sq ft)		1867.86	
E.G. Slope (ft/ft)	0.000570	Area (sq ft)		1867.86	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	176.92	Top Width (ft)		176.92	
Vel Total (ft/s)	6.69	Avg. Vel. (ft/s)		6.69	
Max Chl Dpth (ft)	13.02	Hydr. Depth (ft)		10.56	
Conv. Total (cfs)	523619.0	Conv. (cfs)		523619.0	
Length Wtd. (ft)	810.00	Wetted Per. (ft)		182.36	
Min Ch El (ft)	710.20	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		2.44	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		277.09	
C & E Loss (ft)	0.05	Cum SA (acres)		25.78	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	727.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.025	
W.S. Elev (ft)	726.86	Reach Len. (ft)	870.00	810.00	770.00
Crit W.S. (ft)	719.47	Flow Area (sq ft)		2546.92	
E.G. Slope (ft/ft)	0.000566	Area (sq ft)		2546.92	
Q Total (cfs)	19500.00	Flow (cfs)		19500.00	
Top Width (ft)	195.25	Top Width (ft)		195.25	
Vel Total (ft/s)	7.66	Avg. Vel. (ft/s)		7.66	
Max Chl Dpth (ft)	16.66	Hydr. Depth (ft)		13.04	
Conv. Total (cfs)	819458.0	Conv. (cfs)		819458.0	
Length Wtd. (ft)	809.99	Wetted Per. (ft)		202.22	
Min Ch El (ft)	710.20	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		3.41	
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	1.08	375.10	2.43
C & E Loss (ft)	0.07	Cum SA (acres)	1.75	28.96	4.35

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	730.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.	0.038	0.025	
W.S. Elev (ft)	729.51	Reach Len. (ft)	870.00	810.00	770.00
Crit W.S. (ft)	721.39	Flow Area (sq ft)	11.87	3075.72	
E.G. Slope (ft/ft)	0.000594	Area (sq ft)	11.87	3075.72	
Q Total (cfs)	26600.00	Flow (cfs)	9.35	26590.65	
Top Width (ft)	218.69	Top Width (ft)	15.72	202.96	
Vel Total (ft/s)	8.62	Avg. Vel. (ft/s)	0.79	8.65	
Max Chl Dpth (ft)	19.31	Hydr. Depth (ft)	0.75	15.15	
Conv. Total (cfs)	1091755.0	Conv. (cfs)	383.7	1091372.0	
Length Wtd. (ft)	809.85	Wetted Per. (ft)	15.80	210.86	
Min Ch El (ft)	710.20	Shear (lb/sq ft)	0.03	0.54	
Alpha	1.01	Stream Power (lb/ft s)	0.02	4.67	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	8.52	446.90	18.42
C & E Loss (ft)	0.09	Cum SA (acres)	4.26	29.88	9.05

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	733.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.41	Wt. n-Val.	0.038	0.025	0.090
W.S. Elev (ft)	731.86	Reach Len. (ft)	870.00	810.00	770.00
Crit W.S. (ft)	723.17	Flow Area (sq ft)	128.86	3559.71	95.56
E.G. Slope (ft/ft)	0.000620	Area (sq ft)	128.86	3559.71	95.56
Q Total (cfs)	34200.00	Flow (cfs)	153.40	34009.18	37.42
Top Width (ft)	406.60	Top Width (ft)	95.23	208.71	102.66
Vel Total (ft/s)	9.04	Avg. Vel. (ft/s)	1.19	9.55	0.39
Max Chl Dpth (ft)	21.66	Hydr. Depth (ft)	1.35	17.06	0.93
Conv. Total (cfs)	1373327.0	Conv. (cfs)	6159.8	1365664.0	1502.6
Length Wtd. (ft)	809.85	Wetted Per. (ft)	95.34	217.07	102.82
Min Ch El (ft)	710.20	Shear (lb/sq ft)	0.05	0.63	0.04
Alpha	1.11	Stream Power (lb/ft s)	0.06	6.07	0.01
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	24.35	510.95	44.15
C & E Loss (ft)	0.12	Cum SA (acres)	10.64	30.37	14.27

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	736.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.	0.038	0.025	0.090
W.S. Elev (ft)	734.57	Reach Len. (ft)	870.00	810.00	770.00

```
* Crit W.S. (ft)         *  725.59  * Flow Area (sq ft)      *  420.06  * 4126.30  *  434.92  *
* E.G. Slope (ft/ft)     *0.000639  * Area (sq ft)           *  420.06  * 4126.30  *  434.92  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  987.13  *44113.69  *  399.19  *
* Top Width (ft)         *  456.26  * Top Width (ft)         *  114.25  *  209.06  *  132.96  *
* Vel Total (ft/s)       *    9.13  * Avg. Vel. (ft/s)       *    2.35  *   10.69  *    0.92  *
* Max Chl Dpth (ft)      *   24.37  * Hydr. Depth (ft)       *    3.68  *   19.74  *    3.27  *
* Conv. Total (cfs)      *1799686.0  * Conv. (cfs)           * 39044.3  *1744852.0  * 15789.3  *
* Length Wtd. (ft)       *  810.45  * Wetted Per. (ft)       *  114.62  *  217.44  *  133.39  *
* Min Ch El (ft)         *  710.20  * Shear (lb/sq ft)       *    0.15  *    0.76  *    0.13  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *    0.34  *    8.10  *    0.12  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *   71.73  *  586.94  *   93.52  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *   36.62  *   30.61  *   22.74  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         *  738.05  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.04  * Wt. n-Val.             *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  736.01  * Reach Len. (ft)        *  870.00  *  810.00  *  770.00  *
* Crit W.S. (ft)         *  727.26  * Flow Area (sq ft)      *  587.90  * 4426.50  *  631.89  *
* E.G. Slope (ft/ft)     *0.000700  * Area (sq ft)           *  587.90  * 4426.50  *  631.89  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1752.86  *51900.04  *  747.11  *
* Top Width (ft)         *  470.04  * Top Width (ft)         *  119.61  *  209.06  *  141.36  *
* Vel Total (ft/s)       *    9.63  * Avg. Vel. (ft/s)       *    2.98  *   11.72  *    1.18  *
* Max Chl Dpth (ft)      *   25.81  * Hydr. Depth (ft)       *    4.91  *   21.17  *    4.47  *
* Conv. Total (cfs)      *2055992.0  * Conv. (cfs)           * 66247.5  *1961508.0  * 28236.1  *
* Length Wtd. (ft)       *  810.87  * Wetted Per. (ft)       *  120.18  *  217.44  *  141.91  *
* Min Ch El (ft)         *  710.20  * Shear (lb/sq ft)       *    0.21  *    0.89  *    0.19  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *    0.64  *   10.43  *    0.23  *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)   *  126.39  *  625.38  *  123.02  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   40.31  *   30.66  *   46.74  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
**********************************************************************************************
* E.G. Elev (ft)         *  739.75  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.30  * Wt. n-Val.             *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  737.45  * Reach Len. (ft)        *  870.00  *  810.00  *  770.00  *
* Crit W.S. (ft)         *  728.76  * Flow Area (sq ft)      *  775.09  * 4728.02  *  955.60  *
* E.G. Slope (ft/ft)     *0.000732  * Area (sq ft)           *  775.09  * 4728.02  *  955.60  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 2558.82  *59222.38  * 1218.81  *
* Top Width (ft)         * 1277.80  * Top Width (ft)         *  139.97  *  209.06  *  928.77  *
* Vel Total (ft/s)       *    9.75  * Avg. Vel. (ft/s)       *    3.30  *   12.53  *    1.28  *
* Max Chl Dpth (ft)      *   27.25  * Hydr. Depth (ft)       *    5.54  *   22.62  *    1.03  *
* Conv. Total (cfs)      *2328857.0  * Conv. (cfs)           * 94589.1  *2189213.0  * 45054.3  *
* Length Wtd. (ft)       *  811.23  * Wetted Per. (ft)       *  140.58  *  217.44  *  929.65  *
* Min Ch El (ft)         *  710.20  * Shear (lb/sq ft)       *    0.25  *    0.99  *    0.05  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.83  *   12.44  *    0.06  *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *  175.23  *  660.94  *  187.99  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *   41.26  *   30.69  *  142.20  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  741.82  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.53  * Wt. n-Val.             *   0.038  *   0.025  *   0.081  *
* W.S. Elev (ft)         *  739.29  * Reach Len. (ft)        *  870.00  *  810.00  *  770.00  *
* Crit W.S. (ft)         *  731.15  * Flow Area (sq ft)      * 1057.75  * 5112.42  * 3028.26  *
* E.G. Slope (ft/ft)     *0.000754  * Area (sq ft)           * 1057.75  * 5112.42  * 3028.26  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 3861.36  *68500.10  * 3538.53  *
* Top Width (ft)         * 1592.64  * Top Width (ft)         *  168.13  *  209.06  * 1215.44  *
* Vel Total (ft/s)       *    8.25  * Avg. Vel. (ft/s)       *    3.65  *   13.40  *    1.17  *
```

```
* Max Chl Dpth (ft)      *   29.09  * Hydr. Depth (ft)       *    6.29  *   24.45  *    2.49  *
* Conv. Total (cfs)      *2763240.0  * Conv. (cfs)            *140578.0  *2493837.0  *128824.9  *
* Length Wtd. (ft)       *  810.85  * Wetted Per. (ft)       *  168.81  *  217.44  * 1218.05  *
* Min Ch El (ft)         *  710.20  * Shear (lb/sq ft)       *    0.30  *    1.11  *    0.12  *
* Alpha                  *    2.39  * Stream Power (lb/ft s) *    1.08  *   14.84  *    0.14  *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   *  236.39  *  704.73  *  465.77  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *   42.57  *   30.69  *  208.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  734.52  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.51  * Wt. n-Val.             *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  733.01  * Reach Len. (ft)        *  870.00  *  810.00  *  770.00  *
* Crit W.S. (ft)         *  724.07  * Flow Area (sq ft)      *  246.87  * 3799.33  *  233.64  *
* E.G. Slope (ft/ft)     *0.000616  * Area (sq ft)           *  246.87  * 3799.33  *  233.64  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  419.07  *37735.73  *  145.19  *
* Top Width (ft)         *  440.36  * Top Width (ft)         *  106.49  *  209.06  *  124.81  *
* Vel Total (ft/s)       *    8.95  * Avg. Vel. (ft/s)       *    1.70  *    9.93  *    0.62  *
* Max Chl Dpth (ft)      *   22.81  * Hydr. Depth (ft)       *    2.32  *   18.17  *    1.87  *
* Conv. Total (cfs)      *1543289.0  * Conv. (cfs)            * 16886.4  *1520552.0  *  5850.4  *
* Length Wtd. (ft)       *  810.05  * Wetted Per. (ft)       *  106.70  *  217.44  *  125.09  *
* Min Ch El (ft)         *  710.20  * Shear (lb/sq ft)       *    0.09  *    0.67  *    0.07  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.15  *    6.67  *    0.04  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *   36.99  *  542.57  *   61.51  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   17.78  *   30.53  *   18.42  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 1.293

INPUT
Description: COE River Station= 61023.15
Preliminary Model River Station
             (miles)=1.28

Obstructions: High ground upstream on right
             floodplain.
Station Elevation Data    num=     162
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0     732   18.89     734   30.51     736    42.3     738   54.03     740
   62.21     742   69.08     744   77.12     746  100.24     746  107.04     744
  117.03     742  122.83     740  130.69     738  139.61     736  148.47     734
  170.91     732  280.55     730  283.55     728  286.64     726  289.71     724
  294.52     722  298.26     720   304.5     718  320.98     710  453.49     710
  474.75     718  483.91     720  492.31     722  502.99     724  511.74     726
   539.9     726  590.66     726  604.56     728  618.97     730  632.58     732
  641.56     734  646.65     736  648.38     738  653.16     740  659.23     742
  670.01     744  674.94     744  710.15     742  717.03     740  721.48     738
  727.18     736  732.64     734  770.84     734  779.84     736     787     738
   796.1     740  805.19     742  812.73     744  820.72     746  829.86     748
  893.27     750  995.22     750  1056.7     750 1066.93     752 1076.68     754
 1101.58     754  1109.1     752 1121.53     750 1133.74     748 1144.45     746
 1162.68     746 1205.34     746 1217.31     744 1230.99     742 1242.85     740
 1254.37     738 1267.19     736 1278.09     734 1291.99     732 1327.43     730
 1345.13     728 1372.69     728 1397.87     730 1414.68     732 1452.33     734
  1492.4     734 1509.56     734 1525.28     736 1544.61     738 1557.47     738
 1572.43     736 1585.72     734 1598.39     732 1609.01     730 1637.77     728
 1669.45     728  1693.2     728  1799.9     728 2098.16     730 2110.95     732
  2139.8     732 2176.73     730 2188.92     732 2200.94     734 2258.85     734
 2286.39     734 2298.43     736 2306.93     738 2317.47     740 2330.25     742
 2345.47     744 2383.21     744  2386.8     744 2394.45     744 2445.65     744
 2457.01     744 2464.57     744 2465.58     746 2468.46     748  2473.5     750
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 2474.15     750 2478.69     748 2481.79     746 2483.04     746 2484.56     748
 2485.18     750 2486.73     752 2489.04     754 2490.07     756 2491.73     758
 2493.63     760 2495.45     762 2497.41     764  2503.1     766 2511.54     768
 2527.47     770 2546.32     770 2555.91     768 2561.06     768 2564.37     770
 2567.38     772    2571     774 2572.46     776 2576.29     778 2579.56     780
 2583.01     782 2585.84     784 2588.31     786 2589.94     788 2592.08     790
 2594.59     792 2597.27     794 2599.93     796 2602.73     798 2607.94     800
 2613.22     802 2616.04     804 2623.72     806  2626.8     806 2633.65     804
 2642.36     802 2657.47     802 2710.71     804  2725.1     806 2736.47     808
  2760.9     812 2773.63     814

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .038  280.55    .025  511.74     .09  674.94     .07 2345.47     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        280.55  511.74              717     803     878             .1       .3
Left Levee      Station=  101.26      Elevation=  745.85
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     722 2773.63   737.3

CROSS SECTION OUTPUT  Profile #2-yr
*******************************************************************************************
* E.G. Elev (ft)         *  723.46  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  722.93  * Reach Len. (ft)        *  717.00  *  803.00  *  878.00  *
* Crit W.S. (ft)         *  716.25  * Flow Area (sq ft)      *          * 2137.26  *          *
* E.G. Slope (ft/ft)     *0.000438  * Area (sq ft)           *          * 2137.26  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  204.98  * Top Width (ft)         *          *  204.98  *          *
* Vel Total (ft/s)       *    5.85  * Avg. Vel. (ft/s)       *          *    5.85  *          *
* Max Chl Dpth (ft)      *   12.93  * Hydr. Depth (ft)       *          *   10.43  *          *
* Conv. Total (cfs)      *596948.0  * Conv. (cfs)            *          *596948.0  *          *
* Length Wtd. (ft)       *  803.00  * Wetted Per. (ft)       *          *  209.81  *          *
* Min Ch El (ft)         *  710.00  * Shear (lb/sq ft)       *          *    0.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.63  *          *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *          *  239.85  *          *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *          *   22.23  *          *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*******************************************************************************************
* E.G. Elev (ft)         *  727.31  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.025  *   0.090  *
* W.S. Elev (ft)         *  726.63  * Reach Len. (ft)        *  717.00  *  803.00  *  878.00  *
* Crit W.S. (ft)         *  718.34  * Flow Area (sq ft)      *          * 2941.54  *   50.95  *
* E.G. Slope (ft/ft)     *0.000421  * Area (sq ft)           *          * 2941.54  *   50.95  *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19487.57  *   12.43  *
* Top Width (ft)         *  309.36  * Top Width (ft)         *          *  226.07  *   83.29  *
* Vel Total (ft/s)       *    6.52  * Avg. Vel. (ft/s)       *          *    6.62  *    0.24  *
* Max Chl Dpth (ft)      *   16.63  * Hydr. Depth (ft)       *          *   13.01  *    0.61  *
* Conv. Total (cfs)      *950655.7  * Conv. (cfs)            *          *950049.8  *   605.9  *
* Length Wtd. (ft)       *  803.03  * Wetted Per. (ft)       *          *  232.22  *   83.33  *
* Min Ch El (ft)         *  710.00  * Shear (lb/sq ft)       *          *    0.33  *    0.02  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *          *    2.20  *    0.00  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *    1.08  *  324.07  *    1.98  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    1.75  *   25.05  *    3.61  *
*******************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*******************************************************************************************
* E.G. Elev (ft)         *  730.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.85  * Wt. n-Val.             *          *   0.025  *   0.090  *
* W.S. Elev (ft)         *  729.33  * Reach Len. (ft)        *  717.00  *  803.00  *  878.00  *
* Crit W.S. (ft)         *  720.18  * Flow Area (sq ft)      *          * 3557.10  *  301.19  *
* E.G. Slope (ft/ft)     *0.000421  * Area (sq ft)           *          * 3557.10  *  301.19  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26390.79  *  209.21  *
```

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* Top Width (ft)          *  332.56  * Top Width (ft)          *           *  230.18  *  102.38  *
* Vel Total (ft/s)        *    6.89  * Avg. Vel. (ft/s)        *           *    7.42  *    0.69  *
* Max Chl Dpth (ft)       *   19.33  * Hydr. Depth (ft)        *           *   15.45  *    2.94  *
* Conv. Total (cfs)       *1296126.0  * Conv. (cfs)            *           *1285931.0  * 10194.3  *
* Length Wtd. (ft)        *  803.49  * Wetted Per. (ft)        *           *  237.14  *  102.61  *
* Min Ch El (ft)          *  710.00  * Shear (lb/sq ft)        *           *    0.39  *    0.08  *
* Alpha                   *    1.15  * Stream Power (lb/ft s) *           *    2.93  *    0.05  *
* Frctn Loss (ft)         *    0.29  * Cum Volume (acre-ft)    *    8.40  *  385.23  *   15.75  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    4.10  *   25.86  *    8.14  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  732.74  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.02  * Wt. n-Val.              *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)          *  731.72  * Reach Len. (ft)        *  717.00  *  803.00  *  878.00  *
* Crit W.S. (ft)          *  721.90  * Flow Area (sq ft)      *   81.42  * 4110.94  *  566.70  *
* E.G. Slope (ft/ft)      *0.000424  * Area (sq ft)           *   81.42  * 4110.94  *  566.70  *
* Q Total (cfs)           *34200.00  * Flow (cfs)             *   59.37  *33596.25  *  544.38  *
* Top Width (ft)          *  444.63  * Top Width (ft)          *   94.48  *  231.19  *  118.96  *
* Vel Total (ft/s)        *    7.19  * Avg. Vel. (ft/s)        *    0.73  *    8.17  *    0.96  *
* Max Chl Dpth (ft)       *   21.72  * Hydr. Depth (ft)        *    0.86  *   17.78  *    4.76  *
* Conv. Total (cfs)       *1660415.0  * Conv. (cfs)            *  2882.6  *1631102.0  * 26429.7  *
* Length Wtd. (ft)        *  803.85  * Wetted Per. (ft)        *   94.50  *  238.35  *  119.37  *
* Min Ch El (ft)          *  710.00  * Shear (lb/sq ft)        *    0.02  *    0.46  *    0.13  *
* Alpha                   *    1.27  * Stream Power (lb/ft s) *    0.02  *    3.73  *    0.12  *
* Frctn Loss (ft)         *    0.31  * Cum Volume (acre-ft)    *   22.25  *  439.63  *   38.30  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    8.75  *   26.28  *   12.31  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  735.73  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.26  * Wt. n-Val.              *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)          *  734.47  * Reach Len. (ft)        *  717.00  *  803.00  *  878.00  *
* Crit W.S. (ft)          *  724.16  * Flow Area (sq ft)      *  413.68  * 4745.49  *  911.57  *
* E.G. Slope (ft/ft)      *0.000443  * Area (sq ft)           *  413.68  * 4745.49  *  911.57  *
* Q Total (cfs)           *45500.00  * Flow (cfs)             *  721.03  *43628.26  * 1150.71  *
* Top Width (ft)          *  496.36  * Top Width (ft)          *  134.15  *  231.19  *  131.01  *
* Vel Total (ft/s)        *    7.49  * Avg. Vel. (ft/s)        *    1.74  *    9.19  *    1.26  *
* Max Chl Dpth (ft)       *   24.47  * Hydr. Depth (ft)        *    3.08  *   20.53  *    6.96  *
* Conv. Total (cfs)       *2160845.0  * Conv. (cfs)            * 34242.7  *2071954.0  * 54648.3  *
* Length Wtd. (ft)        *  803.68  * Wetted Per. (ft)        *  134.31  *  238.35  *  131.75  *
* Min Ch El (ft)          *  710.00  * Shear (lb/sq ft)        *    0.09  *    0.55  *    0.19  *
* Alpha                   *    1.44  * Stream Power (lb/ft s) *    0.15  *    5.07  *    0.24  *
* Frctn Loss (ft)         *    0.34  * Cum Volume (acre-ft)    *   63.40  *  504.45  *   81.62  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   34.14  *   26.52  *   20.41  *
*****************************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)          *  737.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.50  * Wt. n-Val.              *   0.038  *   0.025  *   0.090  *
* W.S. Elev (ft)          *  735.91  * Reach Len. (ft)        *  717.00  *  803.00  *  878.00  *
* Crit W.S. (ft)          *  725.75  * Flow Area (sq ft)      *  612.39  * 5079.94  * 1103.76  *
* E.G. Slope (ft/ft)      *0.000490  * Area (sq ft)           *  612.39  * 5079.94  * 1103.76  *
* Q Total (cfs)           *54400.00  * Flow (cfs)             * 1411.28  *51357.86  * 1630.86  *
* Top Width (ft)          *  506.45  * Top Width (ft)          *  140.56  *  231.19  *  134.69  *
* Vel Total (ft/s)        *    8.00  * Avg. Vel. (ft/s)        *    2.30  *   10.11  *    1.48  *
* Max Chl Dpth (ft)       *   25.91  * Hydr. Depth (ft)        *    4.36  *   21.97  *    8.19  *
* Conv. Total (cfs)       *2458489.0  * Conv. (cfs)            * 63779.7  *2321007.0  * 73703.2  *
* Length Wtd. (ft)        *  803.36  * Wetted Per. (ft)        *  140.88  *  238.35  *  135.70  *
* Min Ch El (ft)          *  710.00  * Shear (lb/sq ft)        *    0.13  *    0.65  *    0.25  *
* Alpha                   *    1.51  * Stream Power (lb/ft s) *    0.31  *    6.59  *    0.37  *
* Frctn Loss (ft)         *    0.39  * Cum Volume (acre-ft)    *  114.40  *  537.00  *  107.68  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *   37.71  *   26.57  *   44.30  *
*****************************************************************************************************
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	739.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.69	Wt. n-Val.	0.038	0.025	0.090
W.S. Elev (ft)	737.38	Reach Len. (ft)	717.00	803.00	878.00
Crit W.S. (ft)	727.24	Flow Area (sq ft)	823.82	5419.77	1394.61
E.G. Slope (ft/ft)	0.000512	Area (sq ft)	823.82	5419.77	1394.61
Q Total (cfs)	63000.00	Flow (cfs)	2294.19	58519.98	2185.83
Top Width (ft)	1598.57	Top Width (ft)	147.12	231.19	1220.26
Vel Total (ft/s)	8.25	Avg. Vel. (ft/s)	2.78	10.80	1.57
Max Chl Dpth (ft)	27.38	Hydr. Depth (ft)	5.60	23.44	1.14
Conv. Total (cfs)	2783447.0	Conv. (cfs)	101361.4	2585512.0	96573.7
Length Wtd. (ft)	803.00	Wetted Per. (ft)	147.60	238.35	1221.98
Min Ch El (ft)	710.00	Shear (lb/sq ft)	0.18	0.73	0.04
Alpha	1.60	Stream Power (lb/ft s)	0.50	7.85	0.06
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	159.26	566.59	167.22
C & E Loss (ft)	0.04	Cum SA (acres)	38.40	26.59	123.21

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	741.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.86	Wt. n-Val.	0.038	0.025	0.083
W.S. Elev (ft)	739.25	Reach Len. (ft)	717.00	803.00	878.00
Crit W.S. (ft)	729.09	Flow Area (sq ft)	1104.94	5850.06	3731.02
E.G. Slope (ft/ft)	0.000531	Area (sq ft)	1104.94	5850.06	3731.02
Q Total (cfs)	75900.00	Flow (cfs)	3679.79	67656.78	4563.43
Top Width (ft)	1665.83	Top Width (ft)	154.76	231.19	1279.88
Vel Total (ft/s)	7.10	Avg. Vel. (ft/s)	3.33	11.57	1.22
Max Chl Dpth (ft)	29.25	Hydr. Depth (ft)	7.14	25.30	2.92
Conv. Total (cfs)	3294402.0	Conv. (cfs)	159719.4	2936609.0	198073.4
Length Wtd. (ft)	804.07	Wetted Per. (ft)	155.46	238.35	1283.13
Min Ch El (ft)	710.00	Shear (lb/sq ft)	0.24	0.81	0.10
Alpha	2.38	Stream Power (lb/ft s)	0.78	9.41	0.12
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	214.80	602.81	406.03
C & E Loss (ft)	0.05	Cum SA (acres)	39.35	26.59	186.06

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	733.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.038	0.025	0.090
W.S. Elev (ft)	732.89	Reach Len. (ft)	717.00	803.00	878.00
Crit W.S. (ft)	722.76	Flow Area (sq ft)	211.40	4380.14	708.91
E.G. Slope (ft/ft)	0.000423	Area (sq ft)	211.40	4380.14	708.91
Q Total (cfs)	38300.00	Flow (cfs)	248.47	37287.42	764.12
Top Width (ft)	475.62	Top Width (ft)	119.60	231.19	124.83
Vel Total (ft/s)	7.23	Avg. Vel. (ft/s)	1.18	8.51	1.08
Max Chl Dpth (ft)	22.89	Hydr. Depth (ft)	1.77	18.95	5.68
Conv. Total (cfs)	1862205.0	Conv. (cfs)	12080.8	1812972.0	37152.5
Length Wtd. (ft)	803.85	Wetted Per. (ft)	119.66	238.35	125.35
Min Ch El (ft)	710.00	Shear (lb/sq ft)	0.05	0.49	0.15
Alpha	1.35	Stream Power (lb/ft s)	0.05	4.13	0.16
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	32.42	466.52	53.18
C & E Loss (ft)	0.01	Cum SA (acres)	15.52	26.44	16.22

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 1.141

INPUT
Description: COE River Station=61827.29
Preliminary Model River Station
(miles)=1.12

FEMA XSEC A. Obstructions: High ground upstream
on right floodplain. (Sections 1.53 and 1.43). Underwater channel
based on MO River soundings.
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	732	11.95	734	29.12	736	55.01	738	64.03	740
72.74	742	83.9	744	90.53	746	115.53	746	123.03	744
130.04	742	139	740	144.36	738	150.66	736	161.88	734
221.14	732	246.47	730	288.1	728	331.5	726	332.87	724
335.81	722	338.41	720	344.3	718	351.58	716	383.26	705.44
470.83	705.44	502.51	716	511.3	718	513.22	720	515.45	722
518.43	724	520.96	726	526.58	726	607.35	726	635.12	728
641.98	730	647.36	732	653.32	734	655.03	736	660	738
663.43	740	668.07	742	703.83	744	710.53	744	715.89	742
721.32	740	724.2	738	730.74	736	733.7	734	741.47	732
877.9	732	904.82	732	976.35	732	1017.01	732	1081.5	732
1108.51	732	1184.89	732	1204.01	732	1248.14	730	1279.55	730
1321.85	730	1323.14	730	1404.87	730	1419.74	728	1847.85	728
1880.85	730	1892.88	732	1906.43	734	1921.05	736	1954.07	738
1980.23	738	1988.18	736	1996.25	734	2004.36	732	2012.38	730
2021.07	728	2037.51	726	2038.24	726	2042.72	728	2046.94	730
2053.99	732	2060.07	734	2065.62	736	2081.82	738	2092.52	738
2107.51	736	2113.42	734	2119.88	732	2122.26	732	2128.14	734
2134.08	736	2141.59	738	2146.44	740	2151.31	742	2154.28	744
2156.84	746	2159.87	748	2163	750	2166.28	752	2169.11	754
2172.91	756	2202.59	756	2206.71	754	2210.63	752	2214.44	750
2218.6	748	2222.07	746	2225.33	744	2229.5	742	2233.08	740
2236.58	738	2307.66	736	2361.74	736	2364.23	738	2368.23	740
2379.56	742	2404.31	744	2410.07	744	2422.07	742	2427.07	740
2435.07	740	2443.04	742	2485.95	742	2557.85	742	2596.48	744
2634.42	744								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.083	331.5	.025	520.96	.09	703.83	.07	1980.23	.05
2081.82	.13								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
331.5	520.96	565	626	735	.1	.3

Left Levee Station= 109.87 Elevation= 746.22
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
723	2200	736.6	2200	2630	756

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	723.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.025	
W.S. Elev (ft)	722.74	Reach Len. (ft)	565.00	626.00	735.00
Crit W.S. (ft)	713.27	Flow Area (sq ft)		2407.67	
E.G. Slope (ft/ft)	0.000256	Area (sq ft)		2407.67	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	181.84	Top Width (ft)		181.84	
Vel Total (ft/s)	5.19	Avg. Vel. (ft/s)		5.19	
Max Chl Dpth (ft)	17.30	Hydr. Depth (ft)		13.24	
Conv. Total (cfs)	780996.5	Conv. (cfs)		780996.5	
Length Wtd. (ft)	626.00	Wetted Per. (ft)		188.84	
Min Ch El (ft)	705.44	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		1.06	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		197.96	
C & E Loss (ft)	0.02	Cum SA (acres)		18.67	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	727.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	726.39	Reach Len. (ft)	565.00	626.00	735.00
Crit W.S. (ft)	715.65	Flow Area (sq ft)	1.68	3088.16	35.03
E.G. Slope (ft/ft)	0.000291	Area (sq ft)	1.68	3088.16	35.03
Q Total (cfs)	19500.00	Flow (cfs)	0.17	19494.63	5.19
Top Width (ft)	289.84	Top Width (ft)	8.53	189.46	91.85
Vel Total (ft/s)	6.24	Avg. Vel. (ft/s)	0.10	6.31	0.15
Max Chl Dpth (ft)	20.95	Hydr. Depth (ft)	0.20	16.30	0.38
Conv. Total (cfs)	1142340.0	Conv. (cfs)	10.1	1142026.0	304.1
Length Wtd. (ft)	626.01	Wetted Per. (ft)	8.54	198.98	91.86
Min Ch El (ft)	705.44	Shear (lb/sq ft)	0.00	0.28	0.01
Alpha	1.02	Stream Power (lb/ft s)	0.00	1.78	0.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	1.07	268.50	1.11
C & E Loss (ft)	0.03	Cum SA (acres)	1.68	21.22	1.85

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	729.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	729.04	Reach Len. (ft)	565.00	626.00	735.00
Crit W.S. (ft)	717.76	Flow Area (sq ft)	100.04	3590.36	321.57
E.G. Slope (ft/ft)	0.000323	Area (sq ft)	100.04	3590.36	321.57
Q Total (cfs)	26600.00	Flow (cfs)	42.80	26371.09	186.12
Top Width (ft)	372.33	Top Width (ft)	65.13	189.46	117.74
Vel Total (ft/s)	6.63	Avg. Vel. (ft/s)	0.43	7.34	0.58
Max Chl Dpth (ft)	23.60	Hydr. Depth (ft)	1.54	18.95	2.73
Conv. Total (cfs)	1480790.0	Conv. (cfs)	2382.5	1468046.0	10360.9
Length Wtd. (ft)	626.33	Wetted Per. (ft)	65.20	198.98	117.96
Min Ch El (ft)	705.44	Shear (lb/sq ft)	0.03	0.36	0.05
Alpha	1.22	Stream Power (lb/ft s)	0.01	2.67	0.03
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	7.58	319.35	9.48
C & E Loss (ft)	0.04	Cum SA (acres)	3.57	21.99	5.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #20-yr

E.G. Elev (ft)	732.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	731.38	Reach Len. (ft)	565.00	626.00	735.00
Crit W.S. (ft)	719.60	Flow Area (sq ft)	301.71	4033.86	605.88
E.G. Slope (ft/ft)	0.000352	Area (sq ft)	301.71	4033.86	605.88
Q Total (cfs)	34200.00	Flow (cfs)	207.92	33455.38	536.70
Top Width (ft)	416.77	Top Width (ft)	102.57	189.46	124.74
Vel Total (ft/s)	6.92	Avg. Vel. (ft/s)	0.69	8.29	0.89
Max Chl Dpth (ft)	25.94	Hydr. Depth (ft)	2.94	21.29	4.86
Conv. Total (cfs)	1822238.0	Conv. (cfs)	11078.2	1782563.0	28596.2
Length Wtd. (ft)	626.77	Wetted Per. (ft)	102.72	198.98	125.35
Min Ch El (ft)	705.44	Shear (lb/sq ft)	0.06	0.45	0.11
Alpha	1.41	Stream Power (lb/ft s)	0.04	3.70	0.09
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	19.10	364.56	26.48
C & E Loss (ft)	0.05	Cum SA (acres)	7.13	22.41	9.85

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	735.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	733.97	Reach Len. (ft)	565.00	626.00	735.00
Crit W.S. (ft)	721.92	Flow Area (sq ft)	642.25	4523.83	938.04

```
* E.G. Slope (ft/ft)     *0.000412  * Area (sq ft)           *  642.25  * 4523.83  *  938.04  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  568.17  *43778.08  * 1153.75  *
* Top Width (ft)         *  490.49  * Top Width (ft)         *  168.75  *  189.46  *  132.27  *
* Vel Total (ft/s)       *    7.45  * Avg. Vel. (ft/s)       *    0.88  *    9.68  *    1.23  *
* Max Chl Dpth (ft)      *   28.53  * Hydr. Depth (ft)       *    3.81  *   23.88  *    7.09  *
* Conv. Total (cfs)      *2242719.0  * Conv. (cfs)            * 28005.2  *2157844.0  * 56869.1  *
* Length Wtd. (ft)       *  627.39  * Wetted Per. (ft)       *  168.96  *  198.98  *  133.31  *
* Min Ch El (ft)         *  705.44  * Shear (lb/sq ft)       *    0.10  *    0.58  *    0.18  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *    0.09  *    5.65  *    0.22  *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *   54.71  *  419.02  *   62.98  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   31.65  *   22.64  *   17.76  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  737.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.75  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  735.25  * Reach Len. (ft)        *  565.00  *  626.00  *  735.00  *
* Crit W.S. (ft)         *  723.62  * Flow Area (sq ft)      *  864.28  * 4766.91  * 1108.53  *
* E.G. Slope (ft/ft)     *0.000484  * Area (sq ft)           *  864.28  * 4766.91  * 1108.53  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  979.53  *51782.62  * 1637.86  *
* Top Width (ft)         *  499.55  * Top Width (ft)         *  176.65  *  189.46  *  133.43  *
* Vel Total (ft/s)       *    8.07  * Avg. Vel. (ft/s)       *    1.13  *   10.86  *    1.48  *
* Max Chl Dpth (ft)      *   29.81  * Hydr. Depth (ft)       *    4.89  *   25.16  *    8.31  *
* Conv. Total (cfs)      *2473544.0  * Conv. (cfs)            * 44538.6  *2354533.0  * 74472.6  *
* Length Wtd. (ft)       *  627.60  * Wetted Per. (ft)       *  176.97  *  198.98  *  135.05  *
* Min Ch El (ft)         *  705.44  * Shear (lb/sq ft)       *    0.15  *    0.72  *    0.25  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *    0.17  *    7.86  *    0.37  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   *  102.25  *  446.24  *   85.38  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   35.10  *   22.69  *   41.60  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  738.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.05  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  736.57  * Reach Len. (ft)        *  565.00  *  626.00  *  735.00  *
* Crit W.S. (ft)         *  725.15  * Flow Area (sq ft)      * 1101.13  * 5016.16  * 1285.07  *
* E.G. Slope (ft/ft)     *0.000535  * Area (sq ft)           * 1101.13  * 5016.16  * 1285.07  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             * 1508.49  *59313.81  * 2177.70  *
* Top Width (ft)         *  507.58  * Top Width (ft)         *  182.63  *  189.46  *  135.48  *
* Vel Total (ft/s)       *    8.51  * Avg. Vel. (ft/s)       *    1.37  *   11.82  *    1.69  *
* Max Chl Dpth (ft)      *   31.13  * Hydr. Depth (ft)       *    6.03  *   26.48  *    9.49  *
* Conv. Total (cfs)      *2722572.0  * Conv. (cfs)            * 65190.0  *2563272.0  * 94110.3  *
* Length Wtd. (ft)       *  627.80  * Wetted Per. (ft)       *  183.11  *  198.98  *  137.56  *
* Min Ch El (ft)         *  705.44  * Shear (lb/sq ft)       *    0.20  *    0.84  *    0.31  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *    0.28  *    9.96  *    0.53  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *  143.42  *  470.40  *  140.21  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   35.68  *   22.72  *  109.55  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
*****************************************************************************************
* E.G. Elev (ft)         *  740.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.37  * Wt. n-Val.             *   0.083  *   0.025  *   0.083  *
* W.S. Elev (ft)         *  738.23  * Reach Len. (ft)        *  565.00  *  626.00  *  735.00  *
* Crit W.S. (ft)         *  727.57  * Flow Area (sq ft)      * 1409.59  * 5331.63  * 3737.02  *
* E.G. Slope (ft/ft)     *0.000592  * Area (sq ft)           * 1409.59  * 5331.63  * 3737.02  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 2347.59  *69030.71  * 4521.70  *
* Top Width (ft)         * 1934.97  * Top Width (ft)         *  187.77  *  189.46  * 1557.74  *
* Vel Total (ft/s)       *    7.24  * Avg. Vel. (ft/s)       *    1.67  *   12.95  *    1.21  *
```

```
* Max Chl Dpth (ft)      *   32.79  * Hydr. Depth (ft)       *    7.51  *   28.14  *    2.40  *
* Conv. Total (cfs)      *3119907.0  * Conv. (cfs)            * 96499.0  *2837542.0  *185866.6  *
* Length Wtd. (ft)       *  630.14  * Wetted Per. (ft)       *  188.50  *  198.98  * 1561.06  *
* Min Ch El (ft)         *  705.44  * Shear (lb/sq ft)       *    0.28  *    0.99  *    0.09  *
* Alpha                  *    2.91  * Stream Power (lb/ft s) *    0.46  *   12.82  *    0.11  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *  194.10  *  499.74  *  330.77  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *   36.53  *   22.72  *  157.47  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
*****************************************************************************************
* E.G. Elev (ft)         *  733.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  732.50  * Reach Len. (ft)        *  565.00  *  626.00  *  735.00  *
* Crit W.S. (ft)         *  720.47  * Flow Area (sq ft)      *  426.37  * 4245.59  *  747.00  *
* E.G. Slope (ft/ft)     *0.000367  * Area (sq ft)           *  426.37  * 4245.59  *  747.00  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  330.77  *37205.79  *  763.45  *
* Top Width (ft)         *  442.59  * Top Width (ft)         *  125.24  *  189.46  *  127.90  *
* Vel Total (ft/s)       *    7.07  * Avg. Vel. (ft/s)       *    0.78  *    8.76  *    1.02  *
* Max Chl Dpth (ft)      *   27.06  * Hydr. Depth (ft)       *    3.40  *   22.41  *    5.84  *
* Conv. Total (cfs)      *1998299.0  * Conv. (cfs)            * 17257.8  *1941208.0  * 39832.7  *
* Length Wtd. (ft)       *  627.05  * Wetted Per. (ft)       *  125.42  *  198.98  *  128.70  *
* Min Ch El (ft)         *  705.44  * Shear (lb/sq ft)       *    0.08  *    0.49  *    0.13  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *    0.06  *    4.29  *    0.14  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *   27.17  *  387.02  *   38.51  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   13.51  *   22.56  *   13.67  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 1.023

INPUT
Description: COE River Station= 62452.91
Preliminary Model River Station
             (miles)=1.01

Underwater channel based on MO River soundings
Station Elevation Data    num=     125
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     732   16.45     734   43.55     736   72.13     738   87.55     740
   94.49     742   99.43     744  106.79     746  123.45     748  125.49     748
  130.87     746  137.48     744  144.11     742  148.87     740  154.95     738
  177.98     736  207.53     734  223.71     732  257.03     730  340.14     728
  344.36     726   348.8     724  352.33     722   355.2     720  359.87     718
  366.45     716  398.04  705.47  461.83  705.47  493.42     716  503.59     718
  505.84     720  510.42     722  515.32     724  518.39     726  521.74     728
  651.16     730  659.67     732  663.18     734  667.28     736  670.51     738
  674.29     740  677.92     742  681.88     744  757.39     744  761.29     742
  765.14     740  769.65     738  773.23     736  777.19     734   785.3     732
  858.91     732  881.69     732  958.39     732  986.67     732  1057.2     732
 1074.95     732 1125.45     730 1149.35     730 1429.35     732 1449.77     734
 1552.13     734  1564.8     732 1596.31     732 1748.73     734 1884.16     736
 1932.25     738 1970.53     738 2140.12     736 2149.76     734  2156.1     732
 2163.91     730 2170.62     728 2176.05     726 2204.01     726 2211.34     728
 2219.62     730 2279.65     732 2287.42     734 2293.62     736  2301.3     738
 2307.11     740 2314.71     742 2318.37     744 2321.38     746 2324.99     748
 2329.34     750 2335.98     752 2354.75     752 2361.61     750 2369.47     748
 2375.14     746 2378.14     744 2381.29     742 2384.15     740 2388.41     738
 2390.33     736 2406.21     736 2435.15     736 2442.71     734  2449.8     732
  2450.6     732 2460.06     734 2470.73     736 2478.37     738 2481.47     740
 2484.84     742 2491.87     744 2513.94     746 2528.41     746 2536.53     744
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 2539.57     742 2547.05     740 2551.68     738 2600.13     738 2663.94     738
 2667.74     736 2672.68     734 2677.09     732    2682     730 2688.13     728
 2739.32     728 2742.73     730 2750.77     732 2755.98     734 2763.23     736

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .083  340.14    .025  521.74     .09  681.88     .07 2140.12     .05
 2293.62     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        340.14  521.74             720     694     675             .1       .3
Left Levee      Station=  124.22      Elevation=  747.82
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
     767    2355   734.8    2355 2763.23     752

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  722.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  722.27  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  714.59  * Flow Area (sq ft)      *          * 1920.99  *          *
* E.G. Slope (ft/ft)     *0.000456  * Area (sq ft)           *          * 1920.99  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  159.23  * Top Width (ft)         *          *  159.23  *          *
* Vel Total (ft/s)       *    6.51  * Avg. Vel. (ft/s)       *          *    6.51  *          *
* Max Chl Dpth (ft)      *   16.80  * Hydr. Depth (ft)       *          *   12.06  *          *
* Conv. Total (cfs)      *585374.6  * Conv. (cfs)            *          *585374.6  *          *
* Length Wtd. (ft)       *  694.00  * Wetted Per. (ft)       *          *  165.48  *          *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *          *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.15  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *          *  166.86  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *          *   16.22  *          *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
**********************************************************************************************
* E.G. Elev (ft)         *  726.74  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.94  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  725.80  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  717.31  * Flow Area (sq ft)      *          * 2509.35  *          *
* E.G. Slope (ft/ft)     *0.000514  * Area (sq ft)           *          * 2509.35  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  173.30  * Top Width (ft)         *          *  173.30  *          *
* Vel Total (ft/s)       *    7.77  * Avg. Vel. (ft/s)       *          *    7.77  *          *
* Max Chl Dpth (ft)      *   20.33  * Hydr. Depth (ft)       *          *   14.48  *          *
* Conv. Total (cfs)      *859900.9  * Conv. (cfs)            *          *859900.9  *          *
* Length Wtd. (ft)       *  693.99  * Wetted Per. (ft)       *          *  181.27  *          *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *          *    0.44  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.45  *          *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *    1.06  *  228.28  *    0.82  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    1.62  *   18.61  *    1.07  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  729.56  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  728.30  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  719.44  * Flow Area (sq ft)      *    1.93  * 2954.26  *    3.00  *
* E.G. Slope (ft/ft)     *0.000594  * Area (sq ft)           *    1.93  * 2954.26  *    3.00  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *    0.24  *26599.41  *    0.34  *
* Top Width (ft)         *  213.98  * Top Width (ft)         *   12.66  *  181.60  *   19.72  *
* Vel Total (ft/s)       *    8.99  * Avg. Vel. (ft/s)       *    0.12  *    9.00  *    0.11  *
* Max Chl Dpth (ft)      *   22.83  * Hydr. Depth (ft)       *    0.15  *   16.27  *    0.15  *
* Conv. Total (cfs)      *1091328.0  * Conv. (cfs)            *     9.8  *1091304.0  *    14.1  *
* Length Wtd. (ft)       *  693.92  * Wetted Per. (ft)       *   12.66  *  190.67  *   19.72  *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *    0.01  *    0.57  *    0.01  *
```

```
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.00  *    5.17  *    0.00  *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   *    6.92  *  272.33  *    6.74  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    3.06  *   19.32  *    4.76  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  732.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.59  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  730.49  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  721.38  * Flow Area (sq ft)      *  126.01  * 3351.45  *  193.59  *
* E.G. Slope (ft/ft)     *0.000638  * Area (sq ft)           *  126.01  * 3351.45  *  193.59  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *   70.63  *34024.90  *  104.47  *
* Top Width (ft)         *  404.42  * Top Width (ft)         *   91.30  *  181.60  *  131.51  *
* Vel Total (ft/s)       *    9.32  * Avg. Vel. (ft/s)       *    0.56  *   10.15  *    0.54  *
* Max Chl Dpth (ft)      *   25.02  * Hydr. Depth (ft)       *    1.38  *   18.46  *    1.47  *
* Conv. Total (cfs)      *1353576.0  * Conv. (cfs)            *  2795.4  *1346646.0  *  4134.6  *
* Length Wtd. (ft)       *  693.86  * Wetted Per. (ft)       *   91.34  *  190.67  *  131.59  *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *    0.05  *    0.70  *    0.06  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    0.03  *    7.11  *    0.03  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *   16.32  *  311.49  *   19.73  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    5.87  *   19.74  *    7.69  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  734.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.11  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  732.85  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  724.03  * Flow Area (sq ft)      *  384.25  * 3779.26  *  514.32  *
* E.G. Slope (ft/ft)     *0.000733  * Area (sq ft)           *  384.25  * 3779.26  *  514.32  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  397.21  *44554.97  *  547.82  *
* Top Width (ft)         *  444.31  * Top Width (ft)         *  123.29  *  181.60  *  139.42  *
* Vel Total (ft/s)       *    9.73  * Avg. Vel. (ft/s)       *    1.03  *   11.79  *    1.07  *
* Max Chl Dpth (ft)      *   27.38  * Hydr. Depth (ft)       *    3.12  *   20.81  *    3.69  *
* Conv. Total (cfs)      *1680062.0  * Conv. (cfs)            * 14666.9  *1645167.0  * 20227.8  *
* Length Wtd. (ft)       *  693.85  * Wetted Per. (ft)       *  123.42  *  190.67  *  139.89  *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *    0.14  *    0.91  *    0.17  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *    0.15  *   10.70  *    0.18  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *   48.05  *  359.36  *   50.72  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   29.76  *   19.98  *   15.47  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  736.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.70  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  733.80  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  725.86  * Flow Area (sq ft)      *  505.59  * 3952.57  *  648.17  *
* E.G. Slope (ft/ft)     *0.000889  * Area (sq ft)           *  505.59  * 3952.57  *  648.17  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *  663.34  *52857.93  *  878.74  *
* Top Width (ft)         *  453.70  * Top Width (ft)         *  131.01  *  181.60  *  141.09  *
* Vel Total (ft/s)       *   10.65  * Avg. Vel. (ft/s)       *    1.31  *   13.37  *    1.36  *
* Max Chl Dpth (ft)      *   28.33  * Hydr. Depth (ft)       *    3.86  *   21.77  *    4.59  *
* Conv. Total (cfs)      *1824539.0  * Conv. (cfs)            * 22247.9  *1772819.0  * 29472.3  *
* Length Wtd. (ft)       *  693.86  * Wetted Per. (ft)       *  131.20  *  190.67  *  141.82  *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *    0.21  *    1.15  *    0.25  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *    0.28  *   15.39  *    0.34  *
* Frctn Loss (ft)        *    0.59  * Cum Volume (acre-ft)   *   93.36  *  383.58  *   70.56  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   33.10  *   20.03  *   39.28  *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
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```
* E.G. Elev (ft)         *  738.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.22  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  734.83  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  727.47  * Flow Area (sq ft)      *  646.25  * 4138.50  *  823.99  *
* E.G. Slope (ft/ft)     *0.001006  * Area (sq ft)           *  646.25  * 4138.50  *  823.99  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *  993.62  *60708.32  * 1298.06  *
* Top Width (ft)         * 1642.85  * Top Width (ft)          *  144.81  *  181.60  * 1316.43  *
* Vel Total (ft/s)       *   11.23  * Avg. Vel. (ft/s)       *    1.54  *   14.67  *    1.58  *
* Max Chl Dpth (ft)      *   29.36  * Hydr. Depth (ft)       *    4.46  *   22.79  *    0.63  *
* Conv. Total (cfs)      *1986231.0  * Conv. (cfs)            * 31326.2  *1913980.0  * 40924.5  *
* Length Wtd. (ft)       *  693.87  * Wetted Per. (ft)       *  145.05  *  190.67  * 1317.41  *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *    0.28  *    1.36  *    0.04  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *    0.43  *   20.00  *    0.06  *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   *  132.09  *  404.62  *  122.42  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   33.56  *   20.05  *   97.30  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  739.96  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.81  * Wt. n-Val.             *   0.083  *   0.025  *   0.080  *
* W.S. Elev (ft)         *  736.15  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  730.25  * Flow Area (sq ft)      *  850.32  * 4378.30  * 2632.18  *
* E.G. Slope (ft/ft)     *0.001139  * Area (sq ft)           *  850.32  * 4378.30  * 2632.18  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             * 1538.01  *70941.51  * 3420.49  *
* Top Width (ft)         * 1772.41  * Top Width (ft)          *  163.85  *  181.60  * 1426.96  *
* Vel Total (ft/s)       *    9.66  * Avg. Vel. (ft/s)       *    1.81  *   16.20  *    1.30  *
* Max Chl Dpth (ft)      *   30.68  * Hydr. Depth (ft)       *    5.19  *   24.11  *    1.84  *
* Conv. Total (cfs)      *2249314.0  * Conv. (cfs)            * 45579.2  *2102368.0  *101366.9  *
* Length Wtd. (ft)       *  693.52  * Wetted Per. (ft)       *  164.13  *  190.67  * 1428.91  *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *    0.37  *    1.63  *    0.13  *
* Alpha                  *    2.63  * Stream Power (lb/ft s) *    0.67  *   26.45  *    0.17  *
* Frctn Loss (ft)        *    0.78  * Cum Volume (acre-ft)   *  179.45  *  429.97  *  277.03  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   34.25  *   20.05  *  132.28  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  733.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.75  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  731.55  * Reach Len. (ft)        *  720.00  *  694.00  *  675.00  *
* Crit W.S. (ft)         *  722.39  * Flow Area (sq ft)      *  231.48  * 3542.84  *  334.56  *
* E.G. Slope (ft/ft)     *0.000657  * Area (sq ft)           *  231.48  * 3542.84  *  334.56  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  175.58  *37866.64  *  257.78  *
* Top Width (ft)         *  426.46  * Top Width (ft)          *  108.86  *  181.60  *  136.00  *
* Vel Total (ft/s)       *    9.32  * Avg. Vel. (ft/s)       *    0.76  *   10.69  *    0.77  *
* Max Chl Dpth (ft)      *   26.08  * Hydr. Depth (ft)       *    2.13  *   19.51  *    2.46  *
* Conv. Total (cfs)      *1494146.0  * Conv. (cfs)            *  6849.8  *1477240.0  * 10056.3  *
* Length Wtd. (ft)       *  693.85  * Wetted Per. (ft)       *  108.93  *  190.67  *  136.19  *
* Min Ch El (ft)         *  705.47  * Shear (lb/sq ft)       *    0.09  *    0.76  *    0.10  *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *    0.07  *    8.15  *    0.08  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *   22.90  *  331.06  *   29.38  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   11.99  *   19.90  *   11.44  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 0.891

INPUT
Description: COE River Station= 63147.10
Preliminary Model River Station
             (miles)=.88
```

Underwater channel based on MO River soundings
Station Elevation Data num= 116

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	732	13.12	734	26.21	736	50.43	738	76.89	740
83.96	742	91.77	744	97.78	746	105.15	748	113.65	748
123.09	746	130.51	744	137.89	742	145.38	740	161.81	738
187.27	736	207.87	734	219.47	732	233.26	730	334.19	728
337.09	726	339.67	724	342.06	722	345.02	720	348.3	718
353.69	716	383.78	705.97	462.72	705.97	492.81	716	500.19	718
502.28	720	506.24	722	508.53	724	601.11	726	618.12	728
628.94	730	636.41	732	643.41	734	657.05	736	668.25	738
677.56	740	703.16	742	778.84	742	784.3	740	789.33	738
792.72	736	798.65	734	807.33	732	845.78	732	866.34	732
945.7	732	965.6	732	1106.77	730	1133.33	730	1153.84	732
1278.92	734	1304.07	734	1321.24	732	1336.43	730	1363.14	730
1386.25	730	1577.1	730	1914.15	732	2209.01	734	2368.36	732
2368.5	734	2374.01	730	2377.2	728	2382.12	726	2383.68	724
2386.83	722	2395.16	722	2417.07	724	2421.74	726	2425.15	728
2429.23	730	2453.82	732	2467.19	734	2473.88	736	2481.1	738
2485.82	740	2486.71	742	2491.14	744	2494.87	746	2501.49	748
2512.27	750	2530.34	750	2537.93	748	2543.11	746	2548.46	744
2555.14	742	2560.28	740	2586.86	740	2592.86	742	2598.16	744
2603.54	746	2609.37	748	2627.22	750	2633.94	750	2649.23	750
2653.77	752	2658.51	754	2661.7	756	2665.72	758	2669.34	760
2674.47	762	2682.18	764	2690.29	766	2697.94	768	2707.79	770
2719.2	772	2729.56	774	2741.97	776	2757.6	778	2767.43	780
2779.02	782								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.083	334.19	.025	508.53	.09	703.16	.07	2368.5	.05
2429.23	.13								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
334.19	508.53	630	644	650	.1	.3

Left Levee Station= 111.31 Elevation= 749.2
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
790	2520.88	734.2	2520.88	2650	750

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	722.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.		0.025	
W.S. Elev (ft)	722.02	Reach Len. (ft)	630.00	644.00	650.00
Crit W.S. (ft)	714.21	Flow Area (sq ft)		2017.80	
E.G. Slope (ft/ft)	0.000403	Area (sq ft)		2017.80	
Q Total (cfs)	12500.00	Flow (cfs)		12500.00	
Top Width (ft)	164.22	Top Width (ft)		164.22	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)		6.19	
Max Chl Dpth (ft)	16.05	Hydr. Depth (ft)		12.29	
Conv. Total (cfs)	622676.0	Conv. (cfs)		622676.0	
Length Wtd. (ft)	644.00	Wetted Per. (ft)		170.56	
Min Ch El (ft)	705.97	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		1.84	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		135.48	
C & E Loss (ft)	0.01	Cum SA (acres)		13.64	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	726.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.025	0.090
W.S. Elev (ft)	725.52	Reach Len. (ft)	630.00	644.00	650.00
Crit W.S. (ft)	716.69	Flow Area (sq ft)		2606.81	53.66
E.G. Slope (ft/ft)	0.000445	Area (sq ft)		2606.81	53.66
Q Total (cfs)	19500.00	Flow (cfs)		19484.42	15.58
Top Width (ft)	241.30	Top Width (ft)		170.82	70.48
Vel Total (ft/s)	7.33	Avg. Vel. (ft/s)		7.47	0.29

```
* Max Chl Dpth (ft)      *   19.55  * Hydr. Depth (ft)       *          *   15.26  *    0.76  *
* Conv. Total (cfs)      *924197.6  * Conv. (cfs)            *          *923459.1  *   738.5  *
* Length Wtd. (ft)       *  644.00  * Wetted Per. (ft)       *          *  179.16  *   70.50  *
* Min Ch El (ft)         *  705.97  * Shear (lb/sq ft)       *          *    0.40  *    0.02  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *          *    3.02  *    0.01  *
* Frctn Loss (ft)        *    0.32  * Cum Volume (acre-ft)   *    1.06  *  187.52  *    0.40  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    1.62  *   15.87  *    0.53  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
**********************************************************************************************
* E.G. Elev (ft)         *  729.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *          *   0.025  *   0.090  *
* W.S. Elev (ft)         *  727.99  * Reach Len. (ft)        *  630.00  *  644.00  *  650.00  *
* Crit W.S. (ft)         *  718.78  * Flow Area (sq ft)      *          * 3032.19  *  293.43  *
* E.G. Slope (ft/ft)     *0.000509  * Area (sq ft)           *          * 3032.19  *  293.43  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26389.26  *  210.74  *
* Top Width (ft)         *  283.81  * Top Width (ft)         *          *  174.32  *  109.49  *
* Vel Total (ft/s)       *    8.00  * Avg. Vel. (ft/s)       *          *    8.70  *    0.72  *
* Max Chl Dpth (ft)      *   22.02  * Hydr. Depth (ft)       *          *   17.39  *    2.68  *
* Conv. Total (cfs)      *1178815.0  * Conv. (cfs)           *          *1169476.0  *  9339.2  *
* Length Wtd. (ft)       *  644.03  * Wetted Per. (ft)       *          *  183.44  *  109.63  *
* Min Ch El (ft)         *  705.97  * Shear (lb/sq ft)       *          *    0.53  *    0.09  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *          *    4.57  *    0.06  *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)   *    6.90  *  224.64  *    4.44  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.96  *   16.49  *    3.76  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
**********************************************************************************************
* E.G. Elev (ft)         *  731.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.48  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  730.16  * Reach Len. (ft)        *  630.00  *  644.00  *  650.00  *
* Crit W.S. (ft)         *  720.66  * Flow Area (sq ft)      *  117.13  * 3410.80  *  544.02  *
* E.G. Slope (ft/ft)     *0.000557  * Area (sq ft)           *  117.13  * 3410.80  *  544.02  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *   54.23  *33569.57  *  576.19  *
* Top Width (ft)         *  397.38  * Top Width (ft)         *  102.03  *  174.34  *  121.01  *
* Vel Total (ft/s)       *    8.40  * Avg. Vel. (ft/s)       *    0.46  *    9.84  *    1.06  *
* Max Chl Dpth (ft)      *   24.19  * Hydr. Depth (ft)       *    1.15  *   19.56  *    4.50  *
* Conv. Total (cfs)      *1449456.0  * Conv. (cfs)           *  2298.5  *1422737.0  * 24420.1  *
* Length Wtd. (ft)       *  644.06  * Wetted Per. (ft)       *  102.06  *  183.46  *  121.35  *
* Min Ch El (ft)         *  705.97  * Shear (lb/sq ft)       *    0.04  *    0.65  *    0.16  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *    0.02  *    6.36  *    0.17  *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft)   *   14.32  *  257.62  *   14.02  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    4.27  *   16.90  *    5.73  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
**********************************************************************************************
* E.G. Elev (ft)         *  734.44  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.99  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  732.45  * Reach Len. (ft)        *  630.00  *  644.00  *  650.00  *
* Crit W.S. (ft)         *  723.15  * Flow Area (sq ft)      *  368.79  * 3810.10  *  830.93  *
* E.G. Slope (ft/ft)     *0.000659  * Area (sq ft)           *  368.79  * 3810.10  *  830.93  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  363.26  *43924.41  * 1212.33  *
* Top Width (ft)         *  421.12  * Top Width (ft)         *  117.33  *  174.34  *  129.45  *
* Vel Total (ft/s)       *    9.08  * Avg. Vel. (ft/s)       *    0.99  *   11.53  *    1.46  *
* Max Chl Dpth (ft)      *   26.48  * Hydr. Depth (ft)       *    3.14  *   21.85  *    6.42  *
* Conv. Total (cfs)      *1772407.0  * Conv. (cfs)           * 14150.4  *1711032.0  * 47225.0  *
* Length Wtd. (ft)       *  644.07  * Wetted Per. (ft)       *  117.53  *  183.46  *  130.10  *
* Min Ch El (ft)         *  705.97  * Shear (lb/sq ft)       *    0.13  *    0.85  *    0.26  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *    0.13  *    9.85  *    0.38  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *   41.83  *  298.90  *   40.30  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   27.77  *   17.14  *   13.38  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
```

water surface was used.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	735.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.59	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	733.28	Reach Len. (ft)	630.00	644.00	650.00
Crit W.S. (ft)	724.97	Flow Area (sq ft)	468.64	3955.47	940.10
E.G. Slope (ft/ft)	0.000821	Area (sq ft)	468.64	3955.47	940.10
Q Total (cfs)	54400.00	Flow (cfs)	588.12	52175.28	1636.60
Top Width (ft)	428.88	Top Width (ft)	122.17	174.34	132.37
Vel Total (ft/s)	10.14	Avg. Vel. (ft/s)	1.25	13.19	1.74
Max Chl Dpth (ft)	27.31	Hydr. Depth (ft)	3.84	22.69	7.10
Conv. Total (cfs)	1898874.0	Conv. (cfs)	20528.9	1821218.0	57126.7
Length Wtd. (ft)	644.06	Wetted Per. (ft)	122.44	183.46	133.14
Min Ch El (ft)	705.97	Shear (lb/sq ft)	0.20	1.10	0.36
Alpha	1.62	Stream Power (lb/ft s)	0.25	14.57	0.63
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	85.31	320.59	58.25
C & E Loss (ft)	0.03	Cum SA (acres)	31.01	17.19	37.16

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	737.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.15	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	734.20	Reach Len. (ft)	630.00	644.00	650.00
Crit W.S. (ft)	726.84	Flow Area (sq ft)	583.08	4115.18	1062.90
E.G. Slope (ft/ft)	0.000951	Area (sq ft)	583.08	4115.18	1062.90
Q Total (cfs)	63000.00	Flow (cfs)	881.35	59998.85	2119.80
Top Width (ft)	438.96	Top Width (ft)	128.38	174.34	136.24
Vel Total (ft/s)	10.94	Avg. Vel. (ft/s)	1.51	14.58	1.99
Max Chl Dpth (ft)	28.23	Hydr. Depth (ft)	4.54	23.60	7.80
Conv. Total (cfs)	2042728.0	Conv. (cfs)	28577.2	1945418.0	68732.9
Length Wtd. (ft)	644.05	Wetted Per. (ft)	128.72	183.46	137.12
Min Ch El (ft)	705.97	Shear (lb/sq ft)	0.27	1.33	0.46
Alpha	1.69	Stream Power (lb/ft s)	0.41	19.42	0.92
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	121.93	338.87	107.80
C & E Loss (ft)	0.05	Cum SA (acres)	31.30	17.21	86.04

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	739.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.80	Wt. n-Val.	0.083	0.025	0.083
W.S. Elev (ft)	735.38	Reach Len. (ft)	630.00	644.00	650.00
Crit W.S. (ft)	729.19	Flow Area (sq ft)	741.43	4320.53	3199.06
E.G. Slope (ft/ft)	0.001107	Area (sq ft)	741.43	4320.53	3199.06
Q Total (cfs)	75900.00	Flow (cfs)	1336.17	70207.63	4356.21
Top Width (ft)	2136.36	Top Width (ft)	140.51	174.34	1821.51
Vel Total (ft/s)	9.19	Avg. Vel. (ft/s)	1.80	16.25	1.36
Max Chl Dpth (ft)	29.41	Hydr. Depth (ft)	5.28	24.78	1.76
Conv. Total (cfs)	2280956.0	Conv. (cfs)	40154.7	2109888.0	130913.3
Length Wtd. (ft)	644.15	Wetted Per. (ft)	140.91	183.46	1822.84
Min Ch El (ft)	705.97	Shear (lb/sq ft)	0.36	1.63	0.12
Alpha	2.90	Stream Power (lb/ft s)	0.66	26.45	0.17
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)	166.29	360.68	231.85
C & E Loss (ft)	0.08	Cum SA (acres)	31.73	17.21	107.12

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	732.84	Element	Left OB	Channel	Right OB

```
* Vel Head (ft)          *    1.63  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  731.20  * Reach Len. (ft)        *  630.00  *  644.00  *  650.00  *
* Crit W.S. (ft)         *  721.61  * Flow Area (sq ft)      *  227.29  * 3592.63  *  672.25  *
* E.G. Slope (ft/ft)     *0.000579  * Area (sq ft)           *  227.29  * 3592.63  *  672.25  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             *  159.46  *37322.57  *  817.97  *
* Top Width (ft)         *  408.46  * Top Width (ft)         *  109.22  *  174.34  *  124.90  *
* Vel Total (ft/s)       *    8.53  * Avg. Vel. (ft/s)       *    0.70  *   10.39  *    1.22  *
* Max Chl Dpth (ft)      *   25.23  * Hydr. Depth (ft)       *    2.08  *   20.61  *    5.38  *
* Conv. Total (cfs)      *1592011.0  * Conv. (cfs)            *  6628.3  *1551382.0  * 34000.4  *
* Length Wtd. (ft)       *  644.07  * Wetted Per. (ft)       *  109.33  *  183.46  *  125.38  *
* Min Ch El (ft)         *  705.97  * Shear (lb/sq ft)       *    0.08  *    0.71  *    0.19  *
* Alpha                  *    1.45  * Stream Power (lb/ft s) *    0.05  *    7.35  *    0.24  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *   19.11  *  274.21  *   21.58  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   10.18  *   17.06  *    9.42  *
**********************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 0.769

INPUT
Description: COE River Station= 63791.51
Preliminary Model River Station
             (miles)=.76

Underwater channel based on MO River soundings
Station Elevation Data    num=      88
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
       0      732  104.34      732  145.79      732  154.87      734   169.9      736
  204.47      738  218.86      740  228.17      742  231.28      744  238.21      746
  249.98      748  255.19      748  263.43      746   273.1      744  283.27      742
  291.09      740  301.55      738  346.22      736  359.52      734  371.54      732
  461.88      730  468.58      728  473.87      726  478.78      724  482.98      722
  488.13      720  492.41      718  498.73      716  529.72  705.67  599.61  705.67
   630.6      716   641.2      718  645.22      720  647.65      722  652.95      724
  655.46      726  767.04      728  781.66      730  793.15      732  802.95      734
  813.07      736  823.37      738  836.82      740  865.06      740  869.97      738
  876.21      736  880.77      734  888.89      732  898.46      730  984.03      730
  998.41      732  1011.2      732 1131.82      732  1567.1      732 1960.46      732
 2377.14      734 2430.86      734 2484.68      730 2485.63      732 2488.62      728
 2492.39      726 2496.57      724 2500.07      722 2536.65      722 2539.64      724
 2540.35      726 2544.72      728 2549.35      730 2556.44      732 2562.31      734
 2569.88      736 2582.57      738 2585.59      740 2589.07      742 2592.05      744
 2596.03      746 2599.01      748 2602.13      750 2671.56      750 2706.72      750
  2714.5      752  2723.5      754 2731.17      756 2738.81      758 2747.77      760
 2753.95      762 2759.73      764 2765.06      766

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .083  461.88    .025  655.46     .09  865.06     .09 2430.86     .05
 2562.31     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        461.88  655.46             780     853     930             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
     880 2765.06     733       F
Left Levee      Station=  254.53      Elevation=  747.94
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
     870 2765.06   732.3

CROSS SECTION OUTPUT  Profile #2-yr
**********************************************************************************************
* E.G. Elev (ft)         *  722.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  721.64  * Reach Len. (ft)        *  780.00  *  853.00  *  930.00  *
* Crit W.S. (ft)         *  714.41  * Flow Area (sq ft)      *          * 1891.14  *          *
```

```
* E.G. Slope (ft/ft)     *0.000494  * Area (sq ft)           *          * 1891.14  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  163.30  * Top Width (ft)         *          *  163.30  *          *
* Vel Total (ft/s)       *    6.61  * Avg. Vel. (ft/s)       *          *    6.61  *          *
* Max Chl Dpth (ft)      *   15.97  * Hydr. Depth (ft)       *          *   11.58  *          *
* Conv. Total (cfs)      *562438.5  * Conv. (cfs)            *          *562438.5  *          *
* Length Wtd. (ft)       *  853.00  * Wetted Per. (ft)       *          *  168.96  *          *
* Min Ch El (ft)         *  705.67  * Shear (lb/sq ft)       *          *    0.35  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.28  *          *
* Frctn Loss (ft)        *    0.67  * Cum Volume (acre-ft)   *          *  106.59  *          *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *          *   11.22  *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  726.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.              *          *   0.025  *          *
* W.S. Elev (ft)         *  725.11  * Reach Len. (ft)        *  780.00  *  853.00  *  930.00  *
* Crit W.S. (ft)         *  717.04  * Flow Area (sq ft)      *          * 2484.17  *          *
* E.G. Slope (ft/ft)     *0.000549  * Area (sq ft)           *          * 2484.17  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  178.27  * Top Width (ft)         *          *  178.27  *          *
* Vel Total (ft/s)       *    7.85  * Avg. Vel. (ft/s)       *          *    7.85  *          *
* Max Chl Dpth (ft)      *   19.44  * Hydr. Depth (ft)       *          *   13.93  *          *
* Conv. Total (cfs)      *832500.8  * Conv. (cfs)            *          *832500.8  *          *
* Length Wtd. (ft)       *  853.00  * Wetted Per. (ft)       *          *  185.55  *          *
* Min Ch El (ft)         *  705.67  * Shear (lb/sq ft)       *          *    0.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.60  *          *
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   *    1.06  *  149.89  *          *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *    1.62  *   13.29  *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  728.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.              *          *   0.025  *   0.090  *
* W.S. Elev (ft)         *  727.49  * Reach Len. (ft)        *  780.00  *  853.00  *  930.00  *
* Crit W.S. (ft)         *  719.18  * Flow Area (sq ft)      *          * 2919.01  *   62.16  *
* E.G. Slope (ft/ft)     *0.000630  * Area (sq ft)           *          * 2919.01  *   62.16  *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26578.81  *   21.19  *
* Top Width (ft)         *  268.82  * Top Width (ft)         *          *  185.54  *   83.28  *
* Vel Total (ft/s)       *    8.92  * Avg. Vel. (ft/s)       *          *    9.11  *    0.34  *
* Max Chl Dpth (ft)      *   21.82  * Hydr. Depth (ft)       *          *   15.73  *    0.75  *
* Conv. Total (cfs)      *1059811.0  * Conv. (cfs)            *          *1058967.0  *   844.3  *
* Length Wtd. (ft)       *  853.09  * Wetted Per. (ft)       *          *  193.57  *   83.29  *
* Min Ch El (ft)         *  705.67  * Shear (lb/sq ft)       *          *    0.59  *    0.03  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *          *    5.40  *    0.01  *
* Frctn Loss (ft)        *    0.81  * Cum Volume (acre-ft)   *    6.90  *  180.65  *    1.79  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *    2.96  *   13.83  *    2.32  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  731.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.62  * Wt. n-Val.              *          *   0.025  *   0.090  *
```

```
* W.S. Elev (ft)         *  729.60  * Reach Len. (ft)        *  780.00  *  853.00  *  930.00  *
* Crit W.S. (ft)         *  721.09  * Flow Area (sq ft)      *          * 3317.63  *  300.03  *
* E.G. Slope (ft/ft)     *0.000704  * Area (sq ft)           *          * 3317.63  *  300.03  *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *33962.39  *  237.61  *
* Top Width (ft)         *  315.56  * Top Width (ft)         *          *  192.26  *  123.31  *
* Vel Total (ft/s)       *    9.45  * Avg. Vel. (ft/s)       *          *   10.24  *    0.79  *
* Max Chl Dpth (ft)      *   23.93  * Hydr. Depth (ft)       *          *   17.26  *    2.43  *
* Conv. Total (cfs)      *1288895.0  * Conv. (cfs)            *          *1279940.0  *  8954.8  *
* Length Wtd. (ft)       *  853.59  * Wetted Per. (ft)       *          *  200.62  *  123.44  *
* Min Ch El (ft)         *  705.67  * Shear (lb/sq ft)       *          *    0.73  *    0.11  *
* Alpha                  *    1.16  * Stream Power (lb/ft s) *          *    7.44  *    0.08  *
* Frctn Loss (ft)        *    0.92  * Cum Volume (acre-ft)   *   13.47  *  207.89  *    7.72  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *    3.53  *   14.19  *    3.91  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  733.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.19  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  731.75  * Reach Len. (ft)        *  780.00  *  853.00  *  930.00  *
* Crit W.S. (ft)         *  723.68  * Flow Area (sq ft)      *   69.52  * 3733.55  *  579.61  *
* E.G. Slope (ft/ft)     *0.000832  * Area (sq ft)           *   69.52  * 3733.55  *  579.61  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *   32.89  *44743.64  *  723.47  *
* Top Width (ft)         *  409.11  * Top Width (ft)         *   79.25  *  193.58  *  136.28  *
* Vel Total (ft/s)       *   10.38  * Avg. Vel. (ft/s)       *    0.47  *   11.98  *    1.25  *
* Max Chl Dpth (ft)      *   26.08  * Hydr. Depth (ft)       *    0.88  *   19.29  *    4.25  *
* Conv. Total (cfs)      *1577505.0  * Conv. (cfs)            *  1140.3  *1551281.0  * 25083.2  *
* Length Wtd. (ft)       *  852.96  * Wetted Per. (ft)       *   79.27  *  202.00  *  136.59  *
* Min Ch El (ft)         *  705.67  * Shear (lb/sq ft)       *    0.05  *    0.96  *    0.22  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    0.02  *   11.50  *    0.28  *
* Frctn Loss (ft)        *    0.98  * Cum Volume (acre-ft)   *   38.66  *  243.13  *   29.78  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   26.35  *   14.42  *   11.40  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         *  735.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.94  * Wt. n-Val.             *   0.083  *   0.025  *   0.090  *
* W.S. Elev (ft)         *  732.30  * Reach Len. (ft)        *  780.00  *  853.00  *  930.00  *
* Crit W.S. (ft)         *  725.46  * Flow Area (sq ft)      *  118.13  * 3840.03  *  655.40  *
* E.G. Slope (ft/ft)     *0.001076  * Area (sq ft)           *  118.13  * 3840.03  *  661.00  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             *   81.81  *53322.77  *  995.41  *
* Top Width (ft)         * 1664.84  * Top Width (ft)         *   92.17  *  193.58  * 1379.09  *
* Vel Total (ft/s)       *   11.79  * Avg. Vel. (ft/s)       *    0.69  *   13.89  *    1.52  *
* Max Chl Dpth (ft)      *   26.63  * Hydr. Depth (ft)       *    1.28  *   19.84  *    4.71  *
* Conv. Total (cfs)      *1658559.0  * Conv. (cfs)            *  2494.4  *1625716.0  * 30348.4  *
* Length Wtd. (ft)       *  850.83  * Wetted Per. (ft)       *   92.22  *  202.00  *  139.54  *
* Min Ch El (ft)         *  705.67  * Shear (lb/sq ft)       *    0.09  *    1.28  *    0.32  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *    0.06  *   17.73  *    0.48  *
* Frctn Loss (ft)        *    1.09  * Cum Volume (acre-ft)   *   81.07  *  262.96  *   46.31  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   29.46  *   14.47  *   25.89  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.
```

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	736.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.66	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	732.93	Reach Len. (ft)	780.00	853.00	930.00
Crit W.S. (ft)	727.15	Flow Area (sq ft)	176.71	3960.61	743.05
E.G. Slope (ft/ft)	0.001291	Area (sq ft)	176.71	3960.61	1565.41
Q Total (cfs)	63000.00	Flow (cfs)	170.72	61504.70	1324.58
Top Width (ft)	1814.16	Top Width (ft)	95.91	193.58	1524.66
Vel Total (ft/s)	12.91	Avg. Vel. (ft/s)	0.97	15.53	1.78
Max Chl Dpth (ft)	27.26	Hydr. Depth (ft)	1.84	20.46	5.22
Conv. Total (cfs)	1753304.0	Conv. (cfs)	4751.1	1711689.0	36863.5
Length Wtd. (ft)	849.18	Wetted Per. (ft)	96.01	202.00	142.65
Min Ch El (ft)	705.67	Shear (lb/sq ft)	0.15	1.58	0.42
Alpha	1.41	Stream Power (lb/ft s)	0.14	24.54	0.75
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)	116.43	279.17	88.19
C & E Loss (ft)	0.31	Cum SA (acres)	29.68	14.49	73.65

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	738.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.63	Wt. n-Val.	0.083	0.025	0.088
W.S. Elev (ft)	733.61	Reach Len. (ft)	780.00	853.00	930.00
Crit W.S. (ft)	729.71	Flow Area (sq ft)	243.76	4093.10	2663.60
E.G. Slope (ft/ft)	0.001601	Area (sq ft)	243.76	4093.10	2663.60
Q Total (cfs)	75900.00	Flow (cfs)	315.93	72360.83	3223.24
Top Width (ft)	1978.20	Top Width (ft)	100.03	193.58	1684.60
Vel Total (ft/s)	10.84	Avg. Vel. (ft/s)	1.30	17.68	1.21
Max Chl Dpth (ft)	27.94	Hydr. Depth (ft)	2.44	21.14	1.58
Conv. Total (cfs)	1896615.0	Conv. (cfs)	7894.5	1808177.0	80543.5
Length Wtd. (ft)	849.08	Wetted Per. (ft)	100.18	202.00	1685.51
Min Ch El (ft)	705.67	Shear (lb/sq ft)	0.24	2.03	0.16
Alpha	2.54	Stream Power (lb/ft s)	0.32	35.82	0.19
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	159.17	298.48	188.11
C & E Loss (ft)	0.71	Cum SA (acres)	29.99	14.49	80.96

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	732.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.78	Wt. n-Val.	0.083	0.025	0.090
W.S. Elev (ft)	730.62	Reach Len. (ft)	780.00	853.00	930.00
Crit W.S. (ft)	722.07	Flow Area (sq ft)	8.68	3513.93	428.70
E.G. Slope (ft/ft)	0.000730	Area (sq ft)	8.68	3513.93	428.70
Q Total (cfs)	38300.00	Flow (cfs)	1.92	37874.45	423.63
Top Width (ft)	351.34	Top Width (ft)	28.00	193.58	129.76
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)	0.22	10.78	0.99
Max Chl Dpth (ft)	24.95	Hydr. Depth (ft)	0.31	18.15	3.30
Conv. Total (cfs)	1417952.0	Conv. (cfs)	71.2	1402197.0	15683.7
Length Wtd. (ft)	853.95	Wetted Per. (ft)	28.01	202.00	129.97
Min Ch El (ft)	705.67	Shear (lb/sq ft)	0.01	0.79	0.15
Alpha	1.22	Stream Power (lb/ft s)	0.00	8.54	0.15
Frctn Loss (ft)	0.97	Cum Volume (acre-ft)	17.40	221.68	13.37
C & E Loss (ft)	0.15	Cum SA (acres)	9.19	14.34	7.52

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 0.608

INPUT
Description: COE River Station= 64644.50
Preliminary Model River Station
             (miles)=.6

Underwater channel based on MO River soundings
Station Elevation Data    num=     111
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     736   47.89     734    75.4     732   97.38     730  419.25     728
  587.66     728  662.76     728  705.64     728  824.98     728  834.42     726
  837.82     724  841.33     722  843.34     720  849.46     718  855.32     716
  882.95  706.79  941.71  706.79  969.34     716  985.54     718  987.45     720
  994.05     722  995.32     724  1083.4     726 1144.01     728 1154.93     730
 1169.78     732 1171.22     732 1226.57     730 1247.49     730 1318.29     730
 1326.05     728 1334.01     726 1341.81     724 1350.05     722 1362.18     720
 1383.84     720 1388.89     722 1391.27     724 1393.65     726  1396.2     728
 1400.97     730 1415.02     732 1425.55     732 1437.32     730 1445.08     728
 1451.22     726 1473.28     724 1586.42     722 1689.34     720 1726.19     720
 1752.83     722    1772     724 1822.17     726  2080.9     726 2208.36     726
 2311.36     728 2380.13     730 2400.58     732 2420.75     734 2456.89     734
 2506.13     732 2773.52     730 2927.69     730 2936.77     732 2946.21     734
 2949.65     736 2957.15     738  2982.5     740 2983.48     740 2997.82     738
 3010.76     736 3014.55     734 3016.93     732 3019.37     730 3021.65     728
 3023.91     726 3072.32     718  3077.2     720 3081.69     722 3086.38     724
 3091.75     726 3097.14     728 3105.36     730 3112.24     732 3120.19     734
 3127.92     736 3147.84     738 3153.83     738 3176.61     738 3182.18     740
  3187.4     742 3194.18     744 3198.25     746 3203.52     748 3209.31     750
 3214.95     752 3220.11     754 3261.39     754 3307.14     754 3318.91     756
 3324.66     758 3327.81     760 3332.66     762  3341.4     764 3349.16     766
 3358.49     768 3366.79     770 3375.17     772  3384.7     774 3397.85     776
  3410.1     778

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .038  824.98    .027  995.32     .07 1169.78     .13 2983.48     .05
 3182.18     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        824.98  995.32             310     738     880              .1       .3
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************************************
 1169.78    1420     732    1420    1750     732    1750    1950     736
    1950    2400     732    2455    3115     732

CROSS SECTION OUTPUT  Profile #2-yr
*************************************************************************************************
* E.G. Elev (ft)         *  721.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  720.28  * Reach Len. (ft)        *  310.00  *  738.00  *  880.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1367.17  *          *
* E.G. Slope (ft/ft)     *0.001451  * Area (sq ft)           *          * 1367.17  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  145.34  * Top Width (ft)          *          *  145.34  *          *
* Vel Total (ft/s)       *    9.14  * Avg. Vel. (ft/s)        *          *    9.14  *          *
* Max Chl Dpth (ft)      *   13.49  * Hydr. Depth (ft)        *          *    9.41  *          *
* Conv. Total (cfs)      *328135.9  * Conv. (cfs)             *          *328135.9  *          *
* Length Wtd. (ft)       *  738.00  * Wetted Per. (ft)        *          *  150.11  *          *
* Min Ch El (ft)         *  706.79  * Shear (lb/sq ft)        *          *    0.83  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    7.54  *          *
* Frctn Loss (ft)        *    0.86  * Cum Volume (acre-ft)    *          *   74.68  *          *
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* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *          *    8.20  *          *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  725.28  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.69  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  723.59  * Reach Len. (ft)        *  310.00  *  738.00  *  880.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1868.87  *          *
* E.G. Slope (ft/ft)     *0.001397  * Area (sq ft)           *          * 1868.87  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *          *19500.00  *          *
* Top Width (ft)         *  156.52  * Top Width (ft)          *          *  156.52  *          *
* Vel Total (ft/s)       *   10.43  * Avg. Vel. (ft/s)        *          *   10.43  *          *
* Max Chl Dpth (ft)      *   16.80  * Hydr. Depth (ft)        *          *   11.94  *          *
* Conv. Total (cfs)      *521769.8  * Conv. (cfs)             *          *521769.8  *          *
* Length Wtd. (ft)       *  737.17  * Wetted Per. (ft)        *          *  163.56  *          *
* Min Ch El (ft)         *  706.79  * Shear (lb/sq ft)        *          *    1.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.40  *          *
* Frctn Loss (ft)        *    0.80  * Cum Volume (acre-ft)    *    1.06  *  107.27  *          *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         *    1.62  *   10.01  *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  727.87  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.30  * Wt. n-Val.             *          *   0.027  *   0.070  *
* W.S. Elev (ft)         *  725.57  * Reach Len. (ft)        *  310.00  *  738.00  *  880.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 2182.15  *   54.18  *
* E.G. Slope (ft/ft)     *0.001602  * Area (sq ft)           *          * 2182.15  *   54.18  *
* Q Total (cfs)          *26600.00  * Flow (cfs)              *          *26560.86  *   39.14  *
* Top Width (ft)         *  229.25  * Top Width (ft)          *          *  160.17  *   69.08  *
* Vel Total (ft/s)       *   11.89  * Avg. Vel. (ft/s)        *          *   12.17  *    0.72  *
* Max Chl Dpth (ft)      *   18.78  * Hydr. Depth (ft)        *          *   13.62  *    0.78  *
* Conv. Total (cfs)      *664665.6  * Conv. (cfs)             *          *663687.5  *   978.1  *
* Length Wtd. (ft)       *  729.19  * Wetted Per. (ft)        *          *  167.96  *   69.10  *
* Min Ch El (ft)         *  706.79  * Shear (lb/sq ft)        *          *    1.30  *    0.08  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *          *   15.81  *    0.06  *
* Frctn Loss (ft)        *    0.80  * Cum Volume (acre-ft)    *    6.90  *  130.70  *    0.55  *
* C & E Loss (ft)        *    0.36  * Cum SA (acres)         *    2.96  *   10.44  *    0.70  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  730.16  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.95  * Wt. n-Val.             *          *   0.027  *   0.070  *
* W.S. Elev (ft)         *  727.22  * Reach Len. (ft)        *  310.00  *  738.00  *  880.00  *
* Crit W.S. (ft)         *  722.99  * Flow Area (sq ft)      *          * 2450.39  *  217.48  *
* E.G. Slope (ft/ft)     *0.001869  * Area (sq ft)           *          * 2450.39  *  217.48  *
* Q Total (cfs)          *34200.00  * Flow (cfs)              *          *33911.21  *  288.79  *
* Top Width (ft)         *  291.54  * Top Width (ft)          *          *  166.64  *  124.90  *
* Vel Total (ft/s)       *   12.82  * Avg. Vel. (ft/s)        *          *   13.84  *    1.33  *
* Max Chl Dpth (ft)      *   20.43  * Hydr. Depth (ft)        *          *   14.71  *    1.74  *
* Conv. Total (cfs)      *791072.1  * Conv. (cfs)             *          *784392.2  *  6679.9  *
* Length Wtd. (ft)       *  720.30  * Wetted Per. (ft)        *          *  174.68  *  124.95  *
* Min Ch El (ft)         *  706.79  * Shear (lb/sq ft)        *          *    1.64  *    0.20  *
* Alpha                  *    1.16  * Stream Power (lb/ft s) *          *   22.65  *    0.27  *
* Frctn Loss (ft)        *    0.82  * Cum Volume (acre-ft)    *   13.47  *  151.41  *    2.20  *
* C & E Loss (ft)        *    0.53  * Cum SA (acres)         *    3.53  *   10.68  *    1.26  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
```

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         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr
*************************************************************************************************
* E.G. Elev (ft)         *  732.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.02  * Wt. n-Val.             *   0.038  *   0.027  *   0.070  *
* W.S. Elev (ft)         *  729.87  * Reach Len. (ft)        *  310.00  *  738.00  *  880.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1039.67  * 2901.07  *  612.35  *
* E.G. Slope (ft/ft)     *0.001683  * Area (sq ft)           * 1039.67  * 2901.07  *  612.35  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 2157.67  *42032.75  * 1309.59  *
* Top Width (ft)         * 1035.82  * Top Width (ft)         *  706.58  *  170.34  *  158.90  *
* Vel Total (ft/s)       *    9.99  * Avg. Vel. (ft/s)       *    2.08  *   14.49  *    2.14  *
* Max Chl Dpth (ft)      *   23.08  * Hydr. Depth (ft)       *    1.47  *   17.03  *    3.85  *
* Conv. Total (cfs)      *1109052.0  * Conv. (cfs)            * 52592.7  *1024539.0  * 31920.9  *
* Length Wtd. (ft)       *  716.35  * Wetted Per. (ft)       *  706.59  *  178.46  *  159.12  *
* Min Ch El (ft)         *  706.79  * Shear (lb/sq ft)       *    0.15  *    1.71  *    0.40  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *    0.32  *   24.75  *    0.86  *
* Frctn Loss (ft)        *    0.83  * Cum Volume (acre-ft)   *   28.73  *  178.17  *   17.05  *
* C & E Loss (ft)        *    0.43  * Cum SA (acres)         *   19.31  *   10.86  *    8.25  *
*************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr
*************************************************************************************************
* E.G. Elev (ft)         *  734.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.83  * Wt. n-Val.             *   0.038  *   0.027  *   0.070  *
* W.S. Elev (ft)         *  731.29  * Reach Len. (ft)        *  310.00  *  738.00  *  880.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2083.87  * 3143.69  *  845.86  *
* E.G. Slope (ft/ft)     *0.001541  * Area (sq ft)           * 2083.87  * 3143.69  *  845.86  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 6367.36  *45974.85  * 2057.79  *
* Top Width (ft)         * 1081.38  * Top Width (ft)         *  741.82  *  170.34  *  169.22  *
* Vel Total (ft/s)       *    8.96  * Avg. Vel. (ft/s)       *    3.06  *   14.62  *    2.43  *
* Max Chl Dpth (ft)      *   24.50  * Hydr. Depth (ft)       *    2.81  *   18.46  *    5.00  *
* Conv. Total (cfs)      *1385941.0  * Conv. (cfs)            *162220.3  *1171294.0  * 52426.1  *
* Length Wtd. (ft)       *  682.90  * Wetted Per. (ft)       *  741.88  *  178.46  *  169.54  *
* Min Ch El (ft)         *  706.79  * Shear (lb/sq ft)       *    0.27  *    1.69  *    0.48  *
* Alpha                  *    2.27  * Stream Power (lb/ft s) *    0.83  *   24.78  *    1.17  *
* Frctn Loss (ft)        *    0.69  * Cum Volume (acre-ft)   *   61.35  *  194.58  *   30.22  *
* C & E Loss (ft)        *    0.44  * Cum SA (acres)         *   21.99  *   10.91  *    9.36  *
*************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #200-yr
*************************************************************************************************
* E.G. Elev (ft)         *  735.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.61  * Wt. n-Val.             *   0.038  *   0.027  *   0.074  *
* W.S. Elev (ft)         *  732.51  * Reach Len. (ft)        *  310.00  *  738.00  *  880.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2997.69  * 3351.57  * 1863.14  *
* E.G. Slope (ft/ft)     *0.001410  * Area (sq ft)           * 2997.69  * 3351.57  * 1863.14  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *11020.62  *48940.80  * 3038.57  *
* Top Width (ft)         * 2681.13  * Top Width (ft)         *  756.65  *  170.34  * 1754.13  *
* Vel Total (ft/s)       *    7.67  * Avg. Vel. (ft/s)       *    3.68  *   14.60  *    1.63  *
* Max Chl Dpth (ft)      *   25.72  * Hydr. Depth (ft)       *    3.96  *   19.68  *    1.06  *
* Conv. Total (cfs)      *1677573.0  * Conv. (cfs)            *293458.7  *1303203.0  * 80911.6  *
* Length Wtd. (ft)       *  657.58  * Wetted Per. (ft)       *  756.77  *  178.46  * 1755.93  *
* Min Ch El (ft)         *  706.79  * Shear (lb/sq ft)       *    0.35  *    1.65  *    0.09  *
* Alpha                  *    2.86  * Stream Power (lb/ft s) *    1.28  *   24.15  *    0.15  *
* Frctn Loss (ft)        *    0.61  * Cum Volume (acre-ft)   *   88.01  *  207.58  *   51.59  *
* C & E Loss (ft)        *    0.41  * Cum SA (acres)         *   22.05  *   10.93  *   38.65  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	736.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.27	Wt. n-Val.	0.038	0.027	0.088
W.S. Elev (ft)	734.07	Reach Len. (ft)	310.00	738.00	880.00
Crit W.S. (ft)		Flow Area (sq ft)	4191.17	3616.50	4647.69
E.G. Slope (ft/ft)	0.001238	Area (sq ft)	4191.17	3616.50	4647.69
Q Total (cfs)	75900.00	Flow (cfs)	17706.92	52053.36	6139.73
Top Width (ft)	2806.14	Top Width (ft)	778.75	170.34	1857.05
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)	4.22	14.39	1.32
Max Chl Dpth (ft)	27.28	Hydr. Depth (ft)	5.38	21.23	2.50
Conv. Total (cfs)	2157109.0	Conv. (cfs)	503237.9	1479377.0	174493.5
Length Wtd. (ft)	634.41	Wetted Per. (ft)	778.92	178.46	1862.99
Min Ch El (ft)	706.79	Shear (lb/sq ft)	0.42	1.57	0.19
Alpha	3.94	Stream Power (lb/ft s)	1.76	22.54	0.25
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	119.46	223.00	110.06
C & E Loss (ft)	0.33	Cum SA (acres)	22.12	10.93	43.15

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	731.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.27	Wt. n-Val.	0.038	0.027	0.070
W.S. Elev (ft)	728.02	Reach Len. (ft)	310.00	738.00	880.00
Crit W.S. (ft)	723.90	Flow Area (sq ft)	8.50	2586.19	327.96
E.G. Slope (ft/ft)	0.001994	Area (sq ft)	8.50	2586.19	327.96
Q Total (cfs)	38300.00	Flow (cfs)	1.12	37772.61	526.27
Top Width (ft)	728.23	Top Width (ft)	409.09	170.34	148.80
Vel Total (ft/s)	13.10	Avg. Vel. (ft/s)	0.13	14.61	1.60
Max Chl Dpth (ft)	21.23	Hydr. Depth (ft)	0.02	15.18	2.20
Conv. Total (cfs)	857804.3	Conv. (cfs)	25.1	845992.3	11786.9
Length Wtd. (ft)	716.18	Wetted Per. (ft)	409.09	178.46	148.86
Min Ch El (ft)	706.79	Shear (lb/sq ft)	0.00	1.80	0.27
Alpha	1.23	Stream Power (lb/ft s)	0.00	26.34	0.44
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)	17.25	161.95	5.29
C & E Loss (ft)	0.62	Cum SA (acres)	5.28	10.78	4.55

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Blue River
REACH: Main RS: 0.468

INPUT
Description: COE River Station= 65382.65
Preliminary Model River Station
(miles)=.46

Underwater channel based on MO River soundings
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	730	429.66	730	494.24	730	698.11	730	830	730
970.3	724	1175.62	722	1199.63	720	1201.46	718	1230.16	716
1256.23	707.31	1351.53	707.31	1377.6	716	1385.87	718	1391.09	720
1396.22	722	1403.84	724	1405.01	726	1409.36	728	1431.5	728
1571.51	728	1582.89	730	1603.05	732	1620.96	734	1684.26	734
1700.27	734	1721.79	734	1772.63	734	1800.45	736	1825.07	738
1851.39	738	2056.41	738	2127.74	738	2298.44	736	2321.62	736

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 2665.61     736 2860.13     736 2870.38     736 3118.38     736 3185.78     736
 3306.91     736  3315.8     738 3321.56     740 3400.25     740 3408.86     738
 3417.04     736 3425.39     734 3433.79     732 3442.56     730 3452.87     728
 3462.64     726 3616.66     726 3690.85     726  3706.5     724 3721.92     722
 3736.68     720 3760.85     716 3799.94     716  3833.8     722 3845.44     724
 3855.83     726 3863.25     728 3870.43     730  3875.6     732 3884.18     734
 3924.47     736 3928.14     738 3932.04     740 3935.42     742 3939.19     744
 3942.78     746 3946.35     748 3950.72     750 3956.09     752 3992.59     752
 3997.09     752 4006.36     754 4013.54     756 4016.91     758  4021.6     760
 4023.89     762 4025.89     764 4027.53     766  4028.3     768 4030.81     770
 4032.48     772    4033     776    4034     774 4035.45     778 4035.82     780
 4036.55     784 4037.24     782  4038.2     786 4039.67     788

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .038 1175.62    .027 1409.36     .07 1825.07     .15 3400.25     .05
 3932.04     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1175.62 1409.36              750    1145     720             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
*************************
    2188 4039.67   732.7

CROSS SECTION OUTPUT  Profile #2-yr
***********************************************************************************************
* E.G. Elev (ft)         *  720.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.83  * Wt. n-Val.             *          *   0.027  *          *
* W.S. Elev (ft)         *  719.75  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1714.88  *          *
* E.G. Slope (ft/ft)     *0.000965  * Area (sq ft)           *          * 1714.88  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)              *          *12500.00  *          *
* Top Width (ft)         *  190.58  * Top Width (ft)          *          *  190.58  *          *
* Vel Total (ft/s)       *    7.29  * Avg. Vel. (ft/s)        *          *    7.29  *          *
* Max Chl Dpth (ft)      *   12.44  * Hydr. Depth (ft)        *          *    9.00  *          *
* Conv. Total (cfs)      *402364.1  * Conv. (cfs)             *          *402364.1  *          *
* Length Wtd. (ft)       * 1145.00  * Wetted Per. (ft)        *          *  194.81  *          *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)        *          *    0.53  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    3.87  *          *
* Frctn Loss (ft)        *    0.86  * Cum Volume (acre-ft)    *          *   48.57  *          *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *          *    5.35  *          *
***********************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
***********************************************************************************************
* E.G. Elev (ft)         *  724.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *   0.038  *   0.027  *          *
* W.S. Elev (ft)         *  723.30  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   86.81  * 2464.59  *          *
* E.G. Slope (ft/ft)     *0.000871  * Area (sq ft)           *   86.81  * 2464.59  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)              *   75.19  *19424.81  *          *
* Top Width (ft)         *  359.06  * Top Width (ft)          *  133.51  *  225.55  *          *
* Vel Total (ft/s)       *    7.64  * Avg. Vel. (ft/s)        *    0.87  *    7.88  *          *
* Max Chl Dpth (ft)      *   15.99  * Hydr. Depth (ft)        *    0.65  *   10.93  *          *
* Conv. Total (cfs)      *660734.4  * Conv. (cfs)             *  2547.7  *658186.6  *          *
* Length Wtd. (ft)       * 1144.24  * Wetted Per. (ft)        *  133.51  *  230.56  *          *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)        *    0.04  *    0.58  *          *
* Alpha                  *    1.06  * Stream Power (lb/ft s)  *    0.03  *    4.58  *          *
* Frctn Loss (ft)        *    0.82  * Cum Volume (acre-ft)    *    0.75  *   70.56  *          *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *    1.15  *    6.77  *          *
***********************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
***********************************************************************************************
* E.G. Elev (ft)         *  726.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.038  *   0.027  *          *
* W.S. Elev (ft)         *  725.61  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  567.11  * 2992.36  *          *
* E.G. Slope (ft/ft)     *0.000807  * Area (sq ft)           *  567.11  * 2992.36  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)              * 1107.87  *25492.13  *          *
* Top Width (ft)         *  472.22  * Top Width (ft)          *  243.06  *  229.16  *          *
* Vel Total (ft/s)       *    7.47  * Avg. Vel. (ft/s)        *    1.95  *    8.52  *          *
* Max Chl Dpth (ft)      *   18.30  * Hydr. Depth (ft)        *    2.33  *   13.06  *          *
* Conv. Total (cfs)      *936531.6  * Conv. (cfs)             * 39006.0  *897525.6  *          *
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* Length Wtd. (ft)       * 1136.77  * Wetted Per. (ft)       *  243.10  *  235.19  *          *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)       *    0.12  *    0.64  *          *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *    0.23  *    5.46  *          *
* Frctn Loss (ft)        *    0.79  * Cum Volume (acre-ft)   *    4.88  *   86.87  *          *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *    2.09  *    7.15  *          *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  728.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.038  *   0.027  *          *
* W.S. Elev (ft)         *  727.64  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1106.94  * 3459.52  *          *
* E.G. Slope (ft/ft)     *0.000767  * Area (sq ft)           * 1106.94  * 3459.52  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             * 2925.22  *31274.78  *          *
* Top Width (ft)         *  523.34  * Top Width (ft)         *  290.38  *  232.95  *          *
* Vel Total (ft/s)       *    7.49  * Avg. Vel. (ft/s)       *    2.64  *    9.04  *          *
* Max Chl Dpth (ft)      *   20.33  * Hydr. Depth (ft)       *    3.81  *   14.85  *          *
* Conv. Total (cfs)      *1234676.0  * Conv. (cfs)           *105605.3  *1129071.0  *          *
* Length Wtd. (ft)       * 1128.11  * Wetted Per. (ft)       *  290.47  *  239.55  *          *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)       *    0.18  *    0.69  *          *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *    0.48  *    6.25  *          *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   *    9.53  *  101.35  *          *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    2.50  *    7.30  *          *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  731.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.59  * Wt. n-Val.             *   0.038  *   0.027  *   0.070  *
* W.S. Elev (ft)         *  730.04  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1902.70  * 4020.39  *  342.26  *
* E.G. Slope (ft/ft)     *0.000850  * Area (sq ft)           * 1902.70  * 4020.39  *  342.26  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             * 2989.50  *42178.11  *  332.39  *
* Top Width (ft)         * 1583.27  * Top Width (ft)         * 1175.62  *  233.74  *  173.91  *
* Vel Total (ft/s)       *    7.26  * Avg. Vel. (ft/s)       *    1.57  *   10.49  *    0.97  *
* Max Chl Dpth (ft)      *   22.73  * Hydr. Depth (ft)       *    1.62  *   17.20  *    1.97  *
* Conv. Total (cfs)      *1560820.0  * Conv. (cfs)           *102551.1  *1446867.0  * 11402.2  *
* Length Wtd. (ft)       * 1127.82  * Wetted Per. (ft)       * 1175.80  *  240.42  *  174.09  *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)       *    0.09  *    0.89  *    0.10  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *    0.13  *    9.31  *    0.10  *
* Frctn Loss (ft)        *    0.80  * Cum Volume (acre-ft)   *   18.26  *  119.54  *    7.41  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   12.61  *    7.44  *    4.89  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  732.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.36  * Wt. n-Val.             *   0.038  *   0.027  *   0.070  *
* W.S. Elev (ft)         *  731.62  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 3765.72  * 4390.80  *  630.52  *
* E.G. Slope (ft/ft)     *0.000722  * Area (sq ft)           * 3765.72  * 4390.80  *  630.52  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 8586.36  *45014.16  *  799.48  *
* Top Width (ft)         * 1599.25  * Top Width (ft)         * 1175.62  *  233.74  *  189.89  *
* Vel Total (ft/s)       *    6.19  * Avg. Vel. (ft/s)       *    2.28  *   10.25  *    1.27  *
* Max Chl Dpth (ft)      *   24.31  * Hydr. Depth (ft)       *    3.20  *   18.78  *    3.32  *
* Conv. Total (cfs)      *2025215.0  * Conv. (cfs)           *319654.8  *1675797.0  * 29763.4  *
* Length Wtd. (ft)       * 1100.99  * Wetted Per. (ft)       * 1177.38  *  240.42  *  190.14  *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)       *    0.14  *    0.82  *    0.15  *
* Alpha                  *    2.29  * Stream Power (lb/ft s) *    0.33  *    8.43  *    0.19  *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   *   40.54  *  130.76  *   15.31  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   15.17  *    7.48  *    5.73  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION OUTPUT  Profile #200-yr
*****************************************************************************************
* E.G. Elev (ft)         *  734.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.             *   0.038  *   0.027  *   0.070  *
* W.S. Elev (ft)         *  732.86  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 5223.84  * 4680.70  *  946.43  *
* E.G. Slope (ft/ft)     *0.000653  * Area (sq ft)           * 5223.84  * 4680.70  *  946.43  *
* Q Total (cfs)          *63000.00  * Flow (cfs)             *14084.81  *47640.19  * 1275.00  *
```

```
* Top Width (ft)         * 2059.91  * Top Width (ft)         * 1175.62  *  233.74  *  650.55  *
* Vel Total (ft/s)       *    5.81  * Avg. Vel. (ft/s)       *    2.70  *   10.18  *    1.35  *
* Max Chl Dpth (ft)      *   25.55  * Hydr. Depth (ft)       *    4.44  *   20.03  *    1.45  *
* Conv. Total (cfs)      *2465291.0  * Conv. (cfs)           *551161.2  *1864237.0  * 49892.7  *
* Length Wtd. (ft)       * 1079.13  * Wetted Per. (ft)       * 1178.62  *  240.42  *  650.91  *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)       *    0.18  *    0.79  *    0.06  *
* Alpha                  *    2.37  * Stream Power (lb/ft s) *    0.49  *    8.08  *    0.08  *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   *   58.76  *  139.54  *   23.21  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   15.17  *    7.51  *   14.36  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION OUTPUT  Profile #500-yr
**********************************************************************************************
* E.G. Elev (ft)         *  735.48  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.              *   0.038  *   0.027  *   0.063  *
* W.S. Elev (ft)         *  734.29  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 6901.60  * 5014.28  * 1937.48  *
* E.G. Slope (ft/ft)     *0.000618  * Area (sq ft)           * 6901.60  * 5014.28  * 1937.48  *
* Q Total (cfs)          *75900.00  * Flow (cfs)             *21780.00  *51982.88  * 2137.12  *
* Top Width (ft)         * 2242.51  * Top Width (ft)         * 1175.62  *  233.74  *  833.15  *
* Vel Total (ft/s)       *    5.48  * Avg. Vel. (ft/s)       *    3.16  *   10.37  *    1.10  *
* Max Chl Dpth (ft)      *   26.98  * Hydr. Depth (ft)       *    5.87  *   21.45  *    2.33  *
* Conv. Total (cfs)      *3052892.0  * Conv. (cfs)           *876047.5  *2090884.0  * 85960.5  *
* Length Wtd. (ft)       * 1053.37  * Wetted Per. (ft)       * 1180.05  *  240.42  *  833.89  *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)       *    0.23  *    0.80  *    0.09  *
* Alpha                  *    2.55  * Stream Power (lb/ft s) *    0.71  *    8.34  *    0.10  *
* Frctn Loss (ft)        *    0.64  * Cum Volume (acre-ft)   *   79.99  *  149.88  *   43.55  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   15.17  *    7.51  *   15.98  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION OUTPUT  Profile #Design Discharge
**********************************************************************************************
* E.G. Elev (ft)         *  729.85  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.              *   0.038  *   0.027  *   0.070  *
* W.S. Elev (ft)         *  728.66  * Reach Len. (ft)        *  750.00  * 1145.00  *  720.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1415.11  * 3697.65  *  107.79  *
* E.G. Slope (ft/ft)     *0.000737  * Area (sq ft)           * 1415.11  * 3697.65  *  107.79  *
* Q Total (cfs)          *38300.00  * Flow (cfs)             * 4094.92  *34158.50  *   46.58  *
* Top Width (ft)         *  713.85  * Top Width (ft)         *  314.22  *  233.74  *  165.89  *
* Vel Total (ft/s)       *    7.34  * Avg. Vel. (ft/s)       *    2.89  *    9.24  *    0.43  *
* Max Chl Dpth (ft)      *   21.35  * Hydr. Depth (ft)       *    4.50  *   15.82  *    0.65  *
* Conv. Total (cfs)      *1411105.0  * Conv. (cfs)           *150871.2  *1258517.0  *  1716.1  *
* Length Wtd. (ft)       * 1123.63  * Wetted Per. (ft)       *  314.33  *  240.42  *  165.95  *
* Min Ch El (ft)         *  707.31  * Shear (lb/sq ft)       *    0.21  *    0.71  *    0.03  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    0.60  *    6.53  *    0.01  *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)   *   12.18  *  108.72  *    0.89  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.71  *    7.36  *    1.37  *
**********************************************************************************************

CROSS SECTION


RIVER: Blue River
REACH: Main               RS: 0.251

INPUT
Description: COE River Station= 66527.76
Preliminary Model River Station
             (miles)=.24

This section crosses a long road that runs
             perpendicular to the flow.
The channel bottom is based on
             soundings of the lower Blue River, provided by the COE.  This is a
             change from the old FL based on MO River soundings.  This FL was
             consideribly higher than the others immediately upstream.  It was
             decided to change this one based on the newer data.  The others
             were within a foot of the MO River soundings, and so were not
             changed
Station Elevation Data    num=      92
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     728  384.07     730  586.58     730  592.03     728  596.29     726
  599.71     724  605.31     722  612.79     720  620.48     718  627.73     716
  670.87   704.1  730.14   704.1  803.27     716  815.56     718   849.4     720
  884.79     722  910.32     724  914.72     726     918     728  920.67     730
  924.16     732  937.26     732 1041.61     730 1165.67     728 1483.32     728
 1491.58     730 1499.49     732 1507.55     734 1517.88     736 1528.14     738
 1654.79     738 1783.05     736 1867.06     736 2058.07     736  2163.9     736
  2177.2     738 2205.74     740 2237.37     742 2292.52     744  2343.8     744
 3715.64     744 4080.87     746 4236.22     746  4241.5     744 4245.96     742
 4249.37     740 4251.25     738 4256.47     736 4263.15     734 4270.66     732
 4278.26     730 4285.71     728 4291.58     726 4458.11     726 4592.36     726
  4601.5     724 4616.51     722 4630.21     720 4644.42     718 4657.27     716
 4688.11     716 4703.84     718 4743.23     722 4765.42     724 4768.56     726
 4772.64     728 4778.01     730 4781.66     732 4785.31     734  4789.7     736
 4794.62     738 4798.16     740 4857.65     742 4886.79     742 4935.61     740
  4949.7     740 4955.65     742 4961.99     744 4968.55     746 4976.65     748
 4984.45     750 5017.27     750 5029.85     750 5032.94     752 5037.73     754
    5043     756 5047.06     758 5050.98     760 5078.18     762 5084.26     764
 5087.61     766 5090.93     768

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
       0    .038  586.58    .025  924.16     .06 1528.14     .15 4236.22     .05
 4857.65     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
        586.58  924.16             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1600 5090.93     732

CROSS SECTION OUTPUT  Profile #2-yr
*****************************************************************************************
* E.G. Elev (ft)         *  719.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  719.04  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  712.81  * Flow Area (sq ft)      *          * 1981.02  *          *
* E.G. Slope (ft/ft)     *0.000601  * Area (sq ft)           *          * 1981.02  *          *
* Q Total (cfs)          *12500.00  * Flow (cfs)             *          *12500.00  *          *
* Top Width (ft)         *  216.60  * Top Width (ft)         *          *  216.60  *          *
* Vel Total (ft/s)       *    6.31  * Avg. Vel. (ft/s)       *          *    6.31  *          *
* Max Chl Dpth (ft)      *   14.94  * Hydr. Depth (ft)       *          *    9.15  *          *
* Conv. Total (cfs)      *509993.6  * Conv. (cfs)            *          *509993.6  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *          *  219.76  *          *
* Min Ch El (ft)         *  704.10  * Shear (lb/sq ft)       *          *    0.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.13  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *          *          *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #5-yr
*****************************************************************************************
* E.G. Elev (ft)         *  723.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  722.66  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  715.16  * Flow Area (sq ft)      *          * 2904.00  *          *
* E.G. Slope (ft/ft)     *0.000601  * Area (sq ft)           *          * 2904.00  *          *
* Q Total (cfs)          *19500.00  * Flow (cfs)             *          *19500.00  *          *
* Top Width (ft)         *  289.79  * Top Width (ft)         *          *  289.79  *          *
* Vel Total (ft/s)       *    6.71  * Avg. Vel. (ft/s)       *          *    6.71  *          *
* Max Chl Dpth (ft)      *   18.56  * Hydr. Depth (ft)       *          *   10.02  *          *
* Conv. Total (cfs)      *795385.6  * Conv. (cfs)            *          *795385.6  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *          *  293.57  *          *
* Min Ch El (ft)         *  704.10  * Shear (lb/sq ft)       *          *    0.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.49  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *          *          *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #10-yr
*****************************************************************************************
* E.G. Elev (ft)         *  725.84  * Element                *  Left OB *  Channel * Right OB *
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* Vel Head (ft)          *    0.84  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  725.00  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  717.09  * Flow Area (sq ft)      *          * 3617.01  *          *
* E.G. Slope (ft/ft)     *0.000601  * Area (sq ft)           *          * 3617.01  *          *
* Q Total (cfs)          *26600.00  * Flow (cfs)             *          *26600.00  *          *
* Top Width (ft)         *  314.51  * Top Width (ft)         *          *  314.51  *          *
* Vel Total (ft/s)       *    7.35  * Avg. Vel. (ft/s)        *          *    7.35  *          *
* Max Chl Dpth (ft)      *   20.90  * Hydr. Depth (ft)        *          *   11.50  *          *
* Conv. Total (cfs)      *1084909.0  * Conv. (cfs)            *          *1084909.0  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *          *  319.06  *          *
* Min Ch El (ft)         *  704.10  * Shear (lb/sq ft)        *          *    0.43  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.13  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #20-yr
*****************************************************************************************
* E.G. Elev (ft)         *  728.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.00  * Wt. n-Val.             *          *   0.025  *          *
* W.S. Elev (ft)         *  726.99  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  719.08  * Flow Area (sq ft)      *          * 4251.86  *          *
* E.G. Slope (ft/ft)     *0.000601  * Area (sq ft)           *          * 4251.86  *          *
* Q Total (cfs)          *34200.00  * Flow (cfs)             *          *34200.00  *          *
* Top Width (ft)         *  322.16  * Top Width (ft)         *          *  322.16  *          *
* Vel Total (ft/s)       *    8.04  * Avg. Vel. (ft/s)        *          *    8.04  *          *
* Max Chl Dpth (ft)      *   22.89  * Hydr. Depth (ft)        *          *   13.20  *          *
* Conv. Total (cfs)      *1395406.0  * Conv. (cfs)            *          *1395406.0  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *          *  327.70  *          *
* Min Ch El (ft)         *  704.10  * Shear (lb/sq ft)        *          *    0.49  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.91  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #50-yr
*****************************************************************************************
* E.G. Elev (ft)         *  730.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *   0.038  *   0.025  *   0.060  *
* W.S. Elev (ft)         *  729.51  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  721.52  * Flow Area (sq ft)      *  218.40  * 5075.29  *  554.32  *
* E.G. Slope (ft/ft)     *0.000601  * Area (sq ft)           *  218.40  * 5075.29  *  554.32  *
* Q Total (cfs)          *45500.00  * Flow (cfs)             *  172.82  *44920.80  *  406.38  *
* Top Width (ft)         * 1039.15  * Top Width (ft)         *  289.62  *  332.09  *  417.43  *
* Vel Total (ft/s)       *    7.78  * Avg. Vel. (ft/s)        *    0.79  *    8.85  *    0.73  *
* Max Chl Dpth (ft)      *   25.41  * Hydr. Depth (ft)        *    0.75  *   15.28  *    1.33  *
* Conv. Total (cfs)      *1856367.0  * Conv. (cfs)            *  7050.9  *1832736.0  * 16580.0  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *  291.14  *  338.91  *  417.62  *
* Min Ch El (ft)         *  704.10  * Shear (lb/sq ft)        *    0.03  *    0.56  *    0.05  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    0.02  *    4.97  *    0.04  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         *  732.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.             *   0.038  *   0.025  *   0.060  *
* W.S. Elev (ft)         *  730.95  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  722.99  * Flow Area (sq ft)      *  943.12  * 5558.32  * 1221.96  *
* E.G. Slope (ft/ft)     *0.000600  * Area (sq ft)           *  943.12  * 5558.32  * 1221.96  *
* Q Total (cfs)          *54400.00  * Flow (cfs)             * 1235.92  *51825.68  * 1338.40  *
* Top Width (ft)         * 1425.80  * Top Width (ft)         *  586.58  *  335.75  *  503.47  *
* Vel Total (ft/s)       *    7.04  * Avg. Vel. (ft/s)        *    1.31  *    9.32  *    1.10  *
* Max Chl Dpth (ft)      *   26.85  * Hydr. Depth (ft)        *    1.61  *   16.55  *    2.43  *
* Conv. Total (cfs)      *2220349.0  * Conv. (cfs)            * 50444.5  *2115278.0  * 54627.0  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *  589.54  *  343.08  *  503.85  *
* Min Ch El (ft)         *  704.10  * Shear (lb/sq ft)        *    0.06  *    0.61  *    0.09  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *    0.08  *    5.66  *    0.10  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

CROSS SECTION OUTPUT Profile #200-yr

E.G. Elev (ft)	733.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.34	Wt. n-Val.	0.038	0.025	0.060
W.S. Elev (ft)	732.08	Reach Len. (ft)			
Crit W.S. (ft)	724.19	Flow Area (sq ft)	1601.41	5936.21	1861.67
E.G. Slope (ft/ft)	0.000601	Area (sq ft)	1601.41	5936.21	1861.67
Q Total (cfs)	63000.00	Flow (cfs)	2984.65	57624.78	2390.57
Top Width (ft)	2011.21	Top Width (ft)	586.58	337.58	1087.05
Vel Total (ft/s)	6.70	Avg. Vel. (ft/s)	1.86	9.71	1.28
Max Chl Dpth (ft)	27.98	Hydr. Depth (ft)	2.73	17.58	1.71
Conv. Total (cfs)	2570024.0	Conv. (cfs)	121756.0	2350747.0	97520.9
Length Wtd. (ft)		Wetted Per. (ft)	590.66	345.18	1087.62
Min Ch El (ft)	704.10	Shear (lb/sq ft)	0.10	0.65	0.06
Alpha	1.92	Stream Power (lb/ft s)	0.19	6.26	0.08
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #500-yr

E.G. Elev (ft)	734.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.	0.038	0.025	0.059
W.S. Elev (ft)	733.42	Reach Len. (ft)			
Crit W.S. (ft)	725.64	Flow Area (sq ft)	2389.95	6390.02	3331.68
E.G. Slope (ft/ft)	0.000601	Area (sq ft)	2389.95	6390.02	3331.68
Q Total (cfs)	75900.00	Flow (cfs)	5807.20	65140.53	4952.28
Top Width (ft)	2024.13	Top Width (ft)	586.58	337.58	1099.97
Vel Total (ft/s)	6.27	Avg. Vel. (ft/s)	2.43	10.19	1.49
Max Chl Dpth (ft)	29.32	Hydr. Depth (ft)	4.07	18.93	3.03
Conv. Total (cfs)	3096833.0	Conv. (cfs)	236942.2	2657831.0	202060.3
Length Wtd. (ft)		Wetted Per. (ft)	592.00	345.18	1101.22
Min Ch El (ft)	704.10	Shear (lb/sq ft)	0.15	0.69	0.11
Alpha	2.29	Stream Power (lb/ft s)	0.37	7.08	0.17
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Design Discharge

E.G. Elev (ft)	729.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.025	
W.S. Elev (ft)	727.99	Reach Len. (ft)			
Crit W.S. (ft)	720.01	Flow Area (sq ft)		4574.84	
E.G. Slope (ft/ft)	0.000600	Area (sq ft)		4574.84	
Q Total (cfs)	38300.00	Flow (cfs)		38300.00	
Top Width (ft)	325.92	Top Width (ft)		325.92	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	23.89	Hydr. Depth (ft)		14.04	
Conv. Total (cfs)	1562988.0	Conv. (cfs)		1562988.0	
Length Wtd. (ft)		Wetted Per. (ft)		331.96	
Min Ch El (ft)	704.10	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		4.33	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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SUMMARY OF MANNING'S N VALUES

River:Blue River

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	n11	n12	n13	n14	n15	n16
Main	33.310	.06	.1	.04	.1												
Main	33.307	.06	.1	.04	.1												

*Main	*	33.302	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	33.296	*	.06*	.1*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	33.166	*	.06*	.04*	.12*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	33.041	*	.06*	.1*	.04*	.12*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	32.901	*	.06*	.1*	.04*	.11*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	32.784	*	.06*	.1*	.04*	.1*	.09*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	32.650	*	.06*	.1*	.04*	.09*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	32.461	*	.07*	.04*	.1*	.1*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	32.316	*	.07*	.04*	.06*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	32.140	*	.07*	.04*	.06*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	31.796	*	.075*	.1*	.075*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	31.684	*	.06*	.09*	.06*	.04*	.09*	.06*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	31.680	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	31.677	*	.06*	.09*	.06*	.04*	.09*	.06*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	31.429	*	.06*	.1*	.06*	.04*	.11*	.06*	.1*	*	*	*	*	*	*	*	*	*	*
*Main	*	31.307	*	.06*	.0765*	.04*	.1*	.06*	.11*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	31.127	*	.06*	.1*	.04*	.06*	.11*	.1*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	30.893	*	.06*	.1*	.04*	.11*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	30.733	*	.06*	.11*	.04*	.1*	.09*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	30.476	*	.06*	.1*	.1*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	30.343	*	.06*	.1*	.1*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	30.213	*	.06*	.1*	.1*	.04*	.1*	.06*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	29.990	*	.06*	.1*	.04*	.1*	.06*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	29.973	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	29.957	*	.06*	.1*	.04*	.1*	.06*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	29.832	*	.06*	.11*	.04*	.1*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	29.673	*	.075*	.1*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	29.498	*	.075*	.1*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	29.330	*	.075*	.1*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	28.975	*	.1*	.04*	.1*	.06*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	28.740	*	.06*	.09*	.04*	.06*	.11*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	28.515	*	.06*	.04*	.1255*	.075*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	28.510	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	28.505	*	.06*	.04*	.1255*	.075*	.1036*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	28.289	*	.06*	.1*	.04*	.12*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	28.010	*	.06*	.12*	.04*	.1*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	27.865	*	.06*	.12*	.04*	.1*	.075*	.1*	.1*	*	*	*	*	*	*	*	*	*	*
*Main	*	27.702	*	.1*	.12*	.04*	.1*	.075*	.12*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	27.510	*	.06*	.1*	.04*	.1*	.06*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	27.323	*	.06*	.1*	.04*	.1*	.06*	*	*	*	*	*	*	*	*	*	*	*	*

Main		27.179		.075	.06	.04	.12	.06											
Main		27.173	Bridge																
Main		27.168		.075	.06	.04	.12	.06											
Main		26.936		.06	.1	.04	.1	.07	.09										
Main		26.933	Bridge																
Main		26.930		.06	.1	.04	.1	.07	.09										
Main		26.737		.09	.1	.04	.105	.1	.1										
Main		26.518		.09	.1	.04	.105	.1	.06										
Main		26.514	Bridge																
Main		26.512		.09	.1	.04	.105	.1	.06										
Main		26.295		.09	.1	.04	.105	.06											
Main		26.154		.09	.1	.04	.1												
Main		25.977		.09	.1	.1	.04	.1											
Main		25.804		.09	.1	.04	.09	.1											
Main		25.584		.09	.1	.04	.09	.1											
Main		25.402		.09	.1	.04	.06	.1											
Main		25.238		.09	.04	.1	.06	.1											
Main		25.145		.09	.1	.04	.1												
Main		24.865		.09	.1	.04	.1												
Main		24.653		.09	.1	.04	.1												
Main		24.476		.09	.04	.1													
Main		24.326		.09	.1	.04	.1												
Main		24.165		.09	.1	.04	.1												
Main		24.059		.09	.1	.04	.1	.07	.1										
Main		23.923		.1	.04	.1	.06	.1											
Main		23.802		.09	.1	.04	.105	.07	.105										
Main		23.689		.1	.04	.105	.1												
Main		23.540		.1	.04	.1	.06	.1											
Main		23.452		.1	.04	.09	.1	.09											
Main		23.284		.07	.1	.04	.1	.08	.1	.09									
Main		23.126		.1	.04	.1	.07	.11	.1										
Main		23.039		.105	.1	.095	.04	.1	.07	.105	.1								
Main		23.035	Bridge																
Main		23.030		.105	.1	.095	.04	.099	.07	.105	.1								
Main		22.909		.105	.04	.105	.06	.1											
Main		22.765		.1	.04	.105	.06	.1											
Main		22.588		.105	.04	.099	.06	.1	.105										
Main		22.402		.105	.09	.04	.07	.06	.09										
Main		22.262		.1	.1	.04	.1013	.1											
Main		22.024		.07	.1013	.06	.1	.04	.1										

Main	21.891	.1	.1	.065	.04	.1													
Main	21.772	.06	.1	.07	.04	.1													
Main	21.597	.07	.04	.07															
Main	21.573	Bridge																	
Main	21.557	.07	.04	.07															
Main	21.438	.06	.1	.09	.04	.1													
Main	21.337	.06	.1	.09	.04	.1													
Main	21.126	.06	.1	.04	.105														
Main	21.122	Bridge																	
Main	21.116	.06	.1	.04	.1														
Main	20.940	.1	.04	.105	.1														
Main	20.768	.09	.1	.04	.09	.1													
Main	20.625	.1	.04	.1	.09														
Main	20.549	.1	.04	.1	.06	.1													
Main	20.400	.1	.14	.038	.125	.06													
Main	20.395	Bridge																	
Main	20.392	.1	.14	.038	.125	.06													
Main	20.302	.1	.14	.038	.06	.14													
Main	20.195	.1	.14	.038	.125	.1	.14												
Main	20.087	.105	.06	.105	.038	.105	.05	.125											
Main	20.004	.06	.038	.06	.105														
Main	19.995	Bridge																	
Main	19.986	.06	.038	.08	.06														
Main	19.840	.055	.038	.105	.06	.105													
Main	19.723	.055	.11	.038	.13														
Main	19.719	Bridge																	
Main	19.715	.055	.11	.038	.13														
Main	19.581	.075	.042	.14															
Main	19.502	.075	.042	.14															
Main	19.424	.075	.042	.14															
Main	19.334	.14	.075	.042	.12														
Main	19.285	.12	.075	.042	.14	.0684	.15												
Main	19.247	.12	.075	.09	.042	.09													
Main	19.235	.12	.075	.042	.09	.15													
Main	19.230	Bridge																	
Main	19.225	.12	.075	.042	.09	.15													
Main	19.180	.1	.075	.042	.12														
Main	19.092	.1	.075	.042	.15														
Main	18.977	.09	.075	.14	.042	.14													
Main	18.877	.09	.075	.14	.042	.14													
Main	18.806	.12	.075	.14	.042	.14													

*Main	*	18.677	*	.12*	.075*	.042*	.14*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.578	*	.09*	.075*	.12*	.042*	.14*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.519	*	.12*	.075*	.1*	.042*	.14*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.447	*	.14*	.075*	.09*	.042*	.12*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.425	*	.09*	.042*	.09*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.414	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.401	*	.09*	.042*	.09*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.346	*	.09*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.306	*	.075*	.09*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.272	*	.075*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.266	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.261	*	.075*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.253	*	.075*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.248	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.243	*	.075*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.173	*	.075*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.166	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.160	*	.075*	.042*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	18.038	*	.09*	.075*	.09*	.042*	.14*	*	*	*	*	*	*	*	*	*	*
*Main	*	17.922	*	.14*	.09*	.075*	.09*	.042*	.14*	*	*	*	*	*	*	*	*	*
*Main	*	17.742	*	.14*	.075*	.09*	.042*	.14*	*	*	*	*	*	*	*	*	*	*
*Main	*	17.537	*	.09*	.14*	.075*	.09*	.042*	.15*	*	*	*	*	*	*	*	*	*
*Main	*	17.349	*	.075*	.065*	.085*	.042*	.114*	*	*	*	*	*	*	*	*	*	*
*Main	*	17.175	*	.1*	.065*	.085*	.042*	.14*	*	*	*	*	*	*	*	*	*	*
*Main	*	16.989	*	.15*	.072*	.042*	.15*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	16.874	*	.15*	.15*	.072*	.042*	.15*	*	*	*	*	*	*	*	*	*	*
*Main	*	16.724	*	.15*	.15*	.09*	.15*	.042*	.15*	*	*	*	*	*	*	*	*	*
*Main	*	16.579	*	.15*	.15*	.15*	.042*	.072*	.15*	*	*	*	*	*	*	*	*	*
*Main	*	16.407	*	.15*	.15*	.15*	.042*	.15*	.09*	.072*	.15*	*	*	*	*	*	*	*
*Main	*	16.218	*	.15*	.042*	.15*	.09*	.072*	.15*	*	*	*	*	*	*	*	*	*
*Main	*	16.080	*	.15*	.042*	.15*	.072*	.15*	*	*	*	*	*	*	*	*	*	*
*Main	*	15.882	*	.15*	.072*	.042*	.15*	.072*	.15*	*	*	*	*	*	*	*	*	*
*Main	*	15.879	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	15.876	*	.148*	.072*	.042*	.15*	.072*	.15*	*	*	*	*	*	*	*	*	*
*Main	*	15.731	*	.148*	.072*	.15*	.042*	.15*	.072*	.15*	*	*	*	*	*	*	*	*
*Main	*	15.597	*	.148*	.072*	.15*	.042*	.15*	.11*	.15*	*	*	*	*	*	*	*	*
*Main	*	15.363	*	.148*	.072*	.042*	.09*	.15*	*	*	*	*	*	*	*	*	*	*
*Main	*	15.360	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	15.357	*	.148*	.072*	.042*	.09*	.15*	*	*	*	*	*	*	*	*	*	*
*Main	*	15.100	*	.15*	.042*	.15*	.09*	.15*	*	*	*	*	*	*	*	*	*	*
*Main	*	15.023	*	.12*	.042*	.1*	.06*	.13*	*	*	*	*	*	*	*	*	*	*

*Main	*	15.017	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	15.009	*	.12*	.042*	.1*	.06*	.13*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	14.875	*	.11*	.042*	.07*	.15*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	14.656	*	.11*	.042*	.12*	.07*	.15*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	14.403	*	.11*	.13*	.042*	.12*	.07*	.15*	*	*	*	*	*	*	*	*	*	*
*Main	*	14.149	*	.11*	.13*	.042*	.11*	.05*	.13*	*	*	*	*	*	*	*	*	*	*
*Main	*	13.954	*	.11*	.13*	.042*	.12*	.08*	.12*	*	*	*	*	*	*	*	*	*	*
*Main	*	13.803	*	.11*	.038*	.11*	.05*	.13*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	13.702	*	.11*	.038*	.11*	.05*	.09*	.05*	.13*	*	*	*	*	*	*	*	*	*
*Main	*	13.616	*	.11*	.038*	.11*	.06*	.09*	.05*	.13*	*	*	*	*	*	*	*	*	*
*Main	*	13.570	*	.11*	.038*	.09*	.05*	.1*	.05*	.13*	*	*	*	*	*	*	*	*	*
*Main	*	13.564	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	13.558	*	.11*	.038*	.09*	.05*	.1*	.05*	.13*	*	*	*	*	*	*	*	*	*
*Main	*	13.471	*	.12*	.038*	.1*	.05*	.1*	.05*	.13*	*	*	*	*	*	*	*	*	*
*Main	*	13.307	*	.12*	.035*	.1*	.06*	.08*	.12*	*	*	*	*	*	*	*	*	*	*
*Main	*	13.174	*	.13*	.15*	.035*	.1*	.05*	.1*	*	*	*	*	*	*	*	*	*	*
*Main	*	13.072	*	.13*	.15*	.035*	.1*	.05*	.12*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.988	*	.13*	.035*	.1*	.05*	.12*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.836	*	.12*	.035*	.12*	.05*	.15*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.743	*	.12*	.03*	.12*	.05*	.15*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.708	*	.05*	.12*	.03*	.12*	.05*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.700	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.690	*	.05*	.12*	.035*	.12*	.05*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.616	*	.05*	.1*	.035*	.1*	.06*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.536	*	.075*	.08*	.035*	.12*	.12*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.453	*	.075*	.08*	.035*	.12*	.06*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.356	*	.075*	.12*	.035*	.12*	.05*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.254	*	.075*	.12*	.035*	.12*	.06*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.189	*	.075*	.12*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.096	*	.075*	.1*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.054	*	.075*	.1*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	12.010	*	.075*	.1*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	11.965	*	.12*	.075*	.1*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	11.925	*	.15*	.075*	.1*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	11.871	*	.12*	.075*	.1*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	11.788	*	.15*	.06*	.1*	.035*	.12*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	11.676	*	.15*	.05*	.12*	.05*	.075*	.035*	.12*	.075*	.15*	*	*	*	*	*	*	*
*Main	*	11.563	*	.12*	.06*	.05*	.1*	.035*	.12*	.075*	.15*	*	*	*	*	*	*	*	*
*Main	*	11.484	*	.1*	.07*	.05*	.1*	.035*	.1*	.075*	.15*	*	*	*	*	*	*	*	*

*Main	*	11.387	*	.075*	.1*	.035*	.1*	.075*	.15*	*	*	*	*	*	*	*	*	*
*Main	*	11.287	*	.075*	.1*	.12*	.035*	.1*	.075*	.12*	*	*	*	*	*	*	*	*
*Main	*	11.184	*	.075*	.12*	.03*	.035*	.1*	.075*	.12*	*	*	*	*	*	*	*	*
*Main	*	11.1756*	*	.075*	.074*	.113*	.034*	.035*	.094*	.048*	.07*	.039*	.114*	.074*	.118*	*	*	*
*Main	*	11.1673*	*	.075*	.072*	.106*	.03*	.035*	.088*	.046*	.065*	.044*	.108*	.077*	.115*	*	*	*
*Main	*	11.1589*	*	.075*	.071*	.099*	.043*	.03*	.035*	.081*	.044*	.06*	.048*	.101*	.081*	.113*	*	*
*Main	*	11.1506*	*	.075*	.07*	.092*	.047*	.03*	.035*	.075*	.043*	.055*	.052*	.095*	.085*	.11*	*	*
*Main	*	11.1423*	*	.075*	.068*	.085*	.051*	.035*	.069*	.041*	.05*	.057*	.089*	.089*	.108*	*	*	*
*Main	*	11.1339*	*	.075*	.067*	.078*	.055*	.035*	.063*	.039*	.045*	.061*	.083*	.092*	.105*	*	*	*
*Main	*	11.1256*	*	.075*	.065*	.071*	.06*	.034*	.056*	.037*	.04*	.065*	.076*	.096*	.103*	*	*	*
*Main	*	11.1173*	*	.075*	.064*	.064*	.064*	.03*	.075*	.035*	.075*	.03*	.05*	.035*	.035*	.07*	.07*	.1*
*Main	*	11.117	*	.075*	.064*	.03*	.075*	.03*	.075*	.03*	.05*	.035*	.07*	.1*	*	*	*	*
*Main	*	11.089	*	.075*	.06*	.03*	.075*	.03*	.075*	.03*	.05*	.075*	.12*	*	*	*	*	*
*Main	*	10.996	*	.075*	.03*	.075*	.03*	.075*	.03*	.1*	*	*	*	*	*	*	*	*
*Main	*	10.817	*	.08*	.035*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.808	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.8039	*	.08*	.035*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.803	*	.08*	.035*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.798	*	.08*	.035*	.1*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.646	*	.05*	.1*	.03*	.075*	.03*	.075*	.03*	.06*	*	*	*	*	*	*	*
*Main	*	10.5152*	*	.05*	.084*	.1*	.03*	.035*	.03*	.053*	.097*	.1*	*	*	*	*	*	*
*Main	*	10.515	*	.05*	.084*	.1*	.03*	.035*	.03*	.053*	.097*	.1*	*	*	*	*	*	*
*Main	*	10.510	*	.05*	.084*	.1*	.03*	.035*	.03*	.053*	.097*	.1*	*	*	*	*	*	*
*Main	*	10.451	*	.05*	.1*	.03*	.05*	.12*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.287	*	.08*	.1*	.05*	.03*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.207	*	.08*	.05*	.03*	.06*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	10.125	*	.08*	.05*	.08*	.03*	.05*	.06*	*	*	*	*	*	*	*	*	*
*Main	*	9.977	*	.1*	.05*	.03*	.05*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.805	*	.05*	.03*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.608	*	.15*	.05*	.1*	.05*	.03*	.05*	.06*	*	*	*	*	*	*	*	*
*Main	*	9.473	*	.15*	.05*	.06*	.05*	.03*	.05*	.1*	*	*	*	*	*	*	*	*
*Main	*	9.315	*	.1*	.05*	.03*	.05*	.1*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.232	*	.065*	.05*	.03*	.05*	.1*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.138	*	.065*	.05*	.03*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.094	*	.05*	.03*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.092	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.089	*	.05*	.03*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.068	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.051	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*

*Main	*	9.049	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	9.047	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.983	*	.05*	.03*	.05*	.025*	.025*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.921	*	.05*	.03*	.05*	.025*	.04*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.866	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.863	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.858	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.849	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.845	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.843	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.840	*	.05*	.03*	.05*	.025*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.786	*	.05*	.027*	.05*	.065*	.08*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.687	*	.065*	.027*	.05*	.065*	.08*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.595	*	.065*	.027*	.05*	.065*	.08*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.479	*	.065*	.027*	.05*	.065*	.08*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.373	*	.065*	.027*	.05*	.065*	.08*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.275	*	.065*	.05*	.027*	.05*	.065*	.08*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.221	*	.05*	.04*	.027*	.04*	.05*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.213	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.205	*	.065*	.04*	.027*	.04*	.1*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.167	*	.065*	.027*	.05*	.1*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.116	*	.05*	.065*	.027*	.1*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	8.025	*	.05*	.06*	.027*	.1*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.944	*	.06*	.04*	.027*	.05*	.06*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.887	*	.06*	.04*	.027*	.04*	.05*	.065*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.826	*	.06*	.04*	.027*	.04*	.085*	.15*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.766	*	.06*	.04*	.027*	.04*	.075*	.15*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.678	*	.06*	.027*	.04*	.1*	.065*	.15*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.532	*	.06*	.027*	.04*	.1*	.065*	.15*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.463	*	.06*	.027*	.04*	.1*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.415	*	.06*	.027*	.04*	.15*	.04*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.381	*	.04*	.027*	.04*	.15*	.04*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.294	*	.04*	.027*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.285	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.275	*	.04*	.027*	.05*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.132	*	.05*	.027*	.06*	.04*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.052	*	.05*	.027*	.06*	.04*	.07*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.047	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	7.042	*	.05*	.027*	.06*	.04*	.07*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.984	*	.075*	.027*	.06*	.075*	.04*	.07*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.918	*	.085*	.04*	.027*	.06*	.075*	.04*	.075*	*	*	*	*	*	*	*	*	*	*

*Main	*	6.839	*	.04*	.027*	.05*	.075*	.04*	.075*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.774	*	.14*	.04*	.027*	.04*	.075*	.04*	.075*	*	*	*	*	*	*	*	*	*
*Main	*	6.705	*	.14*	.04*	.027*	.04*	.04*	.075*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.663	*	.14*	.04*	.027*	.04*	.075*	.04*	.075*	*	*	*	*	*	*	*	*	*
*Main	*	6.568	*	.14*	.04*	.027*	.04*	.075*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.489	*	.14*	.04*	.027*	.04*	.075*	.05*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.457	*	.15*	.027*	.04*	.075*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.383	*	.15*	.027*	.04*	.075*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.314	*	.15*	.027*	.06*	.075*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.193	*	.05*	.027*	.04*	.15*	.04*	.06*	*	*	*	*	*	*	*	*	*	*
*Main	*	6.135	*	.04*	.027*	.04*	.15*	.04*	.075*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	6.062	*	.05*	.04*	.027*	.04*	.15*	.04*	.06*	.04*	*	*	*	*	*	*	*	*
*Main	*	5.969	*	.05*	.04*	.027*	.04*	.05*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.871	*	.05*	.027*	.04*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.866	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.861	*	.05*	.027*	.04*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.805	*	.05*	.027*	.05*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	5.732	*	.04*	.027*	.05*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	5.681	*	.05*	.027*	.05*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	5.638	*	.15*	.05*	.027*	.04*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*
*Main	*	5.570	*	.15*	.027*	.04*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	5.518	*	.15*	.027*	.04*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	5.459	*	.15*	.04*	.027*	.04*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*
*Main	*	5.390	*	.05*	.027*	.04*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	5.325	*	.1*	.027*	.04*	.15*	.04*	.15*	.05*	*	*	*	*	*	*	*	*	*
*Main	*	5.266	*	.1*	.028*	.05*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.264	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.262	*	.1*	.028*	.05*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.256	*	.1*	.04*	.028*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.251	*	.1*	.04*	.028*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.249	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.246	*	.1*	.04*	.028*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.224	*	.15*	.04*	.028*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.206	*	.15*	.04*	.028*	.05*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.185	*	.041*	.028*	.041*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.183	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.181	*	.041*	.028*	.041*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.089	*	.041*	.09*	.041*	.027*	.041*	.07*	.041*	*	*	*	*	*	*	*	*	*
*Main	*	5.011	*	.041*	.033*	.041*	.027*	.041*	.07*	.041*	*	*	*	*	*	*	*	*	*
*Main	*	5.007	*Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*Main	*	5.002	*	.041*	.033*	.041*	.027*	.041*	.07*	.041*	*	*	*	*	*	*	*	*	*

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*Main          *   4.928      *     .041*      .1*    .041*    .027*    .041*     .07*    .041*        *        *        *        *        *        *        *        *
   *
*Main          *   4.825      *     .041*    .065*    .029*    .041*     .07*    .041*        *        *        *        *        *        *        *        *        *
   *
*Main          *   4.743      *     .041*    .033*    .029*    .041*        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   4.737      *Bridge   *        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   4.731      *     .041*    .033*    .029*    .041*        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   4.653      *     .041*     .03*    .041*    .029*    .041*     .07*    .041*        *        *        *        *        *        *        *        *
   *
*Main          *   4.521      *     .041*    .055*    .041*      .2*    .041*    .029*    .041*     .07*    .041*        *        *        *        *        *        *
   *
*Main          *   4.466      *     .041*    .055*    .041*    .029*    .041*        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   4.462      *Bridge   *        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   4.459      *     .041*    .055*    .041*     .15*    .041*    .029*    .041*        *        *        *        *        *        *        *        *
   *
*Main          *   4.409      *     .041*     .06*    .041*     .15*    .041*    .029*    .041*        *        *        *        *        *        *        *        *
   *
*Main          *   4.313      *     .041*    .048*    .041*    .029*    .041*        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   4.188      *     .041*     .04*    .041*    .029*    .041*        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   4.024      *     .041*    .048*    .041*    .029*    .041*        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.909      *     .041*    .042*    .041*    .029*    .041*    .035*        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.856      *     .041*     .04*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.853      *Bridge   *        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   3.851      *     .041*     .04*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.801      *     .041*     .03*    .041*    .075*    .041*     .14*        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.665      *     .041*     .03*    .041*    .075*    .041*     .21*        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.625      *     .041*    .075*    .041*     .04*    .041*    .075*    .041*      .2*        *        *        *        *        *        *        *
   *
*Main          *   3.620      *Bridge   *        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   3.615      *     .041*    .075*    .041*     .03*    .041*    .075*    .041*      .2*        *        *        *        *        *        *        *
   *
*Main          *   3.571      *     .041*    .075*     .03*    .041*        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.503      *     .041*     .03*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.464      *     .041*    .018*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.434      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.378      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.371      *Mult Open*        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   3.364      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.319      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.317      *Bridge   *        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   3.314      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.295      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.207      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.151      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.149      *Bridge   *        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   3.146      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.114      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.109      *Bridge   *        *        *        *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   3.104      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   3.047      *     .041*    .014*    .041*        *        *        *        *        *        *        *        *        *        *        *        *
```

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   *
*Main          *   2.988      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.850      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.802      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.800      *Bridge   *       *       *       *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   2.798      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.783      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.780      *Bridge   *       *       *       *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   2.777      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.759      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.756      *Bridge   *       *       *       *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   2.753      *     .041*    .014*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.722      *     .041*    .018*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.644      *     .041*    .045*    .041*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.493      *     .067*    .045*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.445      *     .067*     .05*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.443      *Bridge   *       *       *       *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   2.440      *     .067*     .05*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.389      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.316      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.313      *Bridge   *       *       *       *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   2.310      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.246      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.167      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.068      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.041      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.033      *Bridge   *       *       *       *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   2.024      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   2.004      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.941      *     .067*    .027*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.910      *     .067*    .035*    .027*    .035*    .065*       *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.896      *Bridge   *       *       *       *        *        *        *        *        *        *        *        *        *        *        *
*Main          *   1.882      *     .067*    .035*    .027*    .035*    .065*       *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.840      *     .038*    .025*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.697      *     .038*    .025*    .065*       *        *        *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.549      *     .038*    .025*     .09*     .07*     .13*       *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.447      *     .038*    .025*     .09*     .07*     .13*       *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.293      *     .038*    .025*     .09*     .07*     .13*       *        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.141      *     .083*    .025*     .09*     .07*     .05*    .13*        *        *        *        *        *        *        *        *        *
   *
*Main          *   1.023      *     .083*    .025*     .09*     .07*     .05*    .13*        *        *        *        *        *        *        *        *        *
   *
*Main          *   0.891      *     .083*    .025*     .09*     .07*     .05*    .13*        *        *        *        *        *        *        *        *        *
   *
*Main          *   0.769      *     .083*    .025*     .09*     .09*     .05*    .13*        *        *        *        *        *        *        *        *        *
   *
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*Main            *    0.608       *     .038*     .027*      .07*      .13*      .05*      .13*         *         *         *         *         *         *         *         *         *
   *
*Main            *    0.468       *     .038*     .027*      .07*      .15*      .05*      .15*         *         *         *         *         *         *         *         *         *
   *
*Main            *    0.251       *     .038*     .025*      .06*      .15*      .05*      .15*         *         *         *         *         *         *         *         *         *
   *
*************************************************************************************************************************************************************************************************************
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SUMMARY OF REACH LENGTHS

River: Blue River
*****************************************************************
*     Reach      *   River Sta.   *  Left   * Channel *  Right  *
*****************************************************************
*Main            *    33.310      *       16*       16*       16*
*Main            *    33.307      *       60*       60*       60*
*Main            *    33.302      *Bridge   *         *         *
*Main            *    33.296      *  566.895*   685.93* 808.8675*
*Main            *    33.166      * 570.1185*   660.83* 638.4525*
*Main            *    33.041      * 721.3185*   738.97* 859.2255*
*Main            *    32.901      *  743.946*   618.61* 572.7645*
*Main            *    32.784      * 909.6255*   703.25*  549.528*
*Main            *    32.650      *   716.31*  1002.02*  828.114*
*Main            *    32.461      *  336.672*   762.21* 1768.861*
*Main            *    32.316      * 160.7025*   930.12*   496.86*
*Main            *    32.140      * 297.9375*  1815.96*  800.982*
*Main            *    31.796      *  678.573*   593.84*      630*
*Main            *    31.684      *   40.425*     38.5*   40.425*
*Main            *    31.680      *Bridge   *         *         *
*Main            *    31.677      *  538.545*  1306.62* 1135.522*
*Main            *    31.429      *  740.313*   641.84* 431.2035*
*Main            *    31.307      * 1063.472*   951.88* 479.9655*
*Main            *    31.127      *  868.014*   1235.2*  999.369*
*Main            *    30.893      * 1084.807*   844.04* 1088.734*
*Main            *    30.733      * 707.3955*  1356.56* 373.7265*
*Main            *    30.476      * 245.4585*   704.05* 1027.026*
*Main            *    30.343      *      840*   685.86*  817.824*
*Main            *    30.213      * 1666.665*     1181*  620.235*
*Main            *    29.990      *      174*      174*      174*
*Main            *    29.973      *Bridge   *         *         *
*Main            *    29.957      *  527.835*      660*   401.94*
*Main            *    29.832      * 643.2195*      840* 1094.719*
*Main            *    29.673      *  922.887*   922.65* 851.6235*
*Main            *    29.498      * 820.5015*   887.32* 901.8345*
*Main            *    29.330      * 1252.471*  1871.13* 1362.742*
*Main            *    28.975      *    892.5*  1241.31*  881.622*
*Main            *    28.740      *   1102.5*  1190.21* 930.2685*
*Main            *    28.515      *       53*       53*       53*
*Main            *    28.510      *Bridge   *         *         *
*Main            *    28.505      *  1059.45*   1137.7* 467.1975*
*Main            *    28.289      *   1432.2*  1476.74* 1864.831*
*Main            *    28.010      *  762.258*   762.74* 884.0685*
*Main            *    27.865      *  1034.25*   861.33*  981.498*
*Main            *    27.702      * 929.0085*   1012.5* 1019.518*
*Main            *    27.510      * 710.2725*   989.09* 1213.884*
*Main            *    27.323      * 943.7715*   758.78* 710.1675*
*Main            *    27.179      *       60*       60*       60*
*Main            *    27.173      *Bridge   *         *         *
*Main            *    27.168      *      877*     1225*     1316*
*Main            *    26.936      *       32*       32*       32*
*Main            *    26.933      *Bridge   *         *         *
*Main            *    26.930      *   1422.3*     1018*    628.1*
*Main            *    26.737      *  1566.07*  1158.48*   616.54*
*Main            *    26.518      *       30*       30*       30*
*Main            *    26.514      *Bridge   *         *         *
*Main            *    26.512      *   1126.4*     1146*     1023*
*Main            *    26.295      *   759.37*    741.1*  1104.72*
*Main            *    26.154      *   809.44*   937.68*  1118.74*
*Main            *    25.977      *   938.22*   913.06*  1027.93*
*Main            *    25.804      *  1308.31*  1160.94*   797.87*
*Main            *    25.584      *  1074.92*   959.76*   603.54*
*Main            *    25.402      *  1042.01*   869.98*   679.75*
*Main            *    25.238      *    652.3*   488.81*    499.4*
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*Main	*	25.145	* 733.28*	1480.28*	1109.17*
*Main	*	24.865	* 539.22*	1119.54*	1118.48*
*Main	*	24.653	* 565.84*	932.26*	675.41*
*Main	*	24.476	* 484.63*	790.52*	1145.77*
*Main	*	24.326	* 696.65*	854.03*	735.79*
*Main	*	24.165	* 676.43*	559.37*	531.83*
*Main	*	24.059	* 863.39*	716.03*	660.29*
*Main	*	23.923	* 630.01*	640.61*	648.59*
*Main	*	23.802	* 590.4*	594.6*	531.32*
*Main	*	23.689	* 657.87*	787.03*	564.45*
*Main	*	23.540	* 353.46*	466.07*	593.48*
*Main	*	23.452	* 870.79*	884.23*	621.18*
*Main	*	23.284	* 425.37*	834.04*	441.38*
*Main	*	23.126	* 319.31*	461.56*	557.39*
*Main	*	23.039	* 45*	45*	45*
*Main	*	23.035	*Bridge *	*	*
*Main	*	23.030	* 640.2*	640*	786.5*
*Main	*	22.909	* 836.84*	759.76*	692.74*
*Main	*	22.765	* 1143.3*	936.15*	918.48*
*Main	*	22.588	* 524.92*	983.65*	938.71*
*Main	*	22.402	* 807.91*	736.38*	1064.64*
*Main	*	22.262	* 742.07*	1257.36*	711.61*
*Main	*	22.024	* 808.15*	700.24*	514.11*
*Main	*	21.891	* 451.59*	629.89*	710.19*
*Main	*	21.772	* 802.9*	922.5*	1066.14*
*Main	*	21.597	* 215*	215*	215*
*Main	*	21.573	*Bridge *	*	*
*Main	*	21.557	* 440*	625*	759*
*Main	*	21.438	* 312.93*	537.21*	734.83*
*Main	*	21.337	* 508.22*	1114.41*	731.5*
*Main	*	21.126	* 50*	50*	50*
*Main	*	21.122	*Bridge *	*	*
*Main	*	21.116	* 1276*	930*	726*
*Main	*	20.940	* 975.76*	907.93*	397.18*
*Main	*	20.768	* 497.45*	754.93*	471.22*
*Main	*	20.625	* 264.51*	400.04*	304.15*
*Main	*	20.549	* 1068.21*	790.37*	448.77*
*Main	*	20.400	* 41.5*	41.5*	41.5*
*Main	*	20.395	*Bridge *	*	*
*Main	*	20.392	* 331*	474*	587*
*Main	*	20.302	* 430.84*	562.26*	880.44*
*Main	*	20.195	* 603.01*	574.15*	520.09*
*Main	*	20.087	* 402.75*	436.5*	465*
*Main	*	20.004	* 96.61*	96.29*	80.76*
*Main	*	19.995	*Bridge *	*	*
*Main	*	19.986	* 669.73*	773.55*	388.15*
*Main	*	19.840	* 648.35*	616.3*	541.7*
*Main	*	19.723	* 40*	40*	40*
*Main	*	19.719	*Bridge *	*	*
*Main	*	19.715	* 545.9*	708.56*	753.39*
*Main	*	19.581	* 430.76*	415.68*	378.43*
*Main	*	19.502	* 417.54*	414.45*	407.23*
*Main	*	19.424	* 489.85*	474.07*	470.55*
*Main	*	19.334	* 284.38*	256.16*	252.08*
*Main	*	19.285	* 334.14*	202.94*	78.07*
*Main	*	19.247	* 67.81*	65.57*	57.57*
*Main	*	19.235	* 49.5*	48.5*	47.36*
*Main	*	19.230	*Bridge *	*	*
*Main	*	19.225	* 141.84*	239.53*	354.12*
*Main	*	19.180	* 527.58*	467.17*	329.69*
*Main	*	19.092	* 470.97*	603.47*	622.77*
*Main	*	18.977	* 519.11*	531.47*	524.03*
*Main	*	18.877	* 364.19*	371.98*	367.58*
*Main	*	18.806	* 646.54*	682.71*	701.86*
*Main	*	18.677	* 496.55*	522.52*	517.48*
*Main	*	18.578	* 293*	312.58*	208.33*
*Main	*	18.519	* 378.8*	376.99*	440.23*
*Main	*	18.447	* 154.57*	118.69*	64.48*
*Main	*	18.425	* 110.31*	123.89*	116.49*
*Main	*	18.414	*Bridge *	*	*
*Main	*	18.401	* 273.81*	291.88*	312.33*
*Main	*	18.346	* 259.51*	209.7*	108.23*
*Main	*	18.306	* 220.47*	183.47*	88.91*
*Main	*	18.272	* 52.81*	57.02*	53.09*
*Main	*	18.266	*Bridge *	*	*
*Main	*	18.261	* 39.83*	42.76*	62.22*

*Main	*	18.253	* 45.57*	49.2*	55.25*
*Main	*	18.248	*Bridge *	*	*
*Main	*	18.243	* 225.03*	369.51*	265.46*
*Main	*	18.173	* 62.46*	68.97*	70.15*
*Main	*	18.166	*Bridge *	*	*
*Main	*	18.160	* 619.5*	644.86*	647.17*
*Main	*	18.038	* 563.67*	616.43*	669.71*
*Main	*	17.922	* 680.06*	947.98*	943.18*
*Main	*	17.742	* 1086.38*	1081.85*	861.44*
*Main	*	17.537	* 992.42*	993.3*	1050.7*
*Main	*	17.349	* 912.33*	918.81*	915.65*
*Main	*	17.175	* 964.62*	982.49*	619.92*
*Main	*	16.989	* 704.99*	607.38*	382.48*
*Main	*	16.874	* 668.99*	789.86*	725.09*
*Main	*	16.724	* 354.14*	764.98*	912.92*
*Main	*	16.579	* 182.47*	911.79*	437.98*
*Main	*	16.407	* 878.35*	996.15*	86.29*
*Main	*	16.218	* 772.85*	731.46*	283.38*
*Main	*	16.080	* 262.68*	1047.4*	354.09*
*Main	*	15.882	* 32*	32*	32*
*Main	*	15.879	*Bridge *	*	*
*Main	*	15.876	* 19.12*	764.24*	724.32*
*Main	*	15.731	* 81.66*	706.84*	1091.32*
*Main	*	15.597	* 71.06*	1233.99*	446.93*
*Main	*	15.363	* 32*	32*	32*
*Main	*	15.360	*Bridge *	*	*
*Main	*	15.357	* 425.93*	1356.95*	17.81*
*Main	*	15.100	* 416.32*	409.51*	12.2*
*Main	*	15.023	* 71.56*	71.12*	18.53*
*Main	*	15.017	*Bridge *	*	*
*Main	*	15.009	* 708.58*	707.95*	637.79*
*Main	*	14.875	* 1227.71*	1159.7*	83.1*
*Main	*	14.656	* 301.98*	1333.74*	67.62*
*Main	*	14.403	* 36.87*	1342.52*	287.06*
*Main	*	14.149	* 29.32*	1027.21*	1102.77*
*Main	*	13.954	* 129.85*	799.39*	606.97*
*Main	*	13.803	* 256.4*	531.51*	319.21*
*Main	*	13.702	* 470.86*	454.21*	336.42*
*Main	*	13.616	* 241.33*	243.3*	261.38*
*Main	*	13.570	* 65*	65*	65*
*Main	*	13.564	*Bridge *	*	*
*Main	*	13.558	* 422.93*	459.63*	341.06*
*Main	*	13.471	* 855.58*	863.82*	556.84*
*Main	*	13.307	* 455.65*	701.29*	971.46*
*Main	*	13.174	* 88.58*	539.62*	654.56*
*Main	*	13.072	* 262.67*	444.07*	621.31*
*Main	*	12.988	* 834.26*	801.87*	514.83*
*Main	*	12.836	* 507.56*	491.61*	378.35*
*Main	*	12.743	* 182.13*	187.55*	243.97*
*Main	*	12.708	* 94.03*	96.79*	47.47*
*Main	*	12.700	*Bridge *	*	*
*Main	*	12.690	* 475.6*	391.58*	15.38*
*Main	*	12.616	* 141.92*	421.02*	11.63*
*Main	*	12.536	* 31.3*	440.72*	13.48*
*Main	*	12.453	* 124.9*	511.25*	16.82*
*Main	*	12.356	* 97.23*	538.26*	518.35*
*Main	*	12.254	* 61.29*	342.83*	435.02*
*Main	*	12.189	* 214.33*	489.02*	358.12*
*Main	*	12.096	* 290.65*	224.59*	136.24*
*Main	*	12.054	* 280.44*	239.41*	168.68*
*Main	*	12.010	* 244.12*	251.69*	255.37*
*Main	*	11.965	* 207.53*	206.17*	206.1*
*Main	*	11.925	* 314.31*	326.33*	301.6*
*Main	*	11.871	* 456.7*	490.33*	484.77*
*Main	*	11.788	* 645.68*	734.19*	740.89*
*Main	*	11.676	* 680.41*	659*	560.26*
*Main	*	11.563	* 461.36*	447.64*	387.89*
*Main	*	11.484	* 554.52*	817.42*	512.91*
*Main	*	11.387	* 704.92*	992.81*	517.79*
*Main	*	11.287	* 603.34*	557.57*	557.54*
*Main	*	11.184	* 38.91*	53.51*	48.21*
*Main	*	11.1756*	* 38.91*	53.51*	48.21*
*Main	*	11.1673*	* 38.91*	53.51*	48.21*
*Main	*	11.1589*	* 38.91*	53.51*	48.21*
*Main	*	11.1506*	* 38.91*	53.51*	48.21*
*Main	*	11.1423*	* 38.91*	53.51*	48.21*

*Main	*	11.1339*	*	38.91*	53.51*	48.21*
*Main	*	11.1256*	*	38.91*	53.51*	48.21*
*Main	*	11.1173*	*	1.4*	1.92*	1.73*
*Main	*	11.117	*	150*	150*	150*
*Main	*	11.089	*	260*	440*	475*
*Main	*	10.996	*	950*	1014.3*	770*
*Main	*	10.817	*	104*	104*	104*
*Main	*	10.808	*Bridge	*	*	*
*Main	*	10.8039	*	5*	5*	5*
*Main	*	10.803	*	25*	25*	25*
*Main	*	10.798	*	806.03*	803.72*	306.46*
*Main	*	10.646	*	547.53*	686*	686.34*
*Main	*	10.5152*	*	5*	5*	5*
*Main	*	10.515	*	25*	25*	25*
*Main	*	10.510	*	243*	312*	312*
*Main	*	10.451	*	755.54*	865.94*	943.39*
*Main	*	10.287	*	466.34*	421.37*	414.02*
*Main	*	10.207	*	732.35*	432.6*	425.75*
*Main	*	10.125	*	948.34*	782.02*	514.75*
*Main	*	9.977	*	1046.51*	906.95*	647.4*
*Main	*	9.805	*	1037.67*	1037.41*	1084.32*
*Main	*	9.608	*	654.17*	713*	827.72*
*Main	*	9.473	*	668.8*	835*	989.06*
*Main	*	9.315	*	226.13*	370.25*	736.27*
*Main	*	9.232	*	424.3*	496*	571.65*
*Main	*	9.138	*	254.15*	232*	252.82*
*Main	*	9.094	*	19.98*	24*	23.47*
*Main	*	9.092	*Bridge	*	*	*
*Main	*	9.089	*	84.38*	114*	127.95*
*Main	*	9.068	*	91.48*	91*	113.48*
*Main	*	9.051	*	19.57*	20*	19.11*
*Main	*	9.049	*Bridge	*	*	*
*Main	*	9.047	*	408.02*	335*	330.56*
*Main	*	8.983	*	333.06*	331*	336.3*
*Main	*	8.921	*	322.39*	288*	320.56*
*Main	*	8.866	*	41.2*	38*	37.18*
*Main	*	8.863	*Bridge	*	*	*
*Main	*	8.858	*	54.21*	50.5*	49.36*
*Main	*	8.849	*	21.32*	23*	24.1*
*Main	*	8.845	*	23.24*	24*	26.27*
*Main	*	8.843	*Bridge	*	*	*
*Main	*	8.840	*	334.41*	288*	348.67*
*Main	*	8.786	*	646.04*	524*	419.28*
*Main	*	8.687	*	523.84*	483*	464.64*
*Main	*	8.595	*	656.75*	612*	572.68*
*Main	*	8.479	*	591.78*	559*	521.05*
*Main	*	8.373	*	557*	521.22*	454*
*Main	*	8.275	*	230.75*	281.29*	245.17*
*Main	*	8.221	*	77.11*	86.71*	95.73*
*Main	*	8.213	*Bridge	*	*	*
*Main	*	8.205	*	90.55*	200.48*	324.81*
*Main	*	8.167	*	276.05*	268.15*	356.63*
*Main	*	8.116	*	289.02*	479.2*	525.36*
*Main	*	8.025	*	442.18*	429.89*	376.29*
*Main	*	7.944	*	329.62*	302.08*	213.62*
*Main	*	7.887	*	359.39*	321.58*	121.88*
*Main	*	7.826	*	444.31*	313.76*	137.17*
*Main	*	7.766	*	451.79*	466.32*	161.76*
*Main	*	7.678	*	109.87*	772.82*	151.25*
*Main	*	7.532	*	95.24*	361.45*	259.38*
*Main	*	7.463	*	121.07*	255.13*	354.74*
*Main	*	7.415	*	135*	182.16*	240*
*Main	*	7.381	*	392.82*	455.12*	284.41*
*Main	*	7.294	*	101*	101*	101*
*Main	*	7.285	*Bridge	*	*	*
*Main	*	7.275	*	201.34*	756.34*	1098.23*
*Main	*	7.132	*	151.45*	423.58*	651.085*
*Main	*	7.052	*	50*	50*	50*
*Main	*	7.047	*Bridge	*	*	*
*Main	*	7.042	*	254.66*	307*	139.975*
*Main	*	6.984	*	271.04*	347.7*	201.4*
*Main	*	6.918	*	455.7*	417.2*	180.2*
*Main	*	6.839	*	527.21*	344.26*	158.02*
*Main	*	6.774	*	444.6*	362.11*	237.39*
*Main	*	6.705	*	258.58*	223.16*	233.1*
*Main	*	6.663	*	551.27*	501.74*	308.18*

*Main	*	6.568	* 195.86*	418.79*	244.26*
*Main	*	6.489	* 177.88*	170.17*	454*
*Main	*	6.457	* 332.5*	390.72*	369.88*
*Main	*	6.383	* 357.1*	362.55*	321.78*
*Main	*	6.314	* 650*	637.65*	630*
*Main	*	6.193	* 413.41*	305.64*	196.48*
*Main	*	6.135	* 388.7*	389.29*	520.26*
*Main	*	6.062	* 72.23*	488.6*	324.11*
*Main	*	5.969	* 64.325*	517.825*	599.2*
*Main	*	5.871	* 54*	54*	54*
*Main	*	5.866	*Bridge *	*	*
*Main	*	5.861	* 62.345*	296.955*	454.45*
*Main	*	5.805	* 84.75*	384.94*	87.41*
*Main	*	5.732	* 117.57*	266.01*	66.37*
*Main	*	5.681	* 335.69*	226.23*	68.44*
*Main	*	5.638	* 533.18*	360.4*	71.29*
*Main	*	5.570	* 359.09*	275.31*	51.72*
*Main	*	5.518	* 384.9*	311.01*	77.95*
*Main	*	5.459	* 124.41*	364.77*	98.65*
*Main	*	5.390	* 137.38*	341.14*	256.81*
*Main	*	5.325	* 150*	311.97*	72*
*Main	*	5.266	* 22.2*	22.2*	22.2*
*Main	*	5.264	*Bridge *	*	*
*Main	*	5.262	* 108*	33*	31*
*Main	*	5.256	* 80*	23.52*	34*
*Main	*	5.251	* 28.21*	28.21*	28.21*
*Main	*	5.249	*Bridge *	*	*
*Main	*	5.246	* 75*	117.43*	75*
*Main	*	5.224	* 69.35*	94.4*	86.76*
*Main	*	5.206	* 107*	108*	85*
*Main	*	5.185	* 26*	26*	26*
*Main	*	5.183	*Bridge *	*	*
*Main	*	5.181	* 300*	483*	640*
*Main	*	5.089	* 290*	413*	550*
*Main	*	5.011	* 45*	45*	45*
*Main	*	5.007	*Bridge *	*	*
*Main	*	5.002	* 220*	393*	480*
*Main	*	4.928	* 430*	545*	540*
*Main	*	4.825	* 490*	432*	370*
*Main	*	4.743	* 63*	64*	63*
*Main	*	4.737	*Bridge *	*	*
*Main	*	4.731	* 570*	409*	250*
*Main	*	4.653	* 600*	701*	600*
*Main	*	4.521	* 107*	289*	321*
*Main	*	4.466	* 36*	36*	36*
*Main	*	4.462	*Bridge *	*	*
*Main	*	4.459	* 130*	262*	290*
*Main	*	4.409	* 290*	511*	600*
*Main	*	4.313	* 510*	656*	695*
*Main	*	4.188	* 850*	865*	945*
*Main	*	4.024	* 223*	608*	716*
*Main	*	3.909	* 307*	284*	246*
*Main	*	3.856	* 25*	26*	25*
*Main	*	3.853	*Bridge *	*	*
*Main	*	3.851	* 304*	262*	44*
*Main	*	3.801	* 100*	718*	65*
*Main	*	3.665	* 180*	213*	70*
*Main	*	3.625	* 53*	50*	73*
*Main	*	3.620	*Bridge *	*	*
*Main	*	3.615	* 405*	236*	73*
*Main	*	3.571	* 445*	355*	44*
*Main	*	3.503	* 240*	207*	35*
*Main	*	3.464	* 152*	157*	51*
*Main	*	3.434	* 172*	296*	120*
*Main	*	3.378	* 20*	76*	15*
*Main	*	3.371	*Mult Open*	*	*
*Main	*	3.364	* 206*	235*	190*
*Main	*	3.319	* 25*	26*	30*
*Main	*	3.317	*Bridge *	*	*
*Main	*	3.314	* 80*	103*	55*
*Main	*	3.295	* 410*	463*	310*
*Main	*	3.207	* 253*	297*	245*
*Main	*	3.151	* 25*	24*	48*
*Main	*	3.149	*Bridge *	*	*
*Main	*	3.146	* 105*	171*	230*
*Main	*	3.114	* 45*	55*	60*

*Main	*	3.109	*Bridge *	*	*
*Main	*	3.104	* 256*	298*	325*
*Main	*	3.047	* 150*	315*	450*
*Main	*	2.988	* 500*	728*	665*
*Main	*	2.850	* 329*	252*	87*
*Main	*	2.802	* 22*	22*	22*
*Main	*	2.800	*Bridge *	*	*
*Main	*	2.798	* 104*	79*	62*
*Main	*	2.783	* 32*	33*	32*
*Main	*	2.780	*Bridge *	*	*
*Main	*	2.777	* 101*	91*	86*
*Main	*	2.759	* 36*	35*	32*
*Main	*	2.756	*Bridge *	*	*
*Main	*	2.753	* 279.6*	162*	150*
*Main	*	2.722	* 470*	414*	340*
*Main	*	2.644	* 870*	793*	725*
*Main	*	2.493	* 315*	254*	230*
*Main	*	2.445	* 26*	26*	26*
*Main	*	2.443	*Bridge *	*	*
*Main	*	2.440	* 239*	272*	302*
*Main	*	2.389	* 348*	385*	485*
*Main	*	2.316	* 29*	29*	29*
*Main	*	2.313	*Bridge *	*	*
*Main	*	2.310	* 320*	342*	330*
*Main	*	2.246	* 426*	413*	400*
*Main	*	2.167	* 540*	527*	505*
*Main	*	2.068	* 146*	139*	127*
*Main	*	2.041	* 91*	92*	91*
*Main	*	2.033	*Bridge *	*	*
*Main	*	2.024	* 110*	104*	82*
*Main	*	2.004	* 317*	333*	350*
*Main	*	1.941	* 125*	167*	110*
*Main	*	1.910	* 147*	144*	147*
*Main	*	1.896	*Bridge *	*	*
*Main	*	1.882	* 265*	222*	250*
*Main	*	1.840	* 775*	756*	750*
*Main	*	1.697	* 789*	780*	768*
*Main	*	1.549	* 540*	542*	540*
*Main	*	1.447	* 870*	810*	770*
*Main	*	1.293	* 717*	803*	878*
*Main	*	1.141	* 565*	626*	735*
*Main	*	1.023	* 720*	694*	675*
*Main	*	0.891	* 630*	644*	650*
*Main	*	0.769	* 780*	853*	930*
*Main	*	0.608	* 310*	738*	880*
*Main	*	0.468	* 750*	1145*	720*
*Main	*	0.251	* *	*	*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Blue River

Reach	River Sta.	Contr.	Expan.
*Main	* 33.310	* .1*	.3*
*Main	* 33.307	* .1*	.3*
*Main	* 33.302	*Bridge *	*
*Main	* 33.296	* .1*	.3*
*Main	* 33.166	* .1*	.3*
*Main	* 33.041	* .1*	.3*
*Main	* 32.901	* .1*	.3*
*Main	* 32.784	* .1*	.3*
*Main	* 32.650	* .1*	.3*
*Main	* 32.461	* .1*	.3*
*Main	* 32.316	* .1*	.3*
*Main	* 32.140	* .1*	.3*
*Main	* 31.796	* .1*	.3*
*Main	* 31.684	* .1*	.3*
*Main	* 31.680	*Bridge *	*
*Main	* 31.677	* .1*	.3*
*Main	* 31.429	* .1*	.3*
*Main	* 31.307	* .1*	.3*
*Main	* 31.127	* .1*	.3*

*Main	*	30.893	*	.1*	.3*
*Main	*	30.733	*	.1*	.3*
*Main	*	30.476	*	.1*	.3*
*Main	*	30.343	*	.1*	.3*
*Main	*	30.213	*	.1*	.3*
*Main	*	29.990	*	.1*	.3*
*Main	*	29.973	*Bridge	*	*
*Main	*	29.957	*	.1*	.3*
*Main	*	29.832	*	.1*	.3*
*Main	*	29.673	*	.1*	.3*
*Main	*	29.498	*	.1*	.3*
*Main	*	29.330	*	.1*	.3*
*Main	*	28.975	*	.1*	.3*
*Main	*	28.740	*	.1*	.3*
*Main	*	28.515	*	.3*	.5*
*Main	*	28.510	*Bridge	*	*
*Main	*	28.505	*	.3*	.5*
*Main	*	28.289	*	.1*	.3*
*Main	*	28.010	*	.1*	.3*
*Main	*	27.865	*	.1*	.3*
*Main	*	27.702	*	.1*	.3*
*Main	*	27.510	*	.1*	.3*
*Main	*	27.323	*	.1*	.3*
*Main	*	27.179	*	.1*	.3*
*Main	*	27.173	*Bridge	*	*
*Main	*	27.168	*	.1*	.3*
*Main	*	26.936	*	.1*	.3*
*Main	*	26.933	*Bridge	*	*
*Main	*	26.930	*	.1*	.3*
*Main	*	26.737	*	.1*	.3*
*Main	*	26.518	*	.1*	.3*
*Main	*	26.514	*Bridge	*	*
*Main	*	26.512	*	.1*	.3*
*Main	*	26.295	*	.1*	.3*
*Main	*	26.154	*	.1*	.3*
*Main	*	25.977	*	.1*	.3*
*Main	*	25.804	*	.1*	.3*
*Main	*	25.584	*	.1*	.3*
*Main	*	25.402	*	.1*	.3*
*Main	*	25.238	*	.1*	.3*
*Main	*	25.145	*	.1*	.3*
*Main	*	24.865	*	.1*	.3*
*Main	*	24.653	*	.1*	.3*
*Main	*	24.476	*	.1*	.3*
*Main	*	24.326	*	.1*	.3*
*Main	*	24.165	*	.1*	.3*
*Main	*	24.059	*	.1*	.3*
*Main	*	23.923	*	.1*	.3*
*Main	*	23.802	*	.1*	.3*
*Main	*	23.689	*	.1*	.3*
*Main	*	23.540	*	.1*	.3*
*Main	*	23.452	*	.1*	.3*
*Main	*	23.284	*	.1*	.3*
*Main	*	23.126	*	.1*	.3*
*Main	*	23.039	*	.1*	.3*
*Main	*	23.035	*Bridge	*	*
*Main	*	23.030	*	.1*	.3*
*Main	*	22.909	*	.1*	.3*
*Main	*	22.765	*	.1*	.3*
*Main	*	22.588	*	.1*	.3*
*Main	*	22.402	*	.1*	.3*
*Main	*	22.262	*	.1*	.3*
*Main	*	22.024	*	.1*	.3*
*Main	*	21.891	*	.1*	.3*
*Main	*	21.772	*	.1*	.3*
*Main	*	21.597	*	.1*	.3*
*Main	*	21.573	*Bridge	*	*
*Main	*	21.557	*	.1*	.3*
*Main	*	21.438	*	.1*	.3*
*Main	*	21.337	*	.1*	.3*
*Main	*	21.126	*	.1*	.3*
*Main	*	21.122	*Bridge	*	*
*Main	*	21.116	*	.1*	.3*
*Main	*	20.940	*	.1*	.3*
*Main	*	20.768	*	.1*	.3*
*Main	*	20.625	*	.1*	.3*

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*Main            *    20.549  *       .1*       .3*
*Main            *    20.400  *       .1*       .3*
*Main            *    20.395  *Bridge   *         *
*Main            *    20.392  *       .1*       .3*
*Main            *    20.302  *       .1*       .3*
*Main            *    20.195  *       .1*       .3*
*Main            *    20.087  *       .1*       .3*
*Main            *    20.004  *       .1*       .3*
*Main            *    19.995  *Bridge   *         *
*Main            *    19.986  *       .1*       .3*
*Main            *    19.840  *       .1*       .3*
*Main            *    19.723  *       .1*       .3*
*Main            *    19.719  *Bridge   *         *
*Main            *    19.715  *       .1*       .3*
*Main            *    19.581  *       .1*       .3*
*Main            *    19.502  *       .1*       .3*
*Main            *    19.424  *       .1*       .3*
*Main            *    19.334  *       .1*       .3*
*Main            *    19.285  *       .1*       .3*
*Main            *    19.247  *       .1*       .3*
*Main            *    19.235  *       .1*       .3*
*Main            *    19.230  *Bridge   *         *
*Main            *    19.225  *       .1*       .3*
*Main            *    19.180  *       .1*       .3*
*Main            *    19.092  *       .1*       .3*
*Main            *    18.977  *       .1*       .3*
*Main            *    18.877  *       .1*       .3*
*Main            *    18.806  *       .1*       .3*
*Main            *    18.677  *       .1*       .3*
*Main            *    18.578  *       .1*       .3*
*Main            *    18.519  *       .1*       .3*
*Main            *    18.447  *       .1*       .3*
*Main            *    18.425  *       .1*       .3*
*Main            *    18.414  *Bridge   *         *
*Main            *    18.401  *       .1*       .3*
*Main            *    18.346  *       .1*       .3*
*Main            *    18.306  *       .1*       .3*
*Main            *    18.272  *       .1*       .3*
*Main            *    18.266  *Bridge   *         *
*Main            *    18.261  *       .1*       .3*
*Main            *    18.253  *       .1*       .3*
*Main            *    18.248  *Bridge   *         *
*Main            *    18.243  *       .1*       .3*
*Main            *    18.173  *       .1*       .3*
*Main            *    18.166  *Bridge   *         *
*Main            *    18.160  *       .1*       .3*
*Main            *    18.038  *       .1*       .3*
*Main            *    17.922  *       .1*       .3*
*Main            *    17.742  *       .1*       .3*
*Main            *    17.537  *       .1*       .3*
*Main            *    17.349  *       .1*       .3*
*Main            *    17.175  *       .1*       .3*
*Main            *    16.989  *       .1*       .3*
*Main            *    16.874  *       .1*       .3*
*Main            *    16.724  *       .1*       .3*
*Main            *    16.579  *       .1*       .3*
*Main            *    16.407  *       .1*       .3*
*Main            *    16.218  *       .1*       .3*
*Main            *    16.080  *       .1*       .3*
*Main            *    15.882  *       .1*       .3*
*Main            *    15.879  *Bridge   *         *
*Main            *    15.876  *       .1*       .3*
*Main            *    15.731  *       .1*       .3*
*Main            *    15.597  *       .1*       .3*
*Main            *    15.363  *       .1*       .3*
*Main            *    15.360  *Bridge   *         *
*Main            *    15.357  *       .1*       .3*
*Main            *    15.100  *       .1*       .3*
*Main            *    15.023  *       .1*       .3*
*Main            *    15.017  *Bridge   *         *
*Main            *    15.009  *       .1*       .3*
*Main            *    14.875  *       .1*       .3*
*Main            *    14.656  *       .1*       .3*
*Main            *    14.403  *       .1*       .3*
*Main            *    14.149  *       .1*       .3*
*Main            *    13.954  *       .1*       .3*
```

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*Main          *    13.803  *       .1*       .3*
*Main          *    13.702  *       .1*       .3*
*Main          *    13.616  *       .1*       .3*
*Main          *    13.570  *       .1*       .3*
*Main          *    13.564  *Bridge   *         *
*Main          *    13.558  *       .1*       .3*
*Main          *    13.471  *       .1*       .3*
*Main          *    13.307  *       .1*       .3*
*Main          *    13.174  *       .1*       .3*
*Main          *    13.072  *       .1*       .3*
*Main          *    12.988  *       .1*       .3*
*Main          *    12.836  *       .1*       .3*
*Main          *    12.743  *       .1*       .3*
*Main          *    12.708  *       .1*       .3*
*Main          *    12.700  *Bridge   *         *
*Main          *    12.690  *       .1*       .3*
*Main          *    12.616  *       .1*       .3*
*Main          *    12.536  *       .1*       .3*
*Main          *    12.453  *       .1*       .3*
*Main          *    12.356  *       .1*       .3*
*Main          *    12.254  *       .1*       .3*
*Main          *    12.189  *       .1*       .3*
*Main          *    12.096  *       .1*       .3*
*Main          *    12.054  *       .1*       .3*
*Main          *    12.010  *       .1*       .3*
*Main          *    11.965  *       .1*       .3*
*Main          *    11.925  *       .1*       .3*
*Main          *    11.871  *       .1*       .3*
*Main          *    11.788  *       .1*       .3*
*Main          *    11.676  *       .1*       .3*
*Main          *    11.563  *       .1*       .3*
*Main          *    11.484  *       .1*       .3*
*Main          *    11.387  *       .1*       .3*
*Main          *    11.287  *       .1*       .3*
*Main          *    11.184  *       .1*       .3*
*Main          *    11.1756**       .1*       .3*
*Main          *    11.1673**       .1*       .3*
*Main          *    11.1589**       .1*       .3*
*Main          *    11.1506**       .1*       .3*
*Main          *    11.1423**       .1*       .3*
*Main          *    11.1339**       .1*       .3*
*Main          *    11.1256**       .1*       .3*
*Main          *    11.1173**       .1*       .3*
*Main          *    11.117  *       .1*       .3*
*Main          *    11.089  *       .1*       .3*
*Main          *    10.996  *       .1*       .3*
*Main          *    10.817  *       .3*       .5*
*Main          *    10.808  *Bridge   *         *
*Main          *    10.8039 *       .3*       .5*
*Main          *    10.803  *       .3*       .5*
*Main          *    10.798  *       .3*       .5*
*Main          *    10.646  *       .1*       .3*
*Main          *    10.5152**       .1*       .3*
*Main          *    10.515  *       .1*       .3*
*Main          *    10.510  *       .1*       .3*
*Main          *    10.451  *       .1*       .3*
*Main          *    10.287  *       .1*       .3*
*Main          *    10.207  *       .1*       .3*
*Main          *    10.125  *       .1*       .3*
*Main          *    9.977   *       .1*       .3*
*Main          *    9.805   *       .1*       .3*
*Main          *    9.608   *       .1*       .3*
*Main          *    9.473   *       .1*       .3*
*Main          *    9.315   *       .1*       .3*
*Main          *    9.232   *       .1*       .3*
*Main          *    9.138   *       .1*       .3*
*Main          *    9.094   *       .1*       .3*
*Main          *    9.092   *Bridge   *         *
*Main          *    9.089   *       .1*       .3*
*Main          *    9.068   *       .1*       .3*
*Main          *    9.051   *       .1*       .3*
*Main          *    9.049   *Bridge   *         *
*Main          *    9.047   *       .1*       .3*
*Main          *    8.983   *       .1*       .3*
*Main          *    8.921   *       .1*       .3*
*Main          *    8.866   *       .1*       .3*
```

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*Main            *    8.863   *Bridge   *         *
*Main            *    8.858   *       .1*       .3*
*Main            *    8.849   *       .1*       .3*
*Main            *    8.845   *       .1*       .3*
*Main            *    8.843   *Bridge   *         *
*Main            *    8.840   *       .1*       .3*
*Main            *    8.786   *       .1*       .3*
*Main            *    8.687   *       .1*       .3*
*Main            *    8.595   *       .1*       .3*
*Main            *    8.479   *       .1*       .3*
*Main            *    8.373   *       .1*       .3*
*Main            *    8.275   *       .1*       .3*
*Main            *    8.221   *       .1*       .3*
*Main            *    8.213   *Bridge   *         *
*Main            *    8.205   *       .1*       .3*
*Main            *    8.167   *       .1*       .3*
*Main            *    8.116   *       .1*       .3*
*Main            *    8.025   *       .1*       .3*
*Main            *    7.944   *       .1*       .3*
*Main            *    7.887   *       .1*       .3*
*Main            *    7.826   *       .1*       .3*
*Main            *    7.766   *       .1*       .3*
*Main            *    7.678   *       .1*       .3*
*Main            *    7.532   *       .1*       .3*
*Main            *    7.463   *       .1*       .3*
*Main            *    7.415   *       .1*       .3*
*Main            *    7.381   *       .1*       .3*
*Main            *    7.294   *       .1*       .3*
*Main            *    7.285   *Bridge   *         *
*Main            *    7.275   *       .1*       .3*
*Main            *    7.132   *       .1*       .3*
*Main            *    7.052   *       .1*       .3*
*Main            *    7.047   *Bridge   *         *
*Main            *    7.042   *       .1*       .3*
*Main            *    6.984   *       .1*       .3*
*Main            *    6.918   *       .1*       .3*
*Main            *    6.839   *       .1*       .3*
*Main            *    6.774   *       .1*       .3*
*Main            *    6.705   *       .1*       .3*
*Main            *    6.663   *       .1*       .3*
*Main            *    6.568   *       .1*       .3*
*Main            *    6.489   *       .1*       .3*
*Main            *    6.457   *       .1*       .3*
*Main            *    6.383   *       .1*       .3*
*Main            *    6.314   *       .1*       .3*
*Main            *    6.193   *       .1*       .3*
*Main            *    6.135   *       .1*       .3*
*Main            *    6.062   *       .1*       .3*
*Main            *    5.969   *       .1*       .3*
*Main            *    5.871   *       .1*       .3*
*Main            *    5.866   *Bridge   *         *
*Main            *    5.861   *       .1*       .3*
*Main            *    5.805   *       .1*       .3*
*Main            *    5.732   *       .1*       .3*
*Main            *    5.681   *       .1*       .3*
*Main            *    5.638   *       .1*       .3*
*Main            *    5.570   *       .1*       .3*
*Main            *    5.518   *       .1*       .3*
*Main            *    5.459   *       .1*       .3*
*Main            *    5.390   *       .1*       .3*
*Main            *    5.325   *       .1*       .3*
*Main            *    5.266   *       .1*       .3*
*Main            *    5.264   *Bridge   *         *
*Main            *    5.262   *       .1*       .3*
*Main            *    5.256   *       .1*       .3*
*Main            *    5.251   *       .1*       .3*
*Main            *    5.249   *Bridge   *         *
*Main            *    5.246   *       .1*       .3*
*Main            *    5.224   *       .1*       .3*
*Main            *    5.206   *       .1*       .3*
*Main            *    5.185   *       .1*       .3*
*Main            *    5.183   *Bridge   *         *
*Main            *    5.181   *       .1*       .3*
*Main            *    5.089   *       .1*       .3*
*Main            *    5.011   *       .1*       .3*
*Main            *    5.007   *Bridge   *         *
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*Main            *    5.002   *       .1*       .3*
*Main            *    4.928   *       .1*       .3*
*Main            *    4.825   *       .1*       .3*
*Main            *    4.743   *       .1*       .3*
*Main            *    4.737   *Bridge   *         *
*Main            *    4.731   *       .1*       .3*
*Main            *    4.653   *       .1*       .3*
*Main            *    4.521   *       .1*       .3*
*Main            *    4.466   *       .1*       .3*
*Main            *    4.462   *Bridge   *         *
*Main            *    4.459   *       .1*       .3*
*Main            *    4.409   *       .1*       .3*
*Main            *    4.313   *       .1*       .3*
*Main            *    4.188   *       .1*       .3*
*Main            *    4.024   *       .1*       .3*
*Main            *    3.909   *       .1*       .3*
*Main            *    3.856   *       .1*       .3*
*Main            *    3.853   *Bridge   *         *
*Main            *    3.851   *       .1*       .3*
*Main            *    3.801   *       .1*       .3*
*Main            *    3.665   *       .1*       .3*
*Main            *    3.625   *       .1*       .3*
*Main            *    3.620   *Bridge   *         *
*Main            *    3.615   *       .1*       .3*
*Main            *    3.571   *       .1*       .3*
*Main            *    3.503   *       .1*       .3*
*Main            *    3.464   *       .1*       .3*
*Main            *    3.434   *       .1*       .3*
*Main            *    3.378   *       .1*       .3*
*Main            *    3.371   *Mult Open*         *
*Main            *    3.364   *       .1*       .3*
*Main            *    3.319   *       .1*       .3*
*Main            *    3.317   *Bridge   *         *
*Main            *    3.314   *       .1*       .3*
*Main            *    3.295   *       .1*       .3*
*Main            *    3.207   *       .1*       .3*
*Main            *    3.151   *       .1*       .3*
*Main            *    3.149   *Bridge   *         *
*Main            *    3.146   *       .1*       .3*
*Main            *    3.114   *       .1*       .3*
*Main            *    3.109   *Bridge   *         *
*Main            *    3.104   *       .1*       .3*
*Main            *    3.047   *       .1*       .3*
*Main            *    2.988   *       .1*       .3*
*Main            *    2.850   *       .1*       .3*
*Main            *    2.802   *       .1*       .3*
*Main            *    2.800   *Bridge   *         *
*Main            *    2.798   *       .1*       .3*
*Main            *    2.783   *       .1*       .3*
*Main            *    2.780   *Bridge   *         *
*Main            *    2.777   *       .1*       .3*
*Main            *    2.759   *       .1*       .3*
*Main            *    2.756   *Bridge   *         *
*Main            *    2.753   *       .3*       .5*
*Main            *    2.722   *       .3*       .5*
*Main            *    2.644   *       .1*       .3*
*Main            *    2.493   *       .1*       .3*
*Main            *    2.445   *       .1*       .3*
*Main            *    2.443   *Bridge   *         *
*Main            *    2.440   *       .1*       .3*
*Main            *    2.389   *       .1*       .3*
*Main            *    2.316   *       .1*       .3*
*Main            *    2.313   *Bridge   *         *
*Main            *    2.310   *       .1*       .3*
*Main            *    2.246   *       .1*       .3*
*Main            *    2.167   *       .1*       .3*
*Main            *    2.068   *       .1*       .3*
*Main            *    2.041   *       .1*       .3*
*Main            *    2.033   *Bridge   *         *
*Main            *    2.024   *       .1*       .3*
*Main            *    2.004   *       .1*       .3*
*Main            *    1.941   *       .1*       .3*
*Main            *    1.910   *       .1*       .3*
*Main            *    1.896   *Bridge   *         *
*Main            *    1.882   *       .1*       .3*
*Main            *    1.840   *       .1*       .3*
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*Main            *    1.697   *       .1*       .3*
*Main            *    1.549   *       .1*       .3*
*Main            *    1.447   *       .1*       .3*
*Main            *    1.293   *       .1*       .3*
*Main            *    1.141   *       .1*       .3*
*Main            *    1.023   *       .1*       .3*
*Main            *    0.891   *       .1*       .3*
*Main            *    0.769   *       .1*       .3*
*Main            *    0.608   *       .1*       .3*
*Main            *    0.468   *       .1*       .3*
*Main            *    0.251   *       .1*       .3*
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Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	0.251	2-yr	12500.00	704.10	719.04	712.81	719.65	0.000601	6.31	1981.02	216.60	0.37
Main	0.251	5-yr	19500.00	704.10	722.66	715.16	723.36	0.000601	6.71	2904.00	289.79	0.37
Main	0.251	10-yr	26600.00	704.10	725.00	717.09	725.84	0.000601	7.35	3617.01	314.51	0.38
Main	0.251	20-yr	34200.00	704.10	726.99	719.08	728.00	0.000601	8.04	4251.86	322.16	0.39
Main	0.251	50-yr	45500.00	704.10	729.51	721.52	730.71	0.000601	8.85	5848.01	1039.15	0.40
Main	0.251	100-yr	54400.00	704.10	730.95	722.99	732.24	0.000600	9.32	7723.40	1425.80	0.40
Main	0.251	200-yr	63000.00	704.10	732.08	724.19	733.42	0.000601	9.71	9399.29	2011.21	0.41
Main	0.251	500-yr	75900.00	704.10	733.42	725.64	734.81	0.000601	10.19	12111.64	2024.13	0.41
Main	0.251	Design Discharge	38300.00	704.10	727.99	720.01	729.08	0.000600	8.37	4574.84	325.92	0.39
Main	0.468	2-yr	12500.00	707.31	719.75		720.58	0.000965	7.29	1714.88	190.58	0.43
Main	0.468	5-yr	19500.00	707.31	723.30		724.26	0.000871	7.88	2551.40	359.06	0.42
Main	0.468	10-yr	26600.00	707.31	725.61		726.70	0.000807	8.52	3559.47	472.22	0.42
Main	0.468	20-yr	34200.00	707.31	727.64		728.81	0.000767	9.04	4566.46	523.34	0.41
Main	0.468	50-yr	45500.00	707.31	730.04		731.62	0.000850	10.49	6265.35	1583.27	0.45
Main	0.468	100-yr	54400.00	707.31	731.62		732.99	0.000722	10.25	8787.04	1599.25	0.42
Main	0.468	200-yr	63000.00	707.31	732.86		734.11	0.000653	10.18	10850.97	2059.91	0.40
Main	0.468	500-yr	75900.00	707.31	734.29		735.48	0.000618	10.37	13853.35	2242.51	0.39
Main	0.468	Design Discharge	38300.00	707.31	728.66		729.85	0.000737	9.24	5220.55	713.85	0.41
Main	0.608	2-yr	12500.00	706.79	720.28		721.58	0.001451	9.14	1367.17	145.34	0.53
Main	0.608	5-yr	19500.00	706.79	723.59		725.28	0.001397	10.43	1868.87	156.52	0.53
Main	0.608	10-yr	26600.00	706.79	725.57		727.87	0.001602	12.17	2236.34	229.25	0.58
Main	0.608	20-yr	34200.00	706.79	727.22	722.99	730.16	0.001869	13.84	2667.86	291.54	0.64
Main	0.608	50-yr	45500.00	706.79	729.87		732.89	0.001683	14.49	4553.08	1035.82	0.62
Main	0.608	100-yr	54400.00	706.79	731.29		734.12	0.001541	14.62	6073.42	1081.38	0.60
Main	0.608	200-yr	63000.00	706.79	732.51		735.12	0.001410	14.60	8212.40	2681.13	0.58
Main	0.608	500-yr	75900.00	706.79	734.07		736.34	0.001238	14.39	12455.35	2806.14	0.55
Main	0.608	Design Discharge	38300.00	706.79	728.02	723.90	731.29	0.001994	14.61	2922.65	728.23	0.66
Main	0.769	2-yr	12500.00	705.67	721.64	714.41	722.32	0.000494	6.61	1891.14	163.30	0.34
Main	0.769	5-yr	19500.00	705.67	725.11	717.04	726.06	0.000549	7.85	2484.17	178.27	0.37
Main	0.769	10-yr	26600.00	705.67	727.49	719.18	728.78	0.000630	9.11	2981.16	268.82	0.40
Main	0.769	20-yr	34200.00	705.67	729.60	721.09	731.22	0.000704	10.24	3617.66	315.56	0.43
Main	0.769	50-yr	45500.00	705.67	731.75	723.68	733.95	0.000832	11.98	4382.68	409.11	0.48
Main	0.769	100-yr	54400.00	705.67	732.30	725.46	735.24	0.001076	13.89	4613.56	1664.84	0.55
Main	0.769	200-yr	63000.00	705.67	732.93	727.15	736.58	0.001291	15.53	4880.38	1814.16	0.61
Main	0.769	500-yr	75900.00	705.67	733.61	729.71	738.24	0.001601	17.68	7000.45	1978.20	0.68
Main	0.769	Design Discharge	38300.00	705.67	730.62	722.07	732.40	0.000730	10.78	3951.31	351.34	0.45
Main	0.891	2-yr	12500.00	705.97	722.02	714.21	722.61	0.000403	6.19	2017.80	164.22	0.31
Main	0.891	5-yr	19500.00	705.97	725.52	716.69	726.39	0.000445	7.47	2660.47	241.30	0.34
Main	0.891	10-yr	26600.00	705.97	727.99	718.78	729.15	0.000509	8.70	3325.61	283.81	0.37
Main	0.891	20-yr	34200.00	705.97	730.16	720.66	731.64	0.000557	9.84	4071.94	397.38	0.39
Main	0.891	50-yr	45500.00	705.97	732.45	723.15	734.44	0.000659	11.53	5009.82	421.12	0.43
Main	0.891	100-yr	54400.00	705.97	733.28	724.97	735.88	0.000821	13.19	5364.21	428.88	0.49
Main	0.891	200-yr	63000.00	705.97	734.20	726.84	737.35	0.000951	14.58	5761.16	438.96	0.53
Main	0.891	500-yr	75900.00	705.97	735.38	729.19	739.17	0.001107	16.25	8261.03	2136.36	0.58
Main	0.891	Design Discharge	38300.00	705.97	731.20	721.61	732.84	0.000579	10.39	4492.18	408.46	0.40
Main	1.023	2-yr	12500.00	705.47	722.27	714.59	722.93	0.000456	6.51	1920.99	159.23	0.33
Main	1.023	5-yr	19500.00	705.47	725.80	717.31	726.74	0.000514	7.77	2509.35	173.30	0.36
Main	1.023	10-yr	26600.00	705.47	728.30	719.44	729.56	0.000594	9.00	2959.19	213.98	0.39
Main	1.023	20-yr	34200.00	705.47	730.49	721.38	732.08	0.000638	10.15	3671.05	404.42	0.42
Main	1.023	50-yr	45500.00	705.47	732.85	724.03	734.96	0.000733	11.79	4677.83	444.31	0.46
Main	1.023	100-yr	54400.00	705.47	733.80	725.86	736.50	0.000889	13.37	5106.33	453.70	0.51
Main	1.023	200-yr	63000.00	705.47	734.83	727.47	738.05	0.001006	14.67	5608.74	1642.85	0.54
Main	1.023	500-yr	75900.00	705.47	736.15	730.25	739.96	0.001139	16.20	7860.80	1772.41	0.58

Main	1.023	Design Discharge	38300.00	705.47	731.55	722.39	733.30	0.000657	10.69	4108.88	426.46	0.43
Main	1.141	2-yr	12500.00	705.44	722.74	713.27	723.16	0.000256	5.19	2407.67	181.84	0.25
Main	1.141	5-yr	19500.00	705.44	726.39	715.65	727.01	0.000291	6.31	3124.87	289.84	0.28
Main	1.141	10-yr	26600.00	705.44	729.04	717.76	729.87	0.000323	7.34	4011.97	372.33	0.30
Main	1.141	20-yr	34200.00	705.44	731.38	719.60	732.43	0.000352	8.29	4941.45	416.77	0.32
Main	1.141	50-yr	45500.00	705.44	733.97	721.92	735.37	0.000412	9.68	6104.13	490.49	0.35
Main	1.141	100-yr	54400.00	705.44	735.25	723.62	737.00	0.000484	10.86	6739.72	499.55	0.38
Main	1.141	200-yr	63000.00	705.44	736.57	725.15	738.62	0.000535	11.82	7402.36	507.58	0.40
Main	1.141	500-yr	75900.00	705.44	738.23	727.57	740.60	0.000592	12.95	10478.23	1934.97	0.43
Main	1.141	Design Discharge	38300.00	705.44	732.50	720.47	733.66	0.000367	8.76	5418.95	442.59	0.33
Main	1.293	2-yr	12500.00	710.00	722.93	716.25	723.46	0.000438	5.85	2137.26	204.98	0.32
Main	1.293	5-yr	19500.00	710.00	726.63	718.34	727.31	0.000421	6.62	2992.48	309.36	0.32
Main	1.293	10-yr	26600.00	710.00	729.33	720.18	730.17	0.000421	7.42	3858.29	332.56	0.33
Main	1.293	20-yr	34200.00	710.00	731.72	721.90	732.74	0.000424	8.17	4759.06	444.63	0.34
Main	1.293	50-yr	45500.00	710.00	734.47	724.16	735.73	0.000443	9.19	6070.74	496.36	0.36
Main	1.293	100-yr	54400.00	710.00	735.91	725.75	737.42	0.000490	10.11	6796.09	506.45	0.38
Main	1.293	200-yr	63000.00	710.00	737.38	727.24	739.07	0.000512	10.80	7638.20	1598.57	0.39
Main	1.293	500-yr	75900.00	710.00	739.25	729.09	741.11	0.000531	11.57	10686.03	1665.83	0.41
Main	1.293	Design Discharge	38300.00	710.00	732.89	722.76	733.98	0.000423	8.51	5300.45	475.62	0.34
Main	1.447	2-yr	12500.00	710.20	723.22	717.16	723.91	0.000570	6.69	1867.86	176.92	0.36
Main	1.447	5-yr	19500.00	710.20	726.86	719.47	727.77	0.000566	7.66	2546.92	195.25	0.37
Main	1.447	10-yr	26600.00	710.20	729.51	721.39	730.67	0.000594	8.65	3087.59	218.69	0.39
Main	1.447	20-yr	34200.00	710.20	731.86	723.17	733.27	0.000620	9.55	3784.13	406.60	0.41
Main	1.447	50-yr	45500.00	710.20	734.57	725.59	736.29	0.000639	10.69	4981.28	456.26	0.42
Main	1.447	100-yr	54400.00	710.20	736.01	727.26	738.05	0.000700	11.72	5646.28	470.04	0.45
Main	1.447	200-yr	63000.00	710.20	737.45	728.76	739.75	0.000732	12.53	6458.70	1277.80	0.46
Main	1.447	500-yr	75900.00	710.20	739.29	731.15	741.82	0.000754	13.40	9198.43	1592.64	0.48
Main	1.447	Design Discharge	38300.00	710.20	733.01	724.07	734.52	0.000616	9.93	4279.83	440.36	0.41
Main	1.549	2-yr	12500.00	710.31	723.60	717.01	724.20	0.000467	6.22	2008.84	182.84	0.33
Main	1.549	5-yr	19500.00	710.31	727.26	719.19	728.06	0.000476	7.19	2710.77	200.39	0.34
Main	1.549	10-yr	26600.00	710.31	729.95	721.10	730.98	0.000498	8.16	3306.80	253.45	0.36
Main	1.549	20-yr	34200.00	710.31	732.35	722.86	733.60	0.000523	9.00	4136.70	429.50	0.38
Main	1.549	50-yr	45500.00	710.31	735.11	725.21	736.63	0.000541	10.09	5386.00	477.87	0.39
Main	1.549	100-yr	54400.00	710.31	736.62	726.89	738.42	0.000590	11.04	6131.22	506.72	0.41
Main	1.549	200-yr	63000.00	710.31	738.13	728.36	740.14	0.000614	11.77	6915.16	537.59	0.43
Main	1.549	500-yr	75900.00	710.31	740.02	730.61	742.22	0.000632	12.58	10386.57	1989.77	0.44
Main	1.549	Design Discharge	38300.00	710.31	733.51	723.71	734.84	0.000521	9.37	4644.29	448.58	0.38
Main	1.697	2-yr	12500.00	710.48	723.98	717.12	724.55	0.000432	6.08	2057.41	182.27	0.32
Main	1.697	5-yr	19500.00	710.48	727.65	719.26	728.42	0.000439	7.06	2832.64	317.64	0.33
Main	1.697	10-yr	26600.00	710.48	730.39	721.13	731.35	0.000439	7.93	3738.40	407.89	0.34
Main	1.697	20-yr	34200.00	710.48	732.85	722.90	733.98	0.000438	8.69	4730.29	509.43	0.35
Main	1.697	50-yr	45500.00	710.48	735.67	725.30	737.04	0.000457	9.72	6037.90	585.62	0.37
Main	1.697	100-yr	54400.00	710.48	737.26	727.07	738.86	0.000498	10.63	6822.53	723.46	0.39
Main	1.697	200-yr	63000.00	710.48	738.82	728.85	740.60	0.000518	11.32	7642.07	776.21	0.40
Main	1.697	500-yr	75900.00	710.48	740.64	731.06	742.70	0.000560	12.33	9022.98	1759.58	0.42
Main	1.697	Design Discharge	38300.00	710.48	734.02	723.80	735.23	0.000440	9.05	5255.87	555.76	0.35
Main	1.840	2-yr	12500.00	710.62	724.27	717.77	724.94	0.000528	6.56	1904.52	175.26	0.35
Main	1.840	5-yr	19500.00	710.62	727.93	720.07	728.82	0.000534	7.57	2576.39	192.14	0.36
Main	1.840	10-yr	26600.00	710.62	730.65	722.14	731.77	0.000565	8.50	3277.60	369.32	0.38
Main	1.840	20-yr	34200.00	710.62	733.09	723.96	734.41	0.000555	9.29	4137.10	739.16	0.39
Main	1.840	50-yr	45500.00	710.62	735.89	726.38	737.49	0.000570	10.38	5362.04	1090.47	0.40
Main	1.840	100-yr	54400.00	710.62	737.50	728.10	739.35	0.000609	11.28	6134.50	1198.97	0.42
Main	1.840	200-yr	63000.00	710.62	739.10	729.91	741.08	0.000609	11.82	7376.87	1294.81	0.43
Main	1.840	500-yr	75900.00	710.62	740.96	732.20	743.22	0.000648	12.81	8586.74	1405.41	0.45
Main	1.840	Design Discharge	38300.00	710.62	734.25	724.87	735.66	0.000552	9.67	4619.46	922.19	0.39
Main	1.882	2-yr	12500.00	710.68	724.44	717.85	725.07	0.000580	6.34	1970.45	182.81	0.34
Main	1.882	5-yr	19500.00	710.68	728.13	720.17	728.95	0.000573	7.29	2673.91	203.26	0.35
Main	1.882	10-yr	26600.00	710.68	730.88	722.11	731.91	0.000577	8.17	3401.73	332.04	0.36
Main	1.882	20-yr	34200.00	710.68	733.39	723.85	734.55	0.000550	8.79	4388.53	442.36	0.36
Main	1.882	50-yr	45500.00	710.68	736.35	726.25	737.64	0.000529	9.53	5798.86	593.09	0.36
Main	1.882	100-yr	54400.00	710.68	738.10	727.91	739.53	0.000543	10.17	6692.19	629.75	0.37
Main	1.882	200-yr	63000.00	710.68	739.72	729.69	741.26	0.000549	10.69	7574.37	680.57	0.38
Main	1.882	500-yr	75900.00	710.68	741.89	732.57	743.42	0.000518	10.98	9594.27	728.15	0.37
Main	1.882	Design Discharge	38300.00	710.68	734.60	724.80	735.80	0.000535	9.05	4946.77	506.04	0.36
Main	1.896		Bridge									
Main	1.910	2-yr	12500.00	710.68	724.49	718.17	725.15	0.000622	6.51	1921.25	180.90	0.35
Main	1.910	5-yr	19500.00	710.68	728.20	720.46	729.06	0.000609	7.43	2623.89	202.39	0.36

Main	1.910	10-yr	26600.00	710.68	731.00	722.42	732.06	0.000605	8.31	3293.15	295.94		0.37
Main	1.910	20-yr	34200.00	710.68	733.52	724.21	734.74	0.000582	8.99	4207.99	429.17		0.37
Main	1.910	50-yr	45500.00	710.68	736.48	726.52	737.85	0.000560	9.76	5595.77	580.68		0.37
Main	1.910	100-yr	54400.00	710.68	738.23	728.23	739.74	0.000573	10.41	6478.63	613.93		0.38
Main	1.910	200-yr	63000.00	710.68	739.86	729.90	741.49	0.000578	10.93	7355.22	664.22		0.39
Main	1.910	500-yr	75900.00	710.68	742.02	732.74	743.66	0.000551	11.30	9317.77	735.34		0.38
Main	1.910	Design Discharge	38300.00	710.68	734.73	725.09	736.00	0.000566	9.26	4755.26	476.76		0.37
Main	1.941	2-yr	12500.00	710.72	724.56	718.38	725.28	0.000702	6.79	1841.44	178.25		0.37
Main	1.941	5-yr	19500.00	710.72	728.27	720.90	729.18	0.000682	7.67	2541.31	202.20		0.38
Main	1.941	10-yr	26600.00	710.72	731.06	722.91	732.19	0.000689	8.53	3180.43	278.41		0.39
Main	1.941	20-yr	34200.00	710.72	733.55	724.72	734.87	0.000673	9.27	4047.26	426.98		0.40
Main	1.941	50-yr	45500.00	710.72	736.43	727.13	738.01	0.000672	10.28	5392.42	572.68		0.41
Main	1.941	100-yr	54400.00	710.72	738.12	728.83	739.94	0.000707	11.13	6235.60	754.70		0.42
Main	1.941	200-yr	63000.00	710.72	739.69	730.35	741.71	0.000728	11.84	7065.07	1125.90		0.43
Main	1.941	500-yr	75900.00	710.72	741.63	732.78	743.98	0.000772	12.86	8169.68	1630.88		0.45
Main	1.941	Design Discharge	38300.00	710.72	734.73	725.63	736.14	0.000662	9.62	4582.83	483.93		0.40
Main	2.004	2-yr	12500.00	710.78	724.77	718.55	725.52	0.000688	6.95	1799.30	165.42		0.37
Main	2.004	5-yr	19500.00	710.78	728.46	720.95	729.44	0.000728	7.95	2451.44	191.67		0.39
Main	2.004	10-yr	26600.00	710.78	731.25	722.99	732.45	0.000760	8.81	3041.43	409.75		0.41
Main	2.004	20-yr	34200.00	710.78	733.72	724.90	735.14	0.000738	9.60	3802.36	630.44		0.41
Main	2.004	50-yr	45500.00	710.78	736.55	727.54	738.30	0.000748	10.72	5024.30	851.47		0.43
Main	2.004	100-yr	54400.00	710.78	738.24	729.46	740.24	0.000783	11.60	5897.88	952.10		0.44
Main	2.004	200-yr	63000.00	710.78	739.83	730.99	742.02	0.000795	12.26	6751.84	1008.93		0.45
Main	2.004	500-yr	75900.00	710.78	741.78	733.26	744.30	0.000837	13.28	7832.44	1097.96		0.47
Main	2.004	Design Discharge	38300.00	710.78	734.88	725.87	736.41	0.000732	10.00	4245.06	704.87		0.42
Main	2.024	2-yr	12500.00	711.00	724.75	719.34	725.66	0.001050	7.64	1635.91	179.98		0.45
Main	2.024	5-yr	19500.00	711.00	728.48	721.85	729.55	0.000895	8.31	2346.95	201.35		0.43
Main	2.024	10-yr	26600.00	711.00	731.28	723.96	732.56	0.000861	9.09	2925.80	211.10		0.43
Main	2.024	20-yr	34200.00	711.00	733.73	726.19	735.25	0.000868	9.91	3452.18	218.37		0.44
Main	2.024	50-yr	45500.00	711.00	736.50	728.50	738.44	0.000935	11.19	4066.57	223.90		0.46
Main	2.024	100-yr	54400.00	711.00	738.09	730.08	740.44	0.001030	12.29	4424.69	225.78		0.49
Main	2.024	200-yr	63000.00	711.00	739.55	731.48	742.27	0.001106	13.25	4754.01	226.56		0.51
Main	2.024	500-yr	75900.00	711.00	741.29	733.45	744.66	0.001255	14.74	5148.53	251.27		0.55
Main	2.024	Design Discharge	38300.00	711.00	734.87	727.03	736.53	0.000884	10.34	3703.68	221.76		0.45
Main	2.033		Bridge										
Main	2.041	2-yr	12500.00	711.00	724.98	719.34	725.84	0.000976	7.45	1676.79	181.27		0.43
Main	2.041	5-yr	19500.00	711.00	728.74	721.85	729.76	0.000840	8.13	2399.29	202.84		0.42
Main	2.041	10-yr	26600.00	711.00	731.59	723.96	732.81	0.000806	8.89	2991.21	212.01		0.42
Main	2.041	20-yr	34200.00	711.00	734.10	726.19	735.56	0.000810	9.68	3533.91	219.48		0.43
Main	2.041	50-yr	45500.00	711.00	737.00	728.50	738.84	0.000859	10.89	4179.86	224.50		0.44
Main	2.041	100-yr	54400.00	711.00	738.75	730.08	740.95	0.000930	11.90	4573.32	226.39		0.47
Main	2.041	200-yr	63000.00	711.00	740.37	731.48	742.89	0.000982	12.75	4940.36	227.22		0.48
Main	2.041	500-yr	75900.00	711.00	742.48	733.45	745.53	0.001070	14.00	5422.39	228.30		0.51
Main	2.041	Design Discharge	38300.00	711.00	735.28	727.03	736.87	0.000820	10.09	3795.48	222.48		0.43
Main	2.068	2-yr	12500.00	710.86	725.07	719.41	725.98	0.000881	7.63	1637.22	157.33		0.42
Main	2.068	5-yr	19500.00	710.86	728.77	721.93	729.92	0.000882	8.63	2259.99	180.38		0.43
Main	2.068	10-yr	26600.00	710.86	731.58	724.16	732.99	0.000896	9.53	2815.48	228.08		0.44
Main	2.068	20-yr	34200.00	710.86	734.08	726.18	735.74	0.000898	10.36	3446.66	273.74		0.45
Main	2.068	50-yr	45500.00	710.86	737.00	728.79	739.03	0.000961	11.52	4334.44	338.34		0.48
Main	2.068	100-yr	54400.00	710.86	738.80	730.60	741.12	0.001016	12.39	4987.30	391.19		0.50
Main	2.068	200-yr	63000.00	710.86	740.49	732.24	743.04	0.001008	13.04	5697.67	448.41		0.50
Main	2.068	500-yr	75900.00	710.86	742.86	734.50	745.69	0.000987	13.86	6854.64	516.62		0.50
Main	2.068	Design Discharge	38300.00	710.86	735.26	727.16	737.05	0.000905	10.77	3784.59	297.41		0.46
Main	2.167	2-yr	12500.00	710.96	725.63	719.40	726.42	0.000756	7.15	1747.33	165.23		0.39
Main	2.167	5-yr	19500.00	710.96	729.33	721.94	730.36	0.000738	8.13	2411.23	203.48		0.40
Main	2.167	10-yr	26600.00	710.96	732.17	724.11	733.43	0.000745	9.03	3041.26	235.96		0.41
Main	2.167	20-yr	34200.00	710.96	734.69	726.12	736.19	0.000768	9.88	3669.78	266.94		0.42
Main	2.167	50-yr	45500.00	710.96	737.64	728.64	739.51	0.000804	11.06	4560.51	349.93		0.44
Main	2.167	100-yr	54400.00	710.96	739.45	730.45	741.62	0.000838	11.98	5252.69	413.67		0.46
Main	2.167	200-yr	63000.00	710.96	741.13	732.04	743.54	0.000853	12.71	5979.17	444.99		0.47
Main	2.167	500-yr	75900.00	710.96	743.45	734.15	746.19	0.000866	13.66	7043.29	472.43		0.48
Main	2.167	Design Discharge	38300.00	710.96	735.88	727.09	737.51	0.000787	10.29	4001.42	288.24		0.43
Main	2.246	2-yr	12500.00	711.05	725.98	719.41	726.72	0.000673	6.91	1807.76	164.67		0.37
Main	2.246	5-yr	19500.00	711.05	729.68	721.91	730.66	0.000679	7.91	2486.78	212.79		0.38
Main	2.246	10-yr	26600.00	711.05	732.54	724.07	733.73	0.000690	8.80	3173.08	265.79		0.39
Main	2.246	20-yr	34200.00	711.05	735.10	726.04	736.50	0.000705	9.59	3900.97	303.94		0.41
Main	2.246	50-yr	45500.00	711.05	738.12	728.65	739.84	0.000718	10.67	4908.24	365.62		0.42
Main	2.246	100-yr	54400.00	711.05	739.98	730.44	741.97	0.000746	11.54	5612.28	390.66		0.43

Main	2.246	200-yr	63000.00	711.05	741.67	732.13	743.89	0.000764	12.27	6285.16	405.20	0.44
Main	2.246	500-yr	75900.00	711.05	743.95	734.36	746.55	0.000799	13.34	7313.28	514.81	0.46
Main	2.246	Design Discharge	38300.00	711.05	736.32	727.04	737.83	0.000710	9.97	4283.94	325.28	0.41
Main	2.310	2-yr	12500.00	711.00	726.29	719.18	726.94	0.000571	6.46	1936.27	173.22	0.34
Main	2.310	5-yr	19500.00	711.00	730.03	721.65	730.88	0.000596	7.43	2625.75	195.98	0.36
Main	2.310	10-yr	26600.00	711.00	732.91	723.74	733.97	0.000631	8.27	3215.41	212.55	0.37
Main	2.310	20-yr	34200.00	711.00	735.47	725.71	736.75	0.000651	9.06	3775.01	223.88	0.39
Main	2.310	50-yr	45500.00	711.00	738.47	728.25	740.08	0.000671	10.21	4556.37	278.23	0.40
Main	2.310	100-yr	54400.00	711.00	740.30	730.00	742.22	0.000710	11.14	5073.76	284.57	0.42
Main	2.310	200-yr	63000.00	711.00	741.95	731.59	744.15	0.000740	11.95	5547.60	290.25	0.44
Main	2.310	500-yr	75900.00	711.00	744.21	733.71	746.82	0.000783	13.06	6210.76	298.03	0.46
Main	2.310	Design Discharge	38300.00	711.00	736.68	726.67	738.07	0.000654	9.47	4065.06	272.08	0.39
Main	2.313		Bridge									
Main	2.316	2-yr	12500.00	711.00	726.39	719.18	727.02	0.000558	6.40	1952.57	173.79	0.34
Main	2.316	5-yr	19500.00	711.00	730.15	721.65	730.99	0.000581	7.36	2650.02	196.74	0.35
Main	2.316	10-yr	26600.00	711.00	733.06	723.74	734.10	0.000613	8.19	3248.02	213.32	0.37
Main	2.316	20-yr	34200.00	711.00	735.65	725.71	736.90	0.000630	8.97	3815.64	224.61	0.38
Main	2.316	50-yr	45500.00	711.00	738.69	728.25	740.27	0.000646	10.09	4619.84	279.02	0.40
Main	2.316	100-yr	54400.00	711.00	740.58	730.00	742.44	0.000680	11.00	5151.15	285.51	0.41
Main	2.316	200-yr	63000.00	711.00	742.27	731.59	744.40	0.000707	11.78	5639.71	291.35	0.43
Main	2.316	500-yr	75900.00	711.00	744.59	733.71	747.12	0.000744	12.86	6324.37	299.34	0.44
Main	2.316	Design Discharge	38300.00	711.00	736.88	726.67	738.24	0.000631	9.36	4118.65	272.75	0.39
Main	2.389	2-yr	12500.00	711.22	726.58	719.74	727.27	0.000642	6.67	1874.84	174.61	0.36
Main	2.389	5-yr	19500.00	711.22	730.38	722.29	731.24	0.000692	7.44	2619.90	219.28	0.38
Main	2.389	10-yr	26600.00	711.22	733.34	724.40	734.35	0.000654	8.06	3355.76	324.06	0.38
Main	2.389	20-yr	34200.00	711.22	736.03	726.42	737.15	0.000611	8.57	4527.10	557.82	0.37
Main	2.389	50-yr	45500.00	711.22	739.34	729.18	740.54	0.000558	9.04	6438.16	595.96	0.37
Main	2.389	100-yr	54400.00	711.22	741.47	730.91	742.73	0.000545	9.42	7730.28	620.71	0.37
Main	2.389	200-yr	63000.00	711.22	743.40	732.34	744.72	0.000527	9.71	8950.61	636.54	0.37
Main	2.389	500-yr	75900.00	711.22	746.09	734.59	747.47	0.000505	10.07	10687.02	2462.33	0.36
Main	2.389	Design Discharge	38300.00	711.22	737.35	727.43	738.49	0.000584	8.73	5271.74	573.09	0.37
Main	2.440	2-yr	12500.00	711.00	726.98	719.21	727.56	0.001844	6.11	2047.06	190.22	0.33
Main	2.440	5-yr	19500.00	711.00	730.79	721.70	731.54	0.001787	6.94	2808.75	209.32	0.33
Main	2.440	10-yr	26600.00	711.00	733.71	723.82	734.64	0.001855	7.73	3441.64	223.95	0.35
Main	2.440	20-yr	34200.00	711.00	736.31	726.16	737.43	0.001943	8.46	4040.90	236.97	0.36
Main	2.440	50-yr	45500.00	711.00	739.47	728.46	740.86	0.002097	9.45	4814.68	252.80	0.38
Main	2.440	100-yr	54400.00	711.00	741.49	730.10	743.10	0.002238	10.20	5334.18	262.00	0.40
Main	2.440	200-yr	63000.00	711.00	743.31	731.58	745.13	0.002257	10.84	5810.66	262.01	0.41
Main	2.440	500-yr	75900.00	711.00	745.81	733.63	747.95	0.002293	11.74	6467.15	705.87	0.42
Main	2.440	Design Discharge	38300.00	711.00	737.57	727.02	738.78	0.001987	8.82	4342.68	243.27	0.37
Main	2.443		Bridge									
Main	2.445	2-yr	12500.00	711.00	727.15	719.21	727.71	0.001764	6.01	2079.28	191.31	0.32
Main	2.445	5-yr	19500.00	711.00	731.00	721.67	731.72	0.001713	6.83	2855.29	211.38	0.33
Main	2.445	10-yr	26600.00	711.00	733.97	723.82	734.87	0.001772	7.59	3506.78	226.86	0.34
Main	2.445	20-yr	34200.00	711.00	736.63	726.14	737.70	0.001844	8.28	4128.64	240.71	0.35
Main	2.445	50-yr	45500.00	711.00	739.84	728.48	741.16	0.001986	9.24	4926.90	257.40	0.37
Main	2.445	100-yr	54400.00	711.00	744.39	730.12	745.62	0.001414	8.89	6116.81	419.03	0.32
Main	2.445	200-yr	63000.00	711.00	746.74	731.59	748.10	0.001372	9.34	6961.40	1652.18	0.32
Main	2.445	500-yr	75900.00	711.00	748.84	733.64	750.39	0.001455	10.13	8820.99	2079.64	0.34
Main	2.445	Design Discharge	38300.00	711.00	737.92	727.04	739.08	0.001881	8.62	4443.00	247.42	0.36
Main	2.493	2-yr	12500.00	711.33	727.53	720.03	728.16	0.001629	6.33	1975.19	185.52	0.34
Main	2.493	5-yr	19500.00	711.33	731.38	722.58	732.16	0.001613	7.10	2746.74	215.32	0.35
Main	2.493	10-yr	26600.00	711.33	734.37	724.79	735.31	0.001622	7.77	3421.76	234.77	0.36
Main	2.493	20-yr	34200.00	711.33	737.05	726.92	738.15	0.001620	8.40	4076.94	258.98	0.37
Main	2.493	50-yr	45500.00	711.33	740.29	729.45	741.62	0.001624	9.27	4988.46	308.64	0.37
Main	2.493	100-yr	54400.00	711.33	744.76	731.17	745.94	0.001110	8.83	6655.80	689.51	0.32
Main	2.493	200-yr	63000.00	711.33	747.16	732.66	748.41	0.001044	9.13	7809.04	1311.31	0.32
Main	2.493	500-yr	75900.00	711.33	749.24	734.66	750.72	0.001133	10.02	9439.70	1874.84	0.33
Main	2.493	Design Discharge	38300.00	711.33	738.35	727.95	739.52	0.001607	8.71	4423.72	276.63	0.37
Main	2.644	2-yr	12500.00	711.50	728.90	720.59	729.37	0.001407	5.52	2263.75	235.86	0.31
Main	2.644	5-yr	19500.00	711.50	732.72	723.15	733.29	0.001219	6.07	3214.70	260.43	0.30
Main	2.644	10-yr	26600.00	711.50	735.74	725.43	736.42	0.001167	6.60	4028.22	277.44	0.31
Main	2.644	20-yr	34200.00	711.50	738.47	727.81	739.25	0.001154	7.12	4803.80	292.39	0.31
Main	2.644	50-yr	45500.00	711.50	741.80	729.89	742.75	0.001185	7.83	5810.92	312.21	0.32
Main	2.644	100-yr	54400.00	711.50	745.88	731.31	746.78	0.000950	7.63	7125.41	336.00	0.29
Main	2.644	200-yr	63000.00	711.50	748.23	732.58	749.21	0.000916	7.94	8000.54	1438.55	0.29
Main	2.644	500-yr	75900.00	711.50	750.45	734.33	751.59	0.000977	8.63	9543.51	2314.94	0.30

Main	2.644	Design Discharge	38300.00	711.50	739.79	728.64	740.63	0.001156	7.37	5194.51	300.17	0.31
Main	2.722	2-yr	12500.00	711.59	728.97	723.62	730.01	0.000574	8.20	1525.03	175.46	0.49
Main	2.722	5-yr	19500.00	711.59	732.74	727.01	733.89	0.000509	8.60	2268.49	222.76	0.47
Main	2.722	10-yr	26600.00	711.59	735.77	729.27	736.98	0.000470	8.81	3019.84	270.20	0.46
Main	2.722	20-yr	34200.00	711.59	738.49	731.17	739.76	0.000400	9.05	3778.76	287.02	0.44
Main	2.722	50-yr	45500.00	711.59	741.81	733.70	743.23	0.000358	9.55	4765.68	307.16	0.43
Main	2.722	100-yr	54400.00	711.59	745.89	735.31	747.14	0.000261	8.96	6074.78	946.40	0.37
Main	2.722	200-yr	63000.00	711.59	748.25	736.60	749.54	0.000242	9.14	6889.03	1558.51	0.36
Main	2.722	500-yr	75900.00	711.59	750.45	738.25	751.96	0.000257	9.87	8096.92	2782.50	0.38
Main	2.722	Design Discharge	38300.00	711.59	739.80	732.10	741.12	0.000376	9.20	4161.10	294.13	0.43
Main	2.753	2-yr	12500.00	711.80	728.70	725.82	730.47	0.000623	10.69	1169.67	129.78	0.63
Main	2.753	5-yr	19500.00	711.80	732.36	728.55	734.44	0.000545	11.58	1683.70	150.84	0.61
Main	2.753	10-yr	26600.00	711.80	735.26	730.87	737.65	0.000517	12.40	2145.18	167.51	0.61
Main	2.753	20-yr	34200.00	711.80	737.85	732.98	740.54	0.000504	13.16	2598.40	182.40	0.61
Main	2.753	50-yr	45500.00	711.80	741.03	735.71	744.15	0.000500	14.19	3206.95	200.67	0.63
Main	2.753	100-yr	54400.00	711.80	745.26	737.61	747.88	0.000487	12.99	4187.72	741.81	0.61
Main	2.753	200-yr	63000.00	711.80	747.72	739.29	750.17	0.000430	12.57	5012.22	1219.91	0.58
Main	2.753	500-yr	75900.00	711.80	749.93	741.57	752.58	0.000416	13.08	5801.73	1817.79	0.58
Main	2.753	Design Discharge	38300.00	711.80	739.11	734.00	741.95	0.000498	13.52	2832.96	189.65	0.62
Main	2.756		Bridge									
Main	2.759	2-yr	12500.00	711.80	729.60	725.81	731.06	0.000474	9.70	1288.52	134.94	0.55
Main	2.759	5-yr	19500.00	711.80	733.35	728.57	735.10	0.000428	10.62	1836.13	156.54	0.55
Main	2.759	10-yr	26600.00	711.80	736.36	730.86	738.38	0.000410	11.40	2332.37	173.81	0.55
Main	2.759	20-yr	34200.00	711.80	739.05	732.98	741.33	0.000401	12.12	2821.92	189.31	0.55
Main	2.759	50-yr	45500.00	711.80	742.40	735.67	745.04	0.000397	13.05	3486.96	208.53	0.56
Main	2.759	100-yr	54400.00	711.80	746.30	737.61	748.48	0.000439	11.87	4582.57	907.21	0.58
Main	2.759	200-yr	63000.00	711.80	748.56	739.29	750.67	0.000371	11.65	5409.08	1280.29	0.54
Main	2.759	500-yr	75900.00	711.80	750.82	741.58	753.08	0.000362	12.05	6404.06	2005.26	0.54
Main	2.759	Design Discharge	38300.00	711.80	740.36	734.02	742.77	0.000398	12.46	3074.66	196.84	0.56
Main	2.777	2-yr	12500.00	711.80	729.66	725.82	731.10	0.000465	9.63	1297.42	135.32	0.55
Main	2.777	5-yr	19500.00	711.80	733.41	728.56	735.15	0.000422	10.57	1845.42	156.88	0.54
Main	2.777	10-yr	26600.00	711.80	736.42	730.87	738.42	0.000406	11.36	2342.33	174.14	0.55
Main	2.777	20-yr	34200.00	711.80	739.11	732.98	741.37	0.000397	12.07	2832.61	189.64	0.55
Main	2.777	50-yr	45500.00	711.80	742.45	735.68	745.08	0.000394	13.00	3498.81	208.86	0.56
Main	2.777	100-yr	54400.00	711.80	746.14	737.59	748.60	0.000317	12.58	4323.29	508.43	0.51
Main	2.777	200-yr	63000.00	711.80	748.19	739.29	750.88	0.000310	13.16	4785.68	853.03	0.50
Main	2.777	500-yr	75900.00	711.80	750.14	741.58	753.42	0.000341	14.52	5231.86	1270.01	0.53
Main	2.777	Design Discharge	38300.00	711.80	740.42	734.01	742.81	0.000394	12.41	3085.71	197.16	0.55
Main	2.780		Bridge									
Main	2.783	2-yr	12500.00	711.80	731.27	725.82	732.32	0.000296	8.21	1522.95	144.58	0.45
Main	2.783	5-yr	19500.00	711.80	735.23	728.56	736.52	0.000280	9.11	2140.43	167.35	0.45
Main	2.783	10-yr	26600.00	711.80	738.42	730.87	739.92	0.000273	9.84	2703.26	185.68	0.45
Main	2.783	20-yr	34200.00	711.80	741.29	732.98	743.00	0.000270	10.49	3259.91	202.18	0.46
Main	2.783	50-yr	45500.00	711.80	743.50	735.68	745.81	0.000354	12.21	3726.04	225.99	0.53
Main	2.783	100-yr	54400.00	711.80	746.88	737.59	749.16	0.000281	12.11	4490.98	631.21	0.48
Main	2.783	200-yr	63000.00	711.80	749.10	739.29	751.57	0.000272	12.62	4991.65	1033.54	0.47
Main	2.783	500-yr	75900.00	711.80	751.91	741.58	754.69	0.000269	13.42	6293.43	1979.65	0.47
Main	2.783	Design Discharge	38300.00	711.80	742.68	734.01	744.49	0.000269	10.80	3546.31	210.16	0.46
Main	2.798	2-yr	12500.00	711.80	731.27	725.93	732.36	0.000310	8.37	1494.05	142.36	0.46
Main	2.798	5-yr	19500.00	711.80	735.22	728.70	736.56	0.000292	9.28	2101.55	165.02	0.46
Main	2.798	10-yr	26600.00	711.80	738.41	731.02	739.96	0.000285	10.01	2656.04	183.28	0.46
Main	2.798	20-yr	34200.00	711.80	741.27	733.17	743.04	0.000279	10.67	3203.95	197.49	0.47
Main	2.798	50-yr	45500.00	711.80	743.45	735.92	745.87	0.000337	12.50	3638.89	200.99	0.52
Main	2.798	100-yr	54400.00	711.80	746.76	737.81	749.24	0.000286	12.63	4305.88	201.00	0.48
Main	2.798	200-yr	63000.00	711.80	748.93	739.50	751.67	0.000285	13.29	4741.58	201.01	0.48
Main	2.798	500-yr	75900.00	711.80	751.84	741.69	754.75	0.000266	13.87	7600.94	2104.30	0.47
Main	2.798	Design Discharge	38300.00	711.80	742.65	734.22	744.53	0.000275	11.01	3479.56	200.99	0.47
Main	2.800		Bridge									
Main	2.802	2-yr	12500.00	711.80	731.72	725.93	732.72	0.000275	8.02	1558.91	144.95	0.43
Main	2.802	5-yr	19500.00	711.80	735.76	728.70	736.99	0.000260	8.90	2191.15	168.11	0.43
Main	2.802	10-yr	26600.00	711.80	739.00	731.02	740.44	0.000255	9.62	2766.03	186.69	0.44
Main	2.802	20-yr	34200.00	711.80	741.81	733.17	743.46	0.000254	10.33	3310.08	199.01	0.45
Main	2.802	50-yr	45500.00	711.80	746.13	735.92	747.97	0.000219	10.89	4178.41	201.00	0.42
Main	2.802	100-yr	54400.00	711.80	749.55	737.81	751.49	0.000195	11.18	4878.76	258.39	0.40
Main	2.802	200-yr	63000.00	711.80	751.37	739.50	753.51	0.000199	11.83	6928.76	1888.44	0.41
Main	2.802	500-yr	75900.00	711.80	755.01	741.69	756.81	0.000154	11.37	12100.59	4059.37	0.37

Main	2.802	Design Discharge	38300.00	711.80	743.23	734.22	744.99	0.000248	10.65	3594.64	200.99	0.44
Main	2.850	2-yr	12500.00	712.22	731.58	726.93	732.90	0.000391	9.20	1358.57	132.51	0.51
Main	2.850	5-yr	19500.00	712.22	735.60	729.80	737.17	0.000362	10.06	1938.56	157.44	0.51
Main	2.850	10-yr	26600.00	712.22	738.83	732.21	740.62	0.000360	10.72	2482.02	184.38	0.51
Main	2.850	20-yr	34200.00	712.22	741.70	734.43	743.62	0.000378	11.13	3073.07	227.19	0.53
Main	2.850	50-yr	45500.00	712.22	746.20	737.26	748.03	0.000283	10.87	4224.03	299.31	0.48
Main	2.850	100-yr	54400.00	712.22	749.90	739.58	751.57	0.000218	10.42	5664.18	501.18	0.43
Main	2.850	200-yr	63000.00	712.22	751.94	741.49	753.61	0.000195	10.54	8268.72	2254.28	0.41
Main	2.850	500-yr	75900.00	712.22	755.70	743.65	756.90	0.000126	9.49	15283.75	3928.32	0.34
Main	2.850	Design Discharge	38300.00	712.22	743.17	735.53	745.12	0.000360	11.20	3419.78	242.35	0.53
Main	2.988	2-yr	12500.00	712.37	731.94	727.18	733.18	0.000377	8.95	1397.19	139.23	0.50
Main	2.988	5-yr	19500.00	712.37	735.97	730.02	737.43	0.000336	9.71	2008.86	163.63	0.49
Main	2.988	10-yr	26600.00	712.37	739.21	732.39	740.87	0.000318	10.34	2571.37	183.90	0.49
Main	2.988	20-yr	34200.00	712.37	742.00	734.55	743.88	0.000317	10.99	3111.69	328.48	0.50
Main	2.988	50-yr	45500.00	712.37	746.41	737.27	748.22	0.000244	10.96	4977.42	495.18	0.45
Main	2.988	100-yr	54400.00	712.37	750.06	739.20	751.72	0.000190	10.60	7292.27	2742.09	0.41
Main	2.988	200-yr	63000.00	712.37	752.19	740.91	753.74	0.000166	10.56	10725.83	3177.32	0.39
Main	2.988	500-yr	75900.00	712.37	755.83	743.77	756.99	0.000115	9.70	16799.59	3630.59	0.33
Main	2.988	Design Discharge	38300.00	712.37	743.41	735.57	745.36	0.000302	11.21	3624.16	398.25	0.49
Main	3.047	2-yr	12500.00	712.43	732.18	727.08	733.31	0.000328	8.51	1468.84	139.04	0.46
Main	3.047	5-yr	19500.00	712.43	736.15	729.75	737.54	0.000306	9.48	2056.91	158.32	0.46
Main	3.047	10-yr	26600.00	712.43	739.33	732.04	740.97	0.000302	10.29	2585.76	175.15	0.47
Main	3.047	20-yr	34200.00	712.43	742.08	734.17	743.99	0.000307	11.07	3103.65	351.21	0.48
Main	3.047	50-yr	45500.00	712.43	746.42	736.95	748.33	0.000247	11.23	4841.40	449.13	0.45
Main	3.047	100-yr	54400.00	712.43	749.99	738.91	751.74	0.000193	10.94	6930.32	822.32	0.41
Main	3.047	200-yr	63000.00	712.43	752.08	740.68	753.87	0.000181	11.24	9090.96	1703.20	0.40
Main	3.047	500-yr	75900.00	712.43	755.59	743.72	757.15	0.000143	10.91	12732.42	2291.17	0.36
Main	3.047	Design Discharge	38300.00	712.43	743.47	735.23	745.46	0.000296	11.35	3614.80	383.94	0.48
Main	3.104	2-yr	12500.00	712.51	732.43	726.66	733.41	0.000272	7.93	1575.37	147.80	0.43
Main	3.104	5-yr	19500.00	712.51	736.44	729.40	737.64	0.000257	8.80	2215.94	171.63	0.43
Main	3.104	10-yr	26600.00	712.51	739.67	731.69	741.08	0.000245	9.53	2791.57	183.62	0.43
Main	3.104	20-yr	34200.00	712.51	742.42	733.81	744.09	0.000242	10.36	3301.22	185.00	0.43
Main	3.104	50-yr	45500.00	712.51	746.45	736.53	748.41	0.000228	11.24	4152.77	566.51	0.42
Main	3.104	100-yr	54400.00	712.51	749.96	738.33	751.83	0.000186	11.19	6405.54	826.16	0.39
Main	3.104	200-yr	63000.00	712.51	752.03	739.90	753.97	0.000179	11.57	8046.83	947.85	0.39
Main	3.104	500-yr	75900.00	712.51	755.42	741.95	757.28	0.000156	11.67	10737.96	1263.53	0.37
Main	3.104	Design Discharge	38300.00	712.51	743.75	734.85	745.56	0.000243	10.80	3546.80	185.00	0.43
Main	3.109		Bridge									
Main	3.114	2-yr	12500.00	712.51	732.56	726.66	733.52	0.000263	7.84	1594.94	148.59	0.42
Main	3.114	5-yr	19500.00	712.51	736.61	729.40	737.78	0.000248	8.69	2244.38	172.62	0.42
Main	3.114	10-yr	26600.00	712.51	739.90	731.69	741.27	0.000235	9.38	2834.47	184.33	0.42
Main	3.114	20-yr	34200.00	712.51	742.63	733.81	744.26	0.000233	10.24	3339.72	185.00	0.42
Main	3.114	50-yr	45500.00	712.51	747.44	736.53	749.20	0.000195	10.69	4713.95	575.58	0.39
Main	3.114	100-yr	54400.00	712.51	751.34	738.33	752.92	0.000149	10.37	7503.02	882.13	0.35
Main	3.114	200-yr	63000.00	712.51	752.59	739.90	754.40	0.000164	11.22	8493.04	947.85	0.37
Main	3.114	500-yr	75900.00	712.51	755.84	741.95	757.62	0.000147	11.43	11071.97	1264.36	0.36
Main	3.114	Design Discharge	38300.00	712.51	743.97	734.85	745.74	0.000234	10.68	3587.37	185.00	0.43
Main	3.146	2-yr	12500.00	712.50	732.64	726.60	733.56	0.000252	7.69	1625.12	151.16	0.41
Main	3.146	5-yr	19500.00	712.50	736.70	729.32	737.82	0.000238	8.52	2287.83	175.87	0.42
Main	3.146	10-yr	26600.00	712.50	740.01	731.62	741.32	0.000254	9.16	2904.84	212.99	0.44
Main	3.146	20-yr	34200.00	712.50	742.84	733.71	744.31	0.000224	9.75	3506.23	213.00	0.42
Main	3.146	50-yr	45500.00	712.50	747.76	736.42	749.26	0.000163	9.88	5290.73	644.64	0.38
Main	3.146	100-yr	54400.00	712.50	751.64	738.28	752.97	0.000120	9.51	8114.71	772.48	0.33
Main	3.146	200-yr	63000.00	712.50	752.93	740.34	754.45	0.000132	10.28	9058.14	838.77	0.35
Main	3.146	500-yr	75900.00	712.50	756.12	742.19	757.66	0.000120	10.58	11392.86	1188.92	0.34
Main	3.146	Design Discharge	38300.00	712.50	744.22	734.75	745.80	0.000215	10.08	3801.16	213.01	0.42
Main	3.149		Bridge									
Main	3.151	2-yr	12500.00	712.50	732.85	726.60	733.73	0.000239	7.55	1655.84	152.40	0.40
Main	3.151	5-yr	19500.00	712.50	736.95	729.32	738.03	0.000226	8.36	2332.09	177.39	0.41
Main	3.151	10-yr	26600.00	712.50	740.16	731.62	741.43	0.000245	9.06	2936.17	212.99	0.43
Main	3.151	20-yr	34200.00	712.50	743.01	733.71	744.46	0.000217	9.65	3543.67	213.00	0.42
Main	3.151	50-yr	45500.00	712.50	747.93	736.42	749.40	0.000158	9.79	5404.42	654.25	0.37
Main	3.151	100-yr	54400.00	712.50	751.71	738.28	753.02	0.000119	9.47	8165.11	775.26	0.33
Main	3.151	200-yr	63000.00	712.50	752.96	740.34	754.47	0.000131	10.27	9077.59	840.24	0.35
Main	3.151	500-yr	75900.00	712.50	756.18	742.19	757.71	0.000119	10.55	11438.20	1190.99	0.34
Main	3.151	Design Discharge	38300.00	712.50	744.41	734.75	745.96	0.000208	9.97	3841.75	213.01	0.41

Main	3.207	2-yr	12500.00	712.62	732.75	727.95	733.89	0.000341	8.55	1461.63	145.12	0.47
Main	3.207	5-yr	19500.00	712.62	736.85	730.64	738.18	0.000299	9.27	2103.81	168.71	0.46
Main	3.207	10-yr	26600.00	712.62	740.06	732.85	741.59	0.000291	9.93	2677.72	190.41	0.47
Main	3.207	20-yr	34200.00	712.62	742.90	734.93	744.61	0.000290	10.49	3265.06	228.49	0.47
Main	3.207	50-yr	45500.00	712.62	747.89	737.62	749.50	0.000199	10.25	5197.59	592.83	0.41
Main	3.207	100-yr	54400.00	712.62	751.67	739.54	753.10	0.000145	9.86	7671.16	746.75	0.36
Main	3.207	200-yr	63000.00	712.62	752.92	741.33	754.55	0.000157	10.63	8604.83	859.95	0.38
Main	3.207	500-yr	75900.00	712.62	756.17	743.57	757.77	0.000137	10.78	11031.03	1267.25	0.36
Main	3.207	Design Discharge	38300.00	712.62	744.31	735.95	746.10	0.000278	10.74	3609.19	272.58	0.47
Main	3.295	2-yr	12500.00	712.72	732.97	727.83	734.05	0.000320	8.33	1501.16	148.98	0.46
Main	3.295	5-yr	19500.00	712.72	737.07	730.55	738.33	0.000281	9.00	2167.11	174.69	0.45
Main	3.295	10-yr	26600.00	712.72	740.29	732.85	741.73	0.000268	9.63	2761.23	194.70	0.45
Main	3.295	20-yr	34200.00	712.72	743.11	734.92	744.75	0.000258	10.27	3337.56	220.70	0.45
Main	3.295	50-yr	45500.00	712.72	747.97	737.56	749.59	0.000192	10.27	5175.99	760.76	0.40
Main	3.295	100-yr	54400.00	712.72	751.79	739.33	753.16	0.000137	9.74	8361.42	924.67	0.35
Main	3.295	200-yr	63000.00	712.72	753.08	741.03	754.63	0.000146	10.44	9602.48	1104.05	0.37
Main	3.295	500-yr	75900.00	712.72	756.41	743.18	757.85	0.000123	10.39	12825.91	1368.17	0.34
Main	3.295	Design Discharge	38300.00	712.72	744.49	735.93	746.23	0.000252	10.57	3661.67	256.74	0.45
Main	3.314	2-yr	12500.00	712.75	733.37	726.74	734.11	0.000202	6.91	1809.15	169.88	0.37
Main	3.314	5-yr	19500.00	712.75	737.49	729.36	738.39	0.000187	7.58	2571.44	199.65	0.37
Main	3.314	10-yr	26600.00	712.75	740.76	731.53	741.79	0.000182	8.15	3262.37	223.23	0.38
Main	3.314	20-yr	34200.00	712.75	743.64	733.56	744.82	0.000194	8.68	3938.22	258.99	0.39
Main	3.314	50-yr	45500.00	712.75	748.50	736.12	749.65	0.000134	8.67	5885.29	619.58	0.34
Main	3.314	100-yr	54400.00	712.75	752.15	737.89	753.21	0.000102	8.46	9108.56	1130.80	0.31
Main	3.314	200-yr	63000.00	712.75	753.49	739.46	754.67	0.000108	9.03	10633.80	1257.24	0.32
Main	3.314	500-yr	75900.00	712.75	756.78	741.58	757.89	0.000092	9.03	14348.18	1668.42	0.30
Main	3.314	Design Discharge	38300.00	712.75	745.07	734.53	746.30	0.000180	8.89	4308.42	259.00	0.38
Main	3.317		Bridge									
Main	3.319	2-yr	12500.00	712.75	733.37	726.74	734.11	0.000202	6.91	1810.20	169.92	0.37
Main	3.319	5-yr	19500.00	712.75	737.50	729.36	738.39	0.000187	7.58	2572.56	199.69	0.37
Main	3.319	10-yr	26600.00	712.75	740.77	731.53	741.80	0.000182	8.15	3263.60	223.27	0.38
Main	3.319	20-yr	34200.00	712.75	743.65	733.56	744.82	0.000194	8.68	3939.75	258.99	0.39
Main	3.319	50-yr	45500.00	712.75	748.50	736.12	749.66	0.000134	8.67	5887.75	619.86	0.34
Main	3.319	100-yr	54400.00	712.75	752.23	737.89	753.28	0.000100	8.42	9203.26	1130.80	0.30
Main	3.319	200-yr	63000.00	712.75	753.60	739.46	754.77	0.000106	8.98	10757.49	1291.31	0.32
Main	3.319	500-yr	75900.00	712.75	756.84	741.58	757.94	0.000091	9.00	14420.16	1672.06	0.30
Main	3.319	Design Discharge	38300.00	712.75	745.08	734.53	746.31	0.000180	8.89	4309.83	259.00	0.38
Main	3.364	2-yr	12500.00	712.80	733.33	726.94	734.21	0.000234	7.51	1663.67	151.48	0.40
Main	3.364	5-yr	19500.00	712.80	737.41	729.71	738.50	0.000224	8.36	2331.53	175.77	0.40
Main	3.364	10-yr	26600.00	712.80	740.64	732.00	741.92	0.000222	9.08	2930.05	194.98	0.41
Main	3.364	20-yr	34200.00	712.80	743.49	734.12	744.96	0.000224	9.75	3509.01	211.91	0.42
Main	3.364	50-yr	45500.00	712.80	748.26	736.81	749.81	0.000169	10.03	4673.11	339.53	0.38
Main	3.364	100-yr	54400.00	712.80	751.89	738.73	753.46	0.000140	10.12	6207.55	517.66	0.36
Main	3.364	200-yr	63000.00	712.80	753.15	740.38	755.00	0.000157	11.07	6865.39	527.49	0.38
Main	3.364	500-yr	75900.00	712.80	756.24	742.66	758.24	0.000149	11.63	9027.33	1532.65	0.38
Main	3.364	Design Discharge	38300.00	712.80	744.88	735.14	746.45	0.000214	10.06	3842.96	238.99	0.42
Main	3.371		Mult Open									
Main	3.378	2-yr	12500.00	712.80	733.55	726.94	734.39	0.000222	7.37	1696.61	152.77	0.39
Main	3.378	5-yr	19500.00	712.80	737.69	729.71	738.73	0.000211	8.19	2380.08	177.40	0.39
Main	3.378	10-yr	26600.00	712.80	740.96	732.00	742.19	0.000209	8.89	2992.79	196.89	0.40
Main	3.378	20-yr	34200.00	712.80	743.85	734.12	745.26	0.000208	9.53	3596.12	238.99	0.41
Main	3.378	50-yr	45500.00	712.80	748.56	736.81	750.08	0.000161	9.89	4779.76	352.22	0.37
Main	3.378	100-yr	54400.00	712.80	752.46	738.73	753.94	0.000129	9.86	6505.43	525.18	0.34
Main	3.378	200-yr	63000.00	712.80	753.91	740.38	755.64	0.000141	10.69	7268.56	530.07	0.36
Main	3.378	500-yr	75900.00	712.80	756.99	742.66	758.84	0.000134	11.23	9686.00	1605.61	0.36
Main	3.378	Design Discharge	38300.00	712.80	745.26	735.14	746.77	0.000200	9.85	3933.80	238.99	0.41
Main	3.434	2-yr	12500.00	712.85	733.58	727.47	734.47	0.000240	7.57	1652.17	152.80	0.41
Main	3.434	5-yr	19500.00	712.85	737.73	730.14	738.80	0.000225	8.33	2340.50	179.25	0.41
Main	3.434	10-yr	26600.00	712.85	741.00	732.39	742.26	0.000218	8.99	2957.39	197.90	0.41
Main	3.434	20-yr	34200.00	712.85	743.90	734.50	745.33	0.000216	9.62	3554.90	214.13	0.42
Main	3.434	50-yr	45500.00	712.85	748.67	737.17	750.13	0.000174	9.73	5337.94	875.78	0.39
Main	3.434	100-yr	54400.00	712.85	753.00	739.03	754.03	0.000110	8.58	11881.66	2301.23	0.31
Main	3.434	200-yr	63000.00	712.85	754.78	740.66	755.74	0.000100	8.60	15292.92	2673.88	0.30
Main	3.434	500-yr	75900.00	712.85	758.23	742.91	758.97	0.000074	8.03	21902.74	2785.58	0.27
Main	3.434	Design Discharge	38300.00	712.85	745.31	735.53	746.84	0.000216	9.91	3863.43	222.22	0.42
Main	3.464	2-yr	12500.00	712.39	734.06	724.22	734.54	0.000154	5.58	2239.23	168.56	0.27
Main	3.464	5-yr	19500.00	712.39	738.22	726.98	738.88	0.000176	6.51	2996.02	197.73	0.29

Main	3.464	10-yr	26600.00	712.39	741.55	729.18	742.34	0.000197	7.11	3740.04	235.14	0.31
Main	3.464	20-yr	34200.00	712.39	744.50	731.23	745.42	0.000193	7.70	4443.86	243.24	0.32
Main	3.464	50-yr	45500.00	712.39	749.26	733.90	750.21	0.000170	7.89	7059.99	1425.00	0.30
Main	3.464	100-yr	54400.00	712.39	753.46	735.82	754.08	0.000100	6.81	14922.55	2924.91	0.24
Main	3.464	200-yr	63000.00	712.39	755.22	737.54	755.80	0.000091	6.82	18574.36	2962.19	0.23
Main	3.464	500-yr	75900.00	712.39	758.57	740.38	759.01	0.000069	6.39	25532.28	3033.04	0.20
Main	3.464	Design Discharge	38300.00	712.39	745.93	732.26	746.92	0.000194	7.99	4796.49	248.35	0.32
Main	3.503	2-yr	12500.00	712.45	734.33	722.09	734.60	0.000245	4.21	2972.19	229.01	0.21
Main	3.503	5-yr	19500.00	712.45	738.58	724.83	738.95	0.000264	4.88	3996.73	259.72	0.22
Main	3.503	10-yr	26600.00	712.45	741.97	727.19	742.42	0.000280	5.37	4949.39	290.23	0.23
Main	3.503	20-yr	34200.00	712.45	744.97	729.21	745.50	0.000285	5.85	5842.62	305.06	0.24
Main	3.503	50-yr	45500.00	712.45	749.78	731.65	750.29	0.000221	5.89	10144.04	1874.66	0.21
Main	3.503	100-yr	54400.00	712.45	753.85	733.29	754.13	0.000120	4.83	19329.70	2833.16	0.16
Main	3.503	200-yr	63000.00	712.45	755.59	734.69	755.84	0.000107	4.75	23454.91	3029.49	0.15
Main	3.503	500-yr	75900.00	712.45	758.86	736.62	759.05	0.000078	4.35	31198.75	3071.53	0.13
Main	3.503	Design Discharge	38300.00	712.45	746.44	730.15	747.01	0.000286	6.08	6312.99	395.10	0.24
Main	3.571	2-yr	12500.00	712.52	734.43	721.53	734.69	0.000256	4.11	3043.04	251.74	0.21
Main	3.571	5-yr	19500.00	712.52	738.71	724.17	739.05	0.000257	4.66	4181.90	285.75	0.21
Main	3.571	10-yr	26600.00	712.52	742.12	726.39	742.52	0.000261	5.09	5222.93	316.17	0.22
Main	3.571	20-yr	34200.00	712.52	745.14	728.59	745.61	0.000263	5.51	6204.56	334.63	0.23
Main	3.571	50-yr	45500.00	712.52	749.94	731.34	750.37	0.000195	5.44	11236.91	1953.06	0.20
Main	3.571	100-yr	54400.00	712.52	753.94	733.41	754.17	0.000104	4.42	21343.55	2994.45	0.15
Main	3.571	200-yr	63000.00	712.52	755.67	734.88	755.87	0.000092	4.34	25963.27	3071.70	0.14
Main	3.571	500-yr	75900.00	712.52	758.92	736.68	759.07	0.000067	3.97	34635.72	3071.70	0.12
Main	3.571	Design Discharge	38300.00	712.52	746.61	729.69	747.12	0.000262	5.71	6763.64	536.73	0.23
Main	3.615	2-yr	12500.00	712.50	734.55	719.82	734.74	0.000129	3.48	3593.67	225.91	0.15
Main	3.615	5-yr	19500.00	712.50	738.82	722.11	739.10	0.000157	4.23	4609.44	250.27	0.17
Main	3.615	10-yr	26600.00	712.50	742.21	724.09	742.57	0.000178	4.85	5488.98	286.99	0.19
Main	3.615	20-yr	34200.00	712.50	745.20	725.94	745.66	0.000186	5.43	6348.14	287.00	0.20
Main	3.615	50-yr	45500.00	712.50	749.89	728.38	750.45	0.000179	6.01	7694.07	287.01	0.20
Main	3.615	100-yr	54400.00	712.50	753.81	730.09	754.26	0.000134	5.67	16561.20	2840.66	0.18
Main	3.615	200-yr	63000.00	712.50	755.54	731.63	755.96	0.000129	5.75	21196.68	2979.50	0.17
Main	3.615	500-yr	75900.00	712.50	758.81	733.73	759.14	0.000101	5.43	29991.80	2979.50	0.16
Main	3.615	Design Discharge	38300.00	712.50	746.66	726.86	747.17	0.000191	5.72	6766.77	287.00	0.20
Main	3.620		Bridge									
Main	3.625	2-yr	12500.00	712.50	734.56	719.82	734.75	0.000229	3.48	3595.53	225.95	0.15
Main	3.625	5-yr	19500.00	712.50	738.83	722.11	739.11	0.000279	4.23	4612.80	250.34	0.17
Main	3.625	10-yr	26600.00	712.50	742.23	724.09	742.59	0.000315	4.84	5494.55	286.99	0.19
Main	3.625	20-yr	34200.00	712.50	745.33	725.94	745.79	0.000325	5.40	6385.82	287.00	0.20
Main	3.625	50-yr	45500.00	712.50	750.23	728.38	750.77	0.000306	5.93	7813.90	1262.66	0.20
Main	3.625	100-yr	54400.00	712.50	753.96	730.09	754.35	0.000215	5.40	16966.80	2844.66	0.17
Main	3.625	200-yr	63000.00	712.50	755.72	731.63	756.06	0.000196	5.34	21684.15	2979.50	0.16
Main	3.625	500-yr	75900.00	712.50	758.97	733.73	759.22	0.000145	4.88	30421.52	2979.50	0.14
Main	3.625	Design Discharge	38300.00	712.50	746.85	726.86	747.35	0.000330	5.67	6821.88	287.00	0.20
Main	3.665	2-yr	12500.00	712.64	734.56	721.29	734.81	0.000202	4.00	3121.52	222.29	0.19
Main	3.665	5-yr	19500.00	712.64	738.84	723.75	739.18	0.000223	4.74	4116.27	244.88	0.20
Main	3.665	10-yr	26600.00	712.64	742.23	725.89	742.68	0.000240	5.35	4976.08	259.99	0.22
Main	3.665	20-yr	34200.00	712.64	745.33	727.90	745.87	0.000257	5.89	5805.07	274.82	0.23
Main	3.665	50-yr	45500.00	712.64	750.29	730.78	750.82	0.000214	6.02	10499.61	2380.88	0.21
Main	3.665	100-yr	54400.00	712.64	754.03	732.56	754.39	0.000144	5.31	18761.75	2664.50	0.18
Main	3.665	200-yr	63000.00	712.64	755.75	734.06	756.09	0.000137	5.38	22620.14	2777.39	0.17
Main	3.665	500-yr	75900.00	712.64	758.96	736.02	759.25	0.000110	5.17	29892.51	2787.23	0.16
Main	3.665	Design Discharge	38300.00	712.64	746.85	729.02	747.44	0.000262	6.15	6239.98	309.46	0.23
Main	3.801	2-yr	12500.00	712.80	734.71	723.28	735.00	0.000295	4.31	2900.40	247.42	0.22
Main	3.801	5-yr	19500.00	712.80	739.00	725.96	739.37	0.000276	4.87	4007.44	269.62	0.22
Main	3.801	10-yr	26600.00	712.80	742.42	728.46	742.86	0.000277	5.36	4962.33	289.32	0.23
Main	3.801	20-yr	34200.00	712.80	745.55	730.65	746.07	0.000281	5.80	5897.02	308.60	0.23
Main	3.801	50-yr	45500.00	712.80	750.46	732.99	750.98	0.000244	5.88	9170.71	1600.47	0.22
Main	3.801	100-yr	54400.00	712.80	754.10	734.43	754.50	0.000169	5.43	15110.49	2155.15	0.19
Main	3.801	200-yr	63000.00	712.80	755.78	735.70	756.21	0.000169	5.65	18136.36	2491.73	0.19
Main	3.801	500-yr	75900.00	712.80	758.98	737.48	759.33	0.000133	5.42	24596.87	2501.01	0.17
Main	3.801	Design Discharge	38300.00	712.80	747.09	731.66	747.64	0.000298	6.00	6387.43	332.34	0.24
Main	3.851	2-yr	12500.00	712.84	734.82	720.82	735.08	0.000325	4.10	3052.20	191.94	0.18
Main	3.851	5-yr	19500.00	712.84	739.07	723.35	739.46	0.000392	5.00	3903.88	208.85	0.20
Main	3.851	10-yr	26600.00	712.84	742.46	725.52	742.97	0.000429	5.73	4704.07	276.30	0.22
Main	3.851	20-yr	34200.00	712.84	745.57	727.56	746.19	0.000441	6.36	5562.77	276.31	0.23
Main	3.851	50-yr	45500.00	712.84	750.37	730.39	751.14	0.000431	7.08	7201.68	1298.80	0.23
Main	3.851	100-yr	54400.00	712.84	754.04	732.17	754.60	0.000308	6.47	12099.58	1836.10	0.20

Main	3.851	200-yr	63000.00	712.84	755.76	733.76	756.29	0.000292	6.53	14522.45	1854.55	0.19
Main	3.851	500-yr	75900.00	712.84	758.97	735.98	759.39	0.000231	6.15	19088.85	1881.42	0.18
Main	3.851	Design Discharge	38300.00	712.84	747.10	728.77	747.77	0.000446	6.66	5985.30	276.31	0.23
Main	3.853		Bridge									
Main	3.856	2-yr	12500.00	712.84	734.86	720.82	735.12	0.000322	4.09	3059.62	192.09	0.18
Main	3.856	5-yr	19500.00	712.84	739.14	723.35	739.52	0.000388	4.98	3917.91	209.12	0.20
Main	3.856	10-yr	26600.00	712.84	742.55	725.52	743.06	0.000423	5.71	4729.63	276.30	0.22
Main	3.856	20-yr	34200.00	712.84	745.82	727.56	746.43	0.000425	6.29	5633.11	276.31	0.22
Main	3.856	50-yr	45500.00	712.84	751.00	730.39	751.70	0.000388	6.82	7985.42	1440.74	0.22
Main	3.856	100-yr	54400.00	712.84	754.13	732.17	754.68	0.000303	6.43	12219.27	1837.01	0.20
Main	3.856	200-yr	63000.00	712.84	755.84	733.76	756.36	0.000288	6.49	14629.97	1855.36	0.19
Main	3.856	500-yr	75900.00	712.84	759.04	735.98	759.45	0.000228	6.12	19176.36	1885.17	0.17
Main	3.856	Design Discharge	38300.00	712.84	747.46	728.77	748.11	0.000425	6.56	6085.56	276.31	0.22
Main	3.909	2-yr	12500.00	712.90	734.83	723.10	735.28	0.000410	5.36	2333.26	189.02	0.27
Main	3.909	5-yr	19500.00	712.90	739.12	726.29	739.69	0.000424	6.06	3218.18	222.71	0.28
Main	3.909	10-yr	26600.00	712.90	742.55	729.37	743.23	0.000436	6.60	4029.89	250.72	0.29
Main	3.909	20-yr	34200.00	712.90	745.83	731.94	746.59	0.000419	7.00	4887.27	270.41	0.29
Main	3.909	50-yr	45500.00	712.90	751.04	734.62	751.82	0.000327	7.14	6678.82	585.53	0.27
Main	3.909	100-yr	54400.00	712.90	754.05	736.46	754.83	0.000284	7.24	9040.52	1284.31	0.25
Main	3.909	200-yr	63000.00	712.90	755.71	738.04	756.53	0.000287	7.58	10642.59	1425.45	0.26
Main	3.909	500-yr	75900.00	712.90	758.85	740.17	759.62	0.000248	7.58	13765.95	1487.30	0.24
Main	3.909	Design Discharge	38300.00	712.90	747.48	732.96	748.28	0.000401	7.18	5349.01	293.75	0.29
Main	4.024	2-yr	12500.00	713.00	735.12	722.73	735.51	0.000334	5.03	2486.74	189.35	0.24
Main	4.024	5-yr	19500.00	713.00	739.42	726.01	739.94	0.000365	5.77	3380.35	224.69	0.26
Main	4.024	10-yr	26600.00	713.00	742.87	728.56	743.49	0.000395	6.30	4224.83	262.24	0.28
Main	4.024	20-yr	34200.00	713.00	746.15	730.98	746.84	0.000383	6.68	5116.52	283.34	0.28
Main	4.024	50-yr	45500.00	713.00	751.33	733.85	752.03	0.000306	6.73	7350.31	834.96	0.26
Main	4.024	100-yr	54400.00	713.00	754.35	735.82	755.00	0.000252	6.67	10235.58	1383.90	0.24
Main	4.024	200-yr	63000.00	713.00	756.02	737.48	756.70	0.000251	6.96	11882.78	1515.51	0.24
Main	4.024	500-yr	75900.00	713.00	759.12	739.68	759.77	0.000219	6.99	14960.15	1525.21	0.23
Main	4.024	Design Discharge	38300.00	713.00	747.80	732.15	748.52	0.000387	6.84	5598.15	302.41	0.28
Main	4.188	2-yr	12500.00	713.20	735.46	721.90	735.75	0.000226	4.37	2863.47	201.75	0.20
Main	4.188	5-yr	19500.00	713.20	739.81	725.00	740.21	0.000255	5.12	3809.22	231.82	0.22
Main	4.188	10-yr	26600.00	713.20	743.28	727.41	743.78	0.000277	5.71	4655.99	255.61	0.24
Main	4.188	20-yr	34200.00	713.20	746.54	729.62	747.14	0.000285	6.19	5532.89	304.38	0.24
Main	4.188	50-yr	45500.00	713.20	751.66	732.30	752.26	0.000231	6.33	8061.24	659.25	0.23
Main	4.188	100-yr	54400.00	713.20	754.59	734.16	755.20	0.000207	6.47	10216.05	1072.41	0.22
Main	4.188	200-yr	63000.00	713.20	756.24	735.80	756.91	0.000215	6.86	11523.91	1159.49	0.22
Main	4.188	500-yr	75900.00	713.20	759.28	738.04	759.96	0.000201	7.10	13971.78	1263.11	0.22
Main	4.188	Design Discharge	38300.00	713.20	748.18	730.64	748.81	0.000281	6.39	6115.24	478.83	0.24
Main	4.313	2-yr	12500.00	713.60	735.61	722.75	735.92	0.000276	4.45	2808.78	226.41	0.22
Main	4.313	5-yr	19500.00	713.60	740.00	725.54	740.39	0.000284	5.00	3901.55	270.51	0.23
Main	4.313	10-yr	26600.00	713.60	743.54	727.78	743.99	0.000324	5.34	4981.27	347.17	0.25
Main	4.313	20-yr	34200.00	713.60	746.87	729.97	747.34	0.000296	5.50	6218.54	388.48	0.24
Main	4.313	50-yr	45500.00	713.60	751.99	733.35	752.42	0.000203	5.32	9939.32	1226.63	0.21
Main	4.313	100-yr	54400.00	713.60	754.96	735.30	755.34	0.000160	5.17	13599.23	1235.75	0.19
Main	4.313	200-yr	63000.00	713.60	756.66	736.83	757.05	0.000156	5.36	15698.07	1265.36	0.19
Main	4.313	500-yr	75900.00	713.60	759.72	738.83	760.09	0.000134	5.37	19501.51	1428.53	0.18
Main	4.313	Design Discharge	38300.00	713.60	748.53	731.35	749.01	0.000277	5.57	6892.17	469.18	0.24
Main	4.409	2-yr	12500.00	714.00	735.78	721.84	736.04	0.000180	4.07	3072.02	204.56	0.19
Main	4.409	5-yr	19500.00	714.00	740.16	724.27	740.52	0.000206	4.82	4127.57	310.83	0.20
Main	4.409	10-yr	26600.00	714.00	743.69	726.34	744.12	0.000210	5.34	5354.70	375.13	0.21
Main	4.409	20-yr	34200.00	714.00	746.99	728.47	747.47	0.000207	5.70	6681.92	432.35	0.21
Main	4.409	50-yr	45500.00	714.00	752.05	731.23	752.53	0.000166	5.84	10137.15	993.23	0.20
Main	4.409	100-yr	54400.00	714.00	754.97	733.19	755.45	0.000150	5.94	14212.15	1472.99	0.19
Main	4.409	200-yr	63000.00	714.00	756.66	734.93	757.16	0.000154	6.25	16692.70	1476.44	0.19
Main	4.409	500-yr	75900.00	714.00	759.70	737.28	760.20	0.000144	6.41	21206.73	1610.27	0.19
Main	4.409	Design Discharge	38300.00	714.00	748.64	729.48	749.14	0.000199	5.86	7454.65	577.38	0.21
Main	4.459	2-yr	12500.00	714.00	735.86	723.29	736.09	0.000166	3.81	3279.96	228.28	0.18
Main	4.459	5-yr	19500.00	714.00	740.26	725.49	740.58	0.000212	4.48	4353.63	286.63	0.20
Main	4.459	10-yr	26600.00	714.00	743.80	727.40	744.18	0.000209	4.94	5387.43	300.60	0.21
Main	4.459	20-yr	34200.00	714.00	747.09	729.19	747.53	0.000222	5.33	6419.54	334.97	0.21
Main	4.459	50-yr	45500.00	714.00	752.10	731.53	752.58	0.000188	5.55	8407.84	445.35	0.20
Main	4.459	100-yr	54400.00	714.00	754.99	733.18	755.50	0.000176	5.77	10841.72	1085.89	0.20
Main	4.459	200-yr	63000.00	714.00	756.66	734.67	757.22	0.000182	6.14	12714.41	1145.52	0.21
Main	4.459	500-yr	75900.00	714.00	759.69	736.70	760.26	0.000169	6.34	16308.72	1204.01	0.20
Main	4.459	Design Discharge	38300.00	714.00	748.73	730.07	749.20	0.000220	5.49	6991.50	368.41	0.22

Main	4.462		Bridge										
Main	4.466	2-yr	12500.00	714.00	735.87	723.29	736.10	0.000166	3.81	3282.89	228.36	0.18
Main	4.466	5-yr	19500.00	714.00	740.28	725.49	740.60	0.000212	4.47	4359.35	286.68	0.20
Main	4.466	10-yr	26600.00	714.00	743.83	727.40	744.20	0.000208	4.93	5394.66	300.73	0.21
Main	4.466	20-yr	34200.00	714.00	747.12	729.19	747.56	0.000221	5.32	6429.01	335.28	0.21
Main	4.466	50-yr	45500.00	714.00	752.13	731.53	752.61	0.000187	5.54	8421.76	445.42	0.20
Main	4.466	100-yr	54400.00	714.00	755.04	733.18	755.54	0.000173	5.74	10894.22	1089.00	0.20
Main	4.466	200-yr	63000.00	714.00	756.73	734.67	757.27	0.000178	6.07	12788.66	1147.33	0.20
Main	4.466	500-yr	75900.00	714.00	759.79	736.70	760.33	0.000162	6.21	16430.20	1204.01	0.20
Main	4.466	Design Discharge	38300.00	714.00	748.76	730.07	749.23	0.000219	5.48	7002.82	369.06	0.21
Main	4.521	2-yr	12500.00	714.59	735.92	722.79	736.15	0.000196	3.88	3218.86	249.95	0.19
Main	4.521	5-yr	19500.00	714.59	740.35	725.24	740.66	0.000204	4.41	4424.93	292.30	0.20
Main	4.521	10-yr	26600.00	714.59	743.90	727.33	744.26	0.000208	4.82	5515.49	323.45	0.21
Main	4.521	20-yr	34200.00	714.59	747.21	729.39	747.63	0.000222	5.14	6650.23	372.02	0.21
Main	4.521	50-yr	45500.00	714.59	752.25	732.07	752.67	0.000184	5.22	9393.38	820.36	0.20
Main	4.521	100-yr	54400.00	714.59	755.17	733.86	755.59	0.000161	5.33	12447.41	1327.49	0.19
Main	4.521	200-yr	63000.00	714.59	756.86	735.49	757.33	0.000164	5.62	14708.90	1342.96	0.20
Main	4.521	500-yr	75900.00	714.59	759.92	737.51	760.38	0.000147	5.74	19051.69	1490.67	0.19
Main	4.521	Design Discharge	38300.00	714.59	748.87	730.42	749.29	0.000222	5.25	7325.71	465.97	0.22
Main	4.653	2-yr	12500.00	714.88	736.04	723.35	736.32	0.000245	4.21	2969.84	240.26	0.21
Main	4.653	5-yr	19500.00	714.88	740.48	725.91	740.82	0.000244	4.70	4146.71	283.28	0.22
Main	4.653	10-yr	26600.00	714.88	744.03	728.05	744.44	0.000241	5.12	5193.88	310.20	0.22
Main	4.653	20-yr	34200.00	714.88	747.34	730.01	747.80	0.000224	5.45	6495.14	454.35	0.22
Main	4.653	50-yr	45500.00	714.88	752.36	732.64	752.80	0.000185	5.47	9539.66	1123.66	0.20
Main	4.653	100-yr	54400.00	714.88	755.28	734.76	755.71	0.000160	5.52	12763.53	1515.53	0.19
Main	4.653	200-yr	63000.00	714.88	756.98	736.71	757.44	0.000161	5.78	14956.79	1614.49	0.19
Main	4.653	500-yr	75900.00	714.88	760.04	738.68	760.48	0.000143	5.86	18971.02	1689.37	0.19
Main	4.653	Design Discharge	38300.00	714.88	748.98	731.02	749.46	0.000215	5.58	7330.94	565.97	0.22
Main	4.731	2-yr	12500.00	713.00	736.22	722.44	736.40	0.000135	3.38	3701.71	267.29	0.16
Main	4.731	5-yr	19500.00	713.00	740.67	724.76	740.91	0.000142	3.94	4950.29	294.67	0.17
Main	4.731	10-yr	26600.00	713.00	744.22	726.74	744.52	0.000151	4.41	6036.03	316.56	0.18
Main	4.731	20-yr	34200.00	713.00	747.53	728.97	747.88	0.000161	4.80	7261.13	582.76	0.19
Main	4.731	50-yr	45500.00	713.00	752.51	731.39	752.87	0.000133	4.90	10411.28	736.62	0.17
Main	4.731	100-yr	54400.00	713.00	755.41	732.84	755.77	0.000120	5.02	13433.34	1301.81	0.17
Main	4.731	200-yr	63000.00	713.00	757.12	734.12	757.50	0.000122	5.26	15689.46	1443.41	0.17
Main	4.731	500-yr	75900.00	713.00	760.17	735.94	760.54	0.000110	5.33	19717.47	1760.99	0.17
Main	4.731	Design Discharge	38300.00	713.00	749.18	730.00	749.55	0.000157	4.92	8275.10	619.27	0.19
Main	4.737		Bridge										
Main	4.743	2-yr	12500.00	713.00	736.27	722.44	736.45	0.000134	3.37	3714.46	267.58	0.16
Main	4.743	5-yr	19500.00	713.00	740.73	724.76	740.97	0.000141	3.92	4968.50	295.05	0.17
Main	4.743	10-yr	26600.00	713.00	744.30	726.74	744.60	0.000149	4.39	6059.89	317.03	0.18
Main	4.743	20-yr	34200.00	713.00	747.63	728.97	747.98	0.000160	4.77	7320.33	601.74	0.19
Main	4.743	50-yr	45500.00	713.00	752.60	731.39	752.96	0.000131	4.88	10474.48	739.49	0.17
Main	4.743	100-yr	54400.00	713.00	755.48	732.84	755.84	0.000119	5.00	13534.64	1307.98	0.17
Main	4.743	200-yr	63000.00	713.00	757.19	734.12	757.57	0.000121	5.24	15787.51	1449.03	0.17
Main	4.743	500-yr	75900.00	713.00	760.23	735.94	760.60	0.000109	5.32	19797.07	1761.10	0.16
Main	4.743	Design Discharge	38300.00	713.00	749.27	730.00	749.64	0.000155	4.89	8333.63	619.56	0.18
Main	4.825	2-yr	12500.00	713.30	736.34	721.22	736.50	0.000119	3.21	3891.71	276.08	0.15
Main	4.825	5-yr	19500.00	713.30	740.81	723.63	741.03	0.000125	3.77	5172.56	299.06	0.16
Main	4.825	10-yr	26600.00	713.30	744.38	725.76	744.66	0.000133	4.24	6270.02	316.25	0.17
Main	4.825	20-yr	34200.00	713.30	747.71	727.71	748.04	0.000136	4.64	7475.02	412.24	0.17
Main	4.825	50-yr	45500.00	713.30	752.65	730.39	753.01	0.000117	4.92	10430.39	954.86	0.17
Main	4.825	100-yr	54400.00	713.30	755.52	732.13	755.90	0.000111	5.12	13428.06	1189.70	0.16
Main	4.825	200-yr	63000.00	713.30	757.21	733.70	757.63	0.000117	5.46	15592.64	1326.39	0.17
Main	4.825	500-yr	75900.00	713.30	760.23	735.48	760.66	0.000111	5.65	19976.01	1496.69	0.17
Main	4.825	Design Discharge	38300.00	713.30	749.34	728.75	749.70	0.000133	4.82	8308.10	542.73	0.17
Main	4.928	2-yr	12500.00	713.78	736.40	721.72	736.57	0.000109	3.34	3739.24	261.09	0.16
Main	4.928	5-yr	19500.00	713.78	740.86	724.12	741.10	0.000118	3.93	4961.74	287.59	0.17
Main	4.928	10-yr	26600.00	713.78	744.43	726.27	744.74	0.000128	4.41	6030.08	727.38	0.18
Main	4.928	20-yr	34200.00	713.78	747.77	728.26	748.12	0.000132	4.79	7401.95	941.13	0.18
Main	4.928	50-yr	45500.00	713.78	752.79	730.87	753.08	0.000090	4.54	15286.52	1791.88	0.16
Main	4.928	100-yr	54400.00	713.78	755.69	732.51	755.96	0.000080	4.58	19759.80	1870.34	0.15
Main	4.928	200-yr	63000.00	713.78	757.41	733.96	757.70	0.000082	4.82	22417.08	1934.56	0.15
Main	4.928	500-yr	75900.00	713.78	760.43	735.83	760.72	0.000077	4.99	27081.14	2112.99	0.15
Main	4.928	Design Discharge	38300.00	713.78	749.40	729.31	749.78	0.000128	4.94	8230.32	975.38	0.18
Main	5.002	2-yr	12500.00	714.00	736.43	723.34	736.62	0.000131	3.52	3550.64	262.25	0.17
Main	5.002	5-yr	19500.00	714.00	740.90	725.63	741.16	0.000135	4.08	4781.40	378.42	0.18

Main	5.002	10-yr	26600.00	714.00	744.47	727.58	744.79	0.000141	4.55	5852.15	665.61	0.18
Main	5.002	20-yr	34200.00	714.00	747.81	729.84	748.19	0.000147	4.94	6919.61	841.97	0.19
Main	5.002	50-yr	45500.00	714.00	752.73	732.15	753.16	0.000127	5.30	8888.11	1184.40	0.18
Main	5.002	100-yr	54400.00	714.00	755.58	733.58	756.06	0.000124	5.61	10970.28	1530.75	0.18
Main	5.002	200-yr	63000.00	714.00	757.28	734.87	757.82	0.000131	6.00	12552.62	1583.82	0.19
Main	5.002	500-yr	75900.00	714.00	760.28	736.68	760.85	0.000128	6.30	15352.57	1752.07	0.19
Main	5.002	Design Discharge	38300.00	714.00	749.43	730.86	749.84	0.000143	5.13	7462.31	859.27	0.19
Main	5.007		Bridge									
Main	5.011	2-yr	12500.00	714.00	736.43	723.34	736.63	0.000131	3.52	3551.67	262.28	0.17
Main	5.011	5-yr	19500.00	714.00	740.90	725.63	741.16	0.000135	4.08	4782.90	378.62	0.18
Main	5.011	10-yr	26600.00	714.00	744.48	727.58	744.80	0.000141	4.54	5854.13	654.53	0.18
Main	5.011	20-yr	34200.00	714.00	747.81	729.84	748.19	0.000147	4.94	6922.13	804.72	0.19
Main	5.011	50-yr	45500.00	714.00	752.77	732.15	753.20	0.000127	5.29	8911.87	1185.76	0.18
Main	5.011	100-yr	54400.00	714.00	755.67	733.58	756.15	0.000122	5.58	11051.60	1530.95	0.18
Main	5.011	200-yr	63000.00	714.00	757.38	734.87	757.91	0.000130	5.97	12644.53	1587.14	0.19
Main	5.011	500-yr	75900.00	714.00	760.33	736.68	760.89	0.000127	6.28	15400.21	1752.56	0.19
Main	5.011	Design Discharge	38300.00	714.00	749.44	730.86	749.85	0.000143	5.13	7465.04	859.33	0.19
Main	5.089	2-yr	12500.00	714.55	736.48	722.67	736.68	0.000137	3.60	3474.23	257.84	0.17
Main	5.089	5-yr	19500.00	714.55	740.95	725.14	741.22	0.000142	4.16	4691.86	287.06	0.18
Main	5.089	10-yr	26600.00	714.55	744.53	727.22	744.86	0.000148	4.62	5761.26	443.98	0.19
Main	5.089	20-yr	34200.00	714.55	747.87	729.33	748.26	0.000153	5.01	6827.50	957.13	0.19
Main	5.089	50-yr	45500.00	714.55	752.83	731.99	753.26	0.000128	5.27	9398.50	1305.79	0.18
Main	5.089	100-yr	54400.00	714.55	755.76	733.73	756.20	0.000119	5.47	11821.40	1876.20	0.18
Main	5.089	200-yr	63000.00	714.55	757.47	735.11	757.97	0.000126	5.84	13457.65	1945.26	0.19
Main	5.089	500-yr	75900.00	714.55	760.42	736.97	760.95	0.000124	6.17	16267.97	1988.72	0.19
Main	5.089	Design Discharge	38300.00	714.55	749.49	730.36	749.91	0.000150	5.20	7438.15	1086.88	0.19
Main	5.181	2-yr	12500.00	715.00	736.49	724.99	736.80	0.000223	4.44	2817.34	205.21	0.21
Main	5.181	5-yr	19500.00	715.00	740.94	727.33	741.35	0.000245	5.14	3797.17	238.42	0.23
Main	5.181	10-yr	26600.00	715.00	744.51	729.34	745.01	0.000255	5.66	4701.14	262.49	0.24
Main	5.181	20-yr	34200.00	715.00	747.83	731.27	748.41	0.000247	6.14	5573.98	263.88	0.24
Main	5.181	50-yr	45500.00	715.00	752.74	733.81	753.41	0.000222	6.59	7187.85	1117.42	0.23
Main	5.181	100-yr	54400.00	715.00	755.66	735.60	756.35	0.000204	6.79	9646.85	1377.10	0.22
Main	5.181	200-yr	63000.00	715.00	757.37	737.18	758.12	0.000211	7.18	11089.86	1383.24	0.23
Main	5.181	500-yr	75900.00	715.00	760.33	739.32	761.09	0.000200	7.44	13581.83	1526.99	0.23
Main	5.181	Design Discharge	38300.00	715.00	749.43	732.25	750.07	0.000249	6.38	6001.22	267.56	0.24
Main	5.183		Bridge									
Main	5.185	2-yr	12500.00	715.00	736.51	725.05	736.80	0.000218	4.35	2876.50	213.63	0.21
Main	5.185	5-yr	19500.00	715.00	740.96	727.40	741.35	0.000235	5.01	3895.75	247.13	0.22
Main	5.185	10-yr	26600.00	715.00	744.54	729.39	745.01	0.000237	5.52	4822.28	263.45	0.23
Main	5.185	20-yr	34200.00	715.00	747.91	731.30	748.47	0.000230	5.99	5712.11	264.22	0.23
Main	5.185	50-yr	45500.00	715.00	753.08	733.80	753.67	0.000189	6.23	8547.00	1180.52	0.21
Main	5.185	100-yr	54400.00	715.00	756.02	735.52	756.60	0.000170	6.33	11022.49	1378.82	0.20
Main	5.185	200-yr	63000.00	715.00	757.67	737.06	758.30	0.000178	6.71	12410.81	1384.22	0.21
Main	5.185	500-yr	75900.00	715.00	760.54	739.13	761.18	0.000172	7.00	14822.44	1530.32	0.21
Main	5.185	Design Discharge	38300.00	715.00	749.59	732.25	750.19	0.000226	6.21	6289.57	434.86	0.23
Main	5.206	2-yr	12500.00	715.04	736.56	724.17	736.83	0.000239	4.16	3002.84	234.57	0.21
Main	5.206	5-yr	19500.00	715.04	741.05	726.70	741.39	0.000273	4.67	4179.03	298.72	0.22
Main	5.206	10-yr	26600.00	715.04	744.67	729.10	745.05	0.000274	4.97	5356.23	341.00	0.22
Main	5.206	20-yr	34200.00	715.04	748.09	731.22	748.51	0.000258	5.22	6551.77	358.18	0.22
Main	5.206	50-yr	45500.00	715.04	753.27	733.69	753.70	0.000210	5.30	9172.42	1243.60	0.20
Main	5.206	100-yr	54400.00	715.04	756.20	735.39	756.63	0.000182	5.37	11824.46	1448.62	0.19
Main	5.206	200-yr	63000.00	715.04	757.87	736.93	758.33	0.000187	5.68	13329.99	1461.07	0.19
Main	5.206	500-yr	75900.00	715.04	760.73	738.99	761.22	0.000176	5.90	15924.90	1593.14	0.19
Main	5.206	Design Discharge	38300.00	715.04	749.78	732.12	750.23	0.000254	5.34	7167.71	368.54	0.21
Main	5.224	2-yr	12500.00	715.08	736.60	724.06	736.85	0.000176	4.00	3128.23	221.85	0.19
Main	5.224	5-yr	19500.00	715.08	741.07	726.42	741.41	0.000217	4.65	4191.91	268.92	0.21
Main	5.224	10-yr	26600.00	715.08	744.68	728.46	745.08	0.000234	5.06	5255.21	307.19	0.22
Main	5.224	20-yr	34200.00	715.08	748.09	730.46	748.54	0.000234	5.41	6322.79	320.16	0.21
Main	5.224	50-yr	45500.00	715.08	753.27	733.01	753.73	0.000219	5.49	8871.25	1543.83	0.21
Main	5.224	100-yr	54400.00	715.08	756.20	734.58	756.66	0.000189	5.56	11256.50	1616.09	0.20
Main	5.224	200-yr	63000.00	715.08	757.86	736.01	758.36	0.000194	5.88	12608.99	1649.12	0.20
Main	5.224	500-yr	75900.00	715.08	760.72	738.04	761.25	0.000183	6.14	14939.67	1776.12	0.20
Main	5.224	Design Discharge	38300.00	715.08	749.78	731.51	750.26	0.000248	5.56	6886.85	365.28	0.22
Main	5.246	2-yr	12500.00	715.36	736.58	724.78	736.89	0.000210	4.43	2819.87	195.87	0.21
Main	5.246	5-yr	19500.00	715.36	741.04	727.13	741.46	0.000237	5.20	3747.90	224.42	0.22
Main	5.246	10-yr	26600.00	715.36	744.62	729.16	745.14	0.000262	5.78	4601.91	253.65	0.24
Main	5.246	20-yr	34200.00	715.36	748.02	731.11	748.61	0.000276	6.19	5527.80	283.69	0.25

Main	5.246	50-yr	45500.00	715.36	753.20	733.60	753.80	0.000220	6.30	8177.17	755.26	0.23
Main	5.246	100-yr	54400.00	715.36	756.12	735.43	756.72	0.000197	6.44	10234.90	912.37	0.22
Main	5.246	200-yr	63000.00	715.36	757.76	736.98	758.43	0.000206	6.86	11394.77	984.76	0.23
Main	5.246	500-yr	75900.00	715.36	760.61	739.19	761.33	0.000201	7.22	13400.13	1018.11	0.23
Main	5.246	Design Discharge	38300.00	715.36	749.71	732.07	750.34	0.000274	6.37	6012.96	291.54	0.25
Main	5.249		Bridge									
Main	5.251	2-yr	12500.00	715.40	736.67	724.80	736.97	0.000207	4.41	2833.27	196.32	0.20
Main	5.251	5-yr	19500.00	715.40	741.15	727.17	741.57	0.000234	5.17	3769.57	225.55	0.22
Main	5.251	10-yr	26600.00	715.40	744.81	729.21	745.32	0.000258	5.73	4646.28	256.41	0.24
Main	5.251	20-yr	34200.00	715.40	748.41	731.13	748.98	0.000262	6.07	5634.58	285.50	0.24
Main	5.251	50-yr	45500.00	715.40	753.90	733.65	754.45	0.000196	6.07	8664.21	825.44	0.22
Main	5.251	100-yr	54400.00	715.40	756.48	735.45	757.06	0.000187	6.32	10484.37	918.34	0.21
Main	5.251	200-yr	63000.00	715.40	758.02	736.94	758.67	0.000199	6.77	11574.10	989.02	0.22
Main	5.251	500-yr	75900.00	715.40	760.76	739.23	761.47	0.000198	7.17	13504.80	1018.52	0.22
Main	5.251	Design Discharge	38300.00	715.40	750.22	732.07	750.82	0.000255	6.21	6224.20	581.84	0.24
Main	5.256	2-yr	12500.00	715.43	736.69	724.80	736.98	0.000197	4.32	2895.18	199.58	0.20
Main	5.256	5-yr	19500.00	715.43	741.18	727.11	741.58	0.000220	5.08	3841.78	225.05	0.22
Main	5.256	10-yr	26600.00	715.43	744.83	729.12	745.33	0.000218	5.67	4751.79	277.10	0.22
Main	5.256	20-yr	34200.00	715.43	748.41	731.01	748.99	0.000206	6.14	5824.68	319.68	0.22
Main	5.256	50-yr	45500.00	715.43	753.86	733.47	754.47	0.000172	6.43	8541.03	880.22	0.21
Main	5.256	100-yr	54400.00	715.43	756.43	735.21	757.08	0.000170	6.76	10356.16	976.13	0.21
Main	5.256	200-yr	63000.00	715.43	757.97	736.76	758.71	0.000184	7.27	11440.46	993.35	0.22
Main	5.256	500-yr	75900.00	715.43	760.70	738.93	761.50	0.000187	7.73	13367.34	1064.58	0.23
Main	5.256	Design Discharge	38300.00	715.43	750.21	731.94	750.84	0.000202	6.38	6444.95	464.48	0.22
Main	5.262	2-yr	12500.00	715.48	736.69	724.83	736.99	0.000197	4.34	2881.50	197.53	0.20
Main	5.262	5-yr	19500.00	715.48	741.18	727.15	741.58	0.000215	5.11	3813.79	216.38	0.21
Main	5.262	10-yr	26600.00	715.48	744.83	729.14	745.34	0.000226	5.76	4619.16	224.37	0.22
Main	5.262	20-yr	34200.00	715.48	748.39	731.00	749.01	0.000229	6.30	5425.68	227.99	0.23
Main	5.262	50-yr	45500.00	715.48	753.82	733.49	754.50	0.000200	6.69	8007.92	991.43	0.22
Main	5.262	100-yr	54400.00	715.48	756.36	735.23	757.12	0.000204	7.15	9702.00	1060.73	0.22
Main	5.262	200-yr	63000.00	715.48	757.88	736.81	758.76	0.000226	7.76	10708.39	1067.92	0.24
Main	5.262	500-yr	75900.00	715.48	760.58	738.96	761.57	0.000237	8.38	12502.23	1173.44	0.25
Main	5.262	Design Discharge	38300.00	715.48	750.19	731.93	750.86	0.000230	6.56	5881.03	461.69	0.23
Main	5.264		Bridge									
Main	5.266	2-yr	12500.00	715.52	736.75	724.86	737.04	0.000196	4.33	2888.57	197.79	0.20
Main	5.266	5-yr	19500.00	715.52	741.25	727.18	741.66	0.000213	5.10	3826.37	216.59	0.21
Main	5.266	10-yr	26600.00	715.52	744.90	729.17	745.42	0.000224	5.74	4633.24	224.48	0.22
Main	5.266	20-yr	34200.00	715.52	748.52	731.03	749.13	0.000226	6.27	5452.41	228.12	0.23
Main	5.266	50-yr	45500.00	715.52	754.13	733.52	754.79	0.000192	6.60	8214.84	1014.12	0.21
Main	5.266	100-yr	54400.00	715.52	756.57	735.26	757.31	0.000199	7.09	9835.94	1061.72	0.22
Main	5.266	200-yr	63000.00	715.52	758.04	736.83	758.91	0.000222	7.71	10813.18	1069.18	0.24
Main	5.266	500-yr	75900.00	715.52	760.65	739.00	761.64	0.000236	8.35	12549.92	1177.61	0.25
Main	5.266	Design Discharge	38300.00	715.52	750.40	731.98	751.06	0.000224	6.51	5975.14	464.04	0.23
Main	5.325	2-yr	12500.00	715.70	736.91	723.85	737.10	0.000129	3.52	3552.21	261.15	0.17
Main	5.325	5-yr	19500.00	715.70	741.47	726.08	741.72	0.000129	4.06	4826.32	314.47	0.17
Main	5.325	10-yr	26600.00	715.70	745.18	728.02	745.49	0.000129	4.50	6248.49	474.70	0.18
Main	5.325	20-yr	34200.00	715.70	748.86	730.17	749.21	0.000116	4.78	8434.90	693.46	0.17
Main	5.325	50-yr	45500.00	715.70	754.55	732.52	754.87	0.000086	4.75	15727.80	1947.17	0.16
Main	5.325	100-yr	54400.00	715.70	757.06	734.00	757.39	0.000085	4.98	19976.54	2035.39	0.16
Main	5.325	200-yr	63000.00	715.70	758.62	735.30	758.99	0.000091	5.34	22677.48	2092.72	0.16
Main	5.325	500-yr	75900.00	715.70	761.34	737.12	761.74	0.000092	5.66	27518.63	2157.66	0.17
Main	5.325	Design Discharge	38300.00	715.70	750.78	731.12	751.13	0.000109	4.89	10026.04	1109.21	0.17
Main	5.390	2-yr	12500.00	715.85	736.94	724.17	737.15	0.000145	3.67	3409.77	257.29	0.18
Main	5.390	5-yr	19500.00	715.85	741.50	726.44	741.77	0.000147	4.19	4652.54	289.04	0.18
Main	5.390	10-yr	26600.00	715.85	745.22	728.47	745.54	0.000165	4.50	6057.38	507.79	0.20
Main	5.390	20-yr	34200.00	715.85	748.94	730.54	749.25	0.000131	4.58	8446.99	766.28	0.18
Main	5.390	50-yr	45500.00	715.85	754.66	733.02	754.90	0.000079	4.22	16742.25	2354.92	0.15
Main	5.390	100-yr	54400.00	715.85	757.19	734.54	757.43	0.000073	4.30	21491.61	2608.88	0.14
Main	5.390	200-yr	63000.00	715.85	758.79	735.87	759.03	0.000074	4.50	24650.91	2619.75	0.15
Main	5.390	500-yr	75900.00	715.85	761.53	737.72	761.78	0.000069	4.62	30129.69	2691.78	0.14
Main	5.390	Design Discharge	38300.00	715.85	750.87	731.59	751.18	0.000115	4.56	10096.23	1493.34	0.17
Main	5.459	2-yr	12500.00	716.01	737.00	724.17	737.20	0.000138	3.60	3469.84	257.95	0.17
Main	5.459	5-yr	19500.00	716.01	741.56	726.45	741.83	0.000139	4.14	4706.78	284.57	0.18
Main	5.459	10-yr	26600.00	716.01	745.28	728.43	745.60	0.000149	4.54	5937.93	453.90	0.19
Main	5.459	20-yr	34200.00	716.01	748.98	730.49	749.30	0.000129	4.67	8401.86	808.84	0.18
Main	5.459	50-yr	45500.00	716.01	754.69	732.93	754.93	0.000078	4.25	17544.64	1887.27	0.15
Main	5.459	100-yr	54400.00	716.01	757.22	734.39	757.45	0.000072	4.32	22336.04	1900.27	0.14

Main	5.459	200-yr	63000.00	716.01	758.81	735.71	759.05	0.000074	4.55	25363.33	1908.45	0.15
Main	5.459	500-yr	75900.00	716.01	761.55	737.50	761.80	0.000071	4.72	30616.33	1978.60	0.14
Main	5.459	Design Discharge	38300.00	716.01	750.91	731.53	751.22	0.000114	4.62	10085.63	1730.41	0.17
Main	5.518	2-yr	12500.00	716.04	737.03	724.96	737.26	0.000164	3.81	3278.21	255.55	0.19
Main	5.518	5-yr	19500.00	716.04	741.59	727.28	741.88	0.000158	4.33	4500.81	280.66	0.19
Main	5.518	10-yr	26600.00	716.04	745.30	729.35	745.65	0.000152	4.76	5794.49	475.24	0.19
Main	5.518	20-yr	34200.00	716.04	748.99	731.54	749.35	0.000133	4.91	8214.90	805.20	0.18
Main	5.518	50-yr	45500.00	716.04	754.70	733.79	754.95	0.000083	4.44	17726.76	1996.82	0.15
Main	5.518	100-yr	54400.00	716.04	757.23	735.22	757.47	0.000075	4.50	22811.28	2015.93	0.15
Main	5.518	200-yr	63000.00	716.04	758.82	736.52	759.08	0.000078	4.72	26022.41	2020.68	0.15
Main	5.518	500-yr	75900.00	716.04	761.56	738.32	761.82	0.000074	4.87	31576.59	2079.71	0.15
Main	5.518	Design Discharge	38300.00	716.04	750.92	732.46	751.26	0.000120	4.87	9888.25	1781.64	0.18
Main	5.570	2-yr	12500.00	716.26	737.05	725.39	737.32	0.000215	4.22	2964.06	242.95	0.21
Main	5.570	5-yr	19500.00	716.26	741.60	727.84	741.95	0.000199	4.72	4132.10	269.40	0.21
Main	5.570	10-yr	26600.00	716.26	745.31	729.92	745.72	0.000202	5.10	5278.51	416.50	0.22
Main	5.570	20-yr	34200.00	716.26	749.00	732.14	749.41	0.000169	5.19	7645.77	799.30	0.20
Main	5.570	50-yr	45500.00	716.26	754.69	734.74	754.99	0.000103	4.70	17045.81	2067.50	0.17
Main	5.570	100-yr	54400.00	716.26	757.22	736.36	757.50	0.000092	4.75	22303.34	2086.38	0.16
Main	5.570	200-yr	63000.00	716.26	758.81	737.69	759.11	0.000094	4.99	25622.98	2091.41	0.16
Main	5.570	500-yr	75900.00	716.26	761.55	739.54	761.85	0.000089	5.14	31366.42	2140.94	0.16
Main	5.570	Design Discharge	38300.00	716.26	750.92	733.17	751.31	0.000151	5.14	9292.34	1497.04	0.20
Main	5.638	2-yr	12500.00	716.41	737.12	725.55	737.40	0.000218	4.26	2934.86	239.43	0.21
Main	5.638	5-yr	19500.00	716.41	741.67	727.95	742.02	0.000205	4.76	4092.61	268.36	0.22
Main	5.638	10-yr	26600.00	716.41	745.38	730.02	745.80	0.000216	5.17	5144.10	310.68	0.22
Main	5.638	20-yr	34200.00	716.41	749.04	732.00	749.48	0.000190	5.32	7038.94	764.09	0.21
Main	5.638	50-yr	45500.00	716.41	754.70	734.79	755.04	0.000119	4.93	16149.75	2109.13	0.18
Main	5.638	100-yr	54400.00	716.41	757.22	736.49	757.55	0.000107	5.00	21498.34	2208.87	0.17
Main	5.638	200-yr	63000.00	716.41	758.81	737.89	759.15	0.000109	5.25	24883.55	2262.12	0.17
Main	5.638	500-yr	75900.00	716.41	761.54	739.72	761.89	0.000103	5.42	30749.36	2297.85	0.17
Main	5.638	Design Discharge	38300.00	716.41	750.95	733.12	751.38	0.000171	5.32	8638.64	1288.69	0.21
Main	5.681	2-yr	12500.00	716.51	737.22	725.51	737.45	0.000173	3.86	3241.56	258.68	0.19
Main	5.681	5-yr	19500.00	716.51	741.77	727.78	742.07	0.000164	4.35	4482.02	286.29	0.19
Main	5.681	10-yr	26600.00	716.51	745.49	729.73	745.84	0.000159	4.76	5609.09	338.45	0.20
Main	5.681	20-yr	34200.00	716.51	749.12	731.58	749.52	0.000148	5.06	7043.54	515.45	0.19
Main	5.681	50-yr	45500.00	716.51	754.72	734.19	755.06	0.000116	4.86	15505.34	2044.79	0.17
Main	5.681	100-yr	54400.00	716.51	757.24	735.64	757.57	0.000108	4.95	20661.49	2120.79	0.17
Main	5.681	200-yr	63000.00	716.51	758.82	736.94	759.18	0.000111	5.20	23922.21	2171.39	0.18
Main	5.681	500-yr	75900.00	716.51	761.56	738.70	761.91	0.000105	5.38	29667.03	2303.02	0.17
Main	5.681	Design Discharge	38300.00	716.51	751.01	732.58	751.41	0.000143	5.16	8301.54	1104.07	0.19
Main	5.732	2-yr	12500.00	716.63	737.26	725.68	737.50	0.000190	3.99	3135.18	255.93	0.20
Main	5.732	5-yr	19500.00	716.63	741.81	727.97	742.12	0.000177	4.47	4361.42	283.04	0.20
Main	5.732	10-yr	26600.00	716.63	745.52	729.91	745.89	0.000174	4.88	5455.86	306.33	0.20
Main	5.732	20-yr	34200.00	716.63	749.15	731.85	749.57	0.000163	5.18	6647.34	464.46	0.20
Main	5.732	50-yr	45500.00	716.63	754.73	734.50	755.10	0.000117	5.07	14071.41	1878.04	0.18
Main	5.732	100-yr	54400.00	716.63	757.23	736.08	757.61	0.000110	5.23	18874.77	1976.31	0.17
Main	5.732	200-yr	63000.00	716.63	758.81	737.37	759.22	0.000114	5.53	22076.68	2102.18	0.18
Main	5.732	500-yr	75900.00	716.63	761.54	739.16	761.95	0.000109	5.72	28068.69	2387.59	0.18
Main	5.732	Design Discharge	38300.00	716.63	751.03	732.93	751.46	0.000155	5.30	7524.02	924.16	0.20
Main	5.805	2-yr	12800.00	716.79	737.31	726.23	737.59	0.000226	4.27	2998.76	251.10	0.22
Main	5.805	5-yr	20500.00	716.79	741.84	728.73	742.21	0.000217	4.89	4189.71	275.40	0.22
Main	5.805	10-yr	27100.00	716.79	745.56	730.54	745.98	0.000197	5.16	5255.23	297.10	0.22
Main	5.805	20-yr	34500.00	716.79	749.19	732.51	749.65	0.000179	5.42	6417.67	472.75	0.21
Main	5.805	50-yr	45500.00	716.79	754.76	735.13	755.15	0.000128	5.22	13424.48	1732.02	0.18
Main	5.805	100-yr	54400.00	716.79	757.26	736.65	757.65	0.000118	5.34	18302.70	1991.38	0.18
Main	5.805	200-yr	63000.00	716.79	758.85	737.94	759.26	0.000121	5.62	21666.13	2262.27	0.18
Main	5.805	500-yr	75900.00	716.79	761.59	739.72	761.99	0.000111	5.72	27899.24	2329.18	0.18
Main	5.805	Design Discharge	38700.00	716.79	751.06	733.70	751.54	0.000172	5.55	7310.39	1301.69	0.21
Main	5.861	2-yr	12800.00	716.90	737.34	726.59	737.68	0.000250	4.68	2735.81	239.25	0.23
Main	5.861	5-yr	20500.00	716.90	741.85	729.19	742.31	0.000256	5.42	3842.39	327.54	0.24
Main	5.861	10-yr	27100.00	716.90	745.57	731.09	746.06	0.000222	5.69	4991.54	616.59	0.23
Main	5.861	20-yr	34500.00	716.90	749.19	733.13	749.73	0.000205	5.94	6159.18	1109.89	0.23
Main	5.861	50-yr	45500.00	716.90	754.77	735.51	755.21	0.000142	5.62	10095.11	1546.06	0.19
Main	5.861	100-yr	54400.00	716.90	757.25	737.13	757.72	0.000145	5.93	11582.50	2132.56	0.20
Main	5.861	200-yr	63000.00	716.90	758.82	738.64	759.33	0.000155	6.27	14210.00	2395.42	0.21
Main	5.861	500-yr	75900.00	716.90	761.55	740.82	762.07	0.000147	6.47	18223.66	2490.38	0.20
Main	5.861	Design Discharge	38700.00	716.90	751.06	734.16	751.62	0.000195	6.07	6776.48	1261.40	0.22
Main	5.866		Bridge									

Main	5.871	2-yr	12800.00	717.02	737.42	726.27	737.72	0.000219	4.41	2899.77	223.94	0.22
Main	5.871	5-yr	20500.00	717.02	741.95	728.82	742.36	0.000228	5.16	3969.40	248.65	0.23
Main	5.871	10-yr	27100.00	717.02	745.60	730.68	746.07	0.000213	5.51	4960.12	311.92	0.23
Main	5.871	20-yr	34500.00	717.02	749.23	732.82	749.74	0.000197	5.79	6144.13	563.52	0.22
Main	5.871	50-yr	45500.00	717.02	754.79	735.08	755.26	0.000148	5.69	9695.93	1429.48	0.20
Main	5.871	100-yr	54400.00	717.02	757.27	736.64	757.78	0.000146	6.00	11328.42	2151.23	0.20
Main	5.871	200-yr	63000.00	717.02	758.88	738.06	759.41	0.000156	6.24	14468.58	2306.92	0.21
Main	5.871	500-yr	75900.00	717.02	761.61	740.01	762.13	0.000145	6.39	18694.19	2396.01	0.20
Main	5.871	Design Discharge	38700.00	717.02	751.10	733.77	751.63	0.000187	5.93	6768.42	885.78	0.22
Main	5.969	2-yr	12800.00	717.39	737.55	726.69	737.84	0.000235	4.33	2954.15	249.28	0.22
Main	5.969	5-yr	20500.00	717.39	742.11	729.22	742.48	0.000227	4.92	4166.15	302.00	0.23
Main	5.969	10-yr	27100.00	717.39	745.77	731.04	746.18	0.000196	5.16	5428.86	481.57	0.22
Main	5.969	20-yr	34500.00	717.39	749.42	732.94	749.85	0.000168	5.28	7215.18	682.80	0.21
Main	5.969	50-yr	45500.00	717.39	754.99	735.47	755.34	0.000114	5.01	12288.07	1907.33	0.17
Main	5.969	100-yr	54400.00	717.39	757.53	737.04	757.86	0.000102	5.05	15841.82	2515.36	0.17
Main	5.969	200-yr	63000.00	717.39	759.14	738.35	759.49	0.000105	5.33	19637.81	2820.33	0.17
Main	5.969	500-yr	75900.00	717.39	761.90	740.20	762.21	0.000089	5.22	25610.29	2901.04	0.16
Main	5.969	Design Discharge	38700.00	717.39	751.31	733.97	751.73	0.000157	5.34	8273.45	942.78	0.20
Main	6.062	2-yr	12800.00	717.75	737.68	727.22	737.96	0.000226	4.20	3049.78	262.69	0.22
Main	6.062	5-yr	20500.00	717.75	742.24	729.65	742.59	0.000214	4.74	4328.72	305.28	0.22
Main	6.062	10-yr	27100.00	717.75	745.91	731.48	746.28	0.000179	4.92	5941.33	631.38	0.21
Main	6.062	20-yr	34500.00	717.75	749.58	733.42	749.93	0.000144	4.88	8538.61	899.83	0.19
Main	6.062	50-yr	45500.00	717.75	755.14	735.56	755.40	0.000089	4.44	15875.78	2782.56	0.15
Main	6.062	100-yr	54400.00	717.75	757.67	737.00	757.91	0.000081	4.51	20282.05	2989.07	0.15
Main	6.062	200-yr	63000.00	717.75	759.28	738.29	759.54	0.000083	4.73	23170.96	3085.67	0.15
Main	6.062	500-yr	75900.00	717.75	761.99	740.04	762.25	0.000079	4.89	28122.62	3276.94	0.15
Main	6.062	Design Discharge	38700.00	717.75	751.48	734.33	751.81	0.000128	4.82	10041.95	1374.81	0.18
Main	6.135	2-yr	12800.00	717.93	737.72	728.49	738.09	0.000331	4.91	2605.12	235.66	0.26
Main	6.135	5-yr	20500.00	717.93	742.26	730.92	742.72	0.000307	5.44	3767.25	275.67	0.26
Main	6.135	10-yr	27100.00	717.93	745.92	732.76	746.40	0.000258	5.57	5156.23	657.01	0.24
Main	6.135	20-yr	34500.00	717.93	749.61	734.71	750.01	0.000183	5.28	8658.33	1107.61	0.21
Main	6.135	50-yr	45500.00	717.93	755.18	737.07	755.44	0.000102	4.61	15792.65	2881.75	0.16
Main	6.135	100-yr	54400.00	717.93	757.70	738.63	757.95	0.000092	4.67	19617.45	3159.55	0.16
Main	6.135	200-yr	63000.00	717.93	759.31	739.98	759.58	0.000094	4.89	22134.65	3292.74	0.16
Main	6.135	500-yr	75900.00	717.93	762.01	741.85	762.29	0.000089	5.05	26373.60	3502.22	0.16
Main	6.135	Design Discharge	38700.00	717.93	751.52	735.72	751.88	0.000155	5.10	10838.57	1304.64	0.20
Main	6.193	2-yr	12800.00	718.08	737.84	728.32	738.20	0.000333	4.82	2653.68	246.76	0.26
Main	6.193	5-yr	20500.00	718.08	742.38	730.85	742.82	0.000289	5.33	3848.13	282.92	0.25
Main	6.193	10-yr	27100.00	718.08	746.00	732.72	746.47	0.000242	5.54	5059.93	497.65	0.24
Main	6.193	20-yr	34500.00	718.08	749.64	734.74	750.07	0.000188	5.45	8256.33	1194.41	0.22
Main	6.193	50-yr	45500.00	718.08	755.17	737.13	755.48	0.000113	4.92	14674.68	2698.58	0.17
Main	6.193	100-yr	54400.00	718.08	757.68	738.65	758.00	0.000106	5.07	17777.28	2909.80	0.17
Main	6.193	200-yr	63000.00	718.08	759.28	739.93	759.63	0.000111	5.38	19864.04	3069.61	0.18
Main	6.193	500-yr	75900.00	718.08	761.97	741.68	762.34	0.000109	5.66	23512.81	3183.26	0.18
Main	6.193	Design Discharge	38700.00	718.08	751.54	735.81	751.94	0.000162	5.32	10438.97	1293.42	0.20
Main	6.314	2-yr	12800.00	718.38	738.05	728.66	738.41	0.000325	4.76	2687.13	248.11	0.26
Main	6.314	5-yr	20500.00	718.38	742.56	731.13	743.00	0.000285	5.30	3867.57	275.33	0.25
Main	6.314	10-yr	27100.00	718.38	746.15	733.06	746.63	0.000252	5.54	4894.17	296.85	0.24
Main	6.314	20-yr	34500.00	718.38	749.71	735.17	750.23	0.000225	5.76	5990.49	315.01	0.23
Main	6.314	50-yr	45500.00	718.38	755.10	737.31	755.64	0.000173	5.89	7825.85	836.85	0.21
Main	6.314	100-yr	54400.00	718.38	757.55	738.70	758.18	0.000178	6.37	9197.21	1797.52	0.22
Main	6.314	200-yr	63000.00	718.38	759.11	739.99	759.84	0.000194	6.92	11033.34	1948.88	0.23
Main	6.314	500-yr	75900.00	718.38	761.73	741.75	762.58	0.000202	7.49	14219.54	2101.31	0.24
Main	6.314	Design Discharge	38700.00	718.38	751.56	736.16	752.10	0.000212	5.89	6576.19	319.97	0.23
Main	6.383	2-yr	12800.00	718.53	738.17	728.84	738.53	0.000323	4.80	2668.85	244.34	0.26
Main	6.383	5-yr	20500.00	718.53	742.66	731.32	743.11	0.000289	5.35	3832.56	273.35	0.25
Main	6.383	10-yr	27100.00	718.53	746.24	733.16	746.72	0.000255	5.59	4848.88	294.65	0.24
Main	6.383	20-yr	34500.00	718.53	749.79	735.14	750.31	0.000227	5.82	5927.44	310.82	0.23
Main	6.383	50-yr	45500.00	718.53	755.16	737.40	755.71	0.000185	5.94	7667.28	706.54	0.22
Main	6.383	100-yr	54400.00	718.53	757.61	738.87	758.25	0.000188	6.41	9071.44	1747.43	0.22
Main	6.383	200-yr	63000.00	718.53	759.17	740.15	759.92	0.000204	6.94	11041.78	1809.44	0.24
Main	6.383	500-yr	75900.00	718.53	761.81	741.96	762.65	0.000209	7.48	14406.16	1934.23	0.24
Main	6.383	Design Discharge	38700.00	718.53	751.63	736.12	752.18	0.000216	5.95	6505.16	317.33	0.23
Main	6.457	2-yr	12800.00	718.65	738.35	728.81	738.65	0.000263	4.37	2931.54	264.43	0.23
Main	6.457	5-yr	20500.00	718.65	742.85	731.08	743.22	0.000238	4.89	4192.94	296.13	0.23
Main	6.457	10-yr	27100.00	718.65	746.42	732.70	746.82	0.000211	5.12	5289.51	317.70	0.22
Main	6.457	20-yr	34500.00	718.65	749.96	734.43	750.40	0.000188	5.35	6445.88	332.51	0.21
Main	6.457	50-yr	45500.00	718.65	755.32	736.76	755.78	0.000160	5.47	8318.21	703.06	0.20
Main	6.457	100-yr	54400.00	718.65	757.79	738.21	758.32	0.000163	5.88	9933.52	1790.42	0.21

Main	6.457	200-yr	63000.00	718.65	759.38	739.44	760.00	0.000176	6.36	11943.34	1848.28	0.22
Main	6.457	500-yr	75900.00	718.65	762.03	741.19	762.74	0.000179	6.85	15354.37	1987.01	0.22
Main	6.457	Design Discharge	38700.00	718.65	751.80	735.42	752.26	0.000182	5.48	7066.73	342.68	0.21
Main	6.489	2-yr	12800.00	718.70	738.45	728.37	738.69	0.000205	3.96	3233.81	281.15	0.21
Main	6.489	5-yr	20500.00	718.70	742.95	730.45	743.26	0.000191	4.48	4570.93	312.53	0.21
Main	6.489	10-yr	27100.00	718.70	746.51	731.97	746.86	0.000172	4.73	5723.60	333.29	0.20
Main	6.489	20-yr	34500.00	718.70	750.05	733.54	750.44	0.000159	4.97	6938.70	353.07	0.20
Main	6.489	50-yr	45500.00	718.70	755.41	735.81	755.81	0.000127	5.12	9022.86	802.80	0.18
Main	6.489	100-yr	54400.00	718.70	757.90	737.21	758.36	0.000128	5.48	11055.27	1630.12	0.19
Main	6.489	200-yr	63000.00	718.70	759.53	738.56	760.04	0.000135	5.84	13011.30	1886.28	0.19
Main	6.489	500-yr	75900.00	718.70	762.25	740.25	762.79	0.000130	6.11	16337.74	2024.07	0.19
Main	6.489	Design Discharge	38700.00	718.70	751.89	734.42	752.30	0.000151	5.10	7605.35	371.62	0.19
Main	6.568	2-yr	12800.00	718.83	738.53	728.40	738.78	0.000212	4.01	3189.37	279.16	0.21
Main	6.568	5-yr	20500.00	718.83	743.02	730.47	743.34	0.000196	4.54	4516.73	309.46	0.21
Main	6.568	10-yr	27100.00	718.83	746.58	732.02	746.94	0.000176	4.80	5651.39	327.97	0.20
Main	6.568	20-yr	34500.00	718.83	750.11	733.60	750.51	0.000163	5.04	6841.65	402.68	0.20
Main	6.568	50-yr	45500.00	718.83	755.46	735.92	755.87	0.000141	5.15	8881.94	2108.26	0.19
Main	6.568	100-yr	54400.00	718.83	757.95	737.51	758.42	0.000141	5.52	10364.43	2820.60	0.19
Main	6.568	200-yr	63000.00	718.83	759.57	738.80	760.10	0.000149	5.92	12043.08	3161.44	0.20
Main	6.568	500-yr	75900.00	718.83	762.28	740.49	762.85	0.000145	6.23	14957.92	3270.00	0.20
Main	6.568	Design Discharge	38700.00	718.83	751.95	734.48	752.37	0.000162	5.16	7494.66	457.86	0.20
Main	6.663	2-yr	12800.00	718.99	738.64	728.27	738.88	0.000205	3.98	3215.12	277.48	0.21
Main	6.663	5-yr	20500.00	718.99	743.12	730.37	743.44	0.000194	4.53	4527.71	307.78	0.21
Main	6.663	10-yr	27100.00	718.99	746.67	731.93	747.03	0.000177	4.79	5658.65	329.49	0.20
Main	6.663	20-yr	34500.00	718.99	750.20	733.47	750.59	0.000164	5.03	6858.55	365.29	0.20
Main	6.663	50-yr	45500.00	718.99	755.53	735.75	755.94	0.000150	5.14	8859.01	2300.67	0.19
Main	6.663	100-yr	54400.00	718.99	758.02	737.46	758.49	0.000155	5.49	9978.96	2710.99	0.20
Main	6.663	200-yr	63000.00	718.99	759.65	738.76	760.18	0.000167	5.91	11142.82	2764.27	0.21
Main	6.663	500-yr	75900.00	718.99	762.34	740.46	762.94	0.000170	6.30	13201.35	2823.73	0.21
Main	6.663	Design Discharge	38700.00	718.99	752.03	734.35	752.45	0.000159	5.15	7512.33	433.69	0.20
Main	6.705	2-yr	12800.00	719.05	738.69	728.67	738.93	0.000203	3.91	3275.81	289.32	0.20
Main	6.705	5-yr	20500.00	719.05	743.18	730.72	743.48	0.000186	4.42	4637.79	317.25	0.20
Main	6.705	10-yr	27100.00	719.05	746.73	732.23	747.07	0.000168	4.67	5797.38	336.67	0.20
Main	6.705	20-yr	34500.00	719.05	750.25	733.74	750.63	0.000155	4.92	7018.67	355.80	0.20
Main	6.705	50-yr	45500.00	719.05	755.59	736.16	755.98	0.000141	5.03	9050.66	1878.91	0.19
Main	6.705	100-yr	54400.00	719.05	758.08	737.57	758.53	0.000146	5.38	10188.62	2389.48	0.19
Main	6.705	200-yr	63000.00	719.05	759.70	738.71	760.22	0.000158	5.81	11110.01	2438.34	0.20
Main	6.705	500-yr	75900.00	719.05	762.38	740.40	762.98	0.000164	6.26	12673.52	2553.18	0.21
Main	6.705	Design Discharge	38700.00	719.05	752.09	734.73	752.48	0.000151	5.04	7681.13	382.00	0.19
Main	6.774	2-yr	12800.00	719.16	738.76	728.77	739.01	0.000209	3.95	3238.32	286.89	0.21
Main	6.774	5-yr	20500.00	719.16	743.24	730.83	743.55	0.000190	4.47	4583.84	313.09	0.21
Main	6.774	10-yr	27100.00	719.16	746.78	732.36	747.13	0.000171	4.73	5723.81	331.18	0.20
Main	6.774	20-yr	34500.00	719.16	750.30	733.89	750.69	0.000158	4.98	6921.54	349.05	0.20
Main	6.774	50-yr	45500.00	719.16	755.63	736.20	756.03	0.000140	5.09	9153.48	1310.82	0.19
Main	6.774	100-yr	54400.00	719.16	758.13	737.74	758.58	0.000143	5.43	10455.50	2242.18	0.19
Main	6.774	200-yr	63000.00	719.16	759.76	738.94	760.28	0.000155	5.86	11323.03	2268.68	0.20
Main	6.774	500-yr	75900.00	719.16	762.43	740.58	763.04	0.000162	6.33	12776.24	2358.57	0.21
Main	6.774	Design Discharge	38700.00	719.16	752.14	734.84	752.54	0.000155	5.11	7572.35	392.69	0.20
Main	6.839	2-yr	12800.00	719.25	738.83	728.84	739.08	0.000214	4.01	3191.21	282.47	0.21
Main	6.839	5-yr	20500.00	719.25	743.30	730.92	743.62	0.000196	4.54	4514.25	309.01	0.21
Main	6.839	10-yr	27100.00	719.25	746.83	732.45	747.19	0.000178	4.80	5641.46	329.55	0.20
Main	6.839	20-yr	34500.00	719.25	750.35	734.02	750.75	0.000166	5.05	6836.98	351.30	0.20
Main	6.839	50-yr	45500.00	719.25	755.68	736.45	756.08	0.000153	5.10	8990.05	1290.09	0.20
Main	6.839	100-yr	54400.00	719.25	758.18	737.95	758.63	0.000153	5.41	10314.26	2297.54	0.20
Main	6.839	200-yr	63000.00	719.25	759.81	739.13	760.34	0.000164	5.82	11193.01	2363.71	0.21
Main	6.839	500-yr	75900.00	719.25	762.50	740.77	763.10	0.000168	6.26	12652.62	2489.69	0.21
Main	6.839	Design Discharge	38700.00	719.25	752.19	735.06	752.60	0.000165	5.16	7497.97	371.46	0.20
Main	6.918	2-yr	12800.00	719.37	738.88	728.98	739.21	0.000281	4.59	2789.86	247.12	0.24
Main	6.918	5-yr	20500.00	719.37	743.33	731.46	743.75	0.000259	5.19	3948.38	272.62	0.24
Main	6.918	10-yr	27100.00	719.37	746.84	733.29	747.31	0.000236	5.49	4939.45	291.45	0.23
Main	6.918	20-yr	34500.00	719.37	750.35	735.31	750.86	0.000220	5.75	5996.13	344.98	0.23
Main	6.918	50-yr	45500.00	719.37	755.66	737.61	756.19	0.000194	5.84	7839.67	1080.79	0.22
Main	6.918	100-yr	54400.00	719.37	758.16	739.09	758.74	0.000196	6.18	9314.00	1966.96	0.23
Main	6.918	200-yr	63000.00	719.37	759.79	740.36	760.46	0.000209	6.61	10328.89	2024.32	0.23
Main	6.918	500-yr	75900.00	719.37	762.48	742.14	763.22	0.000212	7.02	12020.52	2259.97	0.24
Main	6.918	Design Discharge	38700.00	719.37	752.18	736.29	752.71	0.000216	5.88	6580.39	468.64	0.23
Main	6.984	2-yr	12800.00	719.46	738.95	729.56	739.34	0.000369	5.00	2557.51	243.66	0.27
Main	6.984	5-yr	20500.00	719.46	743.39	732.14	743.86	0.000319	5.53	3705.22	271.17	0.26

Main	6.984	10-yr	27100.00	719.46	746.90	734.04	747.41	0.000280	5.78	4690.57	290.70		0.25
Main	6.984	20-yr	34500.00	719.46	750.40	736.18	750.96	0.000253	6.01	5742.71	310.32		0.25
Main	6.984	50-yr	45500.00	719.46	755.71	738.64	756.28	0.000239	6.04	7535.81	883.95		0.24
Main	6.984	100-yr	54400.00	719.46	758.20	740.15	758.83	0.000244	6.37	8568.72	1284.22		0.25
Main	6.984	200-yr	63000.00	719.46	759.83	741.38	760.55	0.000257	6.82	9554.58	1516.02		0.26
Main	6.984	500-yr	75900.00	719.46	762.51	743.18	763.32	0.000255	7.25	11449.85	2295.46		0.26
Main	6.984	Design Discharge	38700.00	719.46	752.23	737.33	752.81	0.000243	6.12	6319.60	352.70		0.24
Main	7.042	2-yr	12800.00	719.54	739.09	729.51	739.45	0.000321	4.78	2678.56	246.28		0.26
Main	7.042	5-yr	20500.00	719.54	743.52	732.01	743.96	0.000296	5.33	3843.86	281.51		0.25
Main	7.042	10-yr	27100.00	719.54	747.04	733.80	747.51	0.000292	5.49	4934.60	343.33		0.26
Main	7.042	20-yr	34500.00	719.54	750.58	735.83	751.05	0.000265	5.51	6266.15	404.33		0.25
Main	7.042	50-yr	45500.00	719.54	755.92	738.32	756.36	0.000186	5.30	8596.49	806.84		0.21
Main	7.042	100-yr	54400.00	719.54	758.42	739.80	758.91	0.000179	5.60	9735.43	1181.18		0.21
Main	7.042	200-yr	63000.00	719.54	760.07	741.08	760.64	0.000190	6.02	10494.84	2107.10		0.22
Main	7.042	500-yr	75900.00	719.54	762.75	742.90	763.40	0.000194	6.48	11752.54	2756.81		0.23
Main	7.042	Design Discharge	38700.00	719.54	752.42	736.89	752.89	0.000246	5.50	7036.62	429.91		0.24
Main	7.047		Bridge										
Main	7.052	2-yr	12800.00	719.57	739.25	729.59	739.60	0.000311	4.74	2702.66	245.44		0.25
Main	7.052	5-yr	20500.00	719.57	743.69	732.05	744.13	0.000286	5.31	3858.27	276.66		0.25
Main	7.052	10-yr	27100.00	719.57	747.23	733.86	747.69	0.000297	5.48	4943.62	348.99		0.26
Main	7.052	20-yr	34500.00	719.57	750.77	735.88	751.24	0.000258	5.48	6294.96	400.60		0.24
Main	7.052	50-yr	45500.00	719.57	756.11	738.33	756.56	0.000180	5.35	8504.76	426.47		0.21
Main	7.052	100-yr	54400.00	719.57	758.63	739.82	759.13	0.000182	5.67	9597.70	539.88		0.21
Main	7.052	200-yr	63000.00	719.57	760.16	741.09	760.75	0.000201	6.12	10310.79	1097.59		0.23
Main	7.052	500-yr	75900.00	719.57	762.95	742.91	763.62	0.000197	6.47	11659.39	2222.51		0.23
Main	7.052	Design Discharge	38700.00	719.57	752.62	736.94	753.09	0.000231	5.49	7044.98	410.01		0.23
Main	7.132	2-yr	12800.00	719.67	739.41	729.29	739.72	0.000263	4.50	2846.45	247.53		0.23
Main	7.132	5-yr	20500.00	719.67	743.84	731.71	744.24	0.000252	5.11	4009.25	277.50		0.24
Main	7.132	10-yr	27100.00	719.67	747.36	733.45	747.81	0.000243	5.38	5037.31	314.58		0.24
Main	7.132	20-yr	34500.00	719.67	750.87	735.52	751.34	0.000233	5.54	6230.79	361.09		0.23
Main	7.132	50-yr	45500.00	719.67	756.19	737.89	756.64	0.000209	5.41	8409.04	470.43		0.22
Main	7.132	100-yr	54400.00	719.67	758.72	739.35	759.21	0.000195	5.66	9873.56	915.08		0.22
Main	7.132	200-yr	63000.00	719.67	760.27	740.68	760.83	0.000202	6.05	11068.87	1562.28		0.23
Main	7.132	500-yr	75900.00	719.67	763.10	742.45	763.71	0.000188	6.32	13928.62	2123.42		0.22
Main	7.132	Design Discharge	38700.00	719.67	752.71	736.50	753.19	0.000229	5.60	6913.71	388.61		0.23
Main	7.275	2-yr	12800.00	719.85	739.69	729.04	739.90	0.000185	3.67	3483.55	316.85		0.20
Main	7.275	5-yr	20500.00	719.85	744.15	731.24	744.41	0.000167	4.12	4978.30	353.66		0.19
Main	7.275	10-yr	27100.00	719.85	747.68	732.82	747.97	0.000150	4.32	6277.90	382.63		0.19
Main	7.275	20-yr	34500.00	719.85	751.18	734.47	751.49	0.000138	4.50	7665.81	527.39		0.18
Main	7.275	50-yr	45500.00	719.85	756.45	736.74	756.77	0.000107	4.55	10472.67	1045.30		0.17
Main	7.275	100-yr	54400.00	719.85	759.01	738.25	759.33	0.000097	4.67	13388.77	1269.57		0.16
Main	7.275	200-yr	63000.00	719.85	760.59	739.38	760.96	0.000104	5.01	14744.23	2117.40		0.17
Main	7.275	500-yr	75900.00	719.85	763.42	740.93	763.83	0.000102	5.31	17302.91	2408.65		0.17
Main	7.275	Design Discharge	38700.00	719.85	753.01	735.38	753.34	0.000132	4.59	8439.75	619.60		0.18
Main	7.285		Bridge										
Main	7.294	2-yr	12800.00	719.95	739.70	729.82	739.95	0.000228	4.01	3194.86	297.46		0.22
Main	7.294	5-yr	20500.00	719.95	744.16	731.98	744.47	0.000200	4.46	4592.28	328.50		0.21
Main	7.294	10-yr	27100.00	719.95	747.69	733.57	748.03	0.000178	4.68	5796.10	353.58		0.20
Main	7.294	20-yr	34500.00	719.95	751.19	735.32	751.56	0.000163	4.87	7079.74	594.45		0.20
Main	7.294	50-yr	45500.00	719.95	756.45	737.61	756.82	0.000135	4.86	9830.65	1131.93		0.19
Main	7.294	100-yr	54400.00	719.95	759.01	738.99	759.34	0.000111	4.76	13915.70	1297.53		0.17
Main	7.294	200-yr	63000.00	719.95	760.64	740.17	760.99	0.000114	5.03	15537.80	1556.80		0.18
Main	7.294	500-yr	75900.00	719.95	763.49	741.78	763.86	0.000107	5.22	18431.97	2109.62		0.17
Main	7.294	Design Discharge	38700.00	719.95	753.02	736.24	753.40	0.000164	4.96	7795.83	734.53		0.20
Main	7.381	2-yr	12800.00	720.05	739.76	729.52	740.08	0.000270	4.53	2828.55	248.32		0.24
Main	7.381	5-yr	20500.00	720.05	744.19	731.99	744.60	0.000255	5.13	3992.28	277.17		0.24
Main	7.381	10-yr	27100.00	720.05	747.70	733.81	748.15	0.000234	5.42	5004.32	299.69		0.23
Main	7.381	20-yr	34500.00	720.05	751.18	735.82	751.68	0.000218	5.67	6089.39	323.05		0.23
Main	7.381	50-yr	45500.00	720.05	756.42	738.33	756.93	0.000174	5.77	8067.18	560.50		0.21
Main	7.381	100-yr	54400.00	720.05	758.91	739.80	759.47	0.000168	6.07	10649.48	1628.02		0.21
Main	7.381	200-yr	63000.00	720.05	760.53	741.11	761.12	0.000170	6.36	12853.16	1768.22		0.22
Main	7.381	500-yr	75900.00	720.05	763.42	742.89	763.97	0.000150	6.40	16822.79	2215.47		0.21
Main	7.381	Design Discharge	38700.00	720.05	753.01	736.88	753.53	0.000211	5.78	6698.88	371.28		0.23
Main	7.415	2-yr	12800.00	720.11	739.81	729.81	740.14	0.000285	4.61	2776.00	246.28		0.24
Main	7.415	5-yr	20500.00	720.11	744.23	732.27	744.65	0.000266	5.23	3922.18	272.27		0.24
Main	7.415	10-yr	27100.00	720.11	747.73	734.06	748.20	0.000242	5.52	4911.64	292.45		0.24
Main	7.415	20-yr	34500.00	720.11	751.21	736.03	751.73	0.000227	5.78	5968.82	634.72		0.23

Main	7.415	50-yr	45500.00	720.11	756.43	738.61	756.97	0.000179	5.91	7956.35	1010.70	0.22
Main	7.415	100-yr	54400.00	720.11	758.92	740.05	759.51	0.000176	6.26	10623.09	2234.43	0.22
Main	7.415	200-yr	63000.00	720.11	760.53	741.34	761.17	0.000180	6.60	13223.00	2342.06	0.22
Main	7.415	500-yr	75900.00	720.11	763.41	743.12	764.02	0.000163	6.70	17947.18	2681.43	0.21
Main	7.415	Design Discharge	38700.00	720.11	753.03	737.23	753.57	0.000217	5.90	6562.84	727.28	0.23
Main	7.463	2-yr	12800.00	720.18	739.87	730.01	740.22	0.000309	4.74	2701.22	287.33	0.25
Main	7.463	5-yr	20500.00	720.18	744.28	732.53	744.73	0.000283	5.34	3839.96	337.01	0.25
Main	7.463	10-yr	27100.00	720.18	747.78	734.33	748.27	0.000256	5.61	4826.62	393.45	0.24
Main	7.463	20-yr	34500.00	720.18	751.26	736.34	751.79	0.000237	5.86	5883.19	668.52	0.24
Main	7.463	50-yr	45500.00	720.18	756.47	738.94	757.02	0.000188	5.96	7936.70	1214.21	0.22
Main	7.463	100-yr	54400.00	720.18	759.01	740.43	759.56	0.000170	6.09	12619.35	2428.44	0.21
Main	7.463	200-yr	63000.00	720.18	760.77	741.71	761.23	0.000147	5.91	19248.92	2551.22	0.20
Main	7.463	500-yr	75900.00	720.18	763.66	743.51	764.08	0.000126	5.85	25568.32	2851.33	0.19
Main	7.463	Design Discharge	38700.00	720.18	753.08	737.60	753.63	0.000229	5.98	6467.48	790.16	0.24
Main	7.532	2-yr	12800.00	720.29	739.99	730.24	740.33	0.000291	4.63	2762.16	268.87	0.24
Main	7.532	5-yr	20500.00	720.29	744.40	732.66	744.83	0.000271	5.24	3909.85	355.02	0.24
Main	7.532	10-yr	27100.00	720.29	747.89	734.47	748.36	0.000248	5.52	4907.22	411.21	0.24
Main	7.532	20-yr	34500.00	720.29	751.36	736.40	751.88	0.000227	5.77	6023.22	522.65	0.23
Main	7.532	50-yr	45500.00	720.29	756.57	738.87	757.09	0.000173	5.84	8547.94	2344.19	0.21
Main	7.532	100-yr	54400.00	720.29	759.14	740.31	759.62	0.000151	5.84	13971.57	2486.76	0.20
Main	7.532	200-yr	63000.00	720.29	760.89	741.59	761.28	0.000126	5.57	21632.31	2597.19	0.19
Main	7.532	500-yr	75900.00	720.29	763.78	743.37	764.12	0.000105	5.44	28525.10	2825.11	0.17
Main	7.532	Design Discharge	38700.00	720.29	753.18	737.58	753.72	0.000214	5.88	6732.01	631.91	0.23
Main	7.678	2-yr	12800.00	720.51	740.23	730.04	740.54	0.000260	4.46	2867.39	371.54	0.23
Main	7.678	5-yr	20500.00	720.51	744.62	732.53	745.03	0.000245	5.10	4022.24	445.62	0.23
Main	7.678	10-yr	27100.00	720.51	748.10	734.35	748.54	0.000216	5.38	5466.70	971.60	0.23
Main	7.678	20-yr	34500.00	720.51	751.65	736.36	752.03	0.000166	5.21	8652.95	1169.22	0.20
Main	7.678	50-yr	45500.00	720.51	756.92	738.65	757.21	0.000101	4.73	14627.72	2336.91	0.16
Main	7.678	100-yr	54400.00	720.51	759.46	740.12	759.72	0.000089	4.72	19335.48	2582.79	0.16
Main	7.678	200-yr	63000.00	720.51	761.16	741.41	761.35	0.000072	4.41	29544.02	2639.51	0.14
Main	7.678	500-yr	75900.00	720.51	764.01	743.18	764.18	0.000060	4.30	36804.10	2937.10	0.13
Main	7.678	Design Discharge	38700.00	720.51	753.51	737.34	753.86	0.000141	5.08	10523.96	1324.22	0.19
Main	7.766	2-yr	12800.00	720.64	740.36	730.15	740.66	0.000263	4.45	2873.51	379.65	0.23
Main	7.766	5-yr	20500.00	720.64	744.75	732.73	745.14	0.000248	5.07	4044.20	447.00	0.24
Main	7.766	10-yr	27100.00	720.64	748.20	734.74	748.65	0.000221	5.36	5192.29	654.70	0.23
Main	7.766	20-yr	34500.00	720.64	751.68	736.74	752.13	0.000187	5.46	7300.64	927.91	0.22
Main	7.766	50-yr	45500.00	720.64	756.91	738.87	757.28	0.000132	5.18	11879.24	1598.29	0.19
Main	7.766	100-yr	54400.00	720.64	759.42	740.29	759.79	0.000121	5.30	14945.01	2238.46	0.18
Main	7.766	200-yr	63000.00	720.64	761.13	741.55	761.41	0.000097	4.96	24500.93	2555.85	0.16
Main	7.766	500-yr	75900.00	720.64	763.99	743.32	764.22	0.000079	4.76	31551.06	2661.94	0.15
Main	7.766	Design Discharge	38700.00	720.64	753.52	737.66	753.95	0.000169	5.45	8717.52	1099.48	0.21
Main	7.826	2-yr	12800.00	720.73	740.41	730.75	740.77	0.000319	4.85	2641.63	310.36	0.26
Main	7.826	5-yr	20500.00	720.73	744.78	733.24	745.25	0.000301	5.48	3740.30	438.27	0.26
Main	7.826	10-yr	27100.00	720.73	748.23	735.07	748.74	0.000275	5.77	4694.58	618.14	0.25
Main	7.826	20-yr	34500.00	720.73	751.67	737.22	752.23	0.000243	6.01	5921.75	774.34	0.24
Main	7.826	50-yr	45500.00	720.73	756.83	739.60	757.38	0.000183	6.04	8776.59	1379.71	0.22
Main	7.826	100-yr	54400.00	720.73	759.32	741.12	759.89	0.000174	6.28	10963.45	1850.19	0.22
Main	7.826	200-yr	63000.00	720.73	761.09	742.44	761.47	0.000128	5.64	21505.42	2528.23	0.19
Main	7.826	500-yr	75900.00	720.73	763.96	744.28	764.27	0.000103	5.40	28601.30	2615.84	0.17
Main	7.826	Design Discharge	38700.00	720.73	753.48	738.30	754.05	0.000227	6.10	6715.71	867.92	0.24
Main	7.887	2-yr	12800.00	720.82	740.52	730.64	740.87	0.000310	4.79	2669.61	261.55	0.25
Main	7.887	5-yr	20500.00	720.82	744.89	733.20	745.35	0.000292	5.44	3766.11	295.55	0.25
Main	7.887	10-yr	27100.00	720.82	748.32	735.05	748.83	0.000269	5.76	4708.57	323.80	0.25
Main	7.887	20-yr	34500.00	720.82	751.75	737.15	752.31	0.000250	6.03	5721.04	367.94	0.25
Main	7.887	50-yr	45500.00	720.82	756.87	739.60	757.45	0.000206	6.15	7711.21	1188.69	0.23
Main	7.887	100-yr	54400.00	720.82	759.33	741.11	759.97	0.000201	6.50	9317.67	2092.78	0.23
Main	7.887	200-yr	63000.00	720.82	761.04	742.42	761.55	0.000166	6.17	17266.42	2399.51	0.21
Main	7.887	500-yr	75900.00	720.82	763.92	744.26	764.33	0.000130	5.87	24303.00	2583.24	0.19
Main	7.887	Design Discharge	38700.00	720.82	753.55	738.24	754.13	0.000242	6.16	6280.16	428.89	0.24
Main	7.944	2-yr	12800.00	720.91	740.63	730.59	740.96	0.000284	4.64	2757.31	241.35	0.24
Main	7.944	5-yr	20500.00	720.91	745.00	733.09	745.43	0.000272	5.29	3871.99	287.68	0.25
Main	7.944	10-yr	27100.00	720.91	748.42	734.99	748.91	0.000253	5.61	4829.58	322.48	0.24
Main	7.944	20-yr	34500.00	720.91	751.85	737.14	752.39	0.000238	5.88	5863.55	350.59	0.24
Main	7.944	50-yr	45500.00	720.91	756.96	739.37	757.52	0.000200	6.01	7734.79	1268.70	0.23
Main	7.944	100-yr	54400.00	720.91	759.40	740.89	760.04	0.000198	6.42	8968.80	2373.70	0.23
Main	7.944	200-yr	63000.00	720.91	761.14	742.18	761.60	0.000154	5.93	18685.89	2478.90	0.20
Main	7.944	500-yr	75900.00	720.91	763.98	744.03	764.37	0.000124	5.70	25778.94	2501.63	0.19
Main	7.944	Design Discharge	38700.00	720.91	753.65	738.21	754.21	0.000231	6.01	6437.26	566.16	0.24

Main	8.025	2-yr	12800.00	721.03	740.76	730.76	741.08	0.000270	4.55	2812.29	244.60		0.24
Main	8.025	5-yr	20500.00	721.03	745.13	733.21	745.55	0.000260	5.21	3938.05	271.17		0.24
Main	8.025	10-yr	27100.00	721.03	748.55	735.01	749.02	0.000243	5.53	4900.82	340.23		0.24
Main	8.025	20-yr	34500.00	721.03	751.97	737.09	752.49	0.000230	5.81	5938.78	598.43		0.24
Main	8.025	50-yr	45500.00	721.03	757.05	739.31	757.60	0.000200	5.97	7649.03	1154.37		0.23
Main	8.025	100-yr	54400.00	721.03	759.50	740.83	760.12	0.000204	6.37	9042.61	1889.81		0.23
Main	8.025	200-yr	63000.00	721.03	761.11	742.13	761.72	0.000193	6.48	14215.65	2671.83		0.23
Main	8.025	500-yr	75900.00	721.03	763.90	743.93	764.49	0.000173	6.58	20543.03	2766.26		0.22
Main	8.025	Design Discharge	38700.00	721.03	753.76	738.13	754.31	0.000223	5.94	6514.26	737.32		0.23
Main	8.116	2-yr	12800.00	721.16	740.89	730.78	741.22	0.000284	4.63	2766.06	243.62		0.24
Main	8.116	5-yr	20500.00	721.16	745.25	733.30	745.68	0.000272	5.27	3891.71	272.56		0.25
Main	8.116	10-yr	27100.00	721.16	748.66	735.12	749.14	0.000252	5.58	4859.33	294.52		0.24
Main	8.116	20-yr	34500.00	721.16	752.07	737.17	752.60	0.000235	5.85	5899.91	315.24		0.24
Main	8.116	50-yr	45500.00	721.16	757.15	739.64	757.70	0.000213	5.97	7616.10	460.22		0.23
Main	8.116	100-yr	54400.00	721.16	759.59	741.15	760.22	0.000214	6.37	8796.17	915.83		0.23
Main	8.116	200-yr	63000.00	721.16	761.12	742.44	761.85	0.000229	6.88	9822.38	1583.84		0.25
Main	8.116	500-yr	75900.00	721.16	763.88	744.26	764.63	0.000213	7.13	15390.68	1915.84		0.24
Main	8.116	Design Discharge	38700.00	721.16	753.86	738.23	754.42	0.000227	5.98	6474.25	326.12		0.24
Main	8.167	2-yr	12800.00	721.24	740.97	730.82	741.29	0.000265	4.55	2810.90	240.51		0.23
Main	8.167	5-yr	20500.00	721.24	745.33	733.26	745.75	0.000263	5.22	3925.80	271.40		0.24
Main	8.167	10-yr	27100.00	721.24	748.73	735.07	749.21	0.000247	5.54	4890.82	294.72		0.24
Main	8.167	20-yr	34500.00	721.24	752.14	737.05	752.67	0.000232	5.82	5930.00	316.89		0.24
Main	8.167	50-yr	45500.00	721.24	757.22	739.41	757.76	0.000199	5.91	7745.67	474.34		0.22
Main	8.167	100-yr	54400.00	721.24	759.67	740.94	760.28	0.000195	6.29	9233.76	570.68		0.23
Main	8.167	200-yr	63000.00	721.24	761.21	742.30	761.91	0.000209	6.79	10684.05	1451.44		0.24
Main	8.167	500-yr	75900.00	721.24	763.94	744.16	764.69	0.000201	7.12	15905.71	2155.02		0.24
Main	8.167	Design Discharge	38700.00	721.24	753.94	738.10	754.48	0.000242	5.93	6529.27	350.54		0.24
Main	8.205	2-yr	12800.00	721.29	740.97	731.11	741.37	0.000295	5.09	2514.06	194.63		0.25
Main	8.205	5-yr	20500.00	721.29	745.29	733.62	745.85	0.000319	6.03	3398.95	215.32		0.27
Main	8.205	10-yr	27100.00	721.29	748.66	735.45	749.32	0.000314	6.53	4150.08	229.58		0.27
Main	8.205	20-yr	34500.00	721.29	752.03	737.29	752.79	0.000306	6.98	4945.28	242.05		0.27
Main	8.205	50-yr	45500.00	721.29	757.06	739.86	757.89	0.000276	7.31	6221.90	557.58		0.26
Main	8.205	100-yr	54400.00	721.29	759.52	741.56	760.41	0.000279	7.70	7944.72	641.56		0.27
Main	8.205	200-yr	63000.00	721.29	761.05	743.09	762.06	0.000296	8.25	9165.20	892.13		0.28
Main	8.205	500-yr	75900.00	721.29	763.81	745.19	764.81	0.000273	8.45	13151.61	2002.76		0.27
Main	8.205	Design Discharge	38700.00	721.29	753.81	738.27	754.61	0.000306	7.19	5383.06	251.11		0.27
Main	8.213		Bridge										
Main	8.221	2-yr	12800.00	721.31	741.00	731.10	741.44	0.000312	5.31	2411.20	182.92		0.26
Main	8.221	5-yr	20500.00	721.31	745.33	733.77	745.94	0.000348	6.30	3252.83	206.30		0.28
Main	8.221	10-yr	27100.00	721.31	748.82	735.69	749.53	0.000345	6.76	4009.60	226.79		0.28
Main	8.221	20-yr	34500.00	721.31	752.08	737.61	752.89	0.000348	7.22	4781.59	246.62		0.29
Main	8.221	50-yr	45500.00	721.31	757.72	740.14	758.54	0.000278	7.29	6244.33	542.56		0.27
Main	8.221	100-yr	54400.00	721.31	760.22	741.93	761.05	0.000301	7.42	8294.57	783.33		0.28
Main	8.221	200-yr	63000.00	721.31	761.40	743.56	762.35	0.000329	8.02	9281.26	898.67		0.29
Main	8.221	500-yr	75900.00	721.31	764.28	745.77	765.16	0.000280	7.99	13962.86	2109.79		0.27
Main	8.221	Design Discharge	38700.00	721.31	753.87	738.63	754.72	0.000340	7.40	5227.36	254.39		0.29
Main	8.275	2-yr	12800.00	721.32	741.25	730.63	741.53	0.000219	4.18	3063.53	258.23		0.21
Main	8.275	5-yr	20500.00	721.32	745.69	733.01	746.04	0.000212	4.81	4264.72	283.89		0.22
Main	8.275	10-yr	27100.00	721.32	749.23	734.83	749.63	0.000196	5.11	5337.92	337.94		0.22
Main	8.275	20-yr	34500.00	721.32	752.55	736.73	753.00	0.000183	5.41	6595.97	399.70		0.21
Main	8.275	50-yr	45500.00	721.32	758.18	738.97	758.63	0.000136	5.47	9155.59	747.37		0.19
Main	8.275	100-yr	54400.00	721.32	760.62	740.45	761.14	0.000139	5.88	11092.96	1408.93		0.20
Main	8.275	200-yr	63000.00	721.32	761.84	741.72	762.45	0.000158	6.43	13482.86	2059.55		0.21
Main	8.275	500-yr	75900.00	721.32	764.65	743.45	765.24	0.000146	6.57	19951.55	2487.93		0.20
Main	8.275	Design Discharge	38700.00	721.32	754.35	737.67	754.82	0.000174	5.54	7328.12	417.73		0.21
Main	8.373	2-yr	12800.00	721.45	741.34	731.18	741.66	0.000251	4.59	2788.89	225.14		0.23
Main	8.373	5-yr	20500.00	721.45	745.75	733.61	746.19	0.000255	5.35	3830.35	247.31		0.24
Main	8.373	10-yr	27100.00	721.45	749.27	735.40	749.78	0.000255	5.68	4767.34	281.42		0.24
Main	8.373	20-yr	34500.00	721.45	752.58	737.25	753.14	0.000244	6.02	5727.89	299.82		0.24
Main	8.373	50-yr	45500.00	721.45	758.19	739.57	758.75	0.000210	6.02	7563.06	711.65		0.23
Main	8.373	100-yr	54400.00	721.45	760.63	741.13	761.26	0.000218	6.40	8881.74	1616.53		0.24
Main	8.373	200-yr	63000.00	721.45	761.87	742.51	762.58	0.000233	6.86	11591.89	1727.20		0.25
Main	8.373	500-yr	75900.00	721.45	764.66	744.43	765.37	0.000210	7.01	16282.60	2012.67		0.24
Main	8.373	Design Discharge	38700.00	721.45	754.37	738.17	754.96	0.000241	6.17	6277.15	314.21		0.24
Main	8.479	2-yr	12800.00	721.61	741.52	731.34	741.80	0.000238	4.32	2965.29	253.90		0.22
Main	8.479	5-yr	20500.00	721.61	745.95	733.68	746.33	0.000229	4.93	4155.87	281.95		0.23
Main	8.479	10-yr	27100.00	721.61	749.50	735.60	749.92	0.000220	5.20	5216.18	316.79		0.23
Main	8.479	20-yr	34500.00	721.61	752.84	737.60	753.28	0.000224	5.37	6427.89	377.76		0.23

Main	8.479	50-yr	45500.00	721.61	758.45	739.64	758.87	0.000171	5.22	8721.57	440.78	0.21
Main	8.479	100-yr	54400.00	721.61	760.91	741.04	761.38	0.000170	5.55	9815.55	884.58	0.21
Main	8.479	200-yr	63000.00	721.61	762.15	742.26	762.71	0.000187	6.03	11417.45	1396.21	0.22
Main	8.479	500-yr	75900.00	721.61	764.89	744.13	765.49	0.000176	6.30	15313.58	1655.88	0.22
Main	8.479	Design Discharge	38700.00	721.61	754.64	738.45	755.10	0.000213	5.43	7121.91	395.15	0.23
Main	8.595	2-yr	12800.00	721.78	741.66	731.53	741.95	0.000242	4.32	2959.79	255.64	0.22
Main	8.595	5-yr	20500.00	721.78	746.10	733.92	746.47	0.000231	4.93	4154.89	283.45	0.23
Main	8.595	10-yr	27100.00	721.78	749.63	735.72	750.05	0.000212	5.22	5195.89	305.96	0.22
Main	8.595	20-yr	34500.00	721.78	752.96	737.68	753.42	0.000221	5.47	6311.04	356.94	0.23
Main	8.595	50-yr	45500.00	721.78	758.54	739.81	758.99	0.000173	5.40	8430.81	403.64	0.21
Main	8.595	100-yr	54400.00	721.78	760.99	741.21	761.50	0.000177	5.76	9437.77	623.76	0.21
Main	8.595	200-yr	63000.00	721.78	762.22	742.53	762.85	0.000201	6.33	9964.44	1503.51	0.23
Main	8.595	500-yr	75900.00	721.78	764.96	744.29	765.62	0.000190	6.62	14101.26	1739.50	0.23
Main	8.595	Design Discharge	38700.00	721.78	754.76	738.56	755.24	0.000211	5.56	6963.15	370.55	0.23
Main	8.687	2-yr	12800.00	721.91	741.76	731.76	742.08	0.000261	4.53	2824.81	240.52	0.23
Main	8.687	5-yr	20500.00	721.91	746.18	734.18	746.60	0.000251	5.21	3937.33	262.72	0.24
Main	8.687	10-yr	27100.00	721.91	749.70	735.95	750.17	0.000231	5.54	4888.68	278.58	0.23
Main	8.687	20-yr	34500.00	721.91	753.01	738.00	753.56	0.000225	5.91	5840.69	295.64	0.23
Main	8.687	50-yr	45500.00	721.91	758.55	740.25	759.11	0.000200	5.97	7626.34	348.05	0.22
Main	8.687	100-yr	54400.00	721.91	760.99	741.69	761.63	0.000208	6.40	8505.74	482.74	0.23
Main	8.687	200-yr	63000.00	721.91	762.22	742.95	762.99	0.000235	7.05	9000.37	1046.08	0.25
Main	8.687	500-yr	75900.00	721.91	764.93	744.80	765.77	0.000229	7.45	12208.50	1056.87	0.25
Main	8.687	Design Discharge	38700.00	721.91	754.80	738.89	755.37	0.000226	6.07	6379.83	311.43	0.24
Main	8.786	2-yr	12800.00	722.06	741.93	731.68	742.21	0.000231	4.29	2981.66	251.02	0.22
Main	8.786	5-yr	20500.00	722.06	746.35	734.03	746.73	0.000224	4.95	4140.76	273.79	0.22
Main	8.786	10-yr	27100.00	722.06	749.92		750.35	0.000209	5.26	5156.06	295.21	0.22
Main	8.786	20-yr	34500.00	722.06	753.19	738.02	753.67	0.000207	5.60	6157.36	318.07	0.22
Main	8.786	50-yr	45500.00	722.06	758.81		759.29	0.000194	5.55	8196.37	410.96	0.22
Main	8.786	100-yr	54400.00	722.06	761.26		761.80	0.000201	5.88	9263.32	494.16	0.23
Main	8.786	200-yr	63000.00	722.06	762.49	742.62	763.13	0.000226	6.44	9883.23	1046.54	0.24
Main	8.786	500-yr	75900.00	722.06	765.27		765.95	0.000210	6.72	13188.90	1128.21	0.24
Main	8.786	Design Discharge	38700.00	722.06	754.98	738.80	755.49	0.000213	5.74	6746.23	343.73	0.23
Main	8.840	2-yr	12800.00	722.15	741.99	731.51	742.29	0.000298	4.38	2923.10	246.22	0.22
Main	8.840	5-yr	20500.00	722.15	746.41	733.93	746.81	0.000288	5.05	4059.38	268.31	0.23
Main	8.840	10-yr	27100.00	722.15	749.97	735.77	750.42	0.000265	5.37	5046.64	286.12	0.22
Main	8.840	20-yr	34500.00	722.15	753.23	737.92	753.75	0.000251	5.77	5984.34	302.41	0.22
Main	8.840	50-yr	45500.00	722.15	758.82	740.17	759.37	0.000202	5.96	7640.40	625.65	0.21
Main	8.840	100-yr	54400.00	722.15	761.29	741.51	761.87	0.000207	6.20	10029.52	996.77	0.21
Main	8.840	200-yr	63000.00	722.15	762.53	742.87	763.20	0.000229	6.73	11420.26	1795.79	0.22
Main	8.840	500-yr	75900.00	722.15	765.40	744.66	766.02	0.000202	6.74	15415.83	1857.00	0.21
Main	8.840	Design Discharge	38700.00	722.15	755.02	738.96	755.57	0.000243	5.95	6508.41	311.35	0.22
Main	8.843		Bridge									
Main	8.845	2-yr	12800.00	722.15	742.02	731.51	742.32	0.000296	4.37	2928.91	246.34	0.22
Main	8.845	5-yr	20500.00	722.15	746.45	733.97	746.84	0.000286	5.04	4068.53	268.48	0.23
Main	8.845	10-yr	27100.00	722.15	750.01	735.77	750.46	0.000265	5.36	5057.87	286.31	0.22
Main	8.845	20-yr	34500.00	722.15	753.27	737.92	753.79	0.000254	5.74	6013.74	302.62	0.22
Main	8.845	50-yr	45500.00	722.15	758.97	740.15	759.51	0.000195	5.89	7721.05	699.62	0.20
Main	8.845	100-yr	54400.00	722.15	761.55	741.58	762.11	0.000198	6.10	10407.08	1255.62	0.21
Main	8.845	200-yr	63000.00	722.15	762.84	742.87	763.48	0.000217	6.59	11976.11	1851.00	0.22
Main	8.845	500-yr	75900.00	722.15	765.48	744.65	766.09	0.000197	6.67	15682.10	1851.00	0.21
Main	8.845	Design Discharge	38700.00	722.15	755.07	738.94	755.61	0.000244	5.91	6549.16	311.58	0.22
Main	8.849	2-yr	12800.00	722.15	742.03	731.50	742.32	0.000298	4.36	2935.09	249.27	0.22
Main	8.849	5-yr	20500.00	722.15	746.46	733.98	746.85	0.000289	5.00	4098.72	275.87	0.23
Main	8.849	10-yr	27100.00	722.15	750.03	735.77	750.47	0.000266	5.29	5122.38	297.30	0.22
Main	8.849	20-yr	34500.00	722.15	753.30	737.92	753.79	0.000259	5.63	6126.78	316.93	0.23
Main	8.849	50-yr	45500.00	722.15	759.02	740.17	759.52	0.000198	5.67	8105.07	723.07	0.20
Main	8.849	100-yr	54400.00	722.15	761.55	741.62	762.12	0.000200	6.10	9295.72	1278.82	0.21
Main	8.849	200-yr	63000.00	722.15	762.82	742.91	763.49	0.000224	6.66	10353.49	2381.53	0.22
Main	8.849	500-yr	75900.00	722.15	765.60	744.69	766.10	0.000171	6.19	17159.82	2536.04	0.20
Main	8.849	Design Discharge	38700.00	722.15	755.10	738.96	755.62	0.000248	5.77	6729.20	594.88	0.22
Main	8.858	2-yr	12800.00	722.17	742.04	731.52	742.34	0.000298	4.36	2937.19	249.36	0.22
Main	8.858	5-yr	20500.00	722.17	746.47	733.98	746.86	0.000288	5.00	4101.08	275.94	0.23
Main	8.858	10-yr	27100.00	722.17	750.04	735.78	750.48	0.000266	5.29	5124.67	297.37	0.22
Main	8.858	20-yr	34500.00	722.17	753.31	737.94	753.81	0.000259	5.63	6129.16	316.99	0.23
Main	8.858	50-yr	45500.00	722.17	759.03	740.20	759.53	0.000230	5.66	8037.40	350.32	0.21
Main	8.858	100-yr	54400.00	722.17	761.57	741.63	762.13	0.000245	6.04	9381.00	1021.95	0.21
Main	8.858	200-yr	63000.00	722.17	762.86	742.92	763.51	0.000266	6.52	10928.61	2247.08	0.22
Main	8.858	500-yr	75900.00	722.17	765.55	744.71	766.14	0.000232	6.49	14955.11	2523.91	0.21

Main	8.858	Design Discharge	38700.00	722.17	755.11	738.98	755.63	0.000255	5.77	6708.46	327.53	0.22
Main	8.863		Bridge									
Main	8.866	2-yr	12800.00	722.17	742.08	731.52	742.37	0.000295	4.34	2947.01	249.59	0.22
Main	8.866	5-yr	20500.00	722.17	746.53	733.98	746.91	0.000285	4.98	4115.40	276.25	0.23
Main	8.866	10-yr	27100.00	722.17	750.10	735.78	750.53	0.000263	5.27	5141.41	297.71	0.22
Main	8.866	20-yr	34500.00	722.17	753.38	737.94	753.87	0.000256	5.61	6148.95	317.36	0.22
Main	8.866	50-yr	45500.00	722.17	759.25	740.20	759.74	0.000225	5.61	8114.45	351.61	0.21
Main	8.866	100-yr	54400.00	722.17	761.96	741.63	762.49	0.000231	5.92	9691.40	1117.16	0.21
Main	8.866	200-yr	63000.00	722.17	763.45	742.92	764.04	0.000239	6.27	11781.90	2411.69	0.21
Main	8.866	500-yr	75900.00	722.17	765.97	744.71	766.51	0.000214	6.29	15591.85	2534.47	0.21
Main	8.866	Design Discharge	38700.00	722.17	755.21	738.98	755.72	0.000252	5.74	6739.29	328.07	0.22
Main	8.921	2-yr	12800.00	722.26	742.16	732.02	742.47	0.000320	4.44	2885.34	252.82	0.23
Main	8.921	5-yr	20500.00	722.26	746.60	734.53	747.00	0.000300	5.04	4065.45	278.85	0.23
Main	8.921	10-yr	27100.00	722.26	750.17	736.43	750.61	0.000273	5.31	5100.28	300.70	0.23
Main	8.921	20-yr	34500.00	722.26	753.45	738.41	753.94	0.000263	5.64	6117.40	320.33	0.23
Main	8.921	50-yr	45500.00	722.26	759.33	740.62	759.80	0.000206	5.56	8499.46	753.15	0.21
Main	8.921	100-yr	54400.00	722.26	762.09	742.01	762.56	0.000185	5.65	11574.99	1851.41	0.20
Main	8.921	200-yr	63000.00	722.26	763.65	743.30	764.11	0.000175	5.73	14986.69	2070.06	0.20
Main	8.921	500-yr	75900.00	722.26	766.17	745.06	766.58	0.000151	5.66	19420.38	2280.19	0.19
Main	8.921	Design Discharge	38700.00	722.26	755.28	739.36	755.79	0.000254	5.76	6729.39	357.17	0.23
Main	8.983	2-yr	12800.00	722.35	742.30	732.03	742.57	0.000267	4.16	3078.81	259.78	0.21
Main	8.983	5-yr	20500.00	722.35	746.74	734.42	747.09	0.000258	4.78	4288.70	284.78	0.22
Main	8.983	10-yr	27100.00	722.35	750.30	736.21	750.70	0.000238	5.08	5337.14	304.45	0.21
Main	8.983	20-yr	34500.00	722.35	753.57	738.07	754.03	0.000234	5.42	6367.19	324.75	0.22
Main	8.983	50-yr	45500.00	722.35	759.43	740.06	759.87	0.000200	5.37	8533.52	445.85	0.20
Main	8.983	100-yr	54400.00	722.35	762.13	741.47	762.63	0.000195	5.68	9980.26	1589.59	0.20
Main	8.983	200-yr	63000.00	722.35	763.69	742.72	764.18	0.000188	5.82	13126.48	1844.38	0.20
Main	8.983	500-yr	75900.00	722.35	766.19	744.46	766.65	0.000166	5.82	17015.00	1878.13	0.19
Main	8.983	Design Discharge	38700.00	722.35	755.40	738.85	755.88	0.000236	5.55	6977.88	346.18	0.22
Main	9.047	2-yr	12800.00	722.45	742.38	731.80	742.67	0.000295	4.34	2947.38	249.56	0.22
Main	9.047	5-yr	20500.00	722.45	746.81	734.27	747.19	0.000286	4.98	4112.59	276.16	0.23
Main	9.047	10-yr	27100.00	722.45	750.36	736.06	750.79	0.000265	5.28	5131.34	297.48	0.22
Main	9.047	20-yr	34500.00	722.45	753.63	738.24	754.12	0.000258	5.62	6136.05	317.10	0.23
Main	9.047	50-yr	45500.00	722.45	759.47	740.49	759.95	0.000223	5.56	8184.60	437.92	0.21
Main	9.047	100-yr	54400.00	722.45	762.18	741.91	762.71	0.000231	5.87	9318.76	1756.75	0.22
Main	9.047	200-yr	63000.00	722.45	763.74	743.20	764.26	0.000217	5.95	12691.80	1843.73	0.21
Main	9.047	500-yr	75900.00	722.45	766.23	745.01	766.71	0.000190	5.94	16530.51	1848.71	0.20
Main	9.047	Design Discharge	38700.00	722.45	755.46	739.27	755.97	0.000257	5.75	6728.80	335.11	0.23
Main	9.049		Bridge									
Main	9.051	2-yr	12800.00	722.45	742.43	731.81	742.72	0.000291	4.32	2960.84	249.88	0.22
Main	9.051	5-yr	20500.00	722.45	746.88	734.27	747.26	0.000282	4.96	4132.63	276.60	0.23
Main	9.051	10-yr	27100.00	722.45	750.44	736.06	750.87	0.000261	5.26	5155.09	297.96	0.22
Main	9.051	20-yr	34500.00	722.45	753.72	738.24	754.21	0.000254	5.60	6165.14	317.65	0.22
Main	9.051	50-yr	45500.00	722.45	759.66	740.49	760.13	0.000218	5.51	8254.92	458.99	0.21
Main	9.051	100-yr	54400.00	722.45	762.55	741.91	763.03	0.000204	5.60	10889.75	1818.16	0.21
Main	9.051	200-yr	63000.00	722.45	763.94	743.20	764.44	0.000207	5.86	13030.94	1844.79	0.21
Main	9.051	500-yr	75900.00	722.45	766.29	745.00	766.77	0.000186	5.92	16676.25	1849.15	0.20
Main	9.051	Design Discharge	38700.00	722.45	755.52	739.27	756.03	0.000255	5.73	6748.79	335.88	0.23
Main	9.068	2-yr	12800.00	722.48	742.46	731.84	742.75	0.000291	4.32	2960.01	249.86	0.22
Main	9.068	5-yr	20500.00	722.48	746.91	734.30	747.29	0.000282	4.96	4131.40	276.56	0.23
Main	9.068	10-yr	27100.00	722.48	750.46	736.09	750.89	0.000261	5.26	5153.15	297.91	0.22
Main	9.068	20-yr	34500.00	722.48	753.75	738.27	754.23	0.000255	5.60	6162.81	317.59	0.22
Main	9.068	50-yr	45500.00	722.48	759.67	740.52	760.15	0.000200	5.54	8215.01	432.64	0.20
Main	9.068	100-yr	54400.00	722.48	762.54	741.96	763.06	0.000186	5.79	10274.97	1712.91	0.20
Main	9.068	200-yr	63000.00	722.48	763.91	743.24	764.48	0.000199	6.20	12189.42	1782.26	0.21
Main	9.068	500-yr	75900.00	722.48	766.24	745.03	766.82	0.000193	6.45	15595.12	1827.87	0.21
Main	9.068	Design Discharge	38700.00	722.48	755.54	739.30	756.05	0.000255	5.74	6746.32	335.77	0.23
Main	9.089	2-yr	12800.00	722.51	742.49	731.87	742.78	0.000291	4.32	2960.84	249.88	0.22
Main	9.089	5-yr	20500.00	722.51	746.94	734.33	747.32	0.000282	4.96	4132.04	276.58	0.23
Main	9.089	10-yr	27100.00	722.51	750.50	736.13	750.92	0.000272	5.25	5157.19	307.98	0.23
Main	9.089	20-yr	34500.00	722.51	753.79	738.29	754.26	0.000277	5.51	6257.04	352.78	0.23
Main	9.089	50-yr	45500.00	722.51	759.73	740.53	760.17	0.000200	5.37	8469.21	388.22	0.20
Main	9.089	100-yr	54400.00	722.51	762.59	741.99	763.08	0.000194	5.64	10300.42	1525.63	0.20
Main	9.089	200-yr	63000.00	722.51	763.94	743.28	764.50	0.000209	6.08	12103.83	1578.86	0.21
Main	9.089	500-yr	75900.00	722.51	766.25	745.07	766.85	0.000209	6.43	15230.15	1596.78	0.22
Main	9.089	Design Discharge	38700.00	722.51	755.59	739.31	756.08	0.000264	5.60	6906.93	367.06	0.23

Main	9.092		Bridge										
Main	9.094	2-yr	12800.00	722.51	742.55	731.84	742.84	0.000286	4.30	2976.53	250.26	0.22
Main	9.094	5-yr	20500.00	722.51	747.02	734.33	747.40	0.000278	4.93	4154.90	277.08	0.22
Main	9.094	10-yr	27100.00	722.51	750.59	736.12	751.01	0.000266	5.23	5183.93	306.67	0.22
Main	9.094	20-yr	34500.00	722.51	753.89	738.29	754.36	0.000280	5.49	6284.66	359.36	0.23
Main	9.094	50-yr	45500.00	722.51	759.87	740.55	760.31	0.000193	5.35	8505.73	378.31	0.20
Main	9.094	100-yr	54400.00	722.51	762.85	741.97	763.33	0.000184	5.60	10468.44	1190.54	0.20
Main	9.094	200-yr	63000.00	722.51	764.26	743.27	764.81	0.000198	6.02	12486.91	1593.55	0.21
Main	9.094	500-yr	75900.00	722.51	766.41	745.07	767.01	0.000203	6.42	15671.54	1600.63	0.21
Main	9.094	Design Discharge	38700.00	722.51	755.70	739.33	756.18	0.000262	5.57	6943.10	368.91	0.23
Main	9.138	2-yr	12800.00	722.58	742.64		742.91	0.000277	4.18	3059.02	263.02	0.22
Main	9.138	5-yr	20500.00	722.58	747.12		747.47	0.000262	4.75	4368.10	385.34	0.22
Main	9.138	10-yr	27100.00	722.58	750.71		751.07	0.000208	4.89	6347.20	661.38	0.20
Main	9.138	20-yr	34500.00	722.58	754.06		754.42	0.000173	4.99	8642.36	705.66	0.19
Main	9.138	50-yr	45500.00	722.58	760.07		760.36	0.000110	4.69	13118.03	771.70	0.16
Main	9.138	100-yr	54400.00	722.58	763.08		763.38	0.000103	4.86	16224.50	1486.98	0.15
Main	9.138	200-yr	63000.00	722.58	764.53		764.87	0.000112	5.23	18407.61	1667.85	0.16
Main	9.138	500-yr	75900.00	722.58	766.69		767.06	0.000119	5.63	22030.64	1682.75	0.17
Main	9.138	Design Discharge	38700.00	722.58	755.89		756.24	0.000156	5.01	9952.62	725.68	0.18
Main	9.232	2-yr	12800.00	722.72	742.76		743.05	0.000292	4.42	3251.26	406.06	0.22
Main	9.232	5-yr	20500.00	722.72	747.27		747.59	0.000241	4.76	5142.73	436.74	0.21
Main	9.232	10-yr	27100.00	722.72	750.85		751.18	0.000206	4.90	6769.49	475.65	0.20
Main	9.232	20-yr	34500.00	722.72	754.16		754.51	0.000191	5.13	8412.84	528.02	0.20
Main	9.232	50-yr	45500.00	722.72	760.12		760.42	0.000126	4.91	12637.04	1693.45	0.17
Main	9.232	100-yr	54400.00	722.72	763.14		763.44	0.000111	4.96	18467.25	2191.38	0.16
Main	9.232	200-yr	63000.00	722.72	764.60		764.92	0.000118	5.28	21678.50	2207.81	0.17
Main	9.232	500-yr	75900.00	722.72	766.78		767.13	0.000122	5.61	26510.13	2226.76	0.17
Main	9.232	Design Discharge	38700.00	722.72	755.96		756.32	0.000176	5.20	9428.71	599.76	0.19
Main	9.315	2-yr	12800.00	722.86	743.00	732.21	743.15	0.000180	3.42	4621.12	465.04	0.17
Main	9.315	5-yr	20500.00	722.86	747.49	734.47	747.67	0.000154	3.75	6914.83	542.73	0.17
Main	9.315	10-yr	27100.00	722.86	751.06	736.31	751.25	0.000131	3.88	8915.29	581.95	0.16
Main	9.315	20-yr	34500.00	722.86	754.37	738.00	754.58	0.000121	4.07	10907.80	619.64	0.16
Main	9.315	50-yr	45500.00	722.86	760.27	739.87	760.47	0.000089	4.06	14928.59	748.98	0.14
Main	9.315	100-yr	54400.00	722.86	763.26	741.10	763.48	0.000086	4.30	17260.84	950.13	0.14
Main	9.315	200-yr	63000.00	722.86	764.71	742.05	764.97	0.000098	4.72	18615.85	1239.37	0.15
Main	9.315	500-yr	75900.00	722.86	766.86	743.35	767.17	0.000110	5.23	20817.55	1434.36	0.16
Main	9.315	Design Discharge	38700.00	722.86	756.17	738.81	756.38	0.000116	4.16	12041.89	640.91	0.15
Main	9.473	2-yr	12800.00	723.09	743.08	732.49	743.37	0.000292	4.33	2957.01	249.96	0.22
Main	9.473	5-yr	20500.00	723.09	747.52	734.95	747.90	0.000284	4.97	4123.91	276.56	0.23
Main	9.473	10-yr	27100.00	723.09	751.03	736.76	751.47	0.000265	5.28	5133.68	1099.82	0.22
Main	9.473	20-yr	34500.00	723.09	754.31	738.92	754.80	0.000257	5.62	6141.47	1205.80	0.23
Main	9.473	50-yr	45500.00	723.09	760.18	741.16	760.65	0.000182	5.53	9835.39	2285.94	0.20
Main	9.473	100-yr	54400.00	723.09	763.20	742.56	763.63	0.000153	5.49	14274.73	2870.14	0.18
Main	9.473	200-yr	63000.00	723.09	764.83	743.88	765.05	0.000094	4.46	25616.59	3462.94	0.15
Main	9.473	500-yr	75900.00	723.09	767.05	745.66	767.26	0.000090	4.59	30774.19	3861.91	0.14
Main	9.473	Design Discharge	38700.00	723.09	756.09	739.94	756.61	0.000248	5.76	6720.29	1234.08	0.22
Main	9.608	2-yr	12800.00	723.48	743.29	732.89	743.59	0.000306	4.40	2911.29	248.86	0.23
Main	9.608	5-yr	20500.00	723.48	747.72	735.36	748.11	0.000295	5.04	4071.30	275.41	0.23
Main	9.608	10-yr	27100.00	723.48	751.22	737.15	751.66	0.000274	5.34	5072.64	296.43	0.23
Main	9.608	20-yr	34500.00	723.48	754.49	739.30	754.99	0.000266	5.68	6074.60	316.06	0.23
Main	9.608	50-yr	45500.00	723.48	760.30	741.53	760.79	0.000194	5.67	8593.14	788.93	0.20
Main	9.608	100-yr	54400.00	723.48	763.25	742.98	763.78	0.000182	5.93	10694.25	1156.15	0.20
Main	9.608	200-yr	63000.00	723.48	764.67	744.26	765.25	0.000193	6.32	13642.53	1790.54	0.21
Main	9.608	500-yr	75900.00	723.48	766.86	746.07	767.48	0.000196	6.68	17942.22	2303.49	0.21
Main	9.608	Design Discharge	38700.00	723.48	756.27	740.32	756.79	0.000257	5.82	6647.67	332.22	0.23
Main	9.805	2-yr	12800.00	724.02	743.61	733.42	743.92	0.000324	4.48	2856.23	247.53	0.23
Main	9.805	5-yr	20500.00	724.02	748.02	735.90	748.43	0.000309	5.12	4006.46	274.00	0.24
Main	9.805	10-yr	27100.00	724.02	751.50	737.69	751.96	0.000286	5.42	4995.96	294.87	0.23
Main	9.805	20-yr	34500.00	724.02	754.76	739.85	755.28	0.000276	5.76	5989.79	314.44	0.23
Main	9.805	50-yr	45500.00	724.02	760.49	742.07	761.00	0.000204	5.76	8309.13	658.73	0.21
Main	9.805	100-yr	54400.00	724.02	763.43	743.50	763.98	0.000191	6.02	10252.74	854.89	0.20
Main	9.805	200-yr	63000.00	724.02	764.84	744.79	765.48	0.000212	6.56	11373.95	1038.16	0.22
Main	9.805	500-yr	75900.00	724.02	766.98	746.59	767.74	0.000229	7.16	13551.41	1334.98	0.23
Main	9.805	Design Discharge	38700.00	724.02	756.53	740.88	757.07	0.000268	5.90	6555.71	328.60	0.23
Main	9.977	2-yr	12800.00	724.49	743.90		744.22	0.000341	4.55	2815.57	248.63	0.24
Main	9.977	5-yr	20500.00	724.49	748.30		748.71	0.000324	5.16	3975.78	278.93	0.24
Main	9.977	10-yr	27100.00	724.49	751.76		752.22	0.000292	5.44	4984.65	308.47	0.23
Main	9.977	20-yr	34500.00	724.49	755.01		755.52	0.000270	5.78	6047.04	345.52	0.23

Main	9.977	50-yr	45500.00	724.49	760.67		761.19	0.000200	5.79	8552.77	677.42		0.21
Main	9.977	100-yr	54400.00	724.49	763.61		764.15	0.000186	6.01	10693.01	779.71		0.20
Main	9.977	200-yr	63000.00	724.49	765.05		765.67	0.000204	6.51	11849.58	829.76		0.21
Main	9.977	500-yr	75900.00	724.49	767.21		767.94	0.000221	7.12	13817.57	1004.72		0.23
Main	9.977	Design Discharge	38700.00	724.49	756.77		757.31	0.000259	5.92	6672.28	365.57		0.23
Main	10.125	2-yr	12800.00	724.90	744.17		744.50	0.000352	4.61	2777.19	245.61		0.24
Main	10.125	5-yr	20500.00	724.90	748.55		748.98	0.000331	5.24	3910.59	271.89		0.24
Main	10.125	10-yr	27100.00	724.90	751.98		752.46	0.000306	5.55	4878.64	292.47		0.24
Main	10.125	20-yr	34500.00	724.90	755.21		755.75	0.000295	5.89	5855.75	311.88		0.24
Main	10.125	50-yr	45500.00	724.90	760.83		761.35	0.000213	5.85	8648.19	731.71		0.21
Main	10.125	100-yr	54400.00	724.90	763.75		764.31	0.000198	6.10	10976.25	916.28		0.21
Main	10.125	200-yr	63000.00	724.90	765.20		765.84	0.000215	6.59	12364.17	1003.69		0.22
Main	10.125	500-yr	75900.00	724.90	767.38		768.12	0.000230	7.16	15082.02	1405.40		0.23
Main	10.125	Design Discharge	38700.00	724.90	756.96		757.53	0.000286	6.04	6411.01	334.96		0.24
Main	10.207	2-yr	12800.00	725.12	744.32		744.65	0.000358	4.64	2760.17	245.19		0.24
Main	10.207	5-yr	20500.00	725.12	748.69		749.12	0.000337	5.27	3889.18	271.42		0.25
Main	10.207	10-yr	27100.00	725.12	752.11		752.59	0.000311	5.59	4852.28	291.93		0.24
Main	10.207	20-yr	34500.00	725.12	755.34		755.88	0.000299	5.92	5826.02	311.30		0.24
Main	10.207	50-yr	45500.00	725.12	760.90		761.45	0.000224	5.96	7775.77	397.03		0.22
Main	10.207	100-yr	54400.00	725.12	763.80		764.41	0.000215	6.31	8961.31	421.74		0.22
Main	10.207	200-yr	63000.00	725.12	765.23		765.97	0.000240	6.91	9593.50	508.17		0.23
Main	10.207	500-yr	75900.00	725.12	767.37		768.28	0.000271	7.70	10944.37	853.45		0.25
Main	10.207	Design Discharge	38700.00	725.12	757.08		757.65	0.000291	6.07	6378.71	321.78		0.24
Main	10.287	2-yr	12800.00	725.34	744.47	734.74	744.81	0.000365	4.67	2742.84	244.77		0.25
Main	10.287	5-yr	20500.00	725.34	748.83	737.21	749.27	0.000342	5.30	3867.37	309.96		0.25
Main	10.287	10-yr	27100.00	725.34	752.24	739.01	752.73	0.000316	5.62	4825.51	397.47		0.24
Main	10.287	20-yr	34500.00	725.34	755.46	741.16	756.01	0.000303	5.95	5795.82	479.16		0.24
Main	10.287	50-yr	45500.00	725.34	761.00	743.39	761.55	0.000228	5.95	8015.25	1816.70		0.22
Main	10.287	100-yr	54400.00	725.34	763.92	744.83	764.51	0.000213	6.22	9617.31	1997.34		0.21
Main	10.287	200-yr	63000.00	725.34	765.39	746.13	766.07	0.000233	6.75	10506.83	2116.65		0.23
Main	10.287	500-yr	75900.00	725.34	768.08	747.93	768.42	0.000136	5.48	27659.77	2264.93		0.18
Main	10.287	Design Discharge	38700.00	725.34	757.20	742.20	757.78	0.000295	6.10	6346.36	999.26		0.24
Main	10.451	2-yr	13200.00	725.79	744.75	736.61	745.26	0.000600	5.68	2323.61	223.79		0.31
Main	10.451	5-yr	20300.00	725.79	749.09	739.04	749.66	0.000487	6.06	3349.23	249.77		0.29
Main	10.451	10-yr	26320.00	725.79	752.47	741.10	753.07	0.000419	6.22	4229.31	270.09		0.28
Main	10.451	20-yr	34000.00	725.79	755.67	743.16	756.35	0.000405	6.64	5123.33	289.27		0.28
Main	10.451	50-yr	44500.00	725.79	761.17	745.13	761.82	0.000342	6.49	6924.12	499.10		0.26
Main	10.451	100-yr	53690.00	725.79	764.07	746.68	764.76	0.000333	6.70	8544.17	649.33		0.26
Main	10.451	200-yr	62000.00	725.79	765.57	747.94	766.34	0.000355	7.13	9549.07	694.26		0.27
Main	10.451	500-yr	74720.00	725.79	767.89	749.83	768.75	0.000370	7.62	11238.67	1756.33		0.28
Main	10.451	Design Discharge	38000.00	725.79	757.40	743.93	758.11	0.000387	6.74	5634.26	299.68		0.27
Main	10.510	2-yr	13200.00	725.97	744.97	736.75	745.47	0.000807	5.66	2331.79	224.02		0.31
Main	10.510	5-yr	20300.00	725.97	749.26	739.22	749.83	0.000664	6.06	3347.54	249.75		0.29
Main	10.510	10-yr	26320.00	725.97	752.62	741.26	753.23	0.000573	6.24	4220.62	600.46		0.28
Main	10.510	20-yr	34000.00	725.97	755.81	743.34	756.50	0.000554	6.65	5112.40	728.58		0.28
Main	10.510	50-yr	44500.00	725.97	761.29	745.32	761.94	0.000464	6.49	7012.45	1152.15		0.26
Main	10.510	100-yr	53690.00	725.97	764.22	746.86	764.88	0.000427	6.62	9019.90	1411.77		0.26
Main	10.510	200-yr	62000.00	725.97	765.74	748.16	766.47	0.000444	6.99	10255.16	1497.61		0.26
Main	10.510	500-yr	74720.00	725.97	768.11	749.98	768.89	0.000439	7.34	12391.99	2001.72		0.27
Main	10.510	Design Discharge	38000.00	725.97	757.54	744.12	758.25	0.000530	6.76	5620.90	798.62		0.28
Main	10.515	2-yr	13200.00	728.50	744.97	737.55	745.51	0.000921	5.90	2236.79	223.97		0.33
Main	10.515	5-yr	20300.00	728.50	749.26	739.95	749.86	0.000726	6.24	3252.87	249.71		0.30
Main	10.515	10-yr	26320.00	728.50	752.62	742.01	753.25	0.000615	6.38	4126.21	600.23		0.29
Main	10.515	20-yr	34000.00	728.50	755.81	743.83	756.52	0.000587	6.78	5018.10	728.42		0.29
Main	10.515	50-yr	44500.00	728.50	761.29	745.76	761.96	0.000484	6.58	6918.82	1152.09		0.27
Main	10.515	100-yr	53690.00	728.50	764.22	747.30	764.90	0.000442	6.69	8927.29	1411.81		0.26
Main	10.515	200-yr	62000.00	728.50	765.75	748.59	766.49	0.000458	7.06	10163.32	1497.71		0.27
Main	10.515	500-yr	74720.00	728.50	768.11	750.43	768.90	0.000451	7.40	12300.82	2002.95		0.27
Main	10.515	Design Discharge	38000.00	728.50	757.54	744.58	758.27	0.000558	6.88	5526.67	798.48		0.28
Main	10.5152*	2-yr	13200.00	725.97	745.02	736.75	745.52	0.000796	5.63	2342.70	224.31		0.31
Main	10.5152*	5-yr	20300.00	725.97	749.30	739.22	749.87	0.000659	6.05	3357.07	249.98		0.29
Main	10.5152*	10-yr	26320.00	725.97	752.65	741.26	753.26	0.000570	6.22	4229.21	602.03		0.28
Main	10.5152*	20-yr	34000.00	725.97	755.84	743.34	756.53	0.000552	6.64	5121.13	729.81		0.28
Main	10.5152*	50-yr	44500.00	725.97	761.31	745.32	761.97	0.000463	6.49	7025.83	1153.95		0.26
Main	10.5152*	100-yr	53690.00	725.97	764.24	746.86	764.90	0.000425	6.61	9036.52	1413.03		0.26
Main	10.5152*	200-yr	62000.00	725.97	765.77	748.16	766.49	0.000442	6.98	10273.86	1498.98		0.26
Main	10.5152*	500-yr	74720.00	725.97	768.13	749.98	768.90	0.000438	7.33	12412.71	2014.33		0.27
Main	10.5152*	Design Discharge	38000.00	725.97	757.57	744.12	758.28	0.000528	6.75	5629.42	799.82		0.27

Main	10.646	2-yr	13200.00	726.34	745.66	737.15	746.12	0.000984	5.49	2402.50	225.89		0.30
Main	10.646	5-yr	20300.00	726.34	749.81	739.58	750.37	0.000809	5.98	3393.53	250.84		0.29
Main	10.646	10-yr	26320.00	726.34	753.09	741.64	753.68	0.000690	6.20	4247.35	270.49		0.28
Main	10.646	20-yr	34000.00	726.34	756.26	743.67	756.94	0.000652	6.62	5134.71	289.50		0.28
Main	10.646	50-yr	44500.00	726.34	761.65	745.66	762.31	0.000528	6.49	6859.90	907.04		0.26
Main	10.646	100-yr	53690.00	726.34	764.52	747.21	765.23	0.000498	6.77	7930.75	1297.87		0.26
Main	10.646	200-yr	62000.00	726.34	766.21	748.51	766.80	0.000419	6.49	13024.84	1891.00		0.24
Main	10.646	500-yr	74720.00	726.34	768.63	750.36	769.20	0.000380	6.57	16703.42	2360.33		0.24
Main	10.646	Design Discharge	38000.00	726.34	757.96	744.49	758.67	0.000617	6.74	5636.96	299.73		0.27
Main	10.798	2-yr	13200.00	726.84	746.34		746.79	0.000703	5.40	2444.33	227.00		0.29
Main	10.798	5-yr	20300.00	726.84	750.39		750.94	0.000628	5.95	3413.39	251.31		0.28
Main	10.798	10-yr	26320.00	726.84	753.59		754.18	0.000563	6.20	4247.28	270.49		0.28
Main	10.798	20-yr	34000.00	726.84	756.74		757.42	0.000550	6.63	5128.74	289.38		0.28
Main	10.798	50-yr	44500.00	726.84	762.01		762.68	0.000403	6.60	7093.76	467.84		0.25
Main	10.798	100-yr	53690.00	726.84	764.86		765.60	0.000384	6.98	8555.54	625.69		0.25
Main	10.798	200-yr	62000.00	726.84	766.40		767.26	0.000413	7.53	9714.54	926.53		0.26
Main	10.798	500-yr	74720.00	726.84	768.73		769.72	0.000434	8.16	12396.20	1523.62		0.27
Main	10.798	Design Discharge	38000.00	726.84	758.42		759.13	0.000529	6.76	5624.01	299.47		0.27
Main	10.803	2-yr	13200.00	729.34	746.34		746.83	0.000794	5.61	2351.90	227.00		0.31
Main	10.803	5-yr	20300.00	729.34	750.39		750.97	0.000684	6.11	3321.06	251.31		0.30
Main	10.803	10-yr	26320.00	729.34	753.59		754.21	0.000603	6.33	4155.05	270.49		0.28
Main	10.803	20-yr	34000.00	729.34	756.74		757.45	0.000581	6.75	5036.61	289.39		0.29
Main	10.803	50-yr	44500.00	729.34	762.01		762.70	0.000420	6.69	7001.63	467.85		0.25
Main	10.803	100-yr	53690.00	729.34	764.86		765.62	0.000398	7.06	8463.38	625.72		0.25
Main	10.803	200-yr	62000.00	729.34	766.40		767.28	0.000427	7.61	9622.78	926.66		0.26
Main	10.803	500-yr	74720.00	729.34	768.73		769.74	0.000447	8.24	12305.19	1523.87		0.27
Main	10.803	Design Discharge	38000.00	729.34	758.42		759.15	0.000556	6.87	5531.93	299.48		0.28
Main	10.8039	2-yr	13200.00	726.84	746.40		746.85	0.000692	5.37	2457.38	227.34		0.29
Main	10.8039	5-yr	20300.00	726.84	750.44		750.99	0.000621	5.93	3425.79	251.61		0.28
Main	10.8039	10-yr	26320.00	726.84	753.63		754.22	0.000559	6.18	4258.89	270.75		0.27
Main	10.8039	20-yr	34000.00	726.84	756.78		757.46	0.000546	6.61	5140.60	289.63		0.28
Main	10.8039	50-yr	44500.00	726.84	762.04		762.71	0.000401	6.59	7107.65	468.28		0.25
Main	10.8039	100-yr	53690.00	726.84	764.88		765.63	0.000383	6.97	8573.24	627.26		0.25
Main	10.8039	200-yr	62000.00	726.84	766.43		767.29	0.000411	7.52	9743.30	931.71		0.26
Main	10.8039	500-yr	74720.00	726.84	768.77		769.75	0.000432	8.15	12445.62	1531.82		0.27
Main	10.8039	Design Discharge	38000.00	726.84	758.46		759.16	0.000526	6.74	5635.64	299.71		0.27
Main	10.808		Bridge										
Main	10.817	2-yr	13200.00	726.84	746.63	737.63	747.06	0.000650	5.26	2510.12	228.73		0.28
Main	10.817	5-yr	20300.00	726.84	750.68	740.01	751.21	0.000591	5.82	3486.73	253.06		0.28
Main	10.817	10-yr	26320.00	726.84	753.87	742.14	754.45	0.000535	6.09	4324.96	272.21		0.27
Main	10.817	20-yr	34000.00	726.84	757.04	744.15	757.70	0.000524	6.52	5217.40	291.21		0.27
Main	10.817	50-yr	44500.00	726.84	762.27	746.14	762.92	0.000388	6.52	7214.03	471.61		0.24
Main	10.817	100-yr	53690.00	726.84	765.11	747.69	765.84	0.000371	6.90	8717.64	639.89		0.24
Main	10.817	200-yr	62000.00	726.84	766.68	748.93	767.51	0.000397	7.44	9977.69	967.11		0.25
Main	10.817	500-yr	74720.00	726.84	769.01	750.85	769.97	0.000417	8.06	12828.41	1593.43		0.26
Main	10.817	Design Discharge	38000.00	726.84	758.72	744.90	759.41	0.000506	6.65	5715.75	301.31		0.27
Main	10.996	2-yr	13200.00	727.36	747.38		747.79	0.000806	5.15	2563.30	230.12		0.27
Main	10.996	5-yr	20300.00	727.36	751.36		751.87	0.000720	5.76	3525.41	626.24		0.27
Main	10.996	10-yr	26320.00	727.36	754.47		755.04	0.000643	6.06	4346.77	951.31		0.27
Main	10.996	20-yr	34000.00	727.36	757.62		758.28	0.000615	6.50	5234.78	1095.61		0.27
Main	10.996	50-yr	44500.00	727.36	762.73		763.38	0.000521	6.47	6880.27	1309.27		0.26
Main	10.996	100-yr	53690.00	727.36	765.56		766.27	0.000484	6.76	8304.74	1697.87		0.26
Main	10.996	200-yr	62000.00	727.36	767.17		767.97	0.000504	7.20	9545.47	1829.58		0.27
Main	10.996	500-yr	74720.00	727.36	769.54		770.44	0.000517	7.72	11859.10	2171.95		0.27
Main	10.996	Design Discharge	38000.00	727.36	759.28		759.96	0.000588	6.64	5726.36	1121.84		0.27
Main	11.089	2-yr	13200.00	727.63	747.74	738.46	748.14	0.000787	5.11	2583.46	230.65		0.27
Main	11.089	5-yr	20300.00	727.63	751.67	740.86	752.19	0.000713	5.74	3537.91	254.27		0.27
Main	11.089	10-yr	26320.00	727.63	754.76	742.95	755.33	0.000642	6.05	4350.45	272.77		0.27
Main	11.089	20-yr	34000.00	727.63	757.89	745.00	758.55	0.000615	6.49	5234.97	291.58		0.27
Main	11.089	50-yr	44500.00	727.63	762.94	746.96	763.59	0.000454	6.50	7388.22	667.63		0.24
Main	11.089	100-yr	53690.00	727.63	765.79	748.52	766.47	0.000417	6.75	9365.18	1002.14		0.24
Main	11.089	200-yr	62000.00	727.63	767.44	749.82	768.18	0.000427	7.12	10718.67	1192.46		0.24
Main	11.089	500-yr	74720.00	727.63	769.87	751.67	770.66	0.000425	7.53	13287.70	1735.15		0.25
Main	11.089	Design Discharge	38000.00	727.63	759.54	745.77	760.22	0.000589	6.64	5722.94	301.45		0.27
Main	11.117	2-yr	13200.00	727.71	747.86	738.53	748.26	0.000778	5.09	2592.82	240.80		0.27
Main	11.117	5-yr	20300.00	727.71	751.78	740.96	752.29	0.000708	5.73	3545.23	307.03		0.27
Main	11.117	10-yr	26320.00	727.71	754.86	743.03	755.42	0.000639	6.04	4355.18	356.41		0.27
Main	11.117	20-yr	34000.00	727.71	757.99	745.09	758.64	0.000614	6.49	5238.80	397.30		0.27

Main	11.117	50-yr	44500.00	727.71	763.00	747.05	763.67	0.000465	6.57	6969.37	585.01		0.25
Main	11.117	100-yr	53690.00	727.71	765.81	748.58	766.55	0.000442	6.94	8493.49	766.47		0.24
Main	11.117	200-yr	62000.00	727.71	767.69	749.86	768.25	0.000341	6.39	11912.79	1179.42		0.22
Main	11.117	500-yr	74720.00	727.71	770.17	751.73	770.74	0.000327	6.64	16193.46	2149.22		0.22
Main	11.117	Design Discharge	38000.00	727.71	759.63	745.86	760.31	0.000589	6.64	5725.65	418.50		0.27
Main	11.1173*	2-yr	13200.00	727.71	747.86		748.26	0.000820	5.10	2589.63	239.05		0.27
Main	11.1173*	5-yr	20300.00	727.71	751.80		752.30	0.000722	5.66	3667.53	306.01		0.27
Main	11.1173*	10-yr	26320.00	727.71	754.92		755.43	0.000617	5.82	4698.50	356.27		0.26
Main	11.1173*	20-yr	34000.00	727.71	758.11		758.65	0.000551	6.04	5903.54	398.13		0.25
Main	11.1173*	50-yr	44500.00	727.71	763.19		763.68	0.000378	5.84	8318.15	599.23		0.22
Main	11.1173*	100-yr	53690.00	727.71	766.06		766.57	0.000343	6.03	10350.52	818.72		0.21
Main	11.1173*	200-yr	62000.00	727.71	767.71		768.25	0.000349	6.34	11907.69	1179.17		0.21
Main	11.1173*	500-yr	74720.00	727.71	770.19		770.74	0.000331	6.55	16212.01	2151.28		0.21
Main	11.1173*	Design Discharge	38000.00	727.71	759.78		760.33	0.000508	6.08	6589.52	442.87		0.24
Main	11.1256*	2-yr	13200.00	727.77	747.85		748.32	0.000651	5.48	2409.64	215.61		0.29
Main	11.1256*	5-yr	20300.00	727.77	751.77		752.36	0.000622	6.14	3321.27	262.63		0.29
Main	11.1256*	10-yr	26320.00	727.77	754.86		755.50	0.000566	6.40	4223.09	319.76		0.28
Main	11.1256*	20-yr	34000.00	727.77	758.04		758.72	0.000533	6.72	5327.30	373.67		0.28
Main	11.1256*	50-yr	44500.00	727.77	763.12		763.74	0.000360	6.53	7806.96	626.30		0.24
Main	11.1256*	100-yr	53690.00	727.77	765.99		766.63	0.000326	6.73	9849.10	791.00		0.23
Main	11.1256*	200-yr	62000.00	727.77	767.62		768.31	0.000334	7.09	11297.48	1102.78		0.24
Main	11.1256*	500-yr	74720.00	727.77	770.10		770.80	0.000323	7.38	15113.72	2091.55		0.24
Main	11.1256*	Design Discharge	38000.00	727.77	759.71		760.40	0.000482	6.77	6021.31	450.40		0.27
Main	11.1339*	2-yr	13200.00	727.84	747.84		748.38	0.000821	5.93	2225.54	200.95		0.31
Main	11.1339*	5-yr	20300.00	727.84	751.74		752.43	0.000787	6.64	3057.90	225.40		0.32
Main	11.1339*	10-yr	26320.00	727.84	754.82		755.57	0.000727	6.96	3805.44	273.11		0.31
Main	11.1339*	20-yr	34000.00	727.84	757.97		758.80	0.000668	7.36	4805.67	386.01		0.31
Main	11.1339*	50-yr	44500.00	727.84	763.05		763.80	0.000451	7.14	7326.67	609.13		0.26
Main	11.1339*	100-yr	53690.00	727.84	765.92		766.68	0.000406	7.33	9336.40	768.16		0.25
Main	11.1339*	200-yr	62000.00	727.84	767.56		768.37	0.000413	7.70	10750.53	1038.40		0.26
Main	11.1339*	500-yr	74720.00	727.84	770.04		770.86	0.000396	7.98	14245.55	1800.78		0.26
Main	11.1339*	Design Discharge	38000.00	727.84	759.63		760.47	0.000607	7.44	5505.95	457.02		0.30
Main	11.1423*	2-yr	13200.00	727.90	747.81		748.46	0.001002	6.48	2035.79	186.36		0.35
Main	11.1423*	5-yr	20300.00	727.90	751.70		752.51	0.000961	7.23	2809.21	211.37		0.35
Main	11.1423*	10-yr	26320.00	727.90	754.76		755.65	0.000883	7.55	3486.97	231.90		0.34
Main	11.1423*	20-yr	34000.00	727.90	757.89		758.89	0.000783	8.03	4398.44	371.37		0.33
Main	11.1423*	50-yr	44500.00	727.90	762.98		763.87	0.000530	7.79	6842.81	579.25		0.28
Main	11.1423*	100-yr	53690.00	727.90	765.85		766.75	0.000476	7.98	8804.27	744.13		0.28
Main	11.1423*	200-yr	62000.00	727.90	767.48		768.44	0.000483	8.37	10237.11	1049.54		0.28
Main	11.1423*	500-yr	74720.00	727.90	769.97		770.92	0.000458	8.62	13606.26	1670.14		0.28
Main	11.1423*	Design Discharge	38000.00	727.90	759.55		760.56	0.000715	8.13	5089.24	453.33		0.32
Main	11.1506*	2-yr	13200.00	727.96	747.77		748.57	0.001266	7.17	1840.21	171.97		0.39
Main	11.1506*	5-yr	20300.00	727.96	751.64		752.62	0.001208	7.94	2555.59	197.59		0.39
Main	11.1506*	10-yr	26320.00	727.96	754.69		755.75	0.001049	8.26	3208.80	252.59		0.37
Main	11.1506*	20-yr	34000.00	727.96	757.83		758.98	0.000898	8.66	4189.83	361.47		0.36
Main	11.1506*	50-yr	44500.00	727.96	762.98		763.91	0.000566	8.10	6411.24	555.78		0.29
Main	11.1506*	100-yr	53690.00	727.96	765.88		766.77	0.000484	8.10	8346.61	740.57		0.28
Main	11.1506*	200-yr	62000.00	727.96	767.54		768.46	0.000482	8.41	9886.43	1113.91		0.28
Main	11.1506*	500-yr	74720.00	727.96	770.06		770.95	0.000444	8.55	13283.19	1622.35		0.27
Main	11.1506*	Design Discharge	38000.00	727.96	759.51		760.63	0.000797	8.65	4815.88	393.78		0.34
Main	11.1589*	2-yr	13200.00	728.02	747.70		748.71	0.001677	8.06	1637.32	157.76		0.44
Main	11.1589*	5-yr	20300.00	728.02	751.55		752.76	0.001569	8.84	2295.84	186.26		0.44
Main	11.1589*	10-yr	26320.00	728.02	754.59		755.88	0.001272	9.14	2981.87	286.51		0.41
Main	11.1589*	20-yr	34000.00	728.02	757.79		759.07	0.001027	9.31	4047.36	352.63		0.38
Main	11.1589*	50-yr	44500.00	728.02	762.95		763.97	0.000630	8.59	6053.46	528.12		0.31
Main	11.1589*	100-yr	53690.00	728.02	765.85		766.83	0.000541	8.59	7854.97	765.69		0.29
Main	11.1589*	200-yr	62000.00	728.02	767.50		768.52	0.000538	8.91	9443.02	1120.61		0.30
Main	11.1589*	500-yr	74720.00	728.02	770.04		770.99	0.000491	9.02	12802.54	1583.86		0.29
Main	11.1589*	Design Discharge	38000.00	728.02	759.48		760.71	0.000897	9.22	4656.69	368.05		0.36
Main	11.1673*	2-yr	13200.00	728.09	747.58		748.91	0.002370	9.26	1426.10	143.74		0.52
Main	11.1673*	5-yr	20300.00	728.09	751.40		752.96	0.002055	10.04	2042.83	191.56		0.50
Main	11.1673*	10-yr	26320.00	728.09	754.49		756.03	0.001552	10.11	2843.49	315.16		0.45
Main	11.1673*	20-yr	34000.00	728.09	757.75		759.17	0.001175	9.99	3909.81	340.11		0.41
Main	11.1673*	50-yr	44500.00	728.09	762.93		764.03	0.000699	9.06	5866.55	476.89		0.33
Main	11.1673*	100-yr	53690.00	728.09	765.81		766.88	0.000609	9.12	7465.16	735.04		0.31
Main	11.1673*	200-yr	62000.00	728.09	767.46		768.58	0.000613	9.52	9002.47	1135.44		0.31
Main	11.1673*	500-yr	74720.00	728.09	769.99		771.05	0.000563	9.66	12374.88	1560.52		0.31
Main	11.1673*	Design Discharge	38000.00	728.09	759.45		760.79	0.001013	9.83	4498.96	353.25		0.38

Main	11.1756*	2-yr	13200.00	728.15	747.36		749.23	0.003696	10.98	1202.65	129.64	0.64
Main	11.1756*	5-yr	20300.00	728.15	751.13		753.26	0.002874	11.74	1797.27	219.17	0.59
Main	11.1756*	10-yr	26320.00	728.15	754.39		756.21	0.001916	11.20	2728.26	303.17	0.50
Main	11.1756*	20-yr	34000.00	728.15	757.67		759.30	0.001413	10.92	3758.39	325.09	0.44
Main	11.1756*	50-yr	44500.00	728.15	762.86		764.11	0.000837	9.88	5672.53	464.42	0.35
Main	11.1756*	100-yr	53690.00	728.15	765.75		766.96	0.000730	9.95	7285.67	721.44	0.34
Main	11.1756*	200-yr	62000.00	728.15	767.39		768.65	0.000737	10.40	8709.17	1022.47	0.34
Main	11.1756*	500-yr	74720.00	728.15	769.93		771.12	0.000677	10.55	11966.47	1497.55	0.33
Main	11.1756*	Design Discharge	38000.00	728.15	759.37		760.90	0.001216	10.73	4320.73	336.52	0.42
Main	11.184	2-yr	13200.00	728.21	746.82	745.73	749.84	0.006884	13.94	948.74	118.68	0.84
Main	11.184	5-yr	20300.00	728.21	750.75	748.66	753.69	0.004306	13.99	1630.27	268.34	0.71
Main	11.184	10-yr	26320.00	728.21	754.41		756.35	0.002209	11.95	2653.32	290.57	0.53
Main	11.184	20-yr	34000.00	728.21	757.72		759.38	0.001539	11.32	3646.86	310.80	0.46
Main	11.184	50-yr	44500.00	728.21	762.90		764.16	0.000881	10.06	5533.90	452.47	0.36
Main	11.184	100-yr	53690.00	728.21	765.83		766.99	0.000745	9.98	7190.98	703.64	0.34
Main	11.184	200-yr	62000.00	728.21	767.50		768.69	0.000741	10.36	8548.59	908.34	0.34
Main	11.184	500-yr	74720.00	728.21	769.96		771.15	0.000709	10.70	10975.59	1106.97	0.34
Main	11.184	Design Discharge	38000.00	728.21	759.41		760.98	0.001306	11.04	4181.86	321.65	0.43
Main	11.287	2-yr	13200.00	728.53	750.45		751.84	0.001929	9.48	1464.63	275.57	0.47
Main	11.287	5-yr	20300.00	728.53	753.64		755.36	0.001931	10.89	2888.43	495.27	0.49
Main	11.287	10-yr	26320.00	728.53	755.58		757.53	0.001968	11.89	3869.31	517.29	0.50
Main	11.287	20-yr	34000.00	728.53	758.46		760.38	0.001699	12.23	5394.35	537.32	0.48
Main	11.287	50-yr	44500.00	728.53	763.21		764.85	0.001198	11.81	8104.85	599.21	0.42
Main	11.287	100-yr	53690.00	728.53	766.01		767.65	0.001094	12.11	9967.86	716.81	0.40
Main	11.287	200-yr	62000.00	728.53	767.61		769.39	0.001141	12.83	11148.29	759.90	0.42
Main	11.287	500-yr	74720.00	728.53	769.94		771.90	0.001182	13.74	13243.05	1181.47	0.43
Main	11.287	Design Discharge	38000.00	728.53	760.00		761.88	0.001560	12.30	6243.10	560.26	0.46
Main	11.387	2-yr	13200.00	729.10	752.38		753.34	0.001160	7.91	1824.83	387.25	0.37
Main	11.387	5-yr	20300.00	729.10	755.58		756.92	0.001289	9.53	2794.00	513.67	0.40
Main	11.387	10-yr	26320.00	729.10	757.49		759.16	0.001439	10.79	3449.51	551.93	0.43
Main	11.387	20-yr	34000.00	729.10	759.93		761.89	0.001498	11.91	4361.12	628.23	0.45
Main	11.387	50-yr	44500.00	729.10	764.14		766.06	0.001238	12.18	6351.19	791.32	0.42
Main	11.387	100-yr	53690.00	729.10	766.75		768.83	0.001219	12.89	8263.33	854.95	0.42
Main	11.387	200-yr	62000.00	729.10	768.22		770.76	0.001393	14.24	9641.38	1058.49	0.46
Main	11.387	500-yr	74720.00	729.10	770.61		773.25	0.001386	14.95	12567.76	1374.73	0.46
Main	11.387	Design Discharge	38000.00	729.10	761.30		763.35	0.001471	12.30	4944.90	712.16	0.45
Main	11.484	2-yr	13200.00	729.57	753.44		754.32	0.001220	7.54	1857.59	516.68	0.38
Main	11.484	5-yr	20300.00	729.57	757.07		757.80	0.000850	7.47	4526.12	1072.40	0.33
Main	11.484	10-yr	26320.00	729.57	759.40		759.99	0.000663	7.23	6499.81	1102.85	0.30
Main	11.484	20-yr	34000.00	729.57	762.16		762.65	0.000510	6.96	8887.16	1141.89	0.27
Main	11.484	50-yr	44500.00	729.57	766.27		766.64	0.000343	6.42	12730.19	1287.41	0.23
Main	11.484	100-yr	53690.00	729.57	769.03		769.38	0.000295	6.39	15474.88	1393.93	0.21
Main	11.484	200-yr	62000.00	729.57	771.01		771.36	0.000281	6.52	18075.13	1630.09	0.21
Main	11.484	500-yr	74720.00	729.57	773.49		773.85	0.000275	6.80	23102.18	2514.81	0.21
Main	11.484	Design Discharge	38000.00	729.57	763.61		764.06	0.000447	6.81	10177.75	1193.48	0.25
Main	11.563	2-yr	13200.00	729.82	754.29		754.72	0.000570	5.58	3822.32	780.47	0.26
Main	11.563	5-yr	20300.00	729.82	757.63		758.13	0.000588	6.24	6183.53	1095.80	0.28
Main	11.563	10-yr	26320.00	729.82	759.76		760.27	0.000587	6.59	8050.26	1289.99	0.28
Main	11.563	20-yr	34000.00	729.82	762.38		762.88	0.000512	6.71	10772.68	1412.30	0.27
Main	11.563	50-yr	44500.00	729.82	766.41		766.80	0.000360	6.37	15573.06	1656.19	0.23
Main	11.563	100-yr	53690.00	729.82	769.16		769.52	0.000307	6.33	19242.89	1945.63	0.22
Main	11.563	200-yr	62000.00	729.82	771.13		771.49	0.000287	6.43	22147.85	2054.30	0.21
Main	11.563	500-yr	74720.00	729.82	773.60		773.97	0.000276	6.66	25998.18	2192.78	0.21
Main	11.563	Design Discharge	38000.00	729.82	763.80		764.27	0.000464	6.69	12359.96	1519.14	0.26
Main	11.676	2-yr	13200.00	730.20	754.50		755.35	0.001114	7.51	2291.88	511.85	0.36
Main	11.676	5-yr	20300.00	730.20	757.78		758.80	0.001126	8.52	3863.89	543.12	0.38
Main	11.676	10-yr	26320.00	730.20	759.83		760.99	0.001189	9.32	4871.23	562.05	0.39
Main	11.676	20-yr	34000.00	730.20	762.31		763.59	0.001197	10.00	6187.84	659.69	0.40
Main	11.676	50-yr	44500.00	730.20	766.22		767.40	0.001010	9.97	8846.73	857.55	0.37
Main	11.676	100-yr	53690.00	730.20	768.92		770.07	0.000923	10.14	11025.41	1011.91	0.36
Main	11.676	200-yr	62000.00	730.20	770.84		772.05	0.000897	10.52	12718.16	1129.17	0.36
Main	11.676	500-yr	74720.00	730.20	773.27		774.53	0.000870	11.00	15598.72	1522.14	0.36
Main	11.676	Design Discharge	38000.00	730.20	763.68		764.96	0.001160	10.15	7044.11	746.75	0.40
Main	11.788	2-yr	13200.00	730.62	755.43		755.95	0.000561	5.83	2454.85	290.86	0.27
Main	11.788	5-yr	20300.00	730.62	758.69		759.45	0.000666	7.13	3464.06	316.26	0.30
Main	11.788	10-yr	26320.00	730.62	760.73		761.70	0.000763	8.12	4116.66	322.50	0.32
Main	11.788	20-yr	34000.00	730.62	763.13		764.33	0.000849	9.14	4899.48	329.80	0.34
Main	11.788	50-yr	44500.00	730.62	766.75		768.13	0.000846	9.95	6114.97	356.72	0.35
Main	11.788	100-yr	53690.00	730.62	769.25		770.87	0.000880	10.80	7258.08	674.45	0.36

Main	11.788	200-yr	62000.00	730.62	771.10		772.86	0.000900	11.41	8802.46	1064.05	0.37
Main	11.788	500-yr	74720.00	730.62	773.54		775.31	0.000872	11.84	12116.89	1631.87	0.37
Main	11.788	Design Discharge	38000.00	730.62	764.40		765.69	0.000870	9.54	5319.89	333.56	0.35
Main	11.871	2-yr	13200.00	730.90	755.59	747.64	756.41	0.001110	7.43	2332.60	322.90	0.36
Main	11.871	5-yr	20300.00	730.90	758.91	750.84	759.96	0.001182	8.62	3439.37	345.01	0.38
Main	11.871	10-yr	26320.00	730.90	761.00	753.41	762.26	0.001287	9.58	4178.00	361.54	0.41
Main	11.871	20-yr	34000.00	730.90	763.45	755.97	764.93	0.001362	10.51	5089.08	381.20	0.42
Main	11.871	50-yr	44500.00	730.90	767.11	758.24	768.70	0.001286	11.08	6534.52	410.28	0.42
Main	11.871	100-yr	53690.00	730.90	769.69	759.92	771.41	0.001284	11.65	7701.48	486.79	0.43
Main	11.871	200-yr	62000.00	730.90	771.56	761.33	773.42	0.001297	12.20	8813.66	849.16	0.43
Main	11.871	500-yr	74720.00	730.90	773.87	763.38	775.90	0.001303	12.98	11189.34	1861.71	0.44
Main	11.871	Design Discharge	38000.00	730.90	764.74	756.89	766.30	0.001365	10.84	5586.67	390.97	0.43
Main	11.925	2-yr	13200.00	731.08	756.19	747.17	756.74	0.000772	6.23	3305.20	482.91	0.30
Main	11.925	5-yr	20300.00	731.08	759.65	750.43	760.30	0.000753	7.01	5052.16	537.21	0.31
Main	11.925	10-yr	26320.00	731.08	761.89	753.29	762.63	0.000774	7.65	6292.44	572.24	0.32
Main	11.925	20-yr	34000.00	731.08	764.50	755.57	765.32	0.000772	8.23	7823.23	595.25	0.32
Main	11.925	50-yr	44500.00	731.08	768.21	757.46	769.07	0.000693	8.60	10099.69	657.51	0.31
Main	11.925	100-yr	53690.00	731.08	770.86	758.76	771.78	0.000664	9.05	11954.24	768.42	0.31
Main	11.925	200-yr	62000.00	731.08	772.80	760.06	773.79	0.000664	9.49	13701.65	1029.01	0.32
Main	11.925	500-yr	74720.00	731.08	775.20	761.73	776.29	0.000676	10.13	16460.39	1634.12	0.32
Main	11.925	Design Discharge	38000.00	731.08	765.84	756.34	766.69	0.000756	8.44	8626.40	601.92	0.32
Main	11.965	2-yr	13200.00	731.20	756.21	747.27	756.99	0.000979	7.25	2596.65	468.14	0.34
Main	11.965	5-yr	20300.00	731.20	759.65	750.76	760.55	0.000978	8.16	4321.15	519.91	0.35
Main	11.965	10-yr	26320.00	731.20	761.88	753.59	762.89	0.001006	8.84	5503.75	538.90	0.36
Main	11.965	20-yr	34000.00	731.20	764.48	756.66	765.59	0.001015	9.48	6938.78	567.01	0.37
Main	11.965	50-yr	44500.00	731.20	768.20	758.97	769.31	0.000942	9.80	9126.28	611.54	0.36
Main	11.965	100-yr	53690.00	731.20	770.86	760.53	772.01	0.000929	10.16	10799.08	644.87	0.36
Main	11.965	200-yr	62000.00	731.20	772.79	761.75	774.03	0.000939	10.62	12102.88	832.63	0.37
Main	11.965	500-yr	74720.00	731.20	775.15	763.18	776.55	0.000968	11.43	14423.90	1579.86	0.38
Main	11.965	Design Discharge	38000.00	731.20	765.82	757.72	766.95	0.001006	9.70	7708.94	582.40	0.37
Main	12.010	2-yr	13200.00	731.34	756.50	746.65	757.22	0.000794	7.08	2817.79	532.64	0.33
Main	12.010	5-yr	20300.00	731.34	759.99	750.40	760.79	0.000803	7.83	4734.46	562.68	0.33
Main	12.010	10-yr	26320.00	731.34	762.26	753.98	763.14	0.000831	8.44	6029.97	577.05	0.33
Main	12.010	20-yr	34000.00	731.34	764.89	756.92	765.84	0.000843	9.05	7569.85	595.54	0.34
Main	12.010	50-yr	44500.00	731.34	768.53	758.94	769.54	0.000813	9.61	9906.43	763.94	0.33
Main	12.010	100-yr	53690.00	731.34	771.12	760.42	772.24	0.000839	10.27	12148.37	1042.90	0.34
Main	12.010	200-yr	62000.00	731.34	773.16	761.63	774.26	0.000808	10.47	14245.95	1225.08	0.33
Main	12.010	500-yr	74720.00	731.34	775.67	763.22	776.80	0.000807	10.93	17062.02	1352.35	0.33
Main	12.010	Design Discharge	38000.00	731.34	766.21	757.76	767.20	0.000845	9.33	8371.21	619.01	0.34
Main	12.054	2-yr	13200.00	731.48	756.66	746.43	757.40	0.000746	7.03	2643.16	542.23	0.31
Main	12.054	5-yr	20300.00	731.48	760.10	749.94	761.00	0.000785	8.10	4620.24	623.63	0.33
Main	12.054	10-yr	26320.00	731.48	762.37	752.25	763.36	0.000809	8.80	6053.88	641.16	0.34
Main	12.054	20-yr	34000.00	731.48	764.99	756.52	766.06	0.000812	9.46	7753.85	658.23	0.34
Main	12.054	50-yr	44500.00	731.48	768.64	759.16	769.75	0.000752	9.93	10212.92	691.46	0.33
Main	12.054	100-yr	53690.00	731.48	771.23	760.99	772.44	0.000760	10.56	12107.89	759.05	0.34
Main	12.054	200-yr	62000.00	731.48	773.16	762.26	774.51	0.000800	11.26	13870.55	1148.02	0.35
Main	12.054	500-yr	74720.00	731.48	775.63	763.94	777.07	0.000819	11.94	16850.73	1443.41	0.36
Main	12.054	Design Discharge	38000.00	731.48	766.31	757.74	767.42	0.000802	9.71	8635.98	668.79	0.34
Main	12.096	2-yr	13200.00	731.61	757.09	745.68	757.58	0.000578	5.66	3085.08	542.91	0.27
Main	12.096	5-yr	20300.00	731.61	760.59	749.10	761.18	0.000557	6.46	5101.93	601.79	0.27
Main	12.096	10-yr	26320.00	731.61	762.87	751.63	763.54	0.000566	7.07	6483.40	612.10	0.28
Main	12.096	20-yr	34000.00	731.61	765.47	754.09	766.24	0.000569	7.70	8095.45	625.73	0.29
Main	12.096	50-yr	44500.00	731.61	769.06	757.54	769.90	0.000539	8.28	10394.46	666.27	0.29
Main	12.096	100-yr	53690.00	731.61	771.65	759.17	772.60	0.000547	8.89	12201.30	732.59	0.29
Main	12.096	200-yr	62000.00	731.61	773.61	760.49	774.68	0.000566	9.46	13781.41	1242.47	0.30
Main	12.096	500-yr	74720.00	731.61	776.10	762.16	777.24	0.000574	10.04	17484.32	1730.48	0.31
Main	12.096	Design Discharge	38000.00	731.61	766.79	756.09	767.59	0.000564	7.97	8923.07	635.39	0.29
Main	12.189	2-yr	13200.00	731.89	757.24	747.79	757.97	0.000774	6.94	2233.56	294.49	0.31
Main	12.189	5-yr	20300.00	731.89	760.60	750.90	761.65	0.000885	8.45	3323.16	342.47	0.34
Main	12.189	10-yr	26320.00	731.89	762.76	753.00	764.08	0.000986	9.58	4102.57	377.97	0.37
Main	12.189	20-yr	34000.00	731.89	765.24	755.45	766.84	0.001065	10.72	5064.99	396.70	0.39
Main	12.189	50-yr	44500.00	731.89	768.70	758.80	770.54	0.001067	11.75	6477.59	422.26	0.40
Main	12.189	100-yr	53690.00	731.89	771.20	760.90	773.28	0.001099	12.65	7571.37	472.78	0.41
Main	12.189	200-yr	62000.00	731.89	773.05	762.67	775.43	0.001172	13.60	8778.81	994.09	0.43
Main	12.189	500-yr	74720.00	731.89	775.46	764.89	778.03	0.001201	14.46	12159.65	1914.99	0.44
Main	12.189	Design Discharge	38000.00	731.89	766.50	756.95	768.22	0.001085	11.20	5568.45	405.14	0.40
Main	12.254	2-yr	13200.00	732.08	757.67	746.00	758.20	0.000520	6.07	3166.78	422.54	0.26
Main	12.254	5-yr	20300.00	732.08	761.19	749.28	761.91	0.000579	7.24	4798.82	484.78	0.28

Main	12.254	10-yr	26320.00	732.08	763.51	751.55	764.38	0.000630	8.10	5940.51	499.61	0.30
Main	12.254	20-yr	34000.00	732.08	766.15	755.00	767.17	0.000673	9.00	7278.79	516.28	0.31
Main	12.254	50-yr	44500.00	732.08	769.71	757.91	770.88	0.000682	9.86	9162.41	546.09	0.32
Main	12.254	100-yr	53690.00	732.08	772.27	759.88	773.63	0.000723	10.74	10704.76	677.00	0.33
Main	12.254	200-yr	62000.00	732.08	774.35	761.30	775.81	0.000736	11.30	12951.49	1632.52	0.34
Main	12.254	500-yr	74720.00	732.08	776.85	763.29	778.41	0.000756	12.01	17200.92	1884.33	0.35
Main	12.254	Design Discharge	38000.00	732.08	767.46	756.23	768.55	0.000686	9.38	7963.73	525.28	0.32
Main	12.356	2-yr	13200.00	732.39	758.20	743.89	758.46	0.000370	4.07	3240.72	366.85	0.24
Main	12.356	5-yr	20300.00	732.39	761.92	747.07	762.21	0.000419	4.27	4749.52	451.49	0.23
Main	12.356	10-yr	26320.00	732.39	764.39	749.65	764.70	0.000456	4.46	5903.54	482.16	0.22
Main	12.356	20-yr	34000.00	732.39	767.18	755.35	767.52	0.000487	4.67	7286.98	509.13	0.22
Main	12.356	50-yr	44500.00	732.39	770.88	756.89	771.24	0.000494	4.82	9237.45	1142.02	0.21
Main	12.356	100-yr	53690.00	732.39	773.71	758.08	774.01	0.000416	4.53	14001.83	1937.62	0.18
Main	12.356	200-yr	62000.00	732.39	775.93	759.10	776.17	0.000357	4.30	19015.06	2441.47	0.16
Main	12.356	500-yr	74720.00	732.39	778.55	760.55	778.76	0.000304	4.10	25359.94	2561.50	0.15
Main	12.356	Design Discharge	38000.00	732.39	768.56	755.96	768.91	0.000496	4.75	7999.80	522.48	0.21
Main	12.453	2-yr	13200.00	732.48	758.32	745.89	758.75	0.000594	5.23	2524.60	221.58	0.27
Main	12.453	5-yr	20300.00	732.48	762.01	749.31	762.56	0.000706	5.97	3398.08	250.25	0.29
Main	12.453	10-yr	26320.00	732.48	764.44	751.89	765.11	0.000781	6.54	4026.99	266.32	0.30
Main	12.453	20-yr	34000.00	732.48	767.19	755.38	767.98	0.000848	7.11	4784.32	284.47	0.31
Main	12.453	50-yr	44500.00	732.48	770.84	757.59	771.73	0.000847	7.56	6182.80	758.31	0.30
Main	12.453	100-yr	53690.00	732.48	773.64	759.31	774.38	0.000677	7.24	11690.45	2124.66	0.27
Main	12.453	200-yr	62000.00	732.48	775.88	760.64	776.46	0.000531	6.75	16877.29	2466.54	0.24
Main	12.453	500-yr	74720.00	732.48	778.52	762.55	778.97	0.000417	6.32	23568.91	2616.77	0.21
Main	12.453	Design Discharge	38000.00	732.48	768.55	756.27	769.39	0.000869	7.34	5177.61	296.28	0.31
Main	12.536	2-yr	13200.00	732.56	758.68	746.72	759.01	0.000534	4.60	2870.14	322.76	0.27
Main	12.536	5-yr	20300.00	732.56	762.49	750.50	762.86	0.000566	4.89	4149.66	346.58	0.25
Main	12.536	10-yr	26320.00	732.56	765.01	754.88	765.43	0.000605	5.22	5040.24	359.74	0.25
Main	12.536	20-yr	34000.00	732.56	767.84	756.50	768.33	0.000641	5.59	6081.75	374.55	0.24
Main	12.536	50-yr	44500.00	732.56	771.57	758.15	772.09	0.000670	5.82	7647.96	1365.87	0.25
Main	12.536	100-yr	53690.00	732.56	774.21	759.35	774.67	0.000596	5.60	12242.45	2128.09	0.23
Main	12.536	200-yr	62000.00	732.56	776.28	760.37	776.67	0.000517	5.33	17003.55	2448.41	0.21
Main	12.536	500-yr	74720.00	732.56	778.80	761.78	779.12	0.000443	5.08	23342.10	2612.83	0.19
Main	12.536	Design Discharge	38000.00	732.56	769.25	757.21	769.76	0.000664	5.73	6628.16	408.57	0.25
Main	12.616	2-yr	13200.00	732.63	759.23		759.49	0.003842	4.12	3205.05	441.28	0.27
Main	12.616	5-yr	20300.00	732.63	763.06		763.31	0.002559	4.05	5016.14	502.79	0.23
Main	12.616	10-yr	26320.00	732.63	765.61		765.88	0.002146	4.15	6341.80	528.67	0.21
Main	12.616	20-yr	34000.00	732.63	768.49		768.78	0.001843	4.31	7890.37	548.71	0.20
Main	12.616	50-yr	44500.00	732.63	772.22		772.52	0.001555	4.45	10159.69	1409.70	0.19
Main	12.616	100-yr	53690.00	732.63	774.74		775.02	0.001284	4.34	14017.37	1709.88	0.17
Main	12.616	200-yr	62000.00	732.63	776.71		776.94	0.001054	4.15	17711.62	2043.85	0.16
Main	12.616	500-yr	74720.00	732.63	779.12		779.32	0.000831	3.93	23129.64	2397.23	0.14
Main	12.616	Design Discharge	38000.00	732.63	769.91		770.20	0.001731	4.38	8674.82	558.58	0.20
Main	12.690	2-yr	13200.00	732.70	759.51		759.76	0.000270	3.97	3326.33	377.19	0.24
Main	12.690	5-yr	20300.00	732.70	763.33		763.59	0.000326	4.12	4922.59	452.16	0.22
Main	12.690	10-yr	26320.00	732.70	765.89		766.17	0.000365	4.30	6120.34	479.28	0.21
Main	12.690	20-yr	34000.00	732.70	768.76		769.08	0.000402	4.51	7539.94	505.86	0.21
Main	12.690	50-yr	44500.00	732.70	772.48		772.82	0.000424	4.70	9460.15	1403.77	0.20
Main	12.690	100-yr	53690.00	732.70	774.95		775.30	0.000432	4.80	12852.37	1775.49	0.19
Main	12.690	200-yr	62000.00	732.70	776.86		777.18	0.000403	4.70	16480.40	1940.71	0.18
Main	12.690	500-yr	74720.00	732.70	779.23		779.51	0.000367	4.57	21158.08	2043.04	0.17
Main	12.690	Design Discharge	38000.00	732.70	770.18		770.51	0.000414	4.60	8261.37	527.90	0.20
Main	12.700		Bridge									
Main	12.708	2-yr	13200.00	732.70	759.52	746.19	759.81	0.000310	4.28	3082.12	368.83	0.26
Main	12.708	5-yr	20300.00	732.70	763.35	749.63	763.65	0.000320	4.35	4664.78	436.67	0.23
Main	12.708	10-yr	26320.00	732.70	765.92	752.03	766.24	0.000334	4.53	5813.66	458.72	0.22
Main	12.708	20-yr	34000.00	732.70	768.80	756.50	769.15	0.000348	4.74	7166.72	493.12	0.22
Main	12.708	50-yr	44500.00	732.70	772.52	758.54	772.90	0.000350	4.94	9007.24	1368.19	0.21
Main	12.708	100-yr	53690.00	732.70	774.99	759.98	775.37	0.000345	5.05	12664.03	1958.32	0.20
Main	12.708	200-yr	62000.00	732.70	776.90	761.00	777.24	0.000318	4.95	16468.14	2018.66	0.19
Main	12.708	500-yr	74720.00	732.70	779.27	762.29	779.57	0.000288	4.85	21462.59	2169.74	0.18
Main	12.708	Design Discharge	38000.00	732.70	770.22	757.39	770.58	0.000352	4.84	7855.32	542.13	0.21
Main	12.743	2-yr	13200.00	732.74	759.58		759.87	0.000306	4.32	3053.04	833.12	0.27
Main	12.743	5-yr	20300.00	732.74	763.41		763.71	0.000339	4.37	4646.81	899.58	0.24
Main	12.743	10-yr	26320.00	732.74	765.98		766.31	0.000367	4.54	5793.65	940.92	0.23
Main	12.743	20-yr	34000.00	732.74	768.87		769.22	0.000393	4.75	7156.35	1009.40	0.22
Main	12.743	50-yr	44500.00	732.74	772.60		772.97	0.000408	4.91	9057.24	1545.37	0.21
Main	12.743	100-yr	53690.00	732.74	775.06		775.45	0.000419	5.03	12713.59	2285.48	0.21

Main	12.743	200-yr	62000.00	732.74	776.94		777.32	0.000410	5.06	16306.69	2706.69	0.20
Main	12.743	500-yr	74720.00	732.74	779.29		779.66	0.000405	5.15	21077.29	2819.03	0.19
Main	12.743	Design Discharge	38000.00	732.74	770.29		770.65	0.000402	4.84	7855.95	1220.26	0.22
Main	12.836	2-yr	13200.00	733.01	759.65		760.08	0.000399	5.27	2906.33	786.65	0.23
Main	12.836	5-yr	20300.00	733.01	763.40		763.99	0.000440	6.35	4418.84	880.11	0.25
Main	12.836	10-yr	26320.00	733.01	765.90		766.63	0.000474	7.12	5500.77	933.95	0.26
Main	12.836	20-yr	34000.00	733.01	768.72		769.59	0.000505	7.94	6876.10	1044.10	0.28
Main	12.836	50-yr	44500.00	733.01	772.37		773.39	0.000511	8.74	8853.05	1301.55	0.29
Main	12.836	100-yr	53690.00	733.01	774.77		775.89	0.000526	9.35	11586.70	1737.32	0.29
Main	12.836	200-yr	62000.00	733.01	776.61		777.78	0.000529	9.74	14199.43	2298.76	0.30
Main	12.836	500-yr	74720.00	733.01	778.92		780.13	0.000534	10.23	17649.67	2321.47	0.30
Main	12.836	Design Discharge	38000.00	733.01	770.10		771.05	0.000512	8.29	7609.76	1090.78	0.28
Main	12.988	2-yr	13200.00	733.44	759.96	750.63	760.53	0.000671	6.10	2490.85	322.38	0.29
Main	12.988	5-yr	20300.00	733.44	763.71	753.47	764.46	0.000666	7.12	3771.82	455.83	0.30
Main	12.988	10-yr	26320.00	733.44	766.23	755.39	767.13	0.000685	7.89	4648.96	514.35	0.31
Main	12.988	20-yr	34000.00	733.44	769.05	757.63	770.11	0.000697	8.69	5990.57	786.79	0.32
Main	12.988	50-yr	44500.00	733.44	772.76	760.34	773.84	0.000626	9.10	8204.42	1249.02	0.31
Main	12.988	100-yr	53690.00	733.44	775.22	762.30	776.32	0.000604	9.47	10308.00	1811.82	0.31
Main	12.988	200-yr	62000.00	733.44	777.13	763.73	778.20	0.000571	9.61	12634.18	2096.44	0.30
Main	12.988	500-yr	74720.00	733.44	779.47	765.71	780.54	0.000555	9.94	15782.69	2157.75	0.30
Main	12.988	Design Discharge	38000.00	733.44	770.46	758.86	771.55	0.000678	8.91	6818.34	1010.09	0.32
Main	13.072	2-yr	13200.00	733.68	760.39	748.26	760.79	0.000451	5.07	2747.37	334.12	0.24
Main	13.072	5-yr	20300.00	733.68	764.18	752.24	764.73	0.000477	6.02	4103.46	404.51	0.25
Main	13.072	10-yr	26320.00	733.68	766.73	754.23	767.40	0.000497	6.72	5086.91	463.91	0.26
Main	13.072	20-yr	34000.00	733.68	769.57	756.06	770.39	0.000518	7.48	6243.89	714.51	0.27
Main	13.072	50-yr	44500.00	733.68	773.11	758.31	774.10	0.000529	8.31	7703.63	857.84	0.28
Main	13.072	100-yr	53690.00	733.68	775.42	760.22	776.60	0.000570	9.12	8684.37	1069.49	0.30
Main	13.072	200-yr	62000.00	733.68	777.21	761.96	778.54	0.000603	9.75	10328.14	1911.28	0.31
Main	13.072	500-yr	74720.00	733.68	779.52	764.07	780.90	0.000606	10.26	13543.90	2113.86	0.31
Main	13.072	Design Discharge	38000.00	733.68	770.93	756.97	771.82	0.000526	7.83	6803.34	755.11	0.28
Main	13.174	2-yr	13200.00	733.98	760.54	750.11	761.14	0.000654	6.25	2647.76	459.15	0.28
Main	13.174	5-yr	20300.00	733.98	764.35	753.60	765.06	0.000627	7.11	4624.54	608.97	0.29
Main	13.174	10-yr	26320.00	733.98	766.94	755.78	767.73	0.000614	7.67	6104.92	863.68	0.29
Main	13.174	20-yr	34000.00	733.98	769.84	758.03	770.69	0.000595	8.22	7859.27	1287.89	0.29
Main	13.174	50-yr	44500.00	733.98	773.47	761.58	774.39	0.000561	8.76	10070.43	1599.03	0.29
Main	13.174	100-yr	53690.00	733.98	775.90	763.54	776.91	0.000575	9.37	11543.86	1893.13	0.30
Main	13.174	200-yr	62000.00	733.98	777.75	765.03	778.87	0.000599	9.95	12667.90	1956.05	0.31
Main	13.174	500-yr	74720.00	733.98	779.90	766.89	781.23	0.000665	10.95	13979.01	2003.23	0.33
Main	13.174	Design Discharge	38000.00	733.98	771.23	759.59	772.11	0.000586	8.46	8704.88	1450.35	0.29
Main	13.307	2-yr	13200.00	734.36	761.08	746.38	761.48	0.000352	5.12	2784.13	210.09	0.21
Main	13.307	5-yr	20300.00	734.36	764.82	749.89	765.44	0.000427	6.40	3746.52	289.23	0.24
Main	13.307	10-yr	26320.00	734.36	767.32	752.06	768.12	0.000482	7.32	4504.28	329.42	0.26
Main	13.307	20-yr	34000.00	734.36	770.12	754.65	771.16	0.000546	8.39	5584.94	525.23	0.29
Main	13.307	50-yr	44500.00	734.36	773.68	757.72	774.88	0.000562	9.25	7394.59	716.52	0.30
Main	13.307	100-yr	53690.00	734.36	776.08	759.97	777.44	0.000591	9.98	8791.36	1252.61	0.31
Main	13.307	200-yr	62000.00	734.36	777.93	761.26	779.42	0.000622	10.62	9871.03	1559.72	0.32
Main	13.307	500-yr	74720.00	734.36	780.09	764.56	781.86	0.000694	11.68	11139.15	1691.31	0.34
Main	13.307	Design Discharge	38000.00	734.36	771.48	755.87	772.59	0.000558	8.77	6244.27	565.70	0.29
Main	13.471	2-yr	13200.00	734.83	761.33	749.57	761.93	0.000594	6.29	2485.70	233.94	0.26
Main	13.471	5-yr	20300.00	734.83	765.09	752.69	765.98	0.000709	7.78	3422.05	263.31	0.29
Main	13.471	10-yr	26320.00	734.83	767.61	754.90	768.74	0.000798	8.86	4106.94	282.33	0.31
Main	13.471	20-yr	34000.00	734.83	770.44	757.28	771.85	0.000881	10.01	4923.95	295.60	0.34
Main	13.471	50-yr	44500.00	734.83	773.87	760.74	775.68	0.000988	11.46	6012.89	351.11	0.36
Main	13.471	100-yr	53690.00	734.83	776.17	762.98	778.34	0.001091	12.63	6846.99	1036.27	0.39
Main	13.471	200-yr	62000.00	734.83	777.92	764.89	780.43	0.001194	13.67	7529.25	1104.81	0.41
Main	13.471	500-yr	74720.00	734.83	779.99	767.40	783.03	0.001371	15.22	8387.58	1729.72	0.44
Main	13.471	Design Discharge	38000.00	734.83	771.77	758.65	773.32	0.000919	10.55	5327.98	310.94	0.35
Main	13.558	2-yr	13200.00	735.08	761.57	748.75	762.22	0.000597	6.56	2414.09	201.65	0.26
Main	13.558	5-yr	20300.00	735.08	765.36	752.43	766.34	0.000742	8.21	3228.58	228.44	0.30
Main	13.558	10-yr	26320.00	735.08	767.89	754.79	769.15	0.000852	9.41	3829.03	244.94	0.32
Main	13.558	20-yr	34000.00	735.08	770.73	757.53	772.32	0.000960	10.69	4545.21	259.18	0.35
Main	13.558	50-yr	44500.00	735.08	774.21	761.07	776.19	0.001066	12.14	5475.78	276.59	0.37
Main	13.558	100-yr	53690.00	735.08	776.51	763.44	778.93	0.001199	13.48	6133.08	991.42	0.40
Main	13.558	200-yr	62000.00	735.08	778.25	765.42	781.10	0.001338	14.70	6689.34	1179.56	0.43
Main	13.558	500-yr	74720.00	735.08	780.31	768.28	783.82	0.001559	16.46	7373.89	1518.77	0.47
Main	13.558	Design Discharge	38000.00	735.08	772.07	758.90	773.82	0.001010	11.30	4895.06	265.87	0.36
Main	13.564		Bridge									

Main	13.570	2-yr	13200.00	735.08	761.62	748.75	762.26	0.000591	6.54	2424.46	201.99	0.26
Main	13.570	5-yr	20300.00	735.08	765.43	752.43	766.40	0.000734	8.18	3244.83	228.94	0.29
Main	13.570	10-yr	26320.00	735.08	767.97	754.79	769.21	0.000843	9.38	3847.34	245.31	0.32
Main	13.570	20-yr	34000.00	735.08	770.82	757.53	772.40	0.000948	10.65	4568.90	259.64	0.35
Main	13.570	50-yr	44500.00	735.08	774.38	761.07	776.34	0.001044	12.06	5523.31	949.37	0.37
Main	13.570	100-yr	53690.00	735.08	776.70	763.44	779.10	0.001180	13.42	6191.68	1007.60	0.40
Main	13.570	200-yr	62000.00	735.08	778.50	765.42	781.29	0.001302	14.57	6772.94	1398.27	0.42
Main	13.570	500-yr	74720.00	735.08	780.68	768.28	784.09	0.001501	16.25	7497.78	1560.76	0.46
Main	13.570	Design Discharge	38000.00	735.08	772.17	758.90	773.90	0.000996	11.25	4922.66	266.39	0.36
Main	13.616	2-yr	13200.00	735.20	761.89	748.83	762.42	0.000581	6.06	3068.24	352.31	0.25
Main	13.616	5-yr	20300.00	735.20	765.91	753.20	766.60	0.000613	7.11	4531.24	374.11	0.27
Main	13.616	10-yr	26320.00	735.20	768.63	755.65	769.44	0.000645	7.87	5566.93	387.33	0.28
Main	13.616	20-yr	34000.00	735.20	771.71	759.06	772.65	0.000671	8.67	6777.18	398.58	0.29
Main	13.616	50-yr	44500.00	735.20	775.51	761.89	776.63	0.000697	9.62	8320.85	808.12	0.30
Main	13.616	100-yr	53690.00	735.20	778.05	763.76	779.44	0.000781	10.72	9556.64	1077.24	0.32
Main	13.616	200-yr	62000.00	735.20	780.09	765.25	781.67	0.000837	11.53	10726.54	1311.21	0.34
Main	13.616	500-yr	74720.00	735.20	782.76	767.31	784.53	0.000887	12.44	12334.99	1894.27	0.35
Main	13.616	Design Discharge	38000.00	735.20	773.17	760.32	774.18	0.000684	9.05	7361.01	403.71	0.29
Main	13.702	2-yr	13200.00	735.38	762.18	749.57	762.71	0.000725	6.00	2892.84	364.96	0.27
Main	13.702	5-yr	20300.00	735.38	766.27	753.91	766.89	0.000707	6.71	4440.71	391.35	0.28
Main	13.702	10-yr	26320.00	735.38	769.05	756.86	769.75	0.000711	7.23	5553.80	409.73	0.28
Main	13.702	20-yr	34000.00	735.38	772.20	760.19	772.97	0.000707	7.75	6867.86	425.49	0.29
Main	13.702	50-yr	44500.00	735.38	776.10	762.68	776.95	0.000691	8.30	8566.62	1046.14	0.29
Main	13.702	100-yr	53690.00	735.38	778.83	764.44	779.80	0.000705	8.87	9817.05	1409.43	0.30
Main	13.702	200-yr	62000.00	735.38	780.97	765.78	782.05	0.000722	9.43	11048.39	1997.70	0.30
Main	13.702	500-yr	74720.00	735.38	783.73	767.68	784.93	0.000736	10.10	12966.72	2312.44	0.31
Main	13.702	Design Discharge	38000.00	735.38	773.69	761.26	774.50	0.000706	8.00	7507.61	432.93	0.29
Main	13.803	2-yr	13200.00	735.59	762.47	749.81	763.06	0.000564	6.23	2575.81	224.21	0.25
Main	13.803	5-yr	20300.00	735.59	766.46	753.35	767.31	0.000663	7.67	3499.69	239.72	0.28
Main	13.803	10-yr	26320.00	735.59	769.15	755.75	770.23	0.000740	8.72	4158.29	249.99	0.30
Main	13.803	20-yr	34000.00	735.59	772.17	758.31	773.52	0.000816	9.86	4928.35	259.63	0.32
Main	13.803	50-yr	44500.00	735.59	775.90	761.54	777.59	0.000888	11.15	5918.24	629.43	0.34
Main	13.803	100-yr	53690.00	735.59	778.49	763.82	780.52	0.000971	12.28	6632.74	1051.12	0.37
Main	13.803	200-yr	62000.00	735.59	780.36	765.62	782.94	0.001135	13.74	7298.98	1657.98	0.40
Main	13.803	500-yr	74720.00	735.59	782.93	768.11	785.93	0.001241	15.03	8319.56	2599.40	0.42
Main	13.803	Design Discharge	38000.00	735.59	773.59	759.71	775.09	0.000852	10.40	5301.55	264.05	0.33
Main	13.954	2-yr	13200.00	735.91	763.12	750.69	763.51	0.000564	5.18	3457.73	406.31	0.22
Main	13.954	5-yr	20300.00	735.91	767.31	754.06	767.81	0.000560	6.01	6011.16	971.19	0.23
Main	13.954	10-yr	26320.00	735.91	770.24	756.44	770.73	0.000501	6.21	8664.80	1058.62	0.23
Main	13.954	20-yr	34000.00	735.91	773.55	758.99	774.03	0.000447	6.40	11679.00	1134.83	0.22
Main	13.954	50-yr	44500.00	735.91	777.64	761.74	778.10	0.000396	6.62	15422.13	1179.01	0.21
Main	13.954	100-yr	53690.00	735.91	780.57	763.54	781.06	0.000381	6.90	18134.76	1749.03	0.21
Main	13.954	200-yr	62000.00	735.91	783.05	764.74	783.55	0.000370	7.12	20422.78	2573.65	0.21
Main	13.954	500-yr	74720.00	735.91	786.04	766.72	786.59	0.000379	7.60	23186.26	2819.58	0.21
Main	13.954	Design Discharge	38000.00	735.91	775.12	759.91	775.60	0.000428	6.50	13115.56	1146.73	0.21
Main	14.149	2-yr	13200.00	736.31	763.69	752.06	764.19	0.000803	5.91	3699.84	731.72	0.26
Main	14.149	5-yr	20300.00	736.31	767.87	755.88	768.37	0.000696	6.29	7466.01	1311.68	0.25
Main	14.149	10-yr	26320.00	736.31	770.75	758.30	771.15	0.000542	6.09	11123.04	1460.48	0.23
Main	14.149	20-yr	34000.00	736.31	774.02	762.56	774.36	0.000434	5.97	15284.83	1522.49	0.21
Main	14.149	50-yr	44500.00	736.31	778.06	764.95	778.36	0.000350	5.92	20463.19	1577.91	0.19
Main	14.149	100-yr	53690.00	736.31	781.00	766.36	781.29	0.000321	6.03	24236.61	2352.44	0.19
Main	14.149	200-yr	62000.00	736.31	783.47	767.08	783.77	0.000303	6.15	27480.10	2737.10	0.18
Main	14.149	500-yr	74720.00	736.31	786.50	769.82	786.80	0.000297	6.44	31792.49	2893.75	0.18
Main	14.149	Design Discharge	38000.00	736.31	775.57	763.59	775.90	0.000399	5.95	17273.88	1544.70	0.20
Main	14.403	2-yr	13200.00	736.84	764.66	753.28	765.04	0.000581	5.23	3953.74	1100.06	0.23
Main	14.403	5-yr	20300.00	736.84	768.64	756.07	769.08	0.000578	5.86	6407.47	1512.34	0.23
Main	14.403	10-yr	26320.00	736.84	771.27	758.12	771.72	0.000555	6.19	9097.14	1775.09	0.23
Main	14.403	20-yr	34000.00	736.84	774.37	761.47	774.80	0.000483	6.30	12713.73	2031.91	0.22
Main	14.403	50-yr	44500.00	736.84	778.31	763.61	778.69	0.000396	6.28	18272.29	2141.68	0.20
Main	14.403	100-yr	53690.00	736.84	781.22	765.69	781.56	0.000353	6.31	23619.58	3565.08	0.20
Main	14.403	200-yr	62000.00	736.84	783.68	766.96	784.00	0.000317	6.28	28450.58	3992.73	0.19
Main	14.403	500-yr	74720.00	736.84	786.70	768.77	787.00	0.000291	6.36	35341.73	4342.35	0.18
Main	14.403	Design Discharge	38000.00	736.84	775.88	762.41	776.29	0.000450	6.32	14565.71	2076.91	0.21
Main	14.656	2-yr	13200.00	737.37	765.41	752.74	765.82	0.000669	5.24	3367.17	979.36	0.24
Main	14.656	5-yr	20300.00	737.37	769.32	756.30	769.81	0.000674	5.96	5336.31	1181.63	0.25
Main	14.656	10-yr	26320.00	737.37	771.86	758.58	772.41	0.000677	6.43	6939.19	1404.79	0.25
Main	14.656	20-yr	34000.00	737.37	774.83	761.48	775.39	0.000644	6.76	8911.99	1666.79	0.25
Main	14.656	50-yr	44500.00	737.37	778.61	764.62	779.18	0.000585	7.01	12293.28	1824.91	0.24
Main	14.656	100-yr	53690.00	737.37	781.44	766.39	782.00	0.000543	7.15	16023.88	2709.29	0.24

Main	14.656	200-yr	62000.00	737.37	783.84	767.67	784.38	0.000498	7.23	19716.13	3044.69		0.23
Main	14.656	500-yr	74720.00	737.37	786.81	769.87	787.35	0.000464	7.42	25364.70	3372.03		0.23
Main	14.656	Design Discharge	38000.00	737.37	776.27	763.06	776.85	0.000627	6.90	9878.70	1692.18		0.25
Main	14.875	2-yr	13200.00	737.83	766.13	753.65	766.65	0.000744	6.20	3326.90	846.22		0.25
Main	14.875	5-yr	20300.00	737.83	770.03	757.17	770.68	0.000833	7.21	4940.27	1132.31		0.27
Main	14.875	10-yr	26320.00	737.83	772.57	761.20	773.30	0.000892	7.87	6116.36	1239.81		0.28
Main	14.875	20-yr	34000.00	737.83	775.47	763.84	776.27	0.000923	8.44	7526.95	1331.98		0.29
Main	14.875	50-yr	44500.00	737.83	779.13	766.35	780.00	0.000902	9.09	10601.82	1530.13		0.29
Main	14.875	100-yr	53690.00	737.83	781.89	768.07	782.73	0.000828	9.24	13884.69	2301.58		0.29
Main	14.875	200-yr	62000.00	737.83	784.24	770.16	785.04	0.000766	9.31	16994.95	2468.55		0.28
Main	14.875	500-yr	74720.00	737.83	787.16	771.63	787.95	0.000726	9.56	21819.85	2871.61		0.27
Main	14.875	Design Discharge	38000.00	737.83	776.88	764.61	777.71	0.000922	8.72	8269.10	1408.28		0.29
Main	15.009	2-yr	13200.00	738.11	766.67	752.91	767.12	0.000593	5.70	3497.81	401.45		0.23
Main	15.009	5-yr	20300.00	738.11	770.64	756.96	771.19	0.000617	6.59	5132.83	449.59		0.24
Main	15.009	10-yr	26320.00	738.11	773.20	759.64	773.85	0.000659	7.30	6223.21	491.74		0.25
Main	15.009	20-yr	34000.00	738.11	776.07	763.67	776.83	0.000697	8.06	7496.77	537.04		0.27
Main	15.009	50-yr	44500.00	738.11	779.72	766.31	780.56	0.000706	8.79	9955.74	1319.30		0.27
Main	15.009	100-yr	53690.00	738.11	782.45	768.08	783.24	0.000652	8.92	14856.65	2238.12		0.27
Main	15.009	200-yr	62000.00	738.11	784.85	769.41	785.50	0.000548	8.55	20248.48	2445.19		0.25
Main	15.009	500-yr	74720.00	738.11	787.85	771.23	788.36	0.000449	8.14	27598.18	2691.04		0.23
Main	15.009	Design Discharge	38000.00	738.11	777.47	764.87	778.28	0.000709	8.39	8125.75	561.45		0.27
Main	15.017		Bridge										
Main	15.023	2-yr	13200.00	738.11	767.16	753.58	767.56	0.000513	5.36	3635.69	388.69		0.21
Main	15.023	5-yr	20300.00	738.11	770.81	756.77	771.35	0.000587	6.43	5092.56	436.63		0.23
Main	15.023	10-yr	26320.00	738.11	773.40	759.13	774.04	0.000633	7.16	6169.81	491.45		0.25
Main	15.023	20-yr	34000.00	738.11	776.33	762.95	777.08	0.000670	7.91	7453.03	534.89		0.26
Main	15.023	50-yr	44500.00	738.11	780.06	765.96	780.89	0.000677	8.62	10096.52	1524.72		0.27
Main	15.023	100-yr	53690.00	738.11	782.78	767.74	783.55	0.000622	8.72	15261.11	2264.57		0.26
Main	15.023	200-yr	62000.00	738.11	785.04	769.13	785.70	0.000537	8.44	20426.24	2512.10		0.24
Main	15.023	500-yr	74720.00	738.11	787.99	771.02	788.50	0.000437	8.00	27793.79	2695.98		0.22
Main	15.023	Design Discharge	38000.00	738.11	777.77	764.23	778.56	0.000682	8.24	8092.52	580.20		0.26
Main	15.100	2-yr	13200.00	738.24	767.26	753.76	767.85	0.000740	6.40	3031.15	337.30		0.25
Main	15.100	5-yr	20300.00	738.24	770.84	758.23	771.72	0.000923	7.99	4080.71	577.16		0.29
Main	15.100	10-yr	26320.00	738.24	773.35	761.30	774.47	0.001045	9.10	4873.60	701.79		0.32
Main	15.100	20-yr	34000.00	738.24	776.20	763.97	777.57	0.001146	10.22	5827.08	780.14		0.34
Main	15.100	50-yr	44500.00	738.24	779.82	766.84	781.42	0.001205	11.35	7934.36	1889.75		0.35
Main	15.100	100-yr	53690.00	738.24	782.46	768.94	784.06	0.001170	11.78	11584.78	2244.39		0.35
Main	15.100	200-yr	62000.00	738.24	784.65	770.66	786.17	0.001099	11.89	15006.70	2490.78		0.34
Main	15.100	500-yr	74720.00	738.24	787.54	773.03	788.93	0.001001	11.93	19988.96	2666.10		0.33
Main	15.100	Design Discharge	38000.00	738.24	777.59	765.19	779.07	0.001185	10.73	6304.77	839.88		0.35
Main	15.357	2-yr	13200.00	738.69	768.27		768.73	0.000767	6.54	4293.98	805.93		0.25
Main	15.357	5-yr	20300.00	738.69	772.15		772.68	0.000792	7.42	6059.00	1036.58		0.26
Main	15.357	10-yr	26320.00	738.69	774.90		775.46	0.000798	7.98	7414.47	1345.52		0.26
Main	15.357	20-yr	34000.00	738.69	777.98		778.59	0.000799	8.55	9117.88	1770.67		0.27
Main	15.357	50-yr	44500.00	738.69	781.81		782.39	0.000730	8.83	14445.16	2757.84		0.26
Main	15.357	100-yr	53690.00	738.69	784.39		784.92	0.000664	8.83	18857.45	2901.20		0.25
Main	15.357	200-yr	62000.00	738.69	786.44		786.93	0.000627	8.88	22644.18	3120.66		0.25
Main	15.357	500-yr	74720.00	738.69	789.11		789.57	0.000588	8.98	27789.54	3209.93		0.24
Main	15.357	Design Discharge	38000.00	738.69	779.46		780.11	0.000814	8.91	10690.15	2479.16		0.27
Main	15.360		Bridge										
Main	15.363	2-yr	13200.00	738.69	768.40	756.54	768.86	0.000753	6.51	4232.00	817.50		0.25
Main	15.363	5-yr	20300.00	738.69	772.29	761.70	772.82	0.000787	7.43	5937.68	1048.96		0.26
Main	15.363	10-yr	26320.00	738.69	775.04	764.02	775.62	0.000799	8.01	7249.97	1363.52		0.26
Main	15.363	20-yr	34000.00	738.69	778.13	766.23	778.75	0.000804	8.61	8941.10	1862.04		0.27
Main	15.363	50-yr	44500.00	738.69	781.96	768.53	782.55	0.000732	8.86	14337.28	2764.24		0.26
Main	15.363	100-yr	53690.00	738.69	784.53	770.07	785.07	0.000670	8.89	18692.22	2932.01		0.25
Main	15.363	200-yr	62000.00	738.69	786.57	771.44	787.08	0.000632	8.94	22446.91	3129.98		0.25
Main	15.363	500-yr	74720.00	738.69	789.23	773.16	789.70	0.000590	9.02	27530.43	3211.53		0.24
Main	15.363	Design Discharge	38000.00	738.69	779.52	767.11	780.19	0.000839	9.05	10445.67	2556.96		0.28
Main	15.597	2-yr	13200.00	739.10	769.06		769.32	0.000331	4.63	6074.29	1750.99		0.18
Main	15.597	5-yr	20300.00	739.10	772.95		773.30	0.000380	5.54	8364.74	2020.30		0.19
Main	15.597	10-yr	26320.00	739.10	775.68		776.09	0.000412	6.18	10047.73	2100.45		0.21
Main	15.597	20-yr	34000.00	739.10	778.74		779.22	0.000441	6.85	11989.57	2146.15		0.22
Main	15.597	50-yr	44500.00	739.10	782.41		782.98	0.000472	7.64	14364.88	2220.31		0.23
Main	15.597	100-yr	53690.00	739.10	784.85		785.54	0.000524	8.42	16011.25	2298.93		0.24
Main	15.597	200-yr	62000.00	739.10	786.80		787.57	0.000566	9.06	17414.92	2500.40		0.26
Main	15.597	500-yr	74720.00	739.10	789.33		790.24	0.000626	9.93	19440.73	2553.83		0.27

Main	15.597	Design Discharge	38000.00	739.10	780.15		780.67	0.000456	7.18	12898.71	2172.89	0.22
Main	15.731	2-yr	13200.00	739.33	769.38		769.62	0.000794	4.33	5025.82	1349.63	0.18
Main	15.731	5-yr	20300.00	739.33	773.33		773.59	0.000772	4.86	7240.54	1852.57	0.18
Main	15.731	10-yr	26320.00	739.33	776.10		776.39	0.000766	5.23	8857.74	2024.34	0.18
Main	15.731	20-yr	34000.00	739.33	779.20		779.53	0.000757	5.63	10695.66	2163.51	0.19
Main	15.731	50-yr	44500.00	739.33	782.93		783.30	0.000753	6.10	12938.82	2234.58	0.19
Main	15.731	100-yr	53690.00	739.33	785.46		785.87	0.000789	6.57	14483.49	2393.29	0.20
Main	15.731	200-yr	62000.00	739.33	787.47		787.93	0.000826	6.98	15713.99	2744.92	0.20
Main	15.731	500-yr	74720.00	739.33	790.10		790.64	0.000896	7.62	17319.46	3068.27	0.21
Main	15.731	Design Discharge	38000.00	739.33	780.64		780.98	0.000759	5.82	11555.54	2199.99	0.19
Main	15.876	2-yr	13200.00	739.59	769.66		770.06	0.000508	5.63	4366.00	839.87	0.22
Main	15.876	5-yr	20300.00	739.59	773.51		774.09	0.000613	6.91	6088.69	1240.03	0.24
Main	15.876	10-yr	26320.00	739.59	776.23		776.89	0.000646	7.61	7572.47	1454.67	0.25
Main	15.876	20-yr	34000.00	739.59	779.28		780.04	0.000682	8.38	9371.05	1693.66	0.27
Main	15.876	50-yr	44500.00	739.59	782.97		783.80	0.000686	9.06	11840.29	2056.43	0.27
Main	15.876	100-yr	53690.00	739.59	785.48		786.39	0.000714	9.69	13621.64	2559.85	0.28
Main	15.876	200-yr	62000.00	739.59	787.48		788.45	0.000736	10.19	15094.94	3000.29	0.29
Main	15.876	500-yr	74720.00	739.59	790.11		791.18	0.000777	10.94	17078.77	3356.36	0.30
Main	15.876	Design Discharge	38000.00	739.59	780.69		781.50	0.000695	8.72	10298.53	1867.36	0.27
Main	15.879		Bridge									
Main	15.882	2-yr	13200.00	739.59	769.71	756.64	770.11	0.000504	5.62	4386.74	848.34	0.22
Main	15.882	5-yr	20300.00	739.59	773.60	760.52	774.17	0.000602	6.87	6134.39	1246.37	0.24
Main	15.882	10-yr	26320.00	739.59	776.36	762.72	777.01	0.000630	7.53	7609.56	1469.86	0.25
Main	15.882	20-yr	34000.00	739.59	779.44	765.25	780.18	0.000662	8.29	9394.72	1725.38	0.26
Main	15.882	50-yr	44500.00	739.59	783.15	767.85	783.96	0.000666	8.96	11747.27	2076.12	0.27
Main	15.882	100-yr	53690.00	739.59	785.67	769.71	786.58	0.000703	9.65	13448.04	2603.87	0.28
Main	15.882	200-yr	62000.00	739.59	787.68	771.20	788.67	0.000734	10.21	14877.10	3075.36	0.29
Main	15.882	500-yr	74720.00	739.59	790.34	774.35	791.42	0.000771	10.93	16812.01	3369.26	0.30
Main	15.882	Design Discharge	38000.00	739.59	780.88	766.27	781.65	0.000667	8.57	10292.03	1881.78	0.27
Main	16.080	2-yr	13200.00	740.02	770.15		770.58	0.000479	5.60	4431.79	692.95	0.20
Main	16.080	5-yr	20300.00	740.02	774.15		774.70	0.000581	6.64	6553.88	1056.89	0.23
Main	16.080	10-yr	26320.00	740.02	776.93		777.55	0.000642	7.29	8149.60	1145.32	0.24
Main	16.080	20-yr	34000.00	740.02	780.06		780.74	0.000687	7.88	10067.92	1640.62	0.25
Main	16.080	50-yr	44500.00	740.02	783.73		784.50	0.000704	8.62	12755.67	2057.29	0.26
Main	16.080	100-yr	53690.00	740.02	786.29		787.13	0.000728	9.20	14629.27	2328.95	0.27
Main	16.080	200-yr	62000.00	740.02	788.33		789.23	0.000754	9.71	16118.12	2509.71	0.28
Main	16.080	500-yr	74720.00	740.02	790.97		791.99	0.000808	10.51	18056.47	2832.11	0.29
Main	16.080	Design Discharge	38000.00	740.02	781.47		782.21	0.000714	8.29	11097.38	1790.40	0.26
Main	16.218	2-yr	13200.00	740.33	770.44	755.21	770.99	0.000634	6.25	3638.15	428.98	0.24
Main	16.218	5-yr	20300.00	740.33	774.46	759.37	775.17	0.000714	7.43	5477.19	481.74	0.26
Main	16.218	10-yr	26320.00	740.33	777.23	762.36	778.06	0.000760	8.21	6857.23	518.41	0.27
Main	16.218	20-yr	34000.00	740.33	780.33	767.25	781.28	0.000799	9.02	8629.30	608.88	0.28
Main	16.218	50-yr	44500.00	740.33	783.98	770.34	785.06	0.000834	9.91	10894.67	1469.09	0.29
Main	16.218	100-yr	53690.00	740.33	786.52	772.36	787.71	0.000878	10.66	12508.56	2033.05	0.31
Main	16.218	200-yr	62000.00	740.33	788.54	774.18	789.84	0.000922	11.31	13801.50	2102.05	0.32
Main	16.218	500-yr	74720.00	740.33	791.18	776.28	792.66	0.001002	12.30	15498.12	2154.42	0.33
Main	16.218	Design Discharge	38000.00	740.33	781.76	768.68	782.76	0.000817	9.39	9503.45	622.15	0.29
Main	16.407	2-yr	13200.00	740.98	770.96	755.02	771.49	0.000464	6.43	4293.06	875.85	0.22
Main	16.407	5-yr	20300.00	740.98	774.99	758.66	775.78	0.000607	8.06	5923.31	1023.91	0.25
Main	16.407	10-yr	26320.00	740.98	777.78	761.23	778.72	0.000679	9.02	7193.65	1036.60	0.27
Main	16.407	20-yr	34000.00	740.98	780.88	765.73	781.98	0.000752	10.06	8610.63	1219.99	0.29
Main	16.407	50-yr	44500.00	740.98	784.50	770.08	785.84	0.000848	11.36	10301.91	2123.87	0.31
Main	16.407	100-yr	53690.00	740.98	787.02	772.21	788.56	0.000933	12.40	11524.51	2835.58	0.33
Main	16.407	200-yr	62000.00	740.98	789.03	773.21	790.75	0.001010	13.30	12497.28	2868.80	0.35
Main	16.407	500-yr	74720.00	740.98	791.65	777.16	793.67	0.001135	14.64	13768.33	2904.83	0.37
Main	16.407	Design Discharge	38000.00	740.98	782.30	767.81	783.49	0.000789	10.56	9261.37	1572.37	0.30
Main	16.579	2-yr	13200.00	741.58	771.42	754.31	771.88	0.000475	5.87	4231.13	862.53	0.20
Main	16.579	5-yr	20300.00	741.58	775.64	758.19	776.24	0.000567	7.07	5867.57	950.66	0.22
Main	16.579	10-yr	26320.00	741.58	778.50	761.02	779.21	0.000634	7.93	6990.90	1140.38	0.24
Main	16.579	20-yr	34000.00	741.58	781.66	764.92	782.51	0.000703	8.87	8252.43	1693.03	0.26
Main	16.579	50-yr	44500.00	741.58	785.38	770.00	786.41	0.000785	9.98	9776.04	2203.79	0.28
Main	16.579	100-yr	53690.00	741.58	787.99	772.08	789.18	0.000860	10.89	10854.21	2324.26	0.29
Main	16.579	200-yr	62000.00	741.58	790.07	773.66	791.41	0.000928	11.67	11716.85	2357.96	0.31
Main	16.579	500-yr	74720.00	741.58	792.82	775.85	794.40	0.001036	12.83	12856.57	2404.96	0.33
Main	16.579	Design Discharge	38000.00	741.58	783.11	768.13	784.04	0.000738	9.32	8837.71	1979.61	0.26
Main	16.724	2-yr	13200.00	742.08	771.67	757.79	772.34	0.000652	7.41	4098.81	616.62	0.25
Main	16.724	5-yr	20300.00	742.08	775.90	761.56	776.80	0.000788	8.99	5721.97	712.79	0.29

Main	16.724	10-yr	26320.00	742.08	778.75	766.28	779.84	0.000882	10.09	7032.20	795.85	0.31
Main	16.724	20-yr	34000.00	742.08	781.96	769.38	783.18	0.000943	11.08	8539.60	1082.94	0.32
Main	16.724	50-yr	44500.00	742.08	785.73	772.26	787.13	0.001014	12.26	10358.84	1708.48	0.34
Main	16.724	100-yr	53690.00	742.08	788.36	774.28	789.95	0.001100	13.31	11665.67	1940.21	0.36
Main	16.724	200-yr	62000.00	742.08	790.48	777.40	792.24	0.001176	14.21	12733.63	1978.58	0.37
Main	16.724	500-yr	74720.00	742.08	793.28	779.54	795.32	0.001298	15.54	14178.55	2034.71	0.39
Main	16.724	Design Discharge	38000.00	742.08	783.43	770.57	784.72	0.000975	11.56	9243.48	1293.80	0.33
Main	16.874	2-yr	13200.00	742.60	772.44	756.79	772.73	0.000322	4.51	3994.81	589.29	0.17
Main	16.874	5-yr	20300.00	742.60	776.83	760.13	777.25	0.000373	5.51	5263.95	658.98	0.19
Main	16.874	10-yr	26320.00	742.60	779.81	762.32	780.34	0.000414	6.26	6133.71	780.37	0.21
Main	16.874	20-yr	34000.00	742.60	783.04	765.07	783.72	0.000466	7.13	7106.28	1181.95	0.22
Main	16.874	50-yr	44500.00	742.60	786.86	767.57	787.72	0.000517	8.12	8297.44	1566.99	0.24
Main	16.874	100-yr	53690.00	742.60	789.56	769.48	790.60	0.000570	8.95	9141.64	1755.95	0.26
Main	16.874	200-yr	62000.00	742.60	791.73	771.05	792.93	0.000617	9.67	9819.49	1804.13	0.27
Main	16.874	500-yr	74720.00	742.60	794.62	773.25	796.08	0.000691	10.71	10722.95	1828.15	0.29
Main	16.874	Design Discharge	38000.00	742.60	784.54	766.09	785.29	0.000488	7.53	7573.33	1379.25	0.23
Main	16.989	2-yr	13200.00	742.99	772.56	756.50	772.99	0.000459	5.57	3921.72	773.82	0.20
Main	16.989	5-yr	20300.00	742.99	777.00	759.95	777.55	0.000512	6.59	5747.97	981.96	0.22
Main	16.989	10-yr	26320.00	742.99	780.02	762.46	780.64	0.000539	7.24	7056.97	1027.36	0.23
Main	16.989	20-yr	34000.00	742.99	783.32	766.09	784.03	0.000568	7.95	8506.65	1303.66	0.24
Main	16.989	50-yr	44500.00	742.99	787.21	770.15	788.04	0.000602	8.79	10254.04	1360.47	0.25
Main	16.989	100-yr	53690.00	742.99	790.03	772.39	790.95	0.000635	9.46	11536.24	1452.39	0.26
Main	16.989	200-yr	62000.00	742.99	792.29	774.70	793.31	0.000664	10.03	12571.66	1811.31	0.27
Main	16.989	500-yr	74720.00	742.99	795.35	777.00	796.51	0.000713	10.88	13963.92	1941.08	0.28
Main	16.989	Design Discharge	38000.00	742.99	784.84	768.34	785.60	0.000583	8.29	9182.89	1331.43	0.24
Main	17.175	2-yr	13200.00	743.64	773.09	758.21	773.40	0.000379	4.79	4248.35	424.34	0.19
Main	17.175	5-yr	20300.00	743.64	777.60	761.63	777.97	0.000381	5.48	6238.23	457.43	0.19
Main	17.175	10-yr	26320.00	743.64	780.65	763.98	781.08	0.000389	5.98	7670.99	492.04	0.20
Main	17.175	20-yr	34000.00	743.64	784.00	767.01	784.49	0.000401	6.55	9311.79	597.53	0.21
Main	17.175	50-yr	44500.00	743.64	787.94	770.52	788.53	0.000425	7.30	11420.60	740.88	0.22
Main	17.175	100-yr	53690.00	743.64	790.80	772.30	791.46	0.000442	7.84	13139.37	975.49	0.22
Main	17.175	200-yr	62000.00	743.64	793.11	773.72	793.85	0.000464	8.35	14638.30	1114.36	0.23
Main	17.175	500-yr	74720.00	743.64	796.26	775.70	797.08	0.000481	8.94	16766.26	1157.31	0.24
Main	17.175	Design Discharge	38000.00	743.64	785.54	768.35	786.07	0.000411	6.85	10107.31	651.35	0.21
Main	17.349	2-yr	13200.00	744.24	773.48	759.92	773.75	0.000363	4.68	4951.31	596.40	0.18
Main	17.349	5-yr	20300.00	744.24	778.01	763.86	778.32	0.000350	5.26	7089.76	616.82	0.19
Main	17.349	10-yr	26320.00	744.24	781.09	766.56	781.43	0.000355	5.72	8570.03	629.53	0.19
Main	17.349	20-yr	34000.00	744.24	784.46	769.20	784.85	0.000365	6.26	10208.00	642.77	0.20
Main	17.349	50-yr	44500.00	744.24	788.45	771.12	788.91	0.000376	6.89	12201.83	808.48	0.20
Main	17.349	100-yr	53690.00	744.24	791.34	772.57	791.86	0.000391	7.40	13830.02	1089.07	0.21
Main	17.349	200-yr	62000.00	744.24	793.70	773.71	794.26	0.000403	7.82	15206.35	1188.03	0.22
Main	17.349	500-yr	74720.00	744.24	796.87	775.33	797.51	0.000424	8.43	17087.28	1371.86	0.22
Main	17.349	Design Discharge	38000.00	744.24	786.02	769.98	786.44	0.000371	6.52	10975.26	670.65	0.20
Main	17.537	2-yr	13200.00	744.89	773.79	758.71	774.21	0.000491	5.34	3332.69	529.46	0.21
Main	17.537	5-yr	20300.00	744.89	778.26	762.42	778.81	0.000522	6.31	4806.38	665.06	0.23
Main	17.537	10-yr	26320.00	744.89	781.31	764.89	781.96	0.000550	7.01	5841.50	707.99	0.24
Main	17.537	20-yr	34000.00	744.89	784.64	768.05	785.43	0.000584	7.80	7000.79	766.59	0.25
Main	17.537	50-yr	44500.00	744.89	788.58	771.66	789.53	0.000618	8.71	8447.81	1140.13	0.26
Main	17.537	100-yr	53690.00	744.89	791.44	773.70	792.53	0.000653	9.44	9594.68	1281.85	0.27
Main	17.537	200-yr	62000.00	744.89	793.76	775.32	794.97	0.000682	10.04	10578.88	1382.31	0.28
Main	17.537	500-yr	74720.00	744.89	796.89	777.57	798.28	0.000727	10.91	11939.17	1536.08	0.29
Main	17.537	Design Discharge	38000.00	744.89	786.18	769.63	787.04	0.000601	8.18	7548.18	1056.12	0.25
Main	17.742	2-yr	13200.00	745.59	774.33	758.47	774.69	0.000391	5.03	3438.59	262.11	0.19
Main	17.742	5-yr	20300.00	745.59	778.82	762.10	779.33	0.000448	6.11	4668.87	288.85	0.21
Main	17.742	10-yr	26320.00	745.59	781.89	764.74	782.52	0.000491	6.90	5592.16	312.20	0.23
Main	17.742	20-yr	34000.00	745.59	785.24	767.69	786.02	0.000533	7.74	6665.45	651.87	0.24
Main	17.742	50-yr	44500.00	745.59	789.20	770.66	790.19	0.000593	8.82	8010.23	810.76	0.26
Main	17.742	100-yr	53690.00	745.59	792.10	772.73	793.22	0.000625	9.53	9246.63	964.54	0.27
Main	17.742	200-yr	62000.00	745.59	794.45	774.36	795.69	0.000650	10.10	10326.39	1253.62	0.28
Main	17.742	500-yr	74720.00	745.59	797.63	776.65	799.04	0.000688	10.92	11840.36	1305.27	0.29
Main	17.742	Design Discharge	38000.00	745.59	786.80	768.99	787.65	0.000554	8.14	7180.85	690.22	0.25
Main	17.922	2-yr	13200.00	746.21	774.76	759.98	775.04	0.000364	4.71	4665.14	446.25	0.18
Main	17.922	5-yr	20300.00	746.21	779.37	763.97	779.72	0.000363	5.39	6794.47	477.52	0.19
Main	17.922	10-yr	26320.00	746.21	782.54	767.25	782.93	0.000371	5.90	8340.67	499.25	0.20
Main	17.922	20-yr	34000.00	746.21	786.00	769.50	786.46	0.000381	6.46	10108.84	520.52	0.20
Main	17.922	50-yr	44500.00	746.21	790.14	771.99	790.67	0.000389	7.09	12327.63	559.77	0.21
Main	17.922	100-yr	53690.00	746.21	793.13	773.63	793.72	0.000402	7.61	14046.48	667.86	0.22
Main	17.922	200-yr	62000.00	746.21	795.56	774.91	796.20	0.000414	8.05	15488.71	946.08	0.22
Main	17.922	500-yr	74720.00	746.21	798.85	776.63	799.58	0.000436	8.69	17502.89	1270.83	0.23

Main	17.922	Design Discharge	38000.00	746.21	787.62	770.54	788.10	0.000387	6.73	10956.20	528.39	0.21
Main	18.038	2-yr	13200.00	747.04	774.96	760.26	775.25	0.000312	4.61	4120.48	331.00	0.18
Main	18.038	5-yr	20300.00	747.04	779.56	763.41	779.95	0.000341	5.50	5779.44	383.30	0.19
Main	18.038	10-yr	26320.00	747.04	782.71	765.91	783.18	0.000362	6.12	7023.87	406.01	0.20
Main	18.038	20-yr	34000.00	747.04	786.16	768.24	786.73	0.000387	6.82	8506.67	473.28	0.21
Main	18.038	50-yr	44500.00	747.04	790.28	770.92	790.95	0.000406	7.57	10912.90	640.73	0.22
Main	18.038	100-yr	53690.00	747.04	793.28	772.75	794.01	0.000416	8.08	12879.74	721.21	0.23
Main	18.038	200-yr	62000.00	747.04	795.72	774.25	796.50	0.000422	8.48	14526.34	933.33	0.23
Main	18.038	500-yr	74720.00	747.04	799.03	776.11	799.89	0.000435	9.05	16808.57	1036.02	0.24
Main	18.038	Design Discharge	38000.00	747.04	787.76	769.19	788.39	0.000403	7.20	9366.86	572.91	0.22
Main	18.160	2-yr	13200.00	747.47	775.22	758.99	775.42	0.000209	3.80	4537.63	359.31	0.15
Main	18.160	5-yr	20300.00	747.47	779.86	761.85	780.13	0.000225	4.51	6273.73	387.57	0.16
Main	18.160	10-yr	26320.00	747.47	783.05	763.88	783.38	0.000238	5.01	7540.10	406.50	0.16
Main	18.160	20-yr	34000.00	747.47	786.54	766.13	786.94	0.000256	5.61	9017.80	438.02	0.17
Main	18.160	50-yr	44500.00	747.47	790.70	769.00	791.18	0.000271	6.25	10884.52	460.56	0.18
Main	18.160	100-yr	53690.00	747.47	793.69	770.86	794.25	0.000287	6.79	12287.33	501.31	0.19
Main	18.160	200-yr	62000.00	747.47	796.14	772.41	796.74	0.000299	7.20	14031.19	1198.73	0.20
Main	18.160	500-yr	74720.00	747.47	799.29	774.43	800.14	0.000375	8.47	17255.81	1461.21	0.22
Main	18.160	Design Discharge	38000.00	747.47	788.18	767.14	788.61	0.000262	5.87	9742.53	446.64	0.18
Main	18.166		Bridge									
Main	18.173	2-yr	13200.00	747.54	775.64	759.87	775.83	0.000204	3.62	4619.85	365.47	0.14
Main	18.173	5-yr	20300.00	747.54	780.24	762.76	780.49	0.000218	4.29	6360.98	392.73	0.15
Main	18.173	10-yr	26320.00	747.54	783.40	764.76	783.70	0.000230	4.78	7632.33	411.71	0.16
Main	18.173	20-yr	34000.00	747.54	786.86	766.85	787.24	0.000247	5.36	9120.33	447.48	0.17
Main	18.173	50-yr	44500.00	747.54	790.98	769.37	791.44	0.000262	6.00	11042.32	552.34	0.18
Main	18.173	100-yr	53690.00	747.54	793.72	771.17	794.33	0.000313	6.90	12856.37	784.62	0.20
Main	18.173	200-yr	62000.00	747.54	796.16	772.52	796.85	0.000334	7.43	14975.67	1351.62	0.21
Main	18.173	500-yr	74720.00	747.54	799.59	774.57	800.29	0.000319	7.67	18797.20	1506.57	0.20
Main	18.173	Design Discharge	38000.00	747.54	788.48	767.85	788.89	0.000253	5.62	9853.36	457.81	0.17
Main	18.243	2-yr	13200.00	747.86	775.64	761.00	775.98	0.000429	4.80	3734.08	458.93	0.20
Main	18.243	5-yr	20300.00	747.86	780.23	764.23	780.64	0.000447	5.51	5317.97	522.05	0.21
Main	18.243	10-yr	26320.00	747.86	783.39	766.49	783.87	0.000465	6.02	6427.02	530.71	0.22
Main	18.243	20-yr	34000.00	747.86	786.85	769.06	787.41	0.000488	6.58	7725.88	709.09	0.22
Main	18.243	50-yr	44500.00	747.86	790.89	772.96	791.65	0.000547	7.64	10393.10	850.69	0.24
Main	18.243	100-yr	53690.00	747.86	793.72	774.82	794.53	0.000544	8.08	13132.25	1075.43	0.25
Main	18.243	200-yr	62000.00	747.86	796.24	776.27	797.01	0.000497	8.11	15816.07	1378.55	0.24
Main	18.243	500-yr	74720.00	747.86	799.69	778.24	800.42	0.000450	8.20	19544.04	1422.07	0.23
Main	18.243	Design Discharge	38000.00	747.86	788.47	771.29	789.06	0.000486	6.82	8629.22	751.27	0.23
Main	18.248		Bridge									
Main	18.253	2-yr	13200.00	747.92	775.76	761.10	776.02	0.000356	4.36	4732.24	509.44	0.18
Main	18.253	5-yr	20300.00	747.92	780.40	764.20	780.70	0.000342	4.83	7137.48	530.46	0.18
Main	18.253	10-yr	26320.00	747.92	783.59	766.27	783.92	0.000343	5.20	8900.23	579.37	0.19
Main	18.253	20-yr	34000.00	747.92	787.10	768.50	787.47	0.000349	5.65	11091.55	781.86	0.19
Main	18.253	50-yr	44500.00	747.92	791.32	773.01	791.75	0.000348	6.21	14842.21	1002.42	0.19
Main	18.253	100-yr	53690.00	747.92	794.19	774.57	794.64	0.000335	6.45	17881.95	1122.06	0.19
Main	18.253	200-yr	62000.00	747.92	796.66	775.89	797.11	0.000320	6.60	20577.74	1410.51	0.19
Main	18.253	500-yr	74720.00	747.92	800.06	777.57	800.51	0.000304	6.82	24341.18	1449.39	0.19
Main	18.253	Design Discharge	38000.00	747.92	788.74	771.40	789.13	0.000345	5.84	12424.59	842.24	0.19
Main	18.261	2-yr	13200.00	747.92	775.73	760.79	776.06	0.000364	4.94	4005.03	529.14	0.19
Main	18.261	5-yr	20300.00	747.92	780.33	764.01	780.75	0.000386	5.80	5699.85	625.10	0.20
Main	18.261	10-yr	26320.00	747.92	783.49	766.46	783.99	0.000406	6.43	6877.29	688.64	0.21
Main	18.261	20-yr	34000.00	747.92	786.91	768.77	787.58	0.000472	7.46	8268.90	953.29	0.23
Main	18.261	50-yr	44500.00	747.92	791.13	772.49	791.86	0.000463	8.02	10547.09	1027.63	0.23
Main	18.261	100-yr	53690.00	747.92	793.95	774.53	794.76	0.000484	8.63	12294.45	1115.07	0.24
Main	18.261	200-yr	62000.00	747.92	796.41	776.04	797.25	0.000482	8.96	13860.41	1430.48	0.24
Main	18.261	500-yr	74720.00	747.92	799.77	778.07	800.66	0.000483	9.44	16044.45	1481.26	0.25
Main	18.261	Design Discharge	38000.00	747.92	788.54	769.89	789.24	0.000473	7.72	9124.78	983.78	0.23
Main	18.266		Bridge									
Main	18.272	2-yr	13200.00	748.03	776.50	760.92	776.85	0.000368	5.14	4095.74	573.57	0.19
Main	18.272	5-yr	20300.00	748.03	781.05	764.25	781.49	0.000396	6.03	5862.35	703.93	0.20
Main	18.272	10-yr	26320.00	748.03	784.15	766.66	784.68	0.000421	6.69	7078.14	771.51	0.21
Main	18.272	20-yr	34000.00	748.03	787.51	769.39	788.18	0.000472	7.59	8722.51	1026.27	0.23
Main	18.272	50-yr	44500.00	748.03	791.58	773.88	792.32	0.000484	8.30	10997.81	1136.14	0.24
Main	18.272	100-yr	53690.00	748.03	794.35	775.86	795.14	0.000494	8.80	12764.94	1193.97	0.24
Main	18.272	200-yr	62000.00	748.03	796.74	777.34	797.57	0.000496	9.16	14311.69	1510.97	0.25
Main	18.272	500-yr	74720.00	748.03	800.05	779.37	800.93	0.000499	9.66	16488.83	1570.37	0.25

Main	18.272	Design Discharge	38000.00	748.03	789.08	770.80	789.77	0.000475	7.86	9569.18	1043.53	0.23
Main	18.306	2-yr	13200.00	748.16	776.48		776.97	0.000489	5.88	3285.41	309.07	0.22
Main	18.306	5-yr	20300.00	748.16	780.98		781.64	0.000550	7.04	4768.65	525.25	0.24
Main	18.306	10-yr	26320.00	748.16	784.07		784.84	0.000587	7.82	5918.52	984.06	0.25
Main	18.306	20-yr	34000.00	748.16	787.41		788.36	0.000647	8.81	7362.64	1624.40	0.27
Main	18.306	50-yr	44500.00	748.16	791.46		792.50	0.000654	9.55	9413.86	2562.07	0.28
Main	18.306	100-yr	53690.00	748.16	794.21		795.34	0.000673	10.17	10891.72	2828.12	0.28
Main	18.306	200-yr	62000.00	748.16	796.59		797.77	0.000681	10.62	12167.62	2970.60	0.29
Main	18.306	500-yr	74720.00	748.16	799.87		801.15	0.000694	11.27	13935.10	3024.03	0.29
Main	18.306	Design Discharge	38000.00	748.16	788.97		789.95	0.000652	9.11	8130.62	1970.60	0.27
Main	18.346	2-yr	13200.00	748.30	776.72		777.07	0.000353	4.87	3410.51	246.08	0.19
Main	18.346	5-yr	20300.00	748.30	781.27		781.75	0.000398	5.88	5456.30	980.37	0.20
Main	18.346	10-yr	26320.00	748.30	784.43		784.96	0.000400	6.36	7096.50	1152.84	0.21
Main	18.346	20-yr	34000.00	748.30	787.91		788.49	0.000403	6.89	8935.92	1499.89	0.21
Main	18.346	50-yr	44500.00	748.30	791.97		792.64	0.000419	7.59	11146.22	1752.83	0.22
Main	18.346	100-yr	53690.00	748.30	794.73		795.48	0.000437	8.14	12742.76	2025.85	0.23
Main	18.346	200-yr	62000.00	748.30	797.11		797.91	0.000447	8.56	14115.92	2209.99	0.23
Main	18.346	500-yr	74720.00	748.30	800.41		801.67	0.000591	10.35	16044.67	2274.06	0.27
Main	18.346	Design Discharge	38000.00	748.30	789.48		790.09	0.000409	7.15	9779.22	1562.21	0.22
Main	18.401	2-yr	13200.00	748.73	776.93	760.77	777.17	0.000261	4.13	4669.93	453.19	0.16
Main	18.401	5-yr	20300.00	748.73	781.59	763.85	781.86	0.000259	4.70	6831.26	475.49	0.16
Main	18.401	10-yr	26320.00	748.73	784.76	766.05	785.08	0.000264	5.13	8363.54	489.01	0.17
Main	18.401	20-yr	34000.00	748.73	788.25	768.50	788.61	0.000271	5.62	10093.57	503.68	0.17
Main	18.401	50-yr	44500.00	748.73	792.35	772.70	792.77	0.000281	6.20	12563.66	922.63	0.18
Main	18.401	100-yr	53690.00	748.73	795.15	774.67	795.61	0.000291	6.62	15722.32	1310.83	0.19
Main	18.401	200-yr	62000.00	748.73	797.53	776.09	798.05	0.000309	7.11	19116.13	1603.20	0.19
Main	18.401	500-yr	74720.00	748.73	801.33	777.95	801.86	0.000298	7.40	25134.81	1746.75	0.19
Main	18.401	Design Discharge	38000.00	748.73	789.82	769.81	790.21	0.000277	5.86	10892.67	510.31	0.18
Main	18.414		Bridge									
Main	18.425	2-yr	13200.00	748.73	777.13	760.71	777.37	0.000252	4.20	4650.94	457.47	0.16
Main	18.425	5-yr	20300.00	748.73	781.82	763.82	782.11	0.000253	4.78	6844.47	477.16	0.16
Main	18.425	10-yr	26320.00	748.73	785.01	766.03	785.34	0.000259	5.22	8388.00	490.44	0.17
Main	18.425	20-yr	34000.00	748.73	788.31	768.43	788.69	0.000274	5.77	10029.28	504.14	0.18
Main	18.425	50-yr	44500.00	748.73	792.42	772.39	792.86	0.000285	6.36	12443.61	827.73	0.18
Main	18.425	100-yr	53690.00	748.73	795.26	775.08	795.74	0.000296	6.81	15311.93	1254.78	0.19
Main	18.425	200-yr	62000.00	748.73	797.74	776.49	798.23	0.000290	7.02	18698.06	1528.59	0.19
Main	18.425	500-yr	74720.00	748.73	801.57	778.32	802.14	0.000309	7.68	24565.33	1723.76	0.20
Main	18.425	Design Discharge	38000.00	748.73	789.89	769.62	790.30	0.000280	6.02	10854.02	554.56	0.18
Main	18.447	2-yr	13200.00	748.35	777.11	760.65	777.43	0.000374	4.68	3681.59	362.49	0.19
Main	18.447	5-yr	20300.00	748.35	781.77	763.96	782.19	0.000418	5.50	5134.52	629.41	0.20
Main	18.447	10-yr	26320.00	748.35	784.93	766.31	785.43	0.000439	6.09	6188.07	693.77	0.21
Main	18.447	20-yr	34000.00	748.35	788.19	768.94	788.80	0.000465	6.78	7488.51	1046.54	0.22
Main	18.447	50-yr	44500.00	748.35	792.27	773.07	792.99	0.000481	7.52	9166.62	1804.73	0.23
Main	18.447	100-yr	53690.00	748.35	794.80	775.26	796.01	0.000673	9.33	10843.35	1918.25	0.27
Main	18.447	200-yr	62000.00	748.35	797.38	776.96	798.45	0.000592	9.17	14983.14	1994.81	0.26
Main	18.447	500-yr	74720.00	748.35	801.44	779.17	802.25	0.000457	8.61	21521.74	2099.44	0.23
Main	18.447	Design Discharge	38000.00	748.35	789.76	770.40	790.42	0.000475	7.10	8132.27	1237.71	0.22
Main	18.519	2-yr	13200.00	749.12	777.14	762.99	777.67	0.000602	6.20	3340.42	385.85	0.24
Main	18.519	5-yr	20300.00	749.12	781.78	766.59	782.46	0.000636	7.26	4926.35	422.01	0.25
Main	18.519	10-yr	26320.00	749.12	784.91	769.13	785.73	0.000684	8.12	6059.27	562.01	0.27
Main	18.519	20-yr	34000.00	749.12	788.16	773.29	789.13	0.000727	8.99	7337.01	961.76	0.28
Main	18.519	50-yr	44500.00	749.12	792.18	776.43	793.36	0.000788	10.11	9010.41	1368.52	0.30
Main	18.519	100-yr	53690.00	749.12	795.00	778.53	796.33	0.000827	10.89	10284.71	1748.19	0.31
Main	18.519	200-yr	62000.00	749.12	797.39	780.20	798.84	0.000856	11.52	11369.26	1820.35	0.31
Main	18.519	500-yr	74720.00	749.12	801.14	782.49	802.72	0.000861	12.24	13090.37	1998.15	0.32
Main	18.519	Design Discharge	38000.00	749.12	789.72	774.66	790.76	0.000744	9.38	7956.31	1126.84	0.28
Main	18.578	2-yr	13200.00	749.42	777.29	763.39	777.87	0.000601	6.23	2460.24	286.33	0.24
Main	18.578	5-yr	20300.00	749.42	781.84	767.01	782.73	0.000719	7.75	3261.65	370.47	0.27
Main	18.578	10-yr	26320.00	749.42	784.90	769.21	786.06	0.000811	8.87	3866.40	542.20	0.29
Main	18.578	20-yr	34000.00	749.42	788.03	771.84	789.54	0.000938	10.21	4715.75	792.93	0.32
Main	18.578	50-yr	44500.00	749.42	791.98	774.99	793.83	0.001018	11.49	5908.98	1329.84	0.34
Main	18.578	100-yr	53690.00	749.42	794.69	777.47	796.87	0.001117	12.63	6750.11	1486.23	0.36
Main	18.578	200-yr	62000.00	749.42	796.93	779.58	799.47	0.001211	13.65	7517.87	1662.18	0.38
Main	18.578	500-yr	74720.00	749.42	800.60	782.57	803.38	0.001229	14.57	8859.88	1972.46	0.38
Main	18.578	Design Discharge	38000.00	749.42	789.55	773.11	791.20	0.000978	10.75	5169.07	861.10	0.33
Main	18.677	2-yr	13200.00	749.85	777.78	763.24	778.14	0.000374	4.96	3340.96	264.23	0.19
Main	18.677	5-yr	20300.00	749.85	782.54	766.22	783.05	0.000418	6.01	4671.30	350.55	0.21

Main	18.677	10-yr	26320.00	749.85	785.80	768.29	786.42	0.000446	6.71	5714.40	410.43	0.22
Main	18.677	20-yr	34000.00	749.85	789.17	770.61	789.96	0.000502	7.66	7266.94	658.43	0.24
Main	18.677	50-yr	44500.00	749.85	793.47	773.41	794.28	0.000473	8.09	9955.09	1578.17	0.24
Main	18.677	100-yr	53690.00	749.85	796.53	775.82	797.37	0.000462	8.43	11929.57	1740.88	0.24
Main	18.677	200-yr	62000.00	749.85	799.15	777.57	799.99	0.000449	8.67	13634.26	1804.92	0.23
Main	18.677	500-yr	74720.00	749.85	803.08	779.90	803.93	0.000422	8.91	16225.22	2175.97	0.23
Main	18.677	Design Discharge	38000.00	749.85	790.81	771.69	791.64	0.000500	7.91	8263.27	1162.64	0.24
Main	18.806	2-yr	13200.00	750.39	778.04	763.35	778.42	0.000446	5.04	3385.70	703.55	0.20
Main	18.806	5-yr	20300.00	750.39	782.86	766.52	783.34	0.000443	5.84	5148.66	950.28	0.21
Main	18.806	10-yr	26320.00	750.39	786.16	768.85	786.73	0.000451	6.43	6391.36	1063.84	0.22
Main	18.806	20-yr	34000.00	750.39	789.63	771.39	790.31	0.000474	7.14	7722.62	1218.68	0.23
Main	18.806	50-yr	44500.00	750.39	793.79	774.67	794.61	0.000499	7.98	9355.30	1650.06	0.24
Main	18.806	100-yr	53690.00	750.39	796.78	777.39	797.74	0.000531	8.69	10548.92	1925.68	0.25
Main	18.806	200-yr	62000.00	750.39	799.32	779.05	800.40	0.000555	9.29	11583.59	2096.03	0.26
Main	18.806	500-yr	74720.00	750.39	803.12	781.22	804.39	0.000582	10.10	13256.26	2411.60	0.27
Main	18.806	Design Discharge	38000.00	750.39	791.24	772.58	791.98	0.000486	7.49	8351.77	1261.58	0.23
Main	18.877	2-yr	13200.00	751.12	778.01	765.21	778.73	0.000712	7.23	2915.62	235.63	0.26
Main	18.877	5-yr	20300.00	751.12	782.71	768.65	783.72	0.000818	8.76	4138.49	306.16	0.29
Main	18.877	10-yr	26320.00	751.12	785.93	771.02	787.15	0.000885	9.80	5045.95	327.08	0.31
Main	18.877	20-yr	34000.00	751.12	789.29	773.64	790.80	0.000982	11.06	6035.65	767.99	0.33
Main	18.877	50-yr	44500.00	751.12	793.14	777.95	795.28	0.001210	13.16	7259.98	1562.88	0.37
Main	18.877	100-yr	53690.00	751.12	796.09	780.99	798.45	0.001260	14.11	8533.75	2063.83	0.39
Main	18.877	200-yr	62000.00	751.12	798.61	782.92	801.13	0.001283	14.82	9642.75	2135.55	0.39
Main	18.877	500-yr	74720.00	751.12	802.35	785.58	805.16	0.001326	15.91	11388.10	2259.19	0.41
Main	18.877	Design Discharge	38000.00	751.12	790.85	776.09	792.51	0.001032	11.67	6515.81	879.87	0.34
Main	18.977	2-yr	13200.00	751.12	778.65	764.43	779.09	0.000550	5.44	3057.51	281.73	0.22
Main	18.977	5-yr	20300.00	751.12	783.54	767.76	784.11	0.000545	6.34	4539.65	321.91	0.23
Main	18.977	10-yr	26320.00	751.12	786.88	770.23	787.57	0.000554	7.00	5662.55	540.47	0.24
Main	18.977	20-yr	34000.00	751.12	790.44	773.04	791.26	0.000575	7.76	6939.62	1389.63	0.25
Main	18.977	50-yr	44500.00	751.12	794.80	776.12	795.84	0.000614	8.78	8938.61	2413.34	0.26
Main	18.977	100-yr	53690.00	751.12	797.88	778.20	799.03	0.000627	9.39	10624.87	2549.33	0.27
Main	18.977	200-yr	62000.00	751.12	800.50	780.16	801.73	0.000628	9.83	12094.85	2569.20	0.27
Main	18.977	500-yr	74720.00	751.12	804.47	782.60	805.77	0.000613	10.34	14344.85	2588.93	0.27
Main	18.977	Design Discharge	38000.00	751.12	792.05	774.32	792.99	0.000613	8.29	7558.20	1710.80	0.26
Main	19.092	2-yr	13200.00	751.61	778.87	765.21	779.49	0.000607	6.77	3409.34	362.99	0.24
Main	19.092	5-yr	20300.00	751.61	783.76	768.72	784.52	0.000629	7.80	5256.57	387.04	0.26
Main	19.092	10-yr	26320.00	751.61	787.12	771.21	787.98	0.000649	8.53	6577.66	584.15	0.26
Main	19.092	20-yr	34000.00	751.61	790.70	773.96	791.68	0.000683	9.38	8024.35	1037.92	0.28
Main	19.092	50-yr	44500.00	751.61	795.11	779.17	796.27	0.000728	10.47	10294.74	2159.25	0.29
Main	19.092	100-yr	53690.00	751.61	798.20	781.44	799.47	0.000751	11.17	12137.01	2253.35	0.30
Main	19.092	200-yr	62000.00	751.61	800.86	783.09	802.14	0.000734	11.49	13776.20	2265.91	0.30
Main	19.092	500-yr	74720.00	751.61	804.89	785.33	806.16	0.000693	11.81	16284.10	2282.35	0.29
Main	19.092	Design Discharge	38000.00	751.61	792.32	777.16	793.45	0.000742	10.07	8732.88	1651.30	0.29
Main	19.180	2-yr	13200.00	751.99	779.50	762.76	779.69	0.000202	3.51	4545.58	436.77	0.14
Main	19.180	5-yr	20300.00	751.99	784.48	765.60	784.72	0.000198	4.05	6802.52	604.86	0.15
Main	19.180	10-yr	26320.00	751.99	787.91	767.60	788.18	0.000200	4.45	8450.50	953.26	0.15
Main	19.180	20-yr	34000.00	751.99	791.56	769.79	791.90	0.000211	4.97	10429.11	1616.36	0.16
Main	19.180	50-yr	44500.00	751.99	796.13	772.31	796.51	0.000211	5.44	13663.94	2351.64	0.16
Main	19.180	100-yr	53690.00	751.99	799.31	774.10	799.72	0.000210	5.74	16149.07	2400.09	0.16
Main	19.180	200-yr	62000.00	751.99	801.95	775.57	802.38	0.000209	5.98	18233.48	2417.87	0.16
Main	19.180	500-yr	74720.00	751.99	805.94	778.18	806.39	0.000203	6.27	21403.05	2444.70	0.16
Main	19.180	Design Discharge	38000.00	751.99	793.33	770.81	793.69	0.000212	5.16	11614.90	2111.37	0.16
Main	19.225	2-yr	13200.00	752.17	779.55	763.22	779.74	0.000183	3.73	4689.27	301.34	0.14
Main	19.225	5-yr	20300.00	752.17	784.51	765.99	784.77	0.000203	4.49	6243.35	326.31	0.15
Main	19.225	10-yr	26320.00	752.17	787.92	767.84	788.25	0.000219	5.05	7389.52	711.22	0.16
Main	19.225	20-yr	34000.00	752.17	791.57	770.04	791.97	0.000239	5.68	8681.29	1325.33	0.17
Main	19.225	50-yr	44500.00	752.17	796.11	772.24	796.60	0.000254	6.36	10405.70	1985.03	0.18
Main	19.225	100-yr	53690.00	752.17	799.24	773.98	799.83	0.000276	6.98	11855.54	2299.16	0.19
Main	19.225	200-yr	62000.00	752.17	801.85	775.44	802.51	0.000291	7.46	13614.07	2470.88	0.20
Main	19.225	500-yr	74720.00	752.17	805.79	777.48	806.54	0.000303	8.05	16888.75	2684.49	0.20
Main	19.225	Design Discharge	38000.00	752.17	793.33	770.92	793.77	0.000247	5.96	9324.60	1835.79	0.18
Main	19.230		Bridge									
Main	19.235	2-yr	13200.00	752.27	779.80	764.14	779.99	0.000188	3.79	4778.54	306.50	0.14
Main	19.235	5-yr	20300.00	752.27	784.53	766.67	784.80	0.000215	4.60	6283.21	356.16	0.16
Main	19.235	10-yr	26320.00	752.27	787.96	768.32	788.29	0.000229	5.14	7432.55	786.12	0.16
Main	19.235	20-yr	34000.00	752.27	791.61	770.43	792.02	0.000249	5.78	8713.45	1411.46	0.17
Main	19.235	50-yr	44500.00	752.27	796.15	772.62	796.66	0.000266	6.49	10383.86	1951.82	0.18
Main	19.235	100-yr	53690.00	752.27	799.30	774.34	799.90	0.000288	7.11	11664.86	2119.33	0.19

Main	19.235	200-yr	62000.00	752.27	801.90	775.77	802.58	0.000308	7.66	13259.83	2417.87	0.20
Main	19.235	500-yr	74720.00	752.27	805.86	777.84	806.63	0.000321	8.28	16455.08	2622.62	0.21
Main	19.235	Design Discharge	38000.00	752.27	793.37	771.30	793.82	0.000257	6.07	9351.22	1796.43	0.18
Main	19.247	2-yr	13200.00	752.39	779.85	762.37	780.01	0.000140	3.42	5183.91	420.49	0.12
Main	19.247	5-yr	20300.00	752.39	784.58	764.79	784.82	0.000168	4.23	6801.20	901.19	0.14
Main	19.247	10-yr	26320.00	752.39	788.01	766.49	788.30	0.000182	4.75	8053.67	1091.73	0.15
Main	19.247	20-yr	34000.00	752.39	791.68	768.30	792.04	0.000199	5.35	9428.23	1723.31	0.16
Main	19.247	50-yr	44500.00	752.39	796.16	770.88	796.68	0.000241	6.37	11483.82	2399.37	0.18
Main	19.247	100-yr	53690.00	752.39	799.34	772.61	799.92	0.000250	6.82	13655.82	2506.52	0.18
Main	19.247	200-yr	62000.00	752.39	801.97	774.08	802.60	0.000259	7.22	15723.88	2624.61	0.19
Main	19.247	500-yr	74720.00	752.39	806.03	776.18	806.66	0.000247	7.46	19149.84	2646.98	0.19
Main	19.247	Design Discharge	38000.00	752.39	793.44	769.48	793.84	0.000207	5.63	10104.87	2073.15	0.16
Main	19.285	2-yr	13200.00	752.70	779.80	763.28	780.08	0.000242	4.58	4189.02	279.33	0.16
Main	19.285	5-yr	20300.00	752.70	784.50	766.12	784.91	0.000289	5.62	5572.12	307.78	0.18
Main	19.285	10-yr	26320.00	752.70	787.91	768.23	788.41	0.000317	6.33	6654.29	328.22	0.19
Main	19.285	20-yr	34000.00	752.70	791.55	770.49	792.17	0.000350	7.14	7888.60	350.61	0.21
Main	19.285	50-yr	44500.00	752.70	795.91	773.26	796.88	0.000456	8.78	10361.86	1003.46	0.24
Main	19.285	100-yr	53690.00	752.70	799.20	775.07	800.07	0.000409	8.76	13817.76	1074.21	0.23
Main	19.285	200-yr	62000.00	752.70	801.92	777.59	802.71	0.000372	8.69	16814.57	1144.44	0.22
Main	19.285	500-yr	74720.00	752.70	806.07	780.02	806.73	0.000312	8.42	21817.98	1239.62	0.21
Main	19.285	Design Discharge	38000.00	752.70	793.30	771.60	793.98	0.000364	7.50	8512.47	360.87	0.21
Main	19.334	2-yr	13200.00	753.09	779.85	765.01	780.16	0.000312	4.67	3662.79	289.44	0.18
Main	19.334	5-yr	20300.00	753.09	784.58	767.93	785.00	0.000339	5.56	5096.07	316.81	0.19
Main	19.334	10-yr	26320.00	753.09	788.00	769.96	788.50	0.000353	6.16	6214.36	336.49	0.20
Main	19.334	20-yr	34000.00	753.09	791.66	772.33	792.26	0.000373	6.84	7485.37	357.54	0.21
Main	19.334	50-yr	44500.00	753.09	796.14	775.31	797.01	0.000446	8.15	9891.00	788.14	0.23
Main	19.334	100-yr	53690.00	753.09	799.32	777.62	800.18	0.000425	8.39	12526.73	846.28	0.23
Main	19.334	200-yr	62000.00	753.09	801.99	779.20	802.83	0.000404	8.53	14813.35	870.81	0.23
Main	19.334	500-yr	74720.00	753.09	806.77	781.42	806.81	0.000037	2.76	66765.05	2826.63	0.07
Main	19.334	Design Discharge	38000.00	753.09	793.43	773.44	794.08	0.000380	7.16	8126.04	367.70	0.21
Main	19.424	2-yr	13200.00	753.80	779.99	765.34	780.32	0.000332	4.87	3929.94	364.62	0.18
Main	19.424	5-yr	20300.00	753.80	784.76	768.33	785.16	0.000339	5.61	5744.80	396.79	0.19
Main	19.424	10-yr	26320.00	753.80	788.21	770.44	788.67	0.000344	6.14	7171.20	438.79	0.20
Main	19.424	20-yr	34000.00	753.80	791.92	772.86	792.44	0.000348	6.67	8879.09	472.00	0.20
Main	19.424	50-yr	44500.00	753.80	796.63	776.77	797.22	0.000345	7.25	11195.66	547.35	0.21
Main	19.424	100-yr	53690.00	753.80	799.73	779.05	800.38	0.000359	7.78	13005.56	604.27	0.21
Main	19.424	200-yr	62000.00	753.80	802.30	780.54	803.02	0.000370	8.23	14658.04	663.87	0.22
Main	19.424	500-yr	74720.00	753.80	806.54	782.58	806.96	0.000240	7.04	26327.02	1403.84	0.18
Main	19.424	Design Discharge	38000.00	753.80	793.72	773.98	794.26	0.000346	6.88	9736.11	482.65	0.20
Main	19.502	2-yr	13200.00	754.43	780.06	766.89	780.52	0.000478	5.72	3406.61	324.68	0.22
Main	19.502	5-yr	20300.00	754.43	784.80	769.99	785.38	0.000496	6.66	5051.66	366.90	0.23
Main	19.502	10-yr	26320.00	754.43	788.24	772.27	788.90	0.000498	7.25	6364.62	393.90	0.24
Main	19.502	20-yr	34000.00	754.43	791.92	774.88	792.69	0.000517	7.99	7879.77	433.20	0.24
Main	19.502	50-yr	44500.00	754.43	796.61	778.52	797.47	0.000511	8.68	10078.76	494.80	0.25
Main	19.502	100-yr	53690.00	754.43	799.70	780.56	800.65	0.000529	9.30	11636.73	515.56	0.26
Main	19.502	200-yr	62000.00	754.43	802.27	782.24	803.30	0.000541	9.80	12984.02	532.65	0.26
Main	19.502	500-yr	74720.00	754.43	806.48	784.51	807.16	0.000383	8.77	22006.31	1242.37	0.22
Main	19.502	Design Discharge	38000.00	754.43	793.69	776.73	794.52	0.000529	8.37	8663.41	474.54	0.25
Main	19.581	2-yr	13200.00	755.05	780.27	765.59	780.71	0.000435	5.49	3077.07	272.05	0.21
Main	19.581	5-yr	20300.00	755.05	784.99	768.67	785.59	0.000480	6.56	4582.85	362.14	0.22
Main	19.581	10-yr	26320.00	755.05	788.43	770.88	789.11	0.000489	7.17	5871.80	383.41	0.23
Main	19.581	20-yr	34000.00	755.05	792.11	773.45	792.92	0.000512	7.92	7357.99	424.82	0.24
Main	19.581	50-yr	44500.00	755.05	796.79	776.98	797.70	0.000509	8.61	9515.01	486.70	0.24
Main	19.581	100-yr	53690.00	755.05	799.88	779.47	800.88	0.000529	9.24	11052.03	508.07	0.25
Main	19.581	200-yr	62000.00	755.05	802.45	781.56	803.54	0.000542	9.74	12380.25	523.66	0.26
Main	19.581	500-yr	74720.00	755.05	806.64	784.38	807.32	0.000371	8.56	22234.04	1346.62	0.22
Main	19.581	Design Discharge	38000.00	755.05	793.88	774.73	794.75	0.000522	8.28	8131.04	464.84	0.24
Main	19.715	2-yr	13200.00	756.12	780.59	767.19	780.99	0.000351	5.14	3049.22	230.71	0.21
Main	19.715	5-yr	20300.00	756.12	785.33	770.03	785.89	0.000381	6.19	4205.38	257.66	0.22
Main	19.715	10-yr	26320.00	756.12	788.73	772.03	789.42	0.000399	6.91	5100.25	268.45	0.23
Main	19.715	20-yr	34000.00	756.12	792.40	774.31	793.25	0.000423	7.74	6106.37	279.57	0.24
Main	19.715	50-yr	44500.00	756.12	797.03	777.03	798.07	0.000440	8.65	7426.86	290.64	0.25
Main	19.715	100-yr	53690.00	756.12	800.05	779.15	801.31	0.000480	9.54	8323.99	304.44	0.27
Main	19.715	200-yr	62000.00	756.12	802.55	780.87	804.03	0.000518	10.33	9130.29	338.78	0.28
Main	19.715	500-yr	74720.00	756.12	806.18	783.30	807.96	0.000564	11.40	11131.57	708.66	0.30
Main	19.715	Design Discharge	38000.00	756.12	794.17	775.37	795.10	0.000433	8.12	6605.44	284.91	0.25
Main	19.719		Bridge									

Main	19.723	2-yr	13200.00	756.12	780.67	767.19	781.06	0.000347	5.11	3065.59	231.08	0.20
Main	19.723	5-yr	20300.00	756.12	785.42	770.03	785.98	0.000376	6.16	4228.59	257.96	0.22
Main	19.723	10-yr	26320.00	756.12	788.83	772.03	789.52	0.000393	6.88	5127.32	268.76	0.23
Main	19.723	20-yr	34000.00	756.12	792.52	774.31	793.36	0.000418	7.71	6138.71	279.92	0.24
Main	19.723	50-yr	44500.00	756.12	797.13	777.03	798.17	0.000435	8.62	7458.69	290.85	0.25
Main	19.723	100-yr	53690.00	756.12	800.20	779.15	801.45	0.000474	9.51	8369.51	307.53	0.27
Main	19.723	200-yr	62000.00	756.12	802.91	780.87	804.36	0.000502	10.23	9252.56	342.68	0.28
Main	19.723	500-yr	74720.00	756.12	806.86	783.30	808.54	0.000527	11.13	11613.96	714.24	0.29
Main	19.723	Design Discharge	38000.00	756.12	794.27	775.37	795.20	0.000428	8.10	6634.27	285.21	0.25
Main	19.840	2-yr	13200.00	757.80	780.96	768.04	781.28	0.000350	4.85	3516.39	502.22	0.20
Main	19.840	5-yr	20300.00	757.80	785.88	770.84	786.21	0.000302	5.12	5246.77	526.19	0.19
Main	19.840	10-yr	26320.00	757.80	789.41	772.90	789.75	0.000275	5.35	6506.93	568.42	0.19
Main	19.840	20-yr	34000.00	757.80	793.23	775.49	793.61	0.000259	5.68	7919.09	600.76	0.18
Main	19.840	50-yr	44500.00	757.80	798.17	779.61	798.40	0.000154	4.86	14217.15	914.53	0.15
Main	19.840	100-yr	53690.00	757.80	801.47	781.15	801.70	0.000145	5.01	17492.57	1071.71	0.14
Main	19.840	200-yr	62000.00	757.80	804.38	782.34	804.62	0.000135	5.07	20782.69	1176.21	0.14
Main	19.840	500-yr	74720.00	757.80	808.59	783.93	808.82	0.000120	5.11	26025.08	1324.30	0.13
Main	19.840	Design Discharge	38000.00	757.80	795.05	778.30	795.45	0.000253	5.85	8620.46	617.07	0.18
Main	19.986	2-yr	13200.00	759.55	781.19	770.09	781.64	0.000507	5.52	2811.60	255.26	0.24
Main	19.986	5-yr	20300.00	759.55	786.01	772.99	786.55	0.000453	6.20	4115.93	284.92	0.24
Main	19.986	10-yr	26320.00	759.55	789.48	775.24	790.08	0.000428	6.67	5135.94	303.11	0.24
Main	19.986	20-yr	34000.00	759.55	793.25	777.83	793.94	0.000415	7.22	6317.25	322.78	0.24
Main	19.986	50-yr	44500.00	759.55	797.96	780.18	798.74	0.000396	7.81	7894.88	349.02	0.24
Main	19.986	100-yr	53690.00	759.55	801.18	781.96	802.06	0.000404	8.39	9049.19	367.76	0.25
Main	19.986	200-yr	62000.00	759.55	804.03	783.41	804.99	0.000403	8.81	10123.37	429.94	0.25
Main	19.986	500-yr	74720.00	759.55	808.16	785.51	809.21	0.000397	9.35	11891.18	808.86	0.25
Main	19.986	Design Discharge	38000.00	759.55	795.06	778.77	795.78	0.000409	7.47	6907.13	332.28	0.24
Main	19.995		Bridge									
Main	20.004	2-yr	13200.00	759.79	781.86	771.08	782.29	0.000493	5.55	2929.41	261.06	0.24
Main	20.004	5-yr	20300.00	759.79	786.57	774.14	787.08	0.000447	6.22	4221.87	287.51	0.24
Main	20.004	10-yr	26320.00	759.79	790.00	776.80	790.57	0.000422	6.67	5238.18	305.43	0.24
Main	20.004	20-yr	34000.00	759.79	793.74	778.74	794.39	0.000409	7.21	6419.99	325.92	0.24
Main	20.004	50-yr	44500.00	759.79	798.41	780.93	799.14	0.000390	7.78	8003.50	352.41	0.24
Main	20.004	100-yr	53690.00	759.79	801.62	782.54	802.44	0.000397	8.34	9168.10	383.83	0.24
Main	20.004	200-yr	62000.00	759.79	804.47	784.04	805.35	0.000395	8.74	10253.30	448.76	0.25
Main	20.004	500-yr	74720.00	759.79	808.36	786.00	809.34	0.000395	9.31	11923.13	843.43	0.25
Main	20.004	Design Discharge	38000.00	759.79	795.53	779.61	796.21	0.000404	7.46	7010.41	335.94	0.24
Main	20.087	2-yr	13200.00	761.10	782.00	772.03	782.58	0.000625	6.82	3767.31	960.11	0.27
Main	20.087	5-yr	20300.00	761.10	786.75	774.80	787.30	0.000515	7.16	6047.38	1000.79	0.26
Main	20.087	10-yr	26320.00	761.10	790.21	776.83	790.76	0.000463	7.42	7751.21	1027.11	0.25
Main	20.087	20-yr	34000.00	761.10	794.00	781.39	794.58	0.000432	7.81	9655.91	1051.12	0.25
Main	20.087	50-yr	44500.00	761.10	798.73	783.41	799.32	0.000396	8.21	12091.95	1728.35	0.24
Main	20.087	100-yr	53690.00	761.10	801.99	784.91	802.63	0.000394	8.68	13776.63	2316.83	0.24
Main	20.087	200-yr	62000.00	761.10	804.87	786.12	805.55	0.000388	9.02	15260.89	2363.58	0.24
Main	20.087	500-yr	74720.00	761.10	808.79	787.82	809.53	0.000387	9.56	17286.71	2423.02	0.25
Main	20.087	Design Discharge	38000.00	761.10	795.81	782.23	796.40	0.000422	8.01	10584.94	1124.58	0.24
Main	20.195	2-yr	6725.00	761.70	782.66	769.35	782.84	0.000188	3.71	3494.21	497.19	0.15
Main	20.195	5-yr	12150.00	761.70	787.26	772.63	787.54	0.000241	4.85	5577.89	890.13	0.17
Main	20.195	10-yr	13500.00	761.70	790.76	773.34	790.97	0.000162	4.35	7207.57	1573.61	0.15
Main	20.195	20-yr	19700.00	761.70	794.50	776.03	794.78	0.000197	5.24	8951.10	1827.16	0.17
Main	20.195	50-yr	27700.00	761.70	799.16	779.28	799.52	0.000216	6.01	11126.75	2138.12	0.18
Main	20.195	100-yr	33260.00	761.70	802.44	781.18	802.83	0.000216	6.38	12655.50	2231.98	0.18
Main	20.195	200-yr	39100.00	761.70	805.31	782.96	805.74	0.000224	6.81	13992.07	2255.37	0.19
Main	20.195	500-yr	47000.00	761.70	809.25	784.80	809.73	0.000225	7.25	15830.70	2270.54	0.19
Main	20.195	Design Discharge	20700.00	761.70	796.33	776.43	796.60	0.000170	5.06	9807.72	1918.20	0.16
Main	20.302	2-yr	6725.00	762.20	782.73	770.20	782.99	0.000267	4.25	2338.23	377.90	0.17
Main	20.302	5-yr	12150.00	762.20	787.31	773.35	787.76	0.000365	5.77	3637.27	757.27	0.21
Main	20.302	10-yr	13500.00	762.20	790.76	774.05	791.13	0.000259	5.33	4763.80	919.49	0.18
Main	20.302	20-yr	19700.00	762.20	794.47	776.92	795.00	0.000324	6.51	6124.40	1118.65	0.21
Main	20.302	50-yr	27700.00	762.20	799.11	780.37	799.77	0.000355	7.50	7974.41	1480.89	0.22
Main	20.302	100-yr	33260.00	762.20	802.38	782.37	803.08	0.000348	7.89	9349.15	1588.93	0.23
Main	20.302	200-yr	39100.00	762.20	805.24	784.37	806.00	0.000354	8.35	10575.57	1660.75	0.23
Main	20.302	500-yr	47000.00	762.20	809.12	786.37	810.03	0.000373	9.10	12518.71	1806.05	0.24
Main	20.302	Design Discharge	20700.00	762.20	796.30	777.36	796.79	0.000280	6.30	6839.81	1190.63	0.20
Main	20.392	2-yr	6725.00	761.80	782.98	768.04	783.08	0.000107	2.58	2915.52	424.16	0.11
Main	20.392	5-yr	12150.00	761.80	787.70	770.61	787.89	0.000149	3.59	4064.45	564.38	0.14
Main	20.392	10-yr	13500.00	761.80	791.05	771.16	791.23	0.000111	3.41	4953.89	627.15	0.12
Main	20.392	20-yr	19700.00	761.80	794.86	773.43	795.12	0.000144	4.26	6036.34	710.96	0.14

Main	20.392	50-yr	27700.00	761.80	799.53	775.93	799.91	0.000167	5.08	7487.60	971.85	0.15
Main	20.392	100-yr	33260.00	761.80	802.79	777.46	803.22	0.000173	5.50	8554.98	1586.35	0.16
Main	20.392	200-yr	39100.00	761.80	805.64	778.95	806.14	0.000184	5.96	10110.01	1724.74	0.17
Main	20.392	500-yr	47000.00	761.80	809.62	780.70	810.18	0.000184	6.35	11947.24	1810.52	0.17
Main	20.392	Design Discharge	20700.00	761.80	796.64	773.77	796.89	0.000129	4.20	6570.52	732.57	0.13
Main	20.395		Bridge									
Main	20.400	2-yr	6725.00	761.80	783.00	768.04	783.10	0.000107	2.58	2919.58	425.04	0.11
Main	20.400	5-yr	12150.00	761.80	787.73	770.61	787.92	0.000148	3.58	4072.07	564.91	0.14
Main	20.400	10-yr	13500.00	761.80	791.08	771.16	791.25	0.000111	3.40	4960.58	627.98	0.12
Main	20.400	20-yr	19700.00	761.80	794.89	773.43	795.16	0.000143	4.26	6047.28	711.34	0.14
Main	20.400	50-yr	27700.00	761.80	799.64	775.93	800.01	0.000165	5.06	7522.42	985.41	0.15
Main	20.400	100-yr	33260.00	761.80	802.98	777.46	803.41	0.000169	5.46	8620.23	1597.73	0.16
Main	20.400	200-yr	39100.00	761.80	805.95	778.95	806.44	0.000178	5.90	10251.28	1734.30	0.16
Main	20.400	500-yr	47000.00	761.80	810.03	780.70	810.57	0.000177	6.27	12138.55	1914.94	0.17
Main	20.400	Design Discharge	20700.00	761.80	796.68	773.77	796.93	0.000128	4.19	6583.35	733.19	0.13
Main	20.549	2-yr	6725.00	763.50	783.05	771.33	783.28	0.000341	3.92	2166.33	682.64	0.18
Main	20.549	5-yr	12150.00	763.50	787.83	774.64	788.12	0.000334	4.68	4229.85	1102.15	0.19
Main	20.549	10-yr	13500.00	763.50	791.17	775.33	791.38	0.000209	4.12	5715.36	1295.72	0.15
Main	20.549	20-yr	19700.00	763.50	795.04	778.15	795.30	0.000227	4.76	7565.75	1466.13	0.16
Main	20.549	50-yr	27700.00	763.50	799.87	781.54	800.17	0.000219	5.23	9935.21	1614.37	0.16
Main	20.549	100-yr	33260.00	763.50	803.26	783.78	803.57	0.000205	5.43	11620.88	1923.32	0.16
Main	20.549	200-yr	39100.00	763.50	806.28	785.25	806.61	0.000201	5.68	13136.96	1945.77	0.16
Main	20.549	500-yr	47000.00	763.50	810.39	786.78	810.74	0.000191	5.93	15222.98	2083.34	0.16
Main	20.549	Design Discharge	20700.00	763.50	796.83	778.54	797.06	0.000189	4.54	8437.56	1503.43	0.15
Main	20.625	2-yr	6725.00	763.90	783.19	771.50	783.42	0.000388	3.92	2068.06	907.05	0.19
Main	20.625	5-yr	12150.00	763.90	787.95	774.75	788.26	0.000379	4.74	3688.68	1544.28	0.20
Main	20.625	10-yr	13500.00	763.90	791.24	775.46	791.47	0.000241	4.22	4806.84	1633.53	0.16
Main	20.625	20-yr	19700.00	763.90	795.10	778.30	795.40	0.000267	4.96	6120.15	1748.51	0.17
Main	20.625	50-yr	27700.00	763.90	799.91	782.18	800.28	0.000268	5.59	7757.31	1862.76	0.18
Main	20.625	100-yr	33260.00	763.90	803.28	783.88	803.68	0.000258	5.88	8904.54	2013.66	0.18
Main	20.625	200-yr	39100.00	763.90	806.18	785.25	806.79	0.000324	6.97	10331.58	2040.29	0.20
Main	20.625	500-yr	47000.00	763.90	810.33	786.79	810.88	0.000277	6.92	13332.17	2189.54	0.19
Main	20.625	Design Discharge	20700.00	763.90	796.87	778.72	797.15	0.000226	4.78	6723.22	1802.61	0.16
Main	20.768	2-yr	6725.00	764.64	783.50	771.48	783.63	0.000192	2.95	2672.50	963.29	0.14
Main	20.768	5-yr	12150.00	764.64	788.28	773.87	788.47	0.000207	3.67	4509.53	1364.96	0.15
Main	20.768	10-yr	13500.00	764.64	791.46	774.37	791.61	0.000138	3.32	5823.77	1544.17	0.12
Main	20.768	20-yr	19700.00	764.64	795.36	776.45	795.55	0.000154	3.91	7466.42	1641.13	0.14
Main	20.768	50-yr	27700.00	764.64	800.19	778.77	800.43	0.000158	4.44	9610.43	1764.47	0.14
Main	20.768	100-yr	33260.00	764.64	803.57	780.21	803.83	0.000151	4.66	11199.96	1880.09	0.14
Main	20.768	200-yr	39100.00	764.64	806.68	782.47	806.97	0.000149	4.89	12689.53	1908.47	0.14
Main	20.768	500-yr	47000.00	764.64	810.74	784.30	811.04	0.000144	5.16	14663.07	1944.20	0.14
Main	20.768	Design Discharge	20700.00	764.64	797.10	776.76	797.28	0.000133	3.79	8215.44	1693.19	0.13
Main	20.940	2-yr	6725.00	765.53	783.64	773.99	783.93	0.000489	4.59	2222.78	714.32	0.22
Main	20.940	5-yr	12150.00	765.53	788.41	777.26	788.77	0.000450	5.35	3982.64	1348.46	0.22
Main	20.940	10-yr	13500.00	765.53	791.54	777.96	791.80	0.000289	4.75	5148.47	1449.97	0.18
Main	20.940	20-yr	19700.00	765.53	795.43	781.82	795.76	0.000312	5.50	6618.41	1476.38	0.19
Main	20.940	50-yr	27700.00	765.53	800.25	784.40	800.64	0.000309	6.13	8462.03	1525.54	0.19
Main	20.940	100-yr	33260.00	765.53	803.62	785.64	804.03	0.000293	6.40	10219.51	1767.05	0.19
Main	20.940	200-yr	39100.00	765.53	806.73	786.82	807.16	0.000277	6.60	12238.98	1896.74	0.19
Main	20.940	500-yr	47000.00	765.53	810.80	788.22	811.22	0.000252	6.73	15041.98	1944.19	0.18
Main	20.940	Design Discharge	20700.00	765.53	797.16	782.21	797.46	0.000265	5.29	7273.94	1488.33	0.18
Main	21.116	2-yr	6725.00	766.46	784.07	772.16	784.24	0.000223	3.30	2250.22	673.21	0.15
Main	21.116	5-yr	12150.00	766.46	788.80	774.54	789.09	0.000281	4.42	3310.76	850.32	0.17
Main	21.116	10-yr	13500.00	766.46	791.76	775.06	792.02	0.000212	4.21	4036.09	885.72	0.15
Main	21.116	20-yr	19700.00	766.46	795.65	777.27	796.03	0.000258	5.14	5092.47	943.39	0.17
Main	21.116	50-yr	27700.00	766.46	800.45	779.76	800.93	0.000276	5.93	7529.32	1358.49	0.19
Main	21.116	100-yr	33260.00	766.46	803.83	781.39	804.29	0.000249	6.03	9744.46	1689.77	0.18
Main	21.116	200-yr	39100.00	766.46	806.94	783.15	807.40	0.000231	6.13	11830.65	1803.72	0.17
Main	21.116	500-yr	47000.00	766.46	810.99	785.04	811.44	0.000207	6.22	14555.42	2030.41	0.17
Main	21.116	Design Discharge	20700.00	766.46	797.33	777.60	797.69	0.000229	5.05	5671.06	1117.61	0.17
Main	21.122		Bridge									
Main	21.126	2-yr	6725.00	766.46	784.12	772.16	784.28	0.000221	3.29	2259.22	677.94	0.15
Main	21.126	5-yr	12150.00	766.46	788.86	774.54	789.15	0.000279	4.41	3325.11	850.78	0.17
Main	21.126	10-yr	13500.00	766.46	791.81	775.06	792.07	0.000211	4.20	4048.26	885.66	0.15
Main	21.126	20-yr	19700.00	766.46	795.72	777.27	796.09	0.000257	5.14	5110.79	943.42	0.17
Main	21.126	50-yr	27700.00	766.46	800.64	779.76	801.12	0.000271	5.90	7658.94	1370.38	0.18
Main	21.126	100-yr	33260.00	766.46	804.19	781.37	804.65	0.000239	5.94	9999.82	1717.47	0.18

Main	21.126	200-yr	39100.00	766.46	807.51	783.13	807.95	0.000217	6.00	12237.21	1826.34	0.17
Main	21.126	500-yr	47000.00	766.46	811.59	785.05	812.02	0.000196	6.10	14989.25	2040.92	0.16
Main	21.126	Design Discharge	20700.00	766.46	797.41	777.60	797.77	0.000228	5.05	5703.06	1121.75	0.17
Main	21.337	2-yr	6725.00	767.59	784.33		784.81	0.000905	5.66	1323.72	182.90	0.28
Main	21.337	5-yr	12150.00	767.59	789.08		789.76	0.000876	6.91	2302.82	221.81	0.29
Main	21.337	10-yr	13500.00	767.59	791.96		792.51	0.000597	6.33	2968.51	240.62	0.25
Main	21.337	20-yr	19700.00	767.59	795.88		796.60	0.000637	7.37	3963.23	265.65	0.27
Main	21.337	50-yr	27700.00	767.59	800.80		801.63	0.000608	8.16	5516.50	746.27	0.27
Main	21.337	100-yr	33260.00	767.59	804.25		805.13	0.000564	8.47	7568.06	1494.16	0.26
Main	21.337	200-yr	39100.00	767.59	807.58		808.36	0.000473	8.29	9623.19	1744.19	0.24
Main	21.337	500-yr	47000.00	767.59	811.65		812.36	0.000404	8.23	12233.09	1899.51	0.23
Main	21.337	Design Discharge	20700.00	767.59	797.55		798.21	0.000542	7.11	4414.37	275.72	0.25
Main	21.438	2-yr	6725.00	768.12	784.83	776.22	785.21	0.000613	5.20	1878.83	1008.46	0.24
Main	21.438	5-yr	12150.00	768.12	789.70	779.36	790.14	0.000553	5.99	3389.57	1087.93	0.24
Main	21.438	10-yr	13500.00	768.12	792.43	780.07	792.77	0.000383	5.45	4261.18	1133.21	0.21
Main	21.438	20-yr	19700.00	768.12	796.46	783.57	796.88	0.000400	6.23	5581.55	1200.82	0.22
Main	21.438	50-yr	27700.00	768.12	801.42	786.45	801.91	0.000384	6.87	7324.73	1338.31	0.22
Main	21.438	100-yr	33260.00	768.12	804.87	787.74	805.39	0.000358	7.12	8633.50	1553.99	0.21
Main	21.438	200-yr	39100.00	768.12	808.04	788.96	808.58	0.000345	7.41	9897.79	1910.61	0.21
Main	21.438	500-yr	47000.00	768.12	811.98	790.47	812.55	0.000332	7.76	11564.20	2032.57	0.21
Main	21.438	Design Discharge	20700.00	768.12	798.06	783.80	798.45	0.000345	6.03	6127.52	1243.42	0.20
Main	21.557	2-yr	6725.00	768.89	785.23	778.00	785.77	0.001157	5.93	1153.48	149.67	0.32
Main	21.557	5-yr	12150.00	768.89	789.99	781.28	790.62	0.000913	6.68	2383.89	294.08	0.30
Main	21.557	10-yr	13500.00	768.89	792.63	781.98	793.09	0.000577	5.90	3176.73	307.13	0.24
Main	21.557	20-yr	19700.00	768.89	796.67	784.79	797.18	0.000524	6.43	4457.50	326.10	0.24
Main	21.557	50-yr	27700.00	768.89	801.63	788.54	802.17	0.000447	6.80	6132.01	662.88	0.23
Main	21.557	100-yr	33260.00	768.89	805.08	790.01	805.62	0.000394	6.92	7361.74	1070.60	0.22
Main	21.557	200-yr	39100.00	768.89	808.24	791.25	808.79	0.000365	7.11	8536.21	1436.37	0.22
Main	21.557	500-yr	47000.00	768.89	812.18	792.71	812.75	0.000339	7.38	10065.69	1760.17	0.21
Main	21.557	Design Discharge	20700.00	768.89	798.25	785.36	798.70	0.000434	6.13	4976.83	333.37	0.22
Main	21.573		Bridge									
Main	21.597	2-yr	6725.00	768.89	785.50	778.00	786.01	0.001071	5.77	1195.26	160.05	0.31
Main	21.597	5-yr	12150.00	768.89	790.23	781.28	790.83	0.000856	6.53	2453.78	295.42	0.29
Main	21.597	10-yr	13500.00	768.89	792.78	781.98	793.23	0.000557	5.83	3223.89	307.85	0.24
Main	21.597	20-yr	19700.00	768.89	796.83	784.79	797.33	0.000509	6.37	4507.87	326.81	0.24
Main	21.597	50-yr	27700.00	768.89	801.78	788.54	802.31	0.000437	6.75	6184.17	675.67	0.23
Main	21.597	100-yr	33260.00	768.89	805.23	790.01	805.75	0.000386	6.87	7413.99	1102.34	0.22
Main	21.597	200-yr	39100.00	768.89	808.38	791.25	808.93	0.000359	7.07	8590.64	1442.94	0.21
Main	21.597	500-yr	47000.00	768.89	812.32	792.71	812.89	0.000334	7.34	10123.33	1792.25	0.21
Main	21.597	Design Discharge	20700.00	768.89	798.38	785.36	798.83	0.000424	6.08	5020.76	333.99	0.22
Main	21.772	2-yr	6725.00	769.35	786.43	777.26	786.76	0.000607	4.69	1691.41	495.61	0.23
Main	21.772	5-yr	12150.00	769.35	791.10	780.29	791.42	0.000464	5.05	3829.97	1232.99	0.21
Main	21.772	10-yr	13500.00	769.35	793.39	780.94	793.63	0.000314	4.52	4912.21	1337.21	0.18
Main	21.772	20-yr	19700.00	769.35	797.44	783.65	797.69	0.000277	4.82	6923.40	1556.47	0.18
Main	21.772	50-yr	27700.00	769.35	802.37	788.19	802.62	0.000234	5.03	9582.09	1837.66	0.17
Main	21.772	100-yr	33260.00	769.35	805.79	789.37	806.03	0.000204	5.06	11471.12	1994.06	0.16
Main	21.772	200-yr	39100.00	769.35	808.94	790.36	809.19	0.000188	5.18	13255.51	2143.17	0.15
Main	21.772	500-yr	47000.00	769.35	812.88	791.58	813.14	0.000174	5.35	15682.44	2213.97	0.15
Main	21.772	Design Discharge	20700.00	769.35	798.91	784.06	799.13	0.000232	4.59	7699.72	1647.04	0.16
Main	21.891	2-yr	6725.00	769.65	786.87	778.54	787.16	0.000655	4.47	2164.06	1167.94	0.24
Main	21.891	5-yr	12150.00	769.65	791.48	781.84	791.68	0.000362	4.21	5009.23	1691.25	0.19
Main	21.891	10-yr	13500.00	769.65	793.65	782.51	793.80	0.000237	3.72	6395.49	1712.20	0.16
Main	21.891	20-yr	19700.00	769.65	797.69	786.67	797.83	0.000193	3.86	9042.36	1734.31	0.15
Main	21.891	50-yr	27700.00	769.65	802.60	788.38	802.74	0.000154	3.96	12317.07	1779.54	0.14
Main	21.891	100-yr	33260.00	769.65	806.00	789.20	806.14	0.000133	3.99	14616.24	1937.93	0.13
Main	21.891	200-yr	39100.00	769.65	809.14	789.97	809.29	0.000125	4.12	16864.90	2045.39	0.13
Main	21.891	500-yr	47000.00	769.65	813.07	790.88	813.23	0.000113	4.22	19774.52	2287.38	0.12
Main	21.891	Design Discharge	20700.00	769.65	799.12	787.00	799.25	0.000160	3.66	9992.47	1740.52	0.13
Main	22.024	2-yr	6725.00	769.98	787.36	778.40	787.55	0.000462	3.66	2381.83	1051.36	0.21
Main	22.024	5-yr	12150.00	769.98	791.75	781.49	791.94	0.000382	3.91	4347.48	1650.66	0.18
Main	22.024	10-yr	13500.00	769.98	793.83	782.13	793.99	0.000279	3.59	5289.43	1660.45	0.16
Main	22.024	20-yr	19700.00	769.98	797.82	785.11	798.00	0.000257	3.90	7123.94	1681.24	0.15
Main	22.024	50-yr	27700.00	769.98	802.70	787.50	802.89	0.000226	4.13	9417.54	1741.55	0.15
Main	22.024	100-yr	33260.00	769.98	806.07	788.46	806.27	0.000204	4.24	11132.46	1905.81	0.14
Main	22.024	200-yr	39100.00	769.98	809.21	789.31	809.42	0.000190	4.35	12985.71	1966.46	0.14
Main	22.024	500-yr	47000.00	769.98	813.13	790.37	813.35	0.000175	4.48	15527.31	2037.99	0.13
Main	22.024	Design Discharge	20700.00	769.98	799.23	785.66	799.39	0.000220	3.75	7778.01	1688.89	0.14

Main	22.262	2-yr	6725.00	771.07	787.93	779.36	788.34	0.000757	5.14	1365.69	538.84	0.27
Main	22.262	5-yr	12150.00	771.07	792.16	782.47	792.63	0.000723	5.87	3315.20	1229.49	0.27
Main	22.262	10-yr	13500.00	771.07	794.11	783.15	794.48	0.000530	5.38	4277.52	1320.61	0.23
Main	22.262	20-yr	19700.00	771.07	798.06	786.19	798.43	0.000463	5.66	6226.95	1345.89	0.22
Main	22.262	50-yr	27700.00	771.07	802.89	790.43	803.25	0.000385	5.85	8606.67	1882.44	0.20
Main	22.262	100-yr	33260.00	771.07	806.24	791.69	806.59	0.000338	5.90	10257.28	2106.13	0.19
Main	22.262	200-yr	39100.00	771.07	809.35	792.76	809.71	0.000311	6.02	11792.54	2138.86	0.19
Main	22.262	500-yr	47000.00	771.07	813.25	794.03	813.62	0.000287	6.20	13714.08	2192.84	0.18
Main	22.262	Design Discharge	20700.00	771.07	799.43	786.67	799.76	0.000391	5.41	6901.00	1380.73	0.20
Main	22.402	2-yr	6725.00	772.26	788.50	780.18	788.91	0.000792	5.13	1312.47	124.33	0.26
Main	22.402	5-yr	12150.00	772.26	792.63	783.16	793.32	0.000962	6.72	1988.98	604.95	0.30
Main	22.402	10-yr	13500.00	772.26	794.40	783.82	795.06	0.000818	6.59	2453.71	857.74	0.28
Main	22.402	20-yr	19700.00	772.26	798.27	786.46	799.00	0.000796	7.24	3691.81	1683.52	0.29
Main	22.402	50-yr	27700.00	772.26	803.02	789.41	803.76	0.000699	7.51	5249.69	1929.69	0.27
Main	22.402	100-yr	33260.00	772.26	806.33	791.26	807.05	0.000607	7.55	6375.79	2280.77	0.26
Main	22.402	200-yr	39100.00	772.26	809.41	793.21	810.14	0.000541	7.68	7488.69	2602.50	0.25
Main	22.402	500-yr	47000.00	772.26	813.28	796.08	814.02	0.000481	7.86	8884.61	2615.07	0.24
Main	22.402	Design Discharge	20700.00	772.26	799.59	786.83	800.25	0.000691	6.95	4121.41	1777.83	0.27
Main	22.588	2-yr	6725.00	773.84	789.32	782.03	789.85	0.001081	5.82	1200.29	209.28	0.32
Main	22.588	5-yr	12150.00	773.84	793.68	785.21	794.27	0.000976	6.53	2759.42	434.97	0.31
Main	22.588	10-yr	13500.00	773.84	795.34	785.89	795.84	0.000771	6.16	3424.36	471.89	0.27
Main	22.588	20-yr	19700.00	773.84	799.20	789.13	799.72	0.000679	6.53	4988.11	617.53	0.26
Main	22.588	50-yr	27700.00	773.84	803.85	792.67	804.37	0.000575	6.80	6925.58	761.12	0.24
Main	22.588	100-yr	33260.00	773.84	807.06	793.86	807.58	0.000514	6.92	8407.35	917.54	0.23
Main	22.588	200-yr	39100.00	773.84	810.09	795.01	810.62	0.000465	7.01	9883.50	1340.66	0.22
Main	22.588	500-yr	47000.00	773.84	813.92	796.33	814.45	0.000418	7.15	11796.38	2091.71	0.22
Main	22.588	Design Discharge	20700.00	773.84	800.40	789.89	800.87	0.000591	6.30	5479.42	637.11	0.24
Main	22.765	2-yr	6725.00	775.34	790.29	782.14	790.65	0.000675	4.90	1522.95	467.04	0.25
Main	22.765	5-yr	12150.00	775.34	794.54	784.96	795.03	0.000665	5.95	2989.30	517.67	0.26
Main	22.765	10-yr	13500.00	775.34	796.00	785.56	796.47	0.000577	5.87	3506.15	553.54	0.25
Main	22.765	20-yr	19700.00	775.34	799.76	788.05	800.31	0.000563	6.58	4855.42	625.29	0.25
Main	22.765	50-yr	27700.00	775.34	804.30	791.71	804.91	0.000517	7.16	6535.66	688.04	0.25
Main	22.765	100-yr	33260.00	775.34	807.45	793.19	808.08	0.000473	7.39	7743.75	888.40	0.24
Main	22.765	200-yr	39100.00	775.34	810.43	794.47	811.09	0.000443	7.63	8891.54	1200.64	0.24
Main	22.765	500-yr	47000.00	775.34	814.20	795.97	814.90	0.000413	7.94	10343.68	1272.05	0.23
Main	22.765	Design Discharge	20700.00	775.34	800.88	788.43	801.40	0.000506	6.46	5265.60	655.93	0.24
Main	22.909	2-yr	6725.00	776.39	790.82	783.32	791.28	0.000939	5.53	1373.75	244.79	0.29
Main	22.909	5-yr	12150.00	776.39	795.04	786.34	795.65	0.000896	6.61	2720.36	683.98	0.30
Main	22.909	10-yr	13500.00	776.39	796.43	787.00	797.00	0.000773	6.50	3201.94	731.94	0.28
Main	22.909	20-yr	19700.00	776.39	800.17	790.13	800.82	0.000721	7.17	4491.39	810.68	0.28
Main	22.909	50-yr	27700.00	776.39	804.67	793.36	805.37	0.000642	7.72	6042.21	874.38	0.27
Main	22.909	100-yr	33260.00	776.39	807.78	794.84	808.50	0.000583	7.95	7115.07	942.56	0.26
Main	22.909	200-yr	39100.00	776.39	810.73	796.07	811.49	0.000546	8.23	8132.76	1421.64	0.26
Main	22.909	500-yr	47000.00	776.39	814.46	797.55	815.27	0.000510	8.58	9422.68	1494.43	0.26
Main	22.909	Design Discharge	20700.00	776.39	801.25	790.65	801.86	0.000646	7.03	4863.14	829.56	0.27
Main	23.030	2-yr	6725.00	777.57	791.51	784.02	791.79	0.000629	4.33	1856.81	616.16	0.24
Main	23.030	5-yr	12150.00	777.57	795.76	786.53	796.13	0.000574	5.15	3131.18	1494.97	0.24
Main	23.030	10-yr	13500.00	777.57	797.05	787.08	797.44	0.000541	5.29	3733.80	1603.03	0.23
Main	23.030	20-yr	19700.00	777.57	800.85	789.81	801.20	0.000420	5.38	6457.04	1670.05	0.21
Main	23.030	50-yr	27700.00	777.57	805.40	792.05	805.70	0.000305	5.26	10421.86	1803.09	0.19
Main	23.030	100-yr	33260.00	777.57	808.54	793.22	808.79	0.000239	5.05	13306.79	1842.92	0.17
Main	23.030	200-yr	39100.00	777.57	811.61	794.35	811.68	0.000084	3.22	32121.32	2202.98	0.10
Main	23.030	500-yr	47000.00	777.57	815.39	796.18	815.45	0.000065	3.06	40576.86	2259.71	0.09
Main	23.030	Design Discharge	20700.00	777.57	801.89	790.19	802.20	0.000363	5.17	7208.33	1675.02	0.20
Main	23.035		Bridge									
Main	23.039	2-yr	6725.00	777.57	791.66	784.02	791.93	0.000597	4.25	1900.32	653.12	0.23
Main	23.039	5-yr	12150.00	777.57	795.90	786.53	796.26	0.000553	5.02	3195.98	1555.74	0.23
Main	23.039	10-yr	13500.00	777.57	797.13	787.08	797.52	0.000529	4.83	3790.83	1605.41	0.21
Main	23.039	20-yr	19700.00	777.57	800.95	789.81	801.30	0.000410	5.33	6528.02	1670.52	0.21
Main	23.039	50-yr	27700.00	777.57	805.50	792.05	805.78	0.000299	5.22	10506.31	1803.89	0.19
Main	23.039	100-yr	33260.00	777.57	808.62	793.22	808.86	0.000236	5.02	13377.94	1845.25	0.17
Main	23.039	200-yr	39100.00	777.57	811.53	794.35	811.75	0.000199	4.93	16664.50	2200.62	0.16
Main	23.039	500-yr	47000.00	777.57	815.32	796.23	815.51	0.000159	4.77	21370.13	2258.33	0.14
Main	23.039	Design Discharge	20700.00	777.57	801.99	790.19	802.30	0.000354	5.12	7281.12	1675.51	0.20
Main	23.126	2-yr	6725.00	776.07	791.84	786.02	792.41	0.001327	6.26	1382.86	335.56	0.33
Main	23.126	5-yr	12150.00	776.07	796.02	789.03	796.72	0.001255	7.29	2530.33	1015.32	0.33
Main	23.126	10-yr	13500.00	776.07	797.26	789.60	797.93	0.001132	7.24	2879.86	1375.18	0.32
Main	23.126	20-yr	19700.00	776.07	800.94	792.94	801.69	0.001090	7.94	3914.57	1453.92	0.32

Main	23.126	50-yr	27700.00	776.07	805.34	795.14	806.16	0.001002	8.48	5166.34	1570.92	0.31
Main	23.126	100-yr	33260.00	776.07	808.39	796.40	809.22	0.000943	8.62	6045.29	1687.51	0.30
Main	23.126	200-yr	39100.00	776.07	811.24	797.63	812.10	0.000869	8.89	6995.18	2042.74	0.30
Main	23.126	500-yr	47000.00	776.07	814.95	799.11	815.85	0.000784	9.18	8236.42	2252.39	0.29
Main	23.126	Design Discharge	20700.00	776.07	801.94	793.26	802.66	0.000995	7.79	4199.57	1476.53	0.30
Main	23.284	2-yr	6725.00	781.23	793.10	788.43	793.54	0.001421	5.51	1606.23	446.00	0.34
Main	23.284	5-yr	12150.00	781.23	797.12	791.17	797.57	0.000941	5.87	3179.22	1404.61	0.30
Main	23.284	10-yr	13500.00	781.23	798.25	792.02	798.68	0.000815	5.80	3655.76	1448.65	0.28
Main	23.284	20-yr	19700.00	781.23	801.88	793.73	802.34	0.000669	6.17	5240.38	1555.94	0.26
Main	23.284	50-yr	27700.00	781.23	806.23	795.49	806.71	0.000544	6.48	7209.05	1677.78	0.25
Main	23.284	100-yr	33260.00	781.23	809.22	796.51	809.71	0.000474	6.61	8604.74	1785.38	0.24
Main	23.284	200-yr	39100.00	781.23	812.05	797.46	812.55	0.000431	6.78	10008.13	1883.04	0.23
Main	23.284	500-yr	47000.00	781.23	815.73	798.65	816.26	0.000392	7.05	12059.31	2061.51	0.22
Main	23.284	Design Discharge	20700.00	781.23	802.81	793.96	803.24	0.000599	6.05	5654.36	1588.91	0.25
Main	23.452	2-yr	6725.00	779.01	794.19	786.54	794.64	0.001117	5.38	1294.29	269.03	0.31
Main	23.452	5-yr	12150.00	779.01	797.86	789.96	798.46	0.001046	6.46	2596.19	401.51	0.31
Main	23.452	10-yr	13500.00	779.01	798.89	790.70	799.48	0.000953	6.48	3020.81	427.33	0.30
Main	23.452	20-yr	19700.00	779.01	802.38	793.44	803.01	0.000815	6.95	4668.22	515.36	0.29
Main	23.452	50-yr	27700.00	779.01	806.63	796.60	807.24	0.000646	7.14	7082.97	643.06	0.27
Main	23.452	100-yr	33260.00	779.01	809.58	797.97	810.15	0.000547	7.15	9017.09	959.23	0.25
Main	23.452	200-yr	39100.00	779.01	812.39	799.16	812.93	0.000469	7.11	11129.82	1476.55	0.24
Main	23.452	500-yr	47000.00	779.01	816.10	800.58	816.58	0.000376	6.92	14066.38	1700.29	0.22
Main	23.452	Design Discharge	20700.00	779.01	803.26	794.15	803.84	0.000735	6.81	5126.67	537.11	0.28
Main	23.540	2-yr	6725.00	780.58	794.84	788.93	795.18	0.001179	4.74	1509.46	275.52	0.27
Main	23.540	5-yr	12150.00	780.58	798.53	791.09	799.02	0.001313	5.81	2550.23	610.95	0.28
Main	23.540	10-yr	13500.00	780.58	799.49	791.56	800.00	0.001281	5.94	2851.32	821.82	0.28
Main	23.540	20-yr	19700.00	780.58	802.90	793.60	803.48	0.001241	6.54	4093.06	1127.44	0.28
Main	23.540	50-yr	27700.00	780.58	807.03	796.19	807.62	0.001077	6.85	5745.84	1400.98	0.26
Main	23.540	100-yr	33260.00	780.58	809.91	797.46	810.49	0.000955	6.92	6939.81	1594.71	0.25
Main	23.540	200-yr	39100.00	780.58	812.65	798.66	813.25	0.000876	7.05	8116.58	1696.49	0.24
Main	23.540	500-yr	47000.00	780.58	816.28	800.23	816.86	0.000768	7.11	9696.23	1778.89	0.23
Main	23.540	Design Discharge	20700.00	780.58	803.72	793.97	804.27	0.001148	6.45	4414.80	1192.91	0.27
Main	23.689	2-yr	6725.00	782.78	795.86	793.47	796.99	0.004075	8.53	787.99	201.06	0.63
Main	23.689	5-yr	12150.00	782.78	799.64	796.44	800.83	0.003654	8.85	1521.03	487.49	0.52
Main	23.689	10-yr	13500.00	782.78	800.55	796.93	801.72	0.003389	8.84	1716.97	549.41	0.49
Main	23.689	20-yr	19700.00	782.78	803.81	798.99	805.10	0.003002	9.41	2426.70	693.18	0.46
Main	23.689	50-yr	27700.00	782.78	807.67	800.98	809.08	0.002605	9.95	3283.83	752.98	0.42
Main	23.689	100-yr	33260.00	782.78	810.37	802.21	811.82	0.002322	10.15	3894.82	798.07	0.40
Main	23.689	200-yr	39100.00	782.78	812.98	803.41	814.49	0.002129	10.40	4494.93	1375.37	0.39
Main	23.689	500-yr	47000.00	782.78	816.44	804.88	818.01	0.001908	10.68	5300.65	1477.56	0.37
Main	23.689	Design Discharge	20700.00	782.78	804.53	799.28	805.79	0.002801	9.33	2584.92	703.00	0.44
Main	23.802	2-yr	6725.00	784.45	797.79	791.75	798.12	0.000980	4.76	1746.83	255.22	0.27
Main	23.802	5-yr	12150.00	784.45	801.46	794.20	801.90	0.000971	5.77	3011.77	378.90	0.28
Main	23.802	10-yr	13500.00	784.45	802.29	794.49	802.76	0.000948	5.92	3333.99	391.12	0.28
Main	23.802	20-yr	19700.00	784.45	805.53	796.81	806.07	0.000903	6.58	4647.97	415.46	0.28
Main	23.802	50-yr	27700.00	784.45	809.35	799.16	809.95	0.000823	7.13	6275.06	435.84	0.27
Main	23.802	100-yr	33260.00	784.45	812.00	800.36	812.62	0.000751	7.34	7447.32	872.42	0.26
Main	23.802	200-yr	39100.00	784.45	814.60	801.45	815.24	0.000693	7.54	8615.79	1152.12	0.26
Main	23.802	500-yr	47000.00	784.45	818.04	802.82	818.70	0.000627	7.77	10233.81	1286.54	0.25
Main	23.802	Design Discharge	20700.00	784.45	806.17	797.08	806.71	0.000865	6.59	4916.00	418.77	0.27
Main	23.923	2-yr	6725.00	786.15	798.40	793.85	799.09	0.001986	6.64	1012.27	320.09	0.41
Main	23.923	5-yr	12150.00	786.15	801.97	796.61	802.88	0.001849	7.82	1943.55	352.81	0.41
Main	23.923	10-yr	13500.00	786.15	802.78	797.20	803.70	0.001754	7.98	2172.74	357.61	0.41
Main	23.923	20-yr	19700.00	786.15	805.91	800.17	806.96	0.001543	8.74	3086.86	375.30	0.40
Main	23.923	50-yr	27700.00	786.15	809.62	802.33	810.79	0.001331	9.39	4198.88	393.24	0.38
Main	23.923	100-yr	33260.00	786.15	812.19	803.56	813.40	0.001189	9.67	4986.45	931.51	0.37
Main	23.923	200-yr	39100.00	786.15	814.72	804.73	815.98	0.001083	9.94	5776.82	1166.57	0.36
Main	23.923	500-yr	47000.00	786.15	818.08	806.14	819.39	0.000962	10.23	6845.82	1183.10	0.35
Main	23.923	Design Discharge	20700.00	786.15	806.52	800.51	807.57	0.001466	8.74	3268.15	378.26	0.39
Main	24.059	2-yr	6725.00	787.91	799.79	795.53	800.74	0.002426	7.85	891.78	171.36	0.45
Main	24.059	5-yr	12150.00	787.91	803.13	798.57	804.63	0.002675	10.07	1525.16	471.63	0.49
Main	24.059	10-yr	13500.00	787.91	803.84	799.26	805.43	0.002675	10.44	1692.05	485.45	0.50
Main	24.059	20-yr	19700.00	787.91	806.71	802.62	808.64	0.002650	11.81	2384.20	573.94	0.51
Main	24.059	50-yr	27700.00	787.91	810.17	805.22	812.34	0.002459	12.91	3232.61	618.71	0.51
Main	24.059	100-yr	33260.00	787.91	812.58	806.67	814.85	0.002258	13.36	3838.54	665.38	0.50
Main	24.059	200-yr	39100.00	787.91	815.00	808.02	817.34	0.002090	13.76	4453.73	963.18	0.49
Main	24.059	500-yr	47000.00	787.91	818.23	809.73	820.65	0.001878	14.16	5292.78	1198.02	0.47
Main	24.059	Design Discharge	20700.00	787.91	807.26	803.00	809.19	0.002571	11.88	2516.35	578.03	0.51

Main	24.165	2-yr	6725.00	789.29	801.51	796.93	802.08	0.002232	6.05	1111.85	143.44	0.38
Main	24.165	5-yr	12150.00	789.29	805.34	799.38	805.99	0.001975	6.70	2243.02	439.75	0.36
Main	24.165	10-yr	13500.00	789.29	806.10	799.91	806.77	0.001899	6.83	2483.52	444.71	0.35
Main	24.165	20-yr	19700.00	789.29	809.17	802.76	809.92	0.001696	7.44	3464.53	465.21	0.34
Main	24.165	50-yr	27700.00	789.29	812.69	804.89	813.53	0.001513	8.03	4616.20	597.23	0.33
Main	24.165	100-yr	33260.00	789.29	815.07	805.97	815.95	0.001389	8.30	5407.57	909.27	0.32
Main	24.165	200-yr	39100.00	789.29	817.46	807.00	818.38	0.001284	8.55	6214.12	1067.35	0.31
Main	24.165	500-yr	47000.00	789.29	820.63	808.25	821.60	0.001156	8.81	7301.61	1109.72	0.30
Main	24.165	Design Discharge	20700.00	789.29	809.68	803.10	810.44	0.001650	7.50	3629.58	469.13	0.34
Main	24.326	2-yr	6725.00	790.73	803.02	797.99	803.66	0.001531	6.48	1146.76	364.54	0.37
Main	24.326	5-yr	12150.00	790.73	806.62	800.64	807.45	0.001423	7.70	2351.96	778.00	0.37
Main	24.326	10-yr	13500.00	790.73	807.33	801.21	808.19	0.001409	7.93	2613.57	969.77	0.37
Main	24.326	20-yr	19700.00	790.73	810.26	804.45	811.24	0.001347	8.80	3686.60	1020.54	0.38
Main	24.326	50-yr	27700.00	790.73	813.65	806.83	814.74	0.001250	9.57	4928.76	1039.64	0.37
Main	24.326	100-yr	33260.00	790.73	815.94	808.05	817.07	0.001169	9.94	5766.18	1064.75	0.37
Main	24.326	200-yr	39100.00	790.73	818.25	809.15	819.43	0.001095	10.26	6612.08	1094.97	0.36
Main	24.326	500-yr	47000.00	790.73	821.33	810.50	822.55	0.000999	10.59	7741.36	1117.47	0.35
Main	24.326	Design Discharge	20700.00	790.73	810.74	804.84	811.73	0.001324	8.89	3861.91	1023.71	0.37
Main	24.476	2-yr	5870.00	791.35	804.46	800.02	805.26	0.002754	7.20	852.13	155.40	0.46
Main	24.476	5-yr	10900.00	791.35	807.83	803.86	808.98	0.002592	8.82	1548.70	529.52	0.47
Main	24.476	10-yr	12600.00	791.35	808.50	804.56	809.78	0.002737	9.43	1743.75	555.17	0.49
Main	24.476	20-yr	19100.00	791.35	811.27	807.56	812.82	0.002632	10.69	2582.27	711.40	0.50
Main	24.476	50-yr	27300.00	791.35	814.51	809.92	816.22	0.002366	11.61	3601.92	741.73	0.49
Main	24.476	100-yr	32830.00	791.35	816.70	811.15	818.46	0.002141	11.95	4319.08	759.78	0.47
Main	24.476	200-yr	38750.00	791.35	818.92	812.35	820.72	0.001951	12.25	5067.94	774.36	0.46
Main	24.476	500-yr	46700.00	791.35	821.91	813.80	823.73	0.001716	12.51	6101.96	794.22	0.44
Main	24.476	Design Discharge	20100.00	791.35	811.72	807.85	813.28	0.002573	10.79	2720.80	715.73	0.50
Main	24.653	2-yr	5870.00	791.35	806.19	799.05	806.57	0.000808	4.92	1193.44	113.49	0.26
Main	24.653	5-yr	10900.00	791.35	809.77	801.62	810.45	0.001039	6.72	2013.40	880.54	0.31
Main	24.653	10-yr	12600.00	791.35	810.58	802.38	811.35	0.001116	7.22	2318.70	904.09	0.32
Main	24.653	20-yr	19100.00	791.35	813.43	804.97	814.44	0.001251	8.55	3405.68	934.42	0.35
Main	24.653	50-yr	27300.00	791.35	816.57	808.72	817.77	0.001294	9.67	4621.88	967.81	0.37
Main	24.653	100-yr	32830.00	791.35	818.63	810.98	819.90	0.001266	10.16	5428.47	976.16	0.37
Main	24.653	200-yr	38750.00	791.35	820.73	812.37	822.08	0.001227	10.59	6260.19	1022.81	0.37
Main	24.653	500-yr	46700.00	791.35	823.56	813.93	824.95	0.001151	11.00	7384.67	1042.75	0.36
Main	24.653	Design Discharge	20100.00	791.35	813.85	805.35	814.88	0.001256	8.70	3567.48	937.32	0.35
Main	24.865	2-yr	5870.00	795.12	807.28	803.54	808.13	0.002485	7.88	1012.24	321.47	0.45
Main	24.865	5-yr	10900.00	795.12	811.02	806.61	812.40	0.002849	10.15	1895.97	1006.05	0.50
Main	24.865	10-yr	12600.00	795.12	811.94	807.43	813.30	0.002744	10.37	2343.65	1183.01	0.50
Main	24.865	20-yr	19100.00	795.12	814.96	810.73	816.15	0.002181	10.57	3923.34	1207.01	0.46
Main	24.865	50-yr	27300.00	795.12	818.21	810.67	819.30	0.001806	10.83	5613.47	1268.33	0.43
Main	24.865	100-yr	32830.00	795.12	820.28	814.94	821.33	0.001612	10.94	6697.08	1274.65	0.41
Main	24.865	200-yr	38750.00	795.12	822.39	815.86	823.42	0.001459	11.06	7795.59	1281.03	0.40
Main	24.865	500-yr	46700.00	795.12	825.18	816.97	826.17	0.001286	11.18	9248.34	1289.46	0.38
Main	24.865	Design Discharge	20100.00	795.12	815.39	810.67	816.56	0.002117	10.60	4146.56	1210.30	0.45
Main	25.145	2-yr	5870.00	799.02	810.68	806.52	811.41	0.002093	6.86	914.08	592.99	0.42
Main	25.145	5-yr	10900.00	799.02	814.58	809.39	815.44	0.001647	7.84	2072.95	1357.42	0.39
Main	25.145	10-yr	12600.00	799.02	815.35	810.21	816.29	0.001702	8.30	2334.54	1363.28	0.40
Main	25.145	20-yr	19100.00	799.02	817.66	813.59	818.92	0.001977	9.97	3116.51	1413.07	0.45
Main	25.145	50-yr	27300.00	799.02	820.36	815.68	821.91	0.002067	11.35	4035.92	1416.11	0.47
Main	25.145	100-yr	32830.00	799.02	822.12	816.85	823.82	0.002047	12.02	4636.63	1418.08	0.48
Main	25.145	200-yr	38750.00	799.02	823.96	817.96	825.78	0.001999	12.60	5263.12	1420.14	0.48
Main	25.145	500-yr	46700.00	799.02	826.43	819.36	828.37	0.001893	13.18	6107.54	1422.93	0.47
Main	25.145	Design Discharge	20100.00	799.02	818.00	813.89	819.31	0.001995	10.16	3234.21	1413.46	0.45
Main	25.238	2-yr	5870.00	800.38	811.69	807.63	812.49	0.002244	7.21	844.59	132.02	0.43
Main	25.238	5-yr	10900.00	800.38	815.36	810.49	816.40	0.002036	8.58	1937.30	963.53	0.43
Main	25.238	10-yr	12600.00	800.38	816.18	811.35	817.24	0.001993	8.86	2341.26	1354.40	0.43
Main	25.238	20-yr	19100.00	800.38	818.80	814.67	819.90	0.001860	9.67	3642.79	1802.27	0.43
Main	25.238	50-yr	27300.00	800.38	821.80	817.50	822.88	0.001623	10.14	5161.01	2007.71	0.41
Main	25.238	100-yr	32830.00	800.38	823.68	818.50	824.76	0.001491	10.36	6129.50	2124.41	0.40
Main	25.238	200-yr	38750.00	800.38	825.61	819.45	826.68	0.001376	10.56	7133.77	2179.02	0.39
Main	25.238	500-yr	46700.00	800.38	828.17	820.58	829.22	0.001220	10.69	8475.98	2242.53	0.38
Main	25.238	Design Discharge	20100.00	800.38	819.19	814.68	820.29	0.001825	9.73	3838.63	1863.92	0.43
Main	25.402	2-yr	5870.00	802.56	813.74	809.71	814.44	0.002216	6.72	873.23	132.34	0.46
Main	25.402	5-yr	10900.00	802.56	817.41	812.95	818.32	0.002358	7.64	1426.13	166.94	0.46
Main	25.402	10-yr	12600.00	802.56	818.19	813.68	819.20	0.002554	8.09	1557.88	173.45	0.48
Main	25.402	20-yr	19100.00	802.56	820.67	816.05	822.07	0.003190	9.48	2014.15	194.22	0.52
Main	25.402	50-yr	27300.00	802.56	823.31	818.40	825.07	0.003507	10.68	2681.30	758.68	0.53
Main	25.402	100-yr	32830.00	802.56	825.00	819.77	826.85	0.003402	11.08	3249.10	1278.77	0.51

Main	25.402	200-yr	38750.00	802.56	826.77	821.08	828.65	0.003203	11.32	3851.65	1386.02	0.49
Main	25.402	500-yr	46700.00	802.56	829.12	823.20	831.00	0.002884	11.45	4765.66	2008.66	0.47
Main	25.402	Design Discharge	20100.00	802.56	821.02	816.35	822.46	0.003264	9.65	2082.39	196.99	0.52
Main	25.584	2-yr	5870.00	804.31	815.50	810.32	815.90	0.001067	5.06	1191.29	196.21	0.30
Main	25.584	5-yr	10900.00	804.31	819.19	812.55	819.72	0.000973	6.10	2381.74	426.37	0.30
Main	25.584	10-yr	12600.00	804.31	820.08	813.22	820.66	0.000986	6.43	2697.10	582.09	0.31
Main	25.584	20-yr	19100.00	804.31	822.96	815.54	823.70	0.001032	7.50	3745.44	620.07	0.33
Main	25.584	50-yr	27300.00	804.31	825.89	818.46	826.82	0.001086	8.59	4843.19	655.52	0.35
Main	25.584	100-yr	32830.00	804.31	827.55	819.67	828.60	0.001130	9.26	5484.91	688.80	0.36
Main	25.584	200-yr	38750.00	804.31	829.19	820.85	830.38	0.001165	9.89	6196.71	772.19	0.37
Main	25.584	500-yr	46700.00	804.31	831.33	822.17	832.64	0.001171	10.54	7376.62	909.04	0.37
Main	25.584	Design Discharge	20100.00	804.31	823.35	816.33	824.12	0.001037	7.64	3892.30	626.02	0.33
Main	25.804	2-yr	5870.00	806.42	816.90	812.32	817.51	0.001711	6.23	941.65	109.94	0.38
Main	25.804	5-yr	10900.00	806.42	820.40	814.91	821.38	0.001907	8.03	1534.16	260.00	0.42
Main	25.804	10-yr	12600.00	806.42	821.27	815.66	822.36	0.001948	8.52	1767.44	275.25	0.42
Main	25.804	20-yr	19100.00	806.42	824.09	818.31	825.52	0.002041	9.99	2583.54	299.98	0.45
Main	25.804	50-yr	27300.00	806.42	826.95	821.63	828.78	0.002158	11.52	3469.11	338.70	0.48
Main	25.804	100-yr	32830.00	806.42	828.54	823.10	830.73	0.002331	12.66	4080.86	453.54	0.50
Main	25.804	200-yr	38750.00	806.42	830.20	824.52	832.53	0.002310	13.29	4871.62	486.50	0.51
Main	25.804	500-yr	46700.00	806.42	832.35	826.12	834.74	0.002189	13.79	5928.43	514.17	0.50
Main	25.804	Design Discharge	20100.00	806.42	824.47	818.75	825.95	0.002048	10.17	2700.49	301.69	0.45
Main	25.977	2-yr	5870.00	809.11	819.02	816.21	819.46	0.002703	5.57	1278.44	271.83	0.39
Main	25.977	5-yr	10900.00	809.11	822.70	818.18	823.18	0.001918	6.00	2352.31	303.76	0.34
Main	25.977	10-yr	12600.00	809.11	823.65	818.65	824.17	0.001864	6.23	2643.51	309.13	0.33
Main	25.977	20-yr	19100.00	809.11	826.71	820.29	827.35	0.001798	7.07	3614.23	325.55	0.33
Main	25.977	50-yr	27300.00	809.11	829.88	821.97	830.72	0.001872	8.16	4749.93	394.55	0.35
Main	25.977	100-yr	32830.00	809.11	831.82	822.98	832.76	0.001845	8.66	5557.09	437.67	0.35
Main	25.977	200-yr	38750.00	809.11	833.54	823.99	834.58	0.001894	9.25	6361.48	505.53	0.36
Main	25.977	500-yr	46700.00	809.11	835.58	825.24	836.76	0.001935	9.91	7426.48	686.29	0.37
Main	25.977	Design Discharge	20100.00	809.11	827.13	820.51	827.79	0.001796	7.19	3749.97	327.77	0.33
Main	26.154	2-yr	5870.00	812.47	821.52	819.04	822.29	0.003152	7.22	1019.17	276.80	0.50
Main	26.154	5-yr	10900.00	812.47	824.46	821.72	825.42	0.002604	8.40	1835.47	529.59	0.48
Main	26.154	10-yr	12600.00	812.47	825.33	822.29	826.34	0.002493	8.71	2078.47	543.69	0.48
Main	26.154	20-yr	19100.00	812.47	828.21	824.06	829.43	0.002262	9.77	2898.89	639.07	0.47
Main	26.154	50-yr	27300.00	812.47	831.34	825.89	832.78	0.002100	10.85	3805.84	882.83	0.47
Main	26.154	100-yr	32830.00	812.47	833.20	827.03	834.80	0.002043	11.49	4355.45	924.22	0.47
Main	26.154	200-yr	38750.00	812.47	834.89	828.14	836.68	0.002057	12.23	4860.52	954.87	0.48
Main	26.154	500-yr	46700.00	812.47	836.88	829.52	838.95	0.002112	13.21	5463.10	978.21	0.50
Main	26.154	Design Discharge	20100.00	812.47	828.61	824.30	829.86	0.002242	9.92	3013.50	652.39	0.47
Main	26.295	2-yr	5870.00	815.14	823.91	821.51	824.76	0.003356	7.51	968.11	444.50	0.51
Main	26.295	5-yr	10900.00	815.14	826.57	824.37	827.62	0.002960	8.83	1904.87	904.42	0.51
Main	26.295	10-yr	12600.00	815.14	827.36	825.00	828.45	0.002827	9.12	2188.86	992.29	0.51
Main	26.295	20-yr	19100.00	815.14	830.11	826.74	831.33	0.002468	10.01	3173.46	1011.45	0.49
Main	26.295	50-yr	27300.00	815.14	833.18	828.48	834.54	0.002178	10.85	4284.23	1041.63	0.48
Main	26.295	100-yr	32830.00	815.14	835.04	829.49	836.50	0.002060	11.36	4963.55	1061.39	0.48
Main	26.295	200-yr	38750.00	815.14	836.80	830.51	838.38	0.002007	11.94	5607.66	1154.61	0.48
Main	26.295	500-yr	46700.00	815.14	838.91	831.78	840.67	0.001982	12.71	6387.10	1279.81	0.48
Main	26.295	Design Discharge	20100.00	815.14	830.50	826.97	831.74	0.002427	10.12	3314.15	1014.17	0.49
Main	26.512	2-yr	5870.00	816.48	827.29	823.51	827.96	0.002334	6.54	897.22	526.06	0.43
Main	26.512	5-yr	10900.00	816.48	829.86	826.13	831.06	0.003006	8.83	1275.35	1104.67	0.51
Main	26.512	10-yr	12600.00	816.48	830.55	826.87	831.94	0.003143	9.47	1398.56	1243.67	0.53
Main	26.512	20-yr	19100.00	816.48	832.91	829.31	834.28	0.002697	10.10	3177.63	1293.33	0.51
Main	26.512	50-yr	27300.00	816.48	835.67	832.42	837.02	0.002241	10.53	4798.48	1318.59	0.48
Main	26.512	100-yr	32830.00	816.48	837.46	833.42	838.77	0.001987	10.68	5870.15	1347.47	0.46
Main	26.512	200-yr	38750.00	816.48	839.22	834.33	840.53	0.001807	10.88	6946.72	1372.94	0.44
Main	26.512	500-yr	46700.00	816.48	841.40	835.45	842.72	0.001645	11.17	8307.61	1408.05	0.43
Main	26.512	Design Discharge	20100.00	816.48	833.25	829.64	834.63	0.002640	10.18	3378.23	1296.49	0.50
Main	26.514	Bridge										
Main	26.518	2-yr	5870.00	816.48	827.59	823.51	828.20	0.002072	6.28	934.89	541.79	0.41
Main	26.518	5-yr	10900.00	816.48	830.30	826.13	831.39	0.002567	8.42	1353.50	1198.78	0.47
Main	26.518	10-yr	12600.00	816.48	831.36	826.87	832.33	0.002114	8.18	2297.84	1275.21	0.44
Main	26.518	20-yr	19100.00	816.48	833.29	829.31	834.52	0.002349	9.62	3404.63	1296.83	0.47
Main	26.518	50-yr	27300.00	816.48	835.84	832.41	837.13	0.002133	10.35	4901.68	1320.10	0.47
Main	26.518	100-yr	32830.00	816.48	837.65	833.42	838.91	0.001890	10.49	5990.97	1350.14	0.45
Main	26.518	200-yr	38750.00	816.48	839.43	834.33	840.69	0.001720	10.69	7081.46	1376.03	0.43
Main	26.518	500-yr	46700.00	816.48	841.63	835.44	842.90	0.001570	10.99	8456.51	1412.08	0.42
Main	26.518	Design Discharge	20100.00	816.48	833.60	829.64	834.84	0.002340	9.75	3582.44	1299.62	0.48

Main	26.737	2-yr	5870.00	817.41	829.59	823.82	830.07	0.001276	5.60	1171.39	315.16	0.36
Main	26.737	5-yr	10900.00	817.41	832.88	826.70	833.37	0.001228	6.09	2955.72	1204.29	0.34
Main	26.737	10-yr	12600.00	817.41	833.61	827.55	834.12	0.001257	6.30	3393.40	1221.21	0.34
Main	26.737	20-yr	19100.00	817.41	835.84	831.13	836.44	0.001384	7.11	4732.81	1266.80	0.35
Main	26.737	50-yr	27300.00	817.41	838.26	833.14	838.93	0.001428	7.86	6200.03	1315.60	0.36
Main	26.737	100-yr	32830.00	817.41	839.86	834.02	840.57	0.001394	8.17	7181.47	1353.12	0.35
Main	26.737	200-yr	38750.00	817.41	841.49	834.80	842.22	0.001356	8.46	8186.77	1515.91	0.35
Main	26.737	500-yr	46700.00	817.41	843.54	835.75	844.32	0.001309	8.81	9468.09	1545.24	0.34
Main	26.737	Design Discharge	20100.00	817.41	836.15	831.39	836.76	0.001395	7.22	4918.91	1273.07	0.35
Main	26.930	2-yr	5870.00	819.27	830.87	824.90	831.27	0.001075	5.03	1177.59	409.32	0.30
Main	26.930	5-yr	10900.00	819.27	833.98	827.50	834.64	0.001246	6.64	2081.65	701.64	0.34
Main	26.930	10-yr	12600.00	819.27	834.71	828.23	835.45	0.001313	7.09	2382.79	848.14	0.35
Main	26.930	20-yr	19100.00	819.27	836.94	830.67	837.95	0.001548	8.58	3330.70	946.89	0.39
Main	26.930	50-yr	27300.00	819.27	839.34	834.08	840.47	0.001547	9.49	4937.55	1001.06	0.40
Main	26.930	100-yr	32830.00	819.27	840.87	835.39	842.10	0.001561	10.08	5740.84	1026.87	0.41
Main	26.930	200-yr	38750.00	819.27	842.42	836.55	843.74	0.001556	10.62	6576.08	1050.53	0.42
Main	26.930	500-yr	46700.00	819.27	844.39	838.01	845.82	0.001537	11.22	7662.37	1078.59	0.42
Main	26.930	Design Discharge	20100.00	819.27	837.24	831.16	838.30	0.001577	8.78	3462.37	954.53	0.40
Main	26.933		Bridge									
Main	26.936	2-yr	5870.00	819.27	831.06	824.90	831.44	0.001000	4.92	1210.18	411.94	0.29
Main	26.936	5-yr	10900.00	819.27	834.18	827.50	834.81	0.001166	6.49	2164.52	734.16	0.33
Main	26.936	10-yr	12600.00	819.27	834.92	828.23	835.62	0.001229	6.93	2469.36	864.81	0.34
Main	26.936	20-yr	19100.00	819.27	837.14	830.67	838.12	0.001461	8.42	3421.22	952.18	0.38
Main	26.936	50-yr	27300.00	819.27	839.47	834.08	840.57	0.001499	9.38	5004.02	1003.64	0.40
Main	26.936	100-yr	32830.00	819.27	841.03	835.39	842.23	0.001505	9.96	5827.52	1029.35	0.40
Main	26.936	200-yr	38750.00	819.27	842.61	836.55	843.90	0.001495	10.47	6682.32	1053.34	0.41
Main	26.936	500-yr	46700.00	819.27	844.62	838.01	846.00	0.001473	11.06	7790.61	1081.85	0.41
Main	26.936	Design Discharge	20100.00	819.27	837.44	831.16	838.46	0.001491	8.61	3552.02	959.63	0.39
Main	27.168	2-yr	5870.00	824.18	832.86	830.39	833.75	0.003894	7.57	775.59	138.93	0.56
Main	27.168	5-yr	10900.00	824.18	836.07	833.05	837.23	0.003366	8.64	1262.35	958.95	0.54
Main	27.168	10-yr	12600.00	824.18	836.85	833.69	838.13	0.003369	9.09	1389.49	1095.38	0.55
Main	27.168	20-yr	19100.00	824.18	839.24	835.80	841.04	0.003586	10.77	1804.98	1231.25	0.57
Main	27.168	50-yr	27300.00	824.18	841.42	837.89	843.63	0.003753	12.25	2915.31	1401.08	0.59
Main	27.168	100-yr	32830.00	824.18	843.01	839.18	845.00	0.003180	12.08	4029.00	1433.65	0.55
Main	27.168	200-yr	38750.00	824.18	844.60	842.41	846.37	0.002683	11.81	5152.90	1452.87	0.51
Main	27.168	500-yr	46700.00	824.18	846.60	843.52	848.15	0.002212	11.52	6631.02	1544.23	0.47
Main	27.168	Design Discharge	20100.00	824.18	839.56	836.09	841.43	0.003628	11.01	1860.37	1248.11	0.58
Main	27.173		Bridge									
Main	27.179	2-yr	5870.00	824.18	833.34	830.39	834.09	0.003084	6.97	842.52	142.36	0.50
Main	27.179	5-yr	10900.00	824.18	836.53	833.05	837.57	0.002832	8.17	1336.76	1073.21	0.50
Main	27.179	10-yr	12600.00	824.18	837.32	833.69	838.48	0.002853	8.62	1469.97	1128.29	0.50
Main	27.179	20-yr	19100.00	824.18	839.82	835.80	841.44	0.003042	10.22	1906.75	1301.79	0.53
Main	27.179	50-yr	27300.00	824.18	842.47	837.89	844.09	0.002624	10.73	3654.72	1427.31	0.50
Main	27.179	100-yr	32830.00	824.18	843.73	839.18	845.34	0.002523	11.08	4534.85	1442.21	0.50
Main	27.179	200-yr	38750.00	824.18	845.18	842.41	846.70	0.002264	11.09	5559.57	1463.03	0.47
Main	27.179	500-yr	46700.00	824.18	847.27	843.52	848.59	0.001854	10.78	7156.99	1567.65	0.44
Main	27.179	Design Discharge	20100.00	824.18	840.17	836.09	841.85	0.003058	10.42	2051.41	1346.10	0.53
Main	27.323	2-yr	5870.00	826.09	835.67	832.62	836.42	0.002955	7.52	1076.40	246.74	0.51
Main	27.323	5-yr	10900.00	826.09	838.82	835.56	839.66	0.002540	8.35	2132.82	642.28	0.47
Main	27.323	10-yr	12600.00	826.09	839.68	836.37	840.55	0.002444	8.56	2450.00	662.54	0.47
Main	27.323	20-yr	19100.00	826.09	842.56	838.41	843.51	0.002227	9.31	3499.79	709.40	0.45
Main	27.323	50-yr	27300.00	826.09	844.90	840.14	846.12	0.002462	10.72	4357.08	758.47	0.48
Main	27.323	100-yr	32830.00	826.09	845.99	841.15	847.44	0.002769	11.82	4753.12	787.01	0.51
Main	27.323	200-yr	38750.00	826.09	847.12	842.12	848.81	0.003020	12.82	5167.15	817.46	0.53
Main	27.323	500-yr	46700.00	826.09	848.75	843.30	850.68	0.003175	13.84	5760.36	870.50	0.55
Main	27.323	Design Discharge	20100.00	826.09	842.95	838.65	843.92	0.002209	9.42	3642.92	716.36	0.45
Main	27.510	2-yr	5870.00	827.20	838.22	834.52	838.96	0.002369	7.10	1071.27	626.98	0.44
Main	27.510	5-yr	10900.00	827.20	841.09	838.04	842.11	0.002522	8.74	1852.58	648.39	0.47
Main	27.510	10-yr	12600.00	827.20	841.89	838.73	842.99	0.002564	9.18	2069.75	652.33	0.47
Main	27.510	20-yr	19100.00	827.20	844.52	840.75	845.92	0.002611	10.62	2836.37	702.69	0.50
Main	27.510	50-yr	27300.00	827.20	846.99	842.70	848.78	0.002820	12.27	3709.39	802.95	0.53
Main	27.510	100-yr	32830.00	827.20	848.30	843.90	850.34	0.002992	13.29	4251.82	826.93	0.55
Main	27.510	200-yr	38750.00	827.20	849.61	845.12	851.89	0.003108	14.20	4844.87	878.98	0.57
Main	27.510	500-yr	46700.00	827.20	851.35	846.76	853.85	0.003143	15.12	5693.31	920.58	0.58
Main	27.510	Design Discharge	20100.00	827.20	844.89	841.02	846.32	0.002614	10.80	2952.85	709.58	0.50
Main	27.702	2-yr	5870.00	826.51	839.92	832.89	840.35	0.000866	5.36	1338.12	305.30	0.27
Main	27.702	5-yr	10900.00	826.51	843.06	835.73	843.83	0.001198	7.37	2042.67	490.30	0.34

Main	27.702	10-yr	12600.00	826.51	843.91	836.55	844.79	0.001290	7.94	2236.44	558.32	0.35
Main	27.702	20-yr	19100.00	826.51	846.66	840.12	847.94	0.001591	9.80	2871.27	694.68	0.40
Main	27.702	50-yr	27300.00	826.51	849.29	842.73	851.11	0.001945	11.84	3494.40	792.05	0.45
Main	27.702	100-yr	32830.00	826.51	850.73	844.17	852.93	0.002187	13.11	3839.49	817.82	0.49
Main	27.702	200-yr	38750.00	826.51	852.12	845.61	854.72	0.002428	14.38	4175.35	841.87	0.52
Main	27.702	500-yr	46700.00	826.51	853.81	847.35	856.97	0.002722	15.92	4590.95	876.36	0.55
Main	27.702	Design Discharge	20100.00	826.51	847.03	840.49	848.37	0.001631	10.06	2958.24	702.30	0.41
Main	27.865	2-yr	5870.00	826.79	840.68	833.16	841.07	0.000784	5.04	1240.35	233.60	0.28
Main	27.865	5-yr	10900.00	826.79	844.17	835.94	844.79	0.000992	6.53	2234.33	588.02	0.31
Main	27.865	10-yr	12600.00	826.79	845.14	836.77	845.82	0.001035	6.91	2513.98	676.91	0.32
Main	27.865	20-yr	19100.00	826.79	848.28	840.20	849.17	0.001159	8.12	3438.11	793.97	0.34
Main	27.865	50-yr	27300.00	826.79	851.43	843.42	852.57	0.001290	9.40	4380.77	842.84	0.36
Main	27.865	100-yr	32830.00	826.79	853.23	844.78	854.53	0.001372	10.16	4929.07	870.74	0.37
Main	27.865	200-yr	38750.00	826.79	855.00	846.05	856.48	0.001447	10.90	5474.71	897.92	0.39
Main	27.865	500-yr	46700.00	826.79	857.20	847.63	858.89	0.001527	11.79	6161.91	922.85	0.40
Main	27.865	Design Discharge	20100.00	826.79	848.71	840.66	849.63	0.001174	8.29	3565.75	801.85	0.34
Main	28.010	2-yr	5870.00	828.61	841.36	838.87	842.41	0.003817	8.74	1011.96	640.51	0.55
Main	28.010	5-yr	10900.00	828.61	845.07	842.31	846.09	0.002603	9.32	2118.45	786.28	0.48
Main	28.010	10-yr	12600.00	828.61	846.07	842.88	847.11	0.002466	9.58	2417.00	798.14	0.47
Main	28.010	20-yr	19100.00	828.61	849.29	844.74	850.49	0.002235	10.61	3384.41	885.49	0.47
Main	28.010	50-yr	27300.00	828.61	852.52	846.70	853.95	0.002192	11.89	4352.94	966.65	0.48
Main	28.010	100-yr	32830.00	828.61	854.37	847.83	855.98	0.002213	12.71	4908.32	1000.05	0.49
Main	28.010	200-yr	38750.00	828.61	856.18	848.96	857.97	0.002243	13.52	5451.94	1036.61	0.50
Main	28.010	500-yr	46700.00	828.61	858.42	850.41	860.45	0.002281	14.51	6123.46	1074.44	0.51
Main	28.010	Design Discharge	20100.00	828.61	849.73	845.00	850.95	0.002219	10.77	3516.02	899.54	0.47
Main	28.289	2-yr	5870.00	832.09	845.28	840.14	845.95	0.001586	6.77	1082.60	679.18	0.37
Main	28.289	5-yr	10900.00	832.09	848.43	843.71	849.58	0.002030	9.12	1611.58	765.07	0.43
Main	28.289	10-yr	12600.00	832.09	849.34	844.57	850.64	0.002125	9.74	1765.12	956.55	0.45
Main	28.289	20-yr	19100.00	832.09	852.36	847.12	854.20	0.002413	11.76	2272.90	1400.99	0.49
Main	28.289	50-yr	27300.00	832.09	855.46	849.73	857.96	0.002702	13.87	2794.81	2297.95	0.54
Main	28.289	100-yr	32830.00	832.09	857.26	851.26	860.20	0.002880	15.13	3096.97	2318.18	0.56
Main	28.289	200-yr	38750.00	832.09	859.01	852.81	862.42	0.003055	16.38	3390.61	2328.35	0.59
Main	28.289	500-yr	46700.00	832.09	861.14	854.72	865.18	0.003269	17.92	3748.80	2339.69	0.61
Main	28.289	Design Discharge	20100.00	832.09	852.77	847.47	854.69	0.002450	12.04	2342.75	1459.91	0.50
Main	28.505	2-yr	5870.00	836.15	847.48	843.75	848.20	0.002483	6.78	865.79	429.15	0.44
Main	28.505	5-yr	10900.00	836.15	851.19	846.46	852.18	0.002518	8.00	1406.02	725.42	0.46
Main	28.505	10-yr	12600.00	836.15	852.19	847.21	853.24	0.002371	8.27	1684.41	817.30	0.46
Main	28.505	20-yr	19100.00	836.15	855.64	849.72	856.67	0.001747	8.57	3351.30	1480.65	0.41
Main	28.505	50-yr	27300.00	836.15	859.45	852.80	860.11	0.000985	7.60	7088.21	2055.11	0.32
Main	28.505	100-yr	32830.00	836.15	861.73	854.81	862.23	0.000720	7.05	9431.35	2451.76	0.28
Main	28.505	200-yr	38750.00	836.15	864.01	855.94	864.45	0.000583	6.83	13021.38	2556.03	0.26
Main	28.505	500-yr	46700.00	836.15	866.80	858.07	866.96	0.000246	4.81	24749.41	2609.63	0.17
Main	28.505	Design Discharge	20100.00	836.15	856.12	850.11	857.18	0.001715	8.69	3696.27	1575.87	0.41
Main	28.510		Bridge									
Main	28.515	2-yr	5870.00	836.15	847.59	843.75	848.28	0.002388	6.68	878.47	434.29	0.44
Main	28.515	5-yr	10900.00	836.15	851.37	846.46	852.33	0.002224	7.87	1451.08	744.20	0.44
Main	28.515	10-yr	12600.00	836.15	852.53	847.21	853.52	0.002035	8.04	1794.55	833.40	0.43
Main	28.515	20-yr	19100.00	836.15	855.79	849.72	856.82	0.001648	8.57	3448.00	1501.26	0.40
Main	28.515	50-yr	27300.00	836.15	859.86	852.78	860.46	0.000873	7.38	7503.77	2137.19	0.30
Main	28.515	100-yr	32830.00	836.15	861.91	854.92	862.53	0.000807	7.62	9670.28	2459.15	0.30
Main	28.515	200-yr	38750.00	836.15	864.27	855.94	864.69	0.000550	6.77	13441.57	2563.95	0.25
Main	28.515	500-yr	46700.00	836.15	866.89	858.16	867.05	0.000243	4.85	24991.25	2610.71	0.17
Main	28.515	Design Discharge	20100.00	836.15	856.16	850.11	857.25	0.001676	8.79	3739.95	1590.40	0.41
Main	28.740	2-yr	5870.00	837.05	850.09	844.64	850.62	0.001636	6.04	1242.72	1163.84	0.38
Main	28.740	5-yr	10900.00	837.05	853.77	848.22	854.29	0.001241	6.39	2586.85	1269.54	0.34
Main	28.740	10-yr	12600.00	837.05	854.82	849.96	855.34	0.001161	6.49	2984.07	1285.49	0.33
Main	28.740	20-yr	19100.00	837.05	857.82	851.94	858.42	0.001125	7.23	4139.97	1491.97	0.33
Main	28.740	50-yr	27300.00	837.05	860.90	853.66	861.61	0.001124	8.06	5469.96	1921.52	0.33
Main	28.740	100-yr	32830.00	837.05	862.87	854.62	863.60	0.001059	8.32	6377.24	2102.85	0.32
Main	28.740	200-yr	38750.00	837.05	864.85	855.55	865.60	0.001003	8.56	7284.83	2219.91	0.32
Main	28.740	500-yr	46700.00	837.05	866.90	856.70	867.74	0.001014	9.09	8230.47	2351.67	0.32
Main	28.740	Design Discharge	20100.00	837.05	858.25	852.19	858.87	0.001123	7.34	4311.13	1517.53	0.33
Main	28.975	2-yr	5870.00	837.65	851.67	844.54	852.09	0.000897	5.28	1401.72	785.45	0.28
Main	28.975	5-yr	10900.00	837.65	855.04	847.37	855.53	0.000908	6.19	3201.50	1354.01	0.30
Main	28.975	10-yr	12600.00	837.65	856.02	848.19	856.51	0.000880	6.34	3731.53	1646.55	0.29
Main	28.975	20-yr	19100.00	837.65	859.01	853.03	859.54	0.000863	7.00	5351.18	1749.98	0.29
Main	28.975	50-yr	27300.00	837.65	862.12	854.88	862.71	0.000856	7.69	7036.11	1854.93	0.30
Main	28.975	100-yr	32830.00	837.65	864.03	855.86	864.65	0.000845	8.06	8070.71	2004.56	0.30

Main	28.975	200-yr	38750.00	837.65	865.94	856.76	866.61	0.000832	8.42	9110.47	2260.38	0.30
Main	28.975	500-yr	46700.00	837.65	868.02	857.89	868.76	0.000861	9.00	10234.61	2580.50	0.31
Main	28.975	Design Discharge	20100.00	837.65	859.44	853.29	859.98	0.000857	7.08	5584.84	1764.55	0.29
Main	29.330	2-yr	5870.00	838.57	853.25	845.92	853.59	0.000727	4.78	1719.60	1159.05	0.25
Main	29.330	5-yr	10900.00	838.57	856.60	848.62	857.05	0.000818	5.96	3116.33	1345.29	0.27
Main	29.330	10-yr	12600.00	838.57	857.52	849.43	858.00	0.000830	6.26	3557.17	1366.94	0.28
Main	29.330	20-yr	19100.00	838.57	860.44	853.44	861.02	0.000871	7.18	5050.83	1443.16	0.29
Main	29.330	50-yr	27300.00	838.57	863.51	855.56	864.18	0.000891	8.03	6685.46	1555.60	0.30
Main	29.330	100-yr	32830.00	838.57	865.38	856.77	866.10	0.000890	8.48	7709.96	1611.14	0.31
Main	29.330	200-yr	38750.00	838.57	867.27	857.86	868.03	0.000882	8.89	8754.18	1655.70	0.31
Main	29.330	500-yr	46700.00	838.57	869.37	859.14	870.22	0.000908	9.51	9934.31	1733.87	0.32
Main	29.330	Design Discharge	20100.00	838.57	860.86	853.74	861.45	0.000872	7.29	5270.44	1475.67	0.29
Main	29.498	2-yr	5870.00	839.32	853.94	847.18	854.32	0.000920	5.13	1583.09	960.80	0.30
Main	29.498	5-yr	10900.00	839.32	857.38	850.29	857.81	0.000905	5.88	3058.18	1491.29	0.29
Main	29.498	10-yr	12600.00	839.32	858.31	851.14	858.76	0.000905	6.10	3459.57	1584.82	0.29
Main	29.498	20-yr	19100.00	839.32	861.28	854.90	861.82	0.000935	6.88	4735.25	1679.61	0.30
Main	29.498	50-yr	27300.00	839.32	864.36	856.66	864.99	0.000969	7.70	6055.62	1763.10	0.31
Main	29.498	100-yr	32830.00	839.32	866.23	857.64	866.92	0.000982	8.16	6856.12	1777.11	0.31
Main	29.498	200-yr	38750.00	839.32	868.09	858.59	868.85	0.000991	8.60	7655.78	1821.22	0.31
Main	29.498	500-yr	46700.00	839.32	870.20	859.73	871.06	0.001032	9.24	8562.84	1887.87	0.32
Main	29.498	Design Discharge	20100.00	839.32	861.70	855.16	862.24	0.000937	6.98	4914.28	1686.92	0.30
Main	29.673	2-yr	5870.00	840.45	854.73	847.57	855.15	0.000863	5.32	1423.52	556.71	0.29
Main	29.673	5-yr	10900.00	840.45	858.14	850.60	858.74	0.001023	6.70	2743.87	1406.89	0.32
Main	29.673	10-yr	12600.00	840.45	859.07	851.48	859.70	0.001026	6.95	3190.12	1456.21	0.32
Main	29.673	20-yr	19100.00	840.45	862.07	855.52	862.77	0.001038	7.76	4669.23	1611.83	0.33
Main	29.673	50-yr	27300.00	840.45	865.17	857.08	865.95	0.001043	8.54	6273.04	1770.11	0.33
Main	29.673	100-yr	32830.00	840.45	867.05	859.45	867.88	0.001037	8.96	7275.25	1834.79	0.33
Main	29.673	200-yr	38750.00	840.45	868.93	860.47	869.80	0.001025	9.35	8297.96	1894.23	0.33
Main	29.673	500-yr	46700.00	840.45	871.09	861.73	872.03	0.001038	9.90	9494.55	2034.13	0.34
Main	29.673	Design Discharge	20100.00	840.45	862.49	855.86	863.19	0.001037	7.86	4881.53	1621.47	0.33
Main	29.832	2-yr	5870.00	841.90	855.51	848.31	855.85	0.000761	4.77	1651.70	491.96	0.27
Main	29.832	5-yr	10900.00	841.90	859.10	851.18	859.52	0.000773	5.68	3295.55	1579.11	0.27
Main	29.832	10-yr	12600.00	841.90	860.04	852.21	860.47	0.000772	5.90	3806.35	1656.91	0.28
Main	29.832	20-yr	19100.00	841.90	863.05	855.71	863.55	0.000779	6.61	5447.73	1819.60	0.28
Main	29.832	50-yr	27300.00	841.90	866.17	858.16	866.74	0.000790	7.35	7146.79	1872.21	0.29
Main	29.832	100-yr	32830.00	841.90	868.05	859.23	868.67	0.000794	7.76	8168.93	1894.63	0.29
Main	29.832	200-yr	38750.00	841.90	869.92	860.22	870.58	0.000795	8.16	9185.79	1981.53	0.29
Main	29.832	500-yr	46700.00	841.90	872.09	861.39	872.83	0.000816	8.72	10367.63	2032.58	0.30
Main	29.832	Design Discharge	20100.00	841.90	863.47	855.99	863.97	0.000779	6.71	5675.77	1830.93	0.28
Main	29.957	2-yr	5870.00	842.00	856.10	849.32	856.37	0.000830	4.18	1730.11	708.24	0.25
Main	29.957	5-yr	10900.00	842.00	859.75	852.58	859.99	0.000732	4.43	4047.18	1107.18	0.23
Main	29.957	10-yr	12600.00	842.00	860.69	853.21	860.93	0.000697	4.49	4824.99	1203.74	0.22
Main	29.957	20-yr	19100.00	842.00	863.75	856.00	863.97	0.000579	4.56	7816.41	1390.64	0.20
Main	29.957	50-yr	27300.00	842.00	866.94	858.07	867.13	0.000476	4.56	11169.67	1436.05	0.19
Main	29.957	100-yr	32830.00	842.00	868.85	859.01	869.03	0.000432	4.59	13266.70	1502.44	0.18
Main	29.957	200-yr	38750.00	842.00	870.76	859.84	870.94	0.000403	4.65	15438.57	1551.92	0.17
Main	29.957	500-yr	46700.00	842.00	873.00	860.95	873.18	0.000372	4.72	18032.85	1579.60	0.17
Main	29.957	Design Discharge	20100.00	842.00	864.18	856.56	864.39	0.000562	4.56	8261.08	1403.10	0.20
Main	29.973		Bridge									
Main	29.990	2-yr	5870.00	842.00	856.26	849.32	856.51	0.000790	4.09	1752.77	774.81	0.25
Main	29.990	5-yr	10900.00	842.00	859.88	852.58	860.14	0.000738	4.48	3873.40	1121.80	0.23
Main	29.990	10-yr	12600.00	842.00	860.82	853.21	861.08	0.000712	4.56	4603.89	1216.85	0.23
Main	29.990	20-yr	19100.00	842.00	863.86	855.90	864.10	0.000607	4.69	7419.58	1393.72	0.21
Main	29.990	50-yr	27300.00	842.00	867.04	858.05	867.25	0.000507	4.72	10575.21	1439.46	0.19
Main	29.990	100-yr	32830.00	842.00	868.94	859.06	869.15	0.000462	4.76	12559.56	1504.48	0.18
Main	29.990	200-yr	38750.00	842.00	870.85	860.05	871.05	0.000432	4.83	14616.40	1553.05	0.18
Main	29.990	500-yr	46700.00	842.00	873.08	861.15	873.29	0.000401	4.91	17078.41	1580.54	0.17
Main	29.990	Design Discharge	20100.00	842.00	864.29	856.00	864.52	0.000591	4.69	7837.72	1406.38	0.21
Main	30.213	2-yr	5870.00	844.60	857.20	851.30	857.54	0.000920	4.75	1448.34	635.18	0.31
Main	30.213	5-yr	10900.00	844.60	860.70	853.83	861.05	0.000808	5.16	3370.15	1516.69	0.27
Main	30.213	10-yr	12600.00	844.60	861.61	854.72	861.97	0.000793	5.30	3876.00	2096.05	0.27
Main	30.213	20-yr	19100.00	844.60	864.53	858.00	864.93	0.000774	5.83	5506.81	2290.84	0.27
Main	30.213	50-yr	27300.00	844.60	867.59	859.79	868.04	0.000767	6.40	7206.84	2560.94	0.27
Main	30.213	100-yr	32830.00	844.60	869.43	860.67	869.92	0.000761	6.73	8235.98	2580.47	0.27
Main	30.213	200-yr	38750.00	844.60	871.28	861.53	871.81	0.000755	7.04	9266.59	2616.13	0.27
Main	30.213	500-yr	46700.00	844.60	873.46	862.53	874.04	0.000763	7.48	10480.36	2773.86	0.27
Main	30.213	Design Discharge	20100.00	844.60	864.94	858.36	865.35	0.000772	5.90	5732.75	2324.42	0.27

Main	30.343	2-yr	5870.00	844.59	857.78	852.50	858.52	0.001794	6.95	895.60	535.42	0.39
Main	30.343	5-yr	10900.00	844.59	860.90	855.68	862.25	0.002341	9.52	1651.53	1670.74	0.46
Main	30.343	10-yr	12600.00	844.59	861.81	856.62	863.14	0.002220	9.70	2334.44	2134.44	0.46
Main	30.343	20-yr	19100.00	844.59	864.90	860.09	865.91	0.001628	9.48	4708.35	2427.52	0.40
Main	30.343	50-yr	27300.00	844.59	868.05	860.26	868.87	0.001273	9.38	7211.87	2766.71	0.37
Main	30.343	100-yr	32830.00	844.59	869.93	864.84	870.69	0.001136	9.40	8729.46	2835.38	0.35
Main	30.343	200-yr	38750.00	844.59	871.80	865.64	872.53	0.001033	9.47	10263.73	2890.35	0.34
Main	30.343	500-yr	46700.00	844.59	874.01	866.66	874.73	0.000955	9.65	12100.37	2922.38	0.33
Main	30.343	Design Discharge	20100.00	844.59	865.32	860.26	866.29	0.001567	9.45	5038.49	2447.34	0.40
Main	30.476	2-yr	5870.00	844.69	859.06	852.26	859.37	0.000806	4.53	1515.34	761.18	0.26
Main	30.476	5-yr	10900.00	844.69	862.81	855.26	863.06	0.000603	4.63	4963.16	3331.07	0.22
Main	30.476	10-yr	12600.00	844.69	863.65	855.97	863.89	0.000577	4.68	5869.13	3477.16	0.22
Main	30.476	20-yr	19100.00	844.69	866.25	858.53	866.48	0.000537	4.96	8672.06	3685.12	0.21
Main	30.476	50-yr	27300.00	844.69	869.11	861.85	869.33	0.000492	5.19	11747.89	3964.18	0.21
Main	30.476	100-yr	32830.00	844.69	870.88	862.70	871.11	0.000467	5.32	13658.79	4036.97	0.20
Main	30.476	200-yr	38750.00	844.69	872.68	863.37	872.91	0.000443	5.44	15595.84	4093.40	0.20
Main	30.476	500-yr	46700.00	844.69	874.84	864.13	875.08	0.000427	5.63	17924.98	4121.35	0.20
Main	30.476	Design Discharge	20100.00	844.69	866.62	859.10	866.85	0.000531	4.99	9070.99	3728.68	0.21
Main	30.733	2-yr	5870.00	846.63	860.10	853.11	860.43	0.000771	4.74	1933.92	1790.99	0.26
Main	30.733	5-yr	10900.00	846.63	863.53	855.87	863.86	0.000715	5.30	4104.16	2906.50	0.26
Main	30.733	10-yr	12600.00	846.63	864.32	856.67	864.68	0.000735	5.54	4611.36	3016.44	0.26
Main	30.733	20-yr	19100.00	846.63	866.82	860.82	867.24	0.000782	6.36	6447.86	3713.76	0.28
Main	30.733	50-yr	27300.00	846.63	869.57	862.49	870.04	0.000775	7.03	8568.87	4013.20	0.29
Main	30.733	100-yr	32830.00	846.63	871.29	863.39	871.79	0.000758	7.37	9893.95	4093.08	0.29
Main	30.733	200-yr	38750.00	846.63	873.04	864.23	873.56	0.000737	7.68	11242.75	4140.72	0.29
Main	30.733	500-yr	46700.00	846.63	875.15	865.20	875.71	0.000724	8.08	12875.22	4193.72	0.29
Main	30.733	Design Discharge	20100.00	846.63	867.18	861.04	867.60	0.000783	6.45	6721.82	3748.31	0.28
Main	30.893	2-yr	5870.00	847.56	860.85	856.31	861.45	0.001669	6.49	1217.94	899.44	0.37
Main	30.893	5-yr	10900.00	847.56	864.25	858.58	864.75	0.001233	6.74	3820.90	2774.72	0.33
Main	30.893	10-yr	12600.00	847.56	865.07	859.58	865.54	0.001136	6.75	4613.91	2937.97	0.32
Main	30.893	20-yr	19100.00	847.56	867.64	863.60	868.05	0.000945	6.91	7239.74	3335.93	0.30
Main	30.893	50-yr	27300.00	847.56	870.44	864.95	870.81	0.000801	7.08	10108.33	3406.26	0.29
Main	30.893	100-yr	32830.00	847.56	872.16	865.67	872.52	0.000736	7.19	11878.65	3607.78	0.28
Main	30.893	200-yr	38750.00	847.56	873.91	866.39	874.27	0.000682	7.31	13673.85	3650.74	0.27
Main	30.893	500-yr	46700.00	847.56	876.04	867.17	876.40	0.000637	7.51	15859.12	3708.72	0.27
Main	30.893	Design Discharge	20100.00	847.56	868.01	863.79	868.41	0.000922	6.93	7613.52	3350.63	0.30
Main	31.127	2-yr	5870.00	848.76	862.42	854.92	862.75	0.000715	4.70	1552.48	1148.67	0.25
Main	31.127	5-yr	10900.00	848.76	865.46	857.66	865.83	0.000732	5.51	3702.69	1916.43	0.26
Main	31.127	10-yr	12600.00	848.76	866.19	858.47	866.55	0.000708	5.60	4419.33	2034.82	0.26
Main	31.127	20-yr	19100.00	848.76	868.56	862.73	868.88	0.000621	5.81	6769.43	2916.22	0.25
Main	31.127	50-yr	27300.00	848.76	871.21	865.56	871.50	0.000529	5.91	9390.18	3147.81	0.24
Main	31.127	100-yr	32830.00	848.76	872.87	866.35	873.15	0.000483	5.96	11032.41	3213.68	0.23
Main	31.127	200-yr	38750.00	848.76	874.56	867.01	874.84	0.000443	6.01	12710.53	3257.71	0.22
Main	31.127	500-yr	46700.00	848.76	876.65	867.74	876.93	0.000408	6.12	14775.29	3293.35	0.22
Main	31.127	Design Discharge	20100.00	848.76	868.90	863.05	869.22	0.000608	5.82	7106.48	2955.37	0.25
Main	31.307	2-yr	5870.00	849.70	863.13	856.15	863.61	0.001047	5.53	1060.59	547.72	0.29
Main	31.307	5-yr	10900.00	849.70	866.07	859.01	866.98	0.001607	7.80	1837.17	2481.34	0.37
Main	31.307	10-yr	12600.00	849.70	866.71	859.84	867.72	0.001731	8.35	2172.44	2812.32	0.39
Main	31.307	20-yr	19100.00	849.70	868.81	862.78	870.08	0.002011	9.86	3343.44	3285.59	0.43
Main	31.307	50-yr	27300.00	849.70	871.28	867.84	872.59	0.001943	10.65	4797.80	3560.32	0.43
Main	31.307	100-yr	32830.00	849.70	872.87	869.16	874.17	0.001838	10.94	5733.08	3661.51	0.43
Main	31.307	200-yr	38750.00	849.70	874.51	870.11	875.79	0.001722	11.15	6699.16	3748.06	0.42
Main	31.307	500-yr	46700.00	849.70	876.55	871.21	877.82	0.001611	11.44	7895.40	3913.63	0.41
Main	31.307	Design Discharge	20100.00	849.70	869.12	863.19	870.41	0.002014	10.00	3526.73	3323.40	0.43
Main	31.429	2-yr	5870.00	850.32	863.82	857.71	864.38	0.001301	6.04	988.36	546.08	0.33
Main	31.429	5-yr	10900.00	850.32	867.20	860.60	867.97	0.001513	7.48	2290.39	1919.15	0.36
Main	31.429	10-yr	12600.00	850.32	867.95	861.44	868.77	0.001558	7.84	2687.07	2047.98	0.37
Main	31.429	20-yr	19100.00	850.32	870.33	866.28	871.19	0.001563	8.64	4462.66	3285.19	0.38
Main	31.429	50-yr	27300.00	850.32	872.89	868.95	873.55	0.001218	8.41	7100.89	3759.37	0.34
Main	31.429	100-yr	32830.00	850.32	874.46	870.33	875.03	0.001039	8.19	8870.10	3911.11	0.32
Main	31.429	200-yr	38750.00	850.32	876.07	871.15	876.57	0.000902	8.03	10810.31	4117.49	0.30
Main	31.429	500-yr	46700.00	850.32	878.09	872.09	878.51	0.000729	7.65	13409.60	4157.56	0.28
Main	31.429	Design Discharge	20100.00	850.32	870.67	866.69	871.50	0.001522	8.64	4776.38	3361.63	0.37
Main	31.677	2-yr	5870.00	849.80	865.36	857.50	865.78	0.000878	5.20	1129.65	516.21	0.30
Main	31.677	5-yr	10900.00	849.80	869.06	860.68	869.71	0.001181	6.49	1790.34	1748.20	0.35
Main	31.677	10-yr	12600.00	849.80	869.88	861.56	870.60	0.001281	6.87	2233.25	2498.49	0.36
Main	31.677	20-yr	19100.00	849.80	872.27	864.48	873.06	0.001384	7.61	4118.26	4463.75	0.37
Main	31.677	50-yr	27300.00	849.80	874.38	868.26	875.15	0.001376	8.08	6381.89	4928.98	0.36
Main	31.677	100-yr	32830.00	849.80	875.72	871.33	876.44	0.001296	8.14	8004.54	5253.27	0.35

Main	31.677	200-yr	38750.00	849.80	877.14	872.62	877.76	0.001131	7.90	9871.71	5327.82	0.33
Main	31.677	500-yr	46700.00	849.80	878.93	873.75	879.46	0.000962	7.63	12229.75	5456.75	0.30
Main	31.677	Design Discharge	20100.00	849.80	872.55	865.79	873.34	0.001394	7.70	4394.56	4520.82	0.37
Main	31.680		Bridge									
Main	31.684	2-yr	5870.00	849.80	865.43	857.50	865.84	0.000859	5.16	1137.29	524.52	0.30
Main	31.684	5-yr	10900.00	849.80	869.18	860.68	869.81	0.001150	6.42	1830.08	1882.89	0.35
Main	31.684	10-yr	12600.00	849.80	870.03	861.56	870.72	0.001227	6.75	2333.82	2552.93	0.35
Main	31.684	20-yr	19100.00	849.80	872.34	864.48	873.10	0.001350	7.53	4220.44	4480.01	0.36
Main	31.684	50-yr	27300.00	849.80	874.67	868.27	875.36	0.001236	7.72	6803.54	4990.57	0.34
Main	31.684	100-yr	32830.00	849.80	876.05	871.39	876.68	0.001145	7.72	8552.53	5264.25	0.33
Main	31.684	200-yr	38750.00	849.80	877.40	872.70	877.96	0.001027	7.58	10357.09	5343.98	0.31
Main	31.684	500-yr	46700.00	849.80	879.13	873.77	879.62	0.000895	7.40	12667.60	5464.89	0.29
Main	31.684	Design Discharge	20100.00	849.80	872.62	865.79	873.39	0.001356	7.61	4508.64	4534.34	0.36
Main	31.796	2-yr	5870.00	850.56	866.26	858.79	866.68	0.002758	5.18	1135.58	198.80	0.31
Main	31.796	5-yr	10900.00	850.56	870.28	862.41	870.78	0.002385	5.97	2323.41	1109.64	0.30
Main	31.796	10-yr	12600.00	850.56	871.19	863.31	871.74	0.002486	6.29	2788.10	2002.46	0.30
Main	31.796	20-yr	19100.00	850.56	873.66	866.27	874.15	0.002162	6.54	5419.67	4441.89	0.29
Main	31.796	50-yr	27300.00	850.56	875.89	869.59	876.28	0.001769	6.46	8098.30	4860.52	0.27
Main	31.796	100-yr	32830.00	850.56	877.17	870.24	877.54	0.001617	6.47	9644.51	5036.24	0.26
Main	31.796	200-yr	38750.00	850.56	878.39	873.49	878.75	0.001522	6.54	11112.49	5185.53	0.25
Main	31.796	500-yr	46700.00	850.56	879.98	874.21	880.32	0.001399	6.59	13022.80	5413.77	0.25
Main	31.796	Design Discharge	20100.00	850.56	873.95	867.13	874.42	0.002106	6.53	5768.24	4501.03	0.29
Main	32.140	2-yr	5870.00	853.83	868.38	860.09	868.67	0.000586	4.34	1622.38	466.84	0.23
Main	32.140	5-yr	10900.00	853.83	872.05	862.79	872.35	0.000515	4.90	3666.66	3056.20	0.22
Main	32.140	10-yr	12600.00	853.83	872.97	863.59	873.27	0.000502	5.04	4300.44	3916.25	0.22
Main	32.140	20-yr	19100.00	853.83	875.19	866.26	875.55	0.000558	5.80	5984.78	4177.97	0.24
Main	32.140	50-yr	27300.00	853.83	877.14	870.71	877.57	0.000644	6.67	7518.31	4229.88	0.26
Main	32.140	100-yr	32830.00	853.83	878.32	871.70	878.79	0.000683	7.14	8454.83	4240.58	0.27
Main	32.140	200-yr	38750.00	853.83	879.46	872.75	879.98	0.000724	7.61	9381.95	4263.62	0.28
Main	32.140	500-yr	46700.00	853.83	880.95	873.75	881.51	0.000750	8.09	10603.12	4277.99	0.29
Main	32.140	Design Discharge	20100.00	853.83	875.44	867.38	875.81	0.000572	5.92	6182.80	4208.52	0.24
Main	32.316	2-yr	5870.00	854.44	868.93	861.29	869.26	0.000724	4.79	1711.18	494.69	0.25
Main	32.316	5-yr	10900.00	854.44	872.48	864.32	872.76	0.000562	5.06	4276.70	3653.09	0.23
Main	32.316	10-yr	12600.00	854.44	873.39	865.17	873.64	0.000501	4.97	5202.22	4021.18	0.22
Main	32.316	20-yr	19100.00	854.44	875.66	869.93	875.89	0.000465	5.24	7653.27	4347.35	0.22
Main	32.316	50-yr	27300.00	854.44	877.68	871.60	877.93	0.000479	5.70	9867.93	4397.82	0.22
Main	32.316	100-yr	32830.00	854.44	878.89	872.85	879.15	0.000483	5.96	11199.00	4444.33	0.23
Main	32.316	200-yr	38750.00	854.44	880.08	873.45	880.35	0.000489	6.22	12499.58	4454.51	0.23
Main	32.316	500-yr	46700.00	854.44	881.59	874.13	881.88	0.000490	6.50	14156.72	4467.60	0.23
Main	32.316	Design Discharge	20100.00	854.44	875.92	870.16	876.16	0.000468	5.30	7942.48	4357.21	0.22
Main	32.461	2-yr	5870.00	852.59	869.46	860.00	869.84	0.000718	4.90	1197.58	129.10	0.27
Main	32.461	5-yr	10900.00	852.59	872.89	863.39	873.51	0.001079	6.45	2230.06	3212.49	0.32
Main	32.461	10-yr	12600.00	852.59	873.74	864.38	874.37	0.001094	6.70	2830.12	3414.99	0.32
Main	32.461	20-yr	19100.00	852.59	875.95	868.07	876.67	0.001204	7.59	4423.17	3526.37	0.34
Main	32.461	50-yr	27300.00	852.59	877.95	873.68	878.79	0.001355	8.58	5861.43	3575.56	0.36
Main	32.461	100-yr	32830.00	852.59	879.15	874.78	880.05	0.001417	9.10	6724.02	3619.89	0.37
Main	32.461	200-yr	38750.00	852.59	880.33	875.67	881.28	0.001473	9.59	7566.56	3633.47	0.38
Main	32.461	500-yr	46700.00	852.59	881.81	876.68	882.83	0.001517	10.13	8636.41	3652.34	0.38
Main	32.461	Design Discharge	20100.00	852.59	876.21	868.63	876.95	0.001228	7.73	4611.26	3532.16	0.34
Main	32.650	2-yr	5870.00	854.21	870.23	862.39	870.67	0.000922	5.38	1343.58	544.55	0.28
Main	32.650	5-yr	10900.00	854.21	873.96	865.65	874.52	0.000978	6.50	2590.04	2368.76	0.30
Main	32.650	10-yr	12600.00	854.21	874.80	866.60	875.40	0.001009	6.85	3052.95	2520.93	0.31
Main	32.650	20-yr	19100.00	854.21	877.06	871.18	877.81	0.001176	8.09	4405.20	2672.72	0.34
Main	32.650	50-yr	27300.00	854.21	879.15	873.45	880.09	0.001367	9.39	5658.58	2787.17	0.37
Main	32.650	100-yr	32830.00	854.21	880.38	875.17	881.42	0.001464	10.11	6395.21	2816.56	0.39
Main	32.650	200-yr	38750.00	854.21	881.57	876.31	882.72	0.001554	10.81	7111.13	2848.29	0.40
Main	32.650	500-yr	46700.00	854.21	883.07	877.51	884.35	0.001647	11.62	8006.69	2907.83	0.42
Main	32.650	Design Discharge	20100.00	854.21	877.34	871.52	878.11	0.001203	8.27	4571.64	2684.58	0.34
Main	32.784	2-yr	5870.00	855.83	870.90	863.72	871.31	0.000896	5.15	1183.84	151.91	0.28
Main	32.784	5-yr	10900.00	855.83	874.60	866.55	875.28	0.001124	6.79	2061.12	2096.50	0.32
Main	32.784	10-yr	12600.00	855.83	875.46	867.41	876.18	0.001145	7.10	2517.04	2278.60	0.33
Main	32.784	20-yr	19100.00	855.83	877.85	870.35	878.66	0.001200	8.04	3990.72	2542.23	0.35
Main	32.784	50-yr	27300.00	855.83	880.12	875.34	881.02	0.001245	8.91	5406.97	2576.12	0.36
Main	32.784	100-yr	32830.00	855.83	881.46	876.86	882.40	0.001261	9.38	6241.12	2611.40	0.37
Main	32.784	200-yr	38750.00	855.83	882.75	877.81	883.75	0.001278	9.84	7049.08	2701.21	0.37
Main	32.784	500-yr	46700.00	855.83	884.35	878.88	885.42	0.001295	10.39	8048.95	2778.49	0.38
Main	32.784	Design Discharge	20100.00	855.83	878.15	870.72	878.98	0.001208	8.17	4178.42	2548.58	0.35

Main	32.901	2-yr	5870.00	857.26	871.44	864.14	871.85	0.000872	5.18	1200.80	281.96	0.28
Main	32.901	5-yr	10900.00	857.26	875.26	867.13	875.94	0.001004	6.79	2041.75	1628.87	0.31
Main	32.901	10-yr	12600.00	857.26	876.11	867.97	876.89	0.001084	7.32	2415.70	1860.40	0.33
Main	32.901	20-yr	19100.00	857.26	878.49	870.90	879.51	0.001280	8.75	3731.87	2039.79	0.36
Main	32.901	50-yr	27300.00	857.26	880.76	874.07	881.96	0.001423	9.98	5050.29	2300.33	0.39
Main	32.901	100-yr	32830.00	857.26	882.09	875.77	883.39	0.001486	10.64	5837.53	2423.87	0.40
Main	32.901	200-yr	38750.00	857.26	883.38	878.68	884.78	0.001546	11.29	6612.49	2517.17	0.42
Main	32.901	500-yr	46700.00	857.26	884.97	880.01	886.49	0.001605	12.03	7590.29	2558.05	0.43
Main	32.901	Design Discharge	20100.00	857.26	878.79	871.44	879.83	0.001303	8.92	3904.57	2052.57	0.37
Main	33.041	2-yr	5870.00	858.97	872.19	866.50	872.57	0.001059	4.96	1278.26	258.79	0.29
Main	33.041	5-yr	10900.00	858.97	876.23	868.98	876.68	0.000951	5.73	2778.51	1938.90	0.28
Main	33.041	10-yr	12600.00	858.97	877.19	869.71	877.67	0.000945	5.95	3216.74	2063.35	0.28
Main	33.041	20-yr	19100.00	858.97	879.81	872.23	880.40	0.001049	6.91	4447.39	2134.72	0.30
Main	33.041	50-yr	27300.00	858.97	882.22	875.15	882.97	0.001204	8.02	5608.40	2328.03	0.32
Main	33.041	100-yr	32830.00	858.97	883.60	876.54	884.46	0.001293	8.67	6285.68	2364.14	0.34
Main	33.041	200-yr	38750.00	858.97	884.94	877.64	885.90	0.001379	9.31	6946.15	2396.36	0.35
Main	33.041	500-yr	46700.00	858.97	886.58	878.88	887.68	0.001481	10.08	7760.74	2454.73	0.37
Main	33.041	Design Discharge	20100.00	858.97	880.14	872.74	880.75	0.001069	7.06	4602.54	2155.80	0.30
Main	33.166	2-yr	5870.00	860.49	872.87	869.06	873.76	0.002594	7.75	1014.58	290.56	0.46
Main	33.166	5-yr	10900.00	860.49	876.83	872.45	877.64	0.001870	8.10	2690.72	1589.75	0.41
Main	33.166	10-yr	12600.00	860.49	877.79	874.00	878.58	0.001743	8.22	3285.03	2012.28	0.40
Main	33.166	20-yr	19100.00	860.49	880.53	876.28	881.19	0.001373	8.28	5479.23	2327.35	0.36
Main	33.166	50-yr	27300.00	860.49	883.13	878.77	883.75	0.001194	8.53	7591.79	2481.70	0.35
Main	33.166	100-yr	32830.00	860.49	884.64	879.59	885.25	0.001134	8.76	8826.08	2516.33	0.34
Main	33.166	200-yr	38750.00	860.49	886.09	880.38	886.71	0.001091	9.00	10034.46	2566.86	0.34
Main	33.166	500-yr	46700.00	860.49	887.86	881.24	888.50	0.001054	9.33	11522.49	2599.71	0.34
Main	33.166	Design Discharge	20100.00	860.49	880.88	876.54	881.53	0.001344	8.31	5757.16	2337.53	0.36
Main	33.296	2-yr	5870.00	862.20	875.37	869.41	875.78	0.003165	5.13	1144.23	658.20	0.33
Main	33.296	5-yr	10900.00	862.20	878.88	872.77	879.44	0.003715	6.14	1984.89	1712.50	0.34
Main	33.296	10-yr	12600.00	862.20	879.74	873.52	880.28	0.003590	6.18	2363.00	1919.63	0.33
Main	33.296	20-yr	19100.00	862.20	882.03	875.74	882.60	0.003425	6.60	3395.89	2325.01	0.33
Main	33.296	50-yr	27300.00	862.20	884.34	879.65	884.98	0.003116	7.04	4486.52	2464.35	0.32
Main	33.296	100-yr	32830.00	862.20	885.74	880.53	886.42	0.002953	7.28	5185.06	2525.65	0.32
Main	33.296	200-yr	38750.00	862.20	887.11	881.22	887.85	0.002832	7.52	5894.01	2585.51	0.32
Main	33.296	500-yr	46700.00	862.20	888.81	882.10	889.61	0.002707	7.82	6826.18	2654.93	0.31
Main	33.296	Design Discharge	20100.00	862.20	882.33	876.09	882.91	0.003386	6.66	3532.80	2355.08	0.33
Main	33.302		Bridge									
Main	33.307	2-yr	5870.00	862.20	875.62	869.42	876.00	0.002932	4.97	1181.40	705.67	0.31
Main	33.307	5-yr	10900.00	862.20	879.23	872.78	879.72	0.003264	4.81	2135.32	1829.91	0.26
Main	33.307	10-yr	12600.00	862.20	880.06	873.52	880.55	0.003171	4.40	2500.70	1977.67	0.23
Main	33.307	20-yr	19100.00	862.20	882.40	875.74	882.91	0.003093	3.67	3545.41	2363.14	0.18
Main	33.307	50-yr	27300.00	862.20	884.88	879.63	885.44	0.002731	6.60	4715.89	2491.81	0.30
Main	33.307	100-yr	32830.00	862.20	886.13	880.49	886.77	0.002734	6.97	5342.40	2538.68	0.30
Main	33.307	200-yr	38750.00	862.20	887.54	881.30	888.23	0.002623	7.21	6073.56	2596.87	0.30
Main	33.307	500-yr	46700.00	862.20	889.23	882.13	889.99	0.002537	7.53	7013.55	2672.90	0.30
Main	33.307	Design Discharge	20100.00	862.20	882.71	876.09	883.23	0.003055	3.61	3686.52	2380.36	0.18
Main	33.310	2-yr	5870.00	862.21	875.67	869.41	876.05	0.002887	4.94	1189.19	712.34	0.31
Main	33.310	5-yr	10900.00	862.21	879.29	872.79	879.77	0.003191	5.75	2166.82	1846.70	0.31
Main	33.310	10-yr	12600.00	862.21	880.13	873.51	880.60	0.003087	5.80	2538.55	2003.46	0.31
Main	33.310	20-yr	19100.00	862.21	882.46	875.75	882.96	0.002991	6.16	3599.70	2365.80	0.30
Main	33.310	50-yr	27300.00	862.21	884.94	879.67	885.49	0.002644	6.51	4797.29	2494.26	0.29
Main	33.310	100-yr	32830.00	862.21	886.20	880.53	886.81	0.002645	6.87	5439.21	2540.85	0.30
Main	33.310	200-yr	38750.00	862.21	887.61	881.29	888.27	0.002536	7.10	6188.26	2598.67	0.30
Main	33.310	500-yr	46700.00	862.21	889.30	882.13	890.03	0.002450	7.42	7150.39	2674.35	0.30
Main	33.310	Design Discharge	20100.00	862.21	882.77	876.09	883.28	0.002955	6.22	3744.48	2382.81	0.30

```
                    HEC-RAS Version 3.1.3 May 2005
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

*******************************************************************************

PROJECT DATA
Project Title: BRDB_RipRap_Gutter93+00
Project File : RipRap_Gutter9300.prj
Run Date and Time: 8/6/2008 11:10:24 AM

Project in English units

*******************************************************************************

PLAN DATA

Plan Title: 5-8-08
Plan File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\93+00\RipRap_Gutter9300.p01

           Geometry Title: Template5-8-08
           Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\93+00\RipRap_Gutter9300.g01

           Flow Title    : FutureFlow5-8-08
           Flow File     : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\93+00\RipRap_Gutter9300.f01

Plan Summary Information:
Number of:  Cross Sections =   45    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Program Selects Appropriate method
    Computational Flow Regime:     Mixed Flow


*******************************************************************************

FLOW DATA

Flow Title: FutureFlow5-8-08
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\93+00\RipRap_Gutter9300.f01
```

Flow Data (cfs)

River	Reach	RS	Flow
93+00	1	7	1.84
93+00	1	5.0	44

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
93+00	1	Flow	Normal S = 0.0056	Normal S = 0.0143

GEOMETRY DATA

Geometry Title: Template5-8-08
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\93+00\RipRap_Gutter9300.g01

CROSS SECTION

RIVER: 93+00
REACH: 1 RS: 7

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	760.28	2	760.28	6	758.28	11	758.28	15	760.28
17	760.28								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	2	.03	15	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	5	5	5	.1	.3

CROSS SECTION OUTPUT Profile #Flow

E.G. Elev (ft)	759.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	759.17	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	758.44	Flow Area (sq ft)		6.06	
E.G. Slope (ft/ft)	0.000064	Area (sq ft)		6.06	
Q Total (cfs)	1.84	Flow (cfs)		1.84	
Top Width (ft)	8.57	Top Width (ft)		8.57	
Vel Total (ft/s)	0.30	Avg. Vel. (ft/s)		0.30	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	230.8	Conv. (cfs)		230.8	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		8.99	
Min Ch El (ft)	758.28	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	0.04	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.05	0.00

CROSS SECTION

```
RIVER: 93+00
REACH: 1                  RS: 6.92857*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.25       2  760.25       6  758.25      11  758.25      15  760.25
      17  760.25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    6.32  *          *
* E.G. Slope (ft/ft)     *0.000056  * Area (sq ft)           *          *    6.32  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *    8.69  * Top Width (ft)          *          *    8.69  *          *
* Vel Total (ft/s)       *    0.29  * Avg. Vel. (ft/s)        *          *    0.29  *          *
* Max Chl Dpth (ft)      *    0.92  * Hydr. Depth (ft)        *          *    0.73  *          *
* Conv. Total (cfs)      *   244.9  * Conv. (cfs)             *          *   244.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.13  *          *
* Min Ch El (ft)         *  758.25  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.05  *    0.00  *
*************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.85714*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.23       2  760.23       6  758.23      11  758.23      15  760.23
      17  760.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
```

```
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    6.49  *          *
* E.G. Slope (ft/ft)     *0.000052  * Area (sq ft)           *          *    6.49  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *    8.77  * Top Width (ft)          *          *    8.77  *          *
* Vel Total (ft/s)       *    0.28  * Avg. Vel. (ft/s)        *          *    0.28  *          *
* Max Chl Dpth (ft)      *    0.94  * Hydr. Depth (ft)        *          *    0.74  *          *
* Conv. Total (cfs)      *   254.5  * Conv. (cfs)             *          *   254.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.22  *          *
* Min Ch El (ft)         *  758.23  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.05  *    0.00  *
**********************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.78571*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   760.2       2   760.2       6   758.2      11   758.2      15   760.2
      17   760.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
**********************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    6.75  *          *
* E.G. Slope (ft/ft)     *0.000047  * Area (sq ft)           *          *    6.75  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *    8.89  * Top Width (ft)          *          *    8.89  *          *
* Vel Total (ft/s)       *    0.27  * Avg. Vel. (ft/s)        *          *    0.27  *          *
* Max Chl Dpth (ft)      *    0.97  * Hydr. Depth (ft)        *          *    0.76  *          *
* Conv. Total (cfs)      *   269.4  * Conv. (cfs)             *          *   269.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.35  *          *
* Min Ch El (ft)         *  758.20  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.05  *    0.00  *
**********************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.71428*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
       0  760.18       2  760.18       6  758.18      11  758.18      15  760.18
      17  760.18

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *    6.93  *          *
* E.G. Slope (ft/ft)     *0.000043  * Area (sq ft)          *          *    6.93  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)             *          *    1.84  *          *
* Top Width (ft)         *    8.97  * Top Width (ft)         *          *    8.97  *          *
* Vel Total (ft/s)       *    0.27  * Avg. Vel. (ft/s)       *          *    0.27  *          *
* Max Chl Dpth (ft)      *    0.99  * Hydr. Depth (ft)       *          *    0.77  *          *
* Conv. Total (cfs)      *   279.5  * Conv. (cfs)            *          *   279.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.44  *          *
* Min Ch El (ft)         *  758.18  * Shear (lb/sq ft)       *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.05  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.64285*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.15       2  760.15       6  758.15      11  758.15      15  760.15
      17  760.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *    7.20  *          *
* E.G. Slope (ft/ft)     *0.000039  * Area (sq ft)          *          *    7.20  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)             *          *    1.84  *          *
* Top Width (ft)         *    9.09  * Top Width (ft)         *          *    9.09  *          *
* Vel Total (ft/s)       *    0.26  * Avg. Vel. (ft/s)       *          *    0.26  *          *
* Max Chl Dpth (ft)      *    1.02  * Hydr. Depth (ft)       *          *    0.79  *          *
* Conv. Total (cfs)      *   295.0  * Conv. (cfs)            *          *   295.0  *          *
```

```
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.57  *          *
* Min Ch El (ft)         *  758.15  * Shear (lb/sq ft)       *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.05  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.57142*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.13       2  760.13       6  758.13      11  758.13      15  760.13
      17  760.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    7.38  *          *
* E.G. Slope (ft/ft)     *0.000036  * Area (sq ft)           *          *    7.38  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *    9.17  * Top Width (ft)          *          *    9.17  *          *
* Vel Total (ft/s)       *    0.25  * Avg. Vel. (ft/s)        *          *    0.25  *          *
* Max Chl Dpth (ft)      *    1.04  * Hydr. Depth (ft)        *          *    0.81  *          *
* Conv. Total (cfs)      *   305.6  * Conv. (cfs)             *          *   305.6  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.66  *          *
* Min Ch El (ft)         *  758.13  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.05  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.5

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   760.1       2   760.1       6   758.1      11   758.1      15   760.1
      17   760.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
```

```
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *    7.66  *          *
* E.G. Slope (ft/ft)     *0.000033  * Area (sq ft)          *          *    7.66  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)            *          *    1.84  *          *
* Top Width (ft)         *    9.29  * Top Width (ft)        *          *    9.29  *          *
* Vel Total (ft/s)       *    0.24  * Avg. Vel. (ft/s)      *          *    0.24  *          *
* Max Chl Dpth (ft)      *    1.07  * Hydr. Depth (ft)      *          *    0.82  *          *
* Conv. Total (cfs)      *   321.9  * Conv. (cfs)           *          *   321.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)      *          *    9.79  *          *
* Min Ch El (ft)         *  758.10  * Shear (lb/sq ft)      *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)  *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *    0.00  *    0.04  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  760.07       2  760.07       6  758.07   13.67  758.07   17.67  760.07
   19.67  760.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03   17.67     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   17.67                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *   10.88  *          *
* E.G. Slope (ft/ft)     *0.000014  * Area (sq ft)          *          *   10.88  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)            *          *    1.84  *          *
* Top Width (ft)         *   12.08  * Top Width (ft)        *          *   12.08  *          *
* Vel Total (ft/s)       *    0.17  * Avg. Vel. (ft/s)      *          *    0.17  *          *
* Max Chl Dpth (ft)      *    1.10  * Hydr. Depth (ft)      *          *    0.90  *          *
* Conv. Total (cfs)      *   488.9  * Conv. (cfs)           *          *   488.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)      *          *   12.60  *          *
* Min Ch El (ft)         *  758.07  * Shear (lb/sq ft)      *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)  *    0.00  *    0.03  *    0.00  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.03       2  760.03       6  758.03   16.33  758.03   20.33  760.03
   22.33  760.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03   20.33     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   20.33                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   14.41  *          *
* E.G. Slope (ft/ft)     *0.000007  * Area (sq ft)           *          *   14.41  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   14.90  * Top Width (ft)          *          *   14.90  *          *
* Vel Total (ft/s)       *    0.13  * Avg. Vel. (ft/s)        *          *    0.13  *          *
* Max Chl Dpth (ft)      *    1.14  * Hydr. Depth (ft)        *          *    0.97  *          *
* Conv. Total (cfs)      *   681.5  * Conv. (cfs)             *          *   681.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   15.44  *          *
* Min Ch El (ft)         *  758.03  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.04  *    0.00  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 6.0

INPUT
Description: Rock Riprap Gutter Inlet
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     760       2     760       6     758      19     758      23     760
      25     760

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      23     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      23                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   17.99  *          *
* E.G. Slope (ft/ft)     *0.000017  * Area (sq ft)           *          *   17.99  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   17.69  * Top Width (ft)         *          *   17.69  *          *
* Vel Total (ft/s)       *    0.10  * Avg. Vel. (ft/s)       *          *    0.10  *          *
* Max Chl Dpth (ft)      *    1.17  * Hydr. Depth (ft)       *          *    1.02  *          *
* Conv. Total (cfs)      *   441.3  * Conv. (cfs)            *          *   441.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   18.24  *          *
* Min Ch El (ft)         *  758.00  * Shear (lb/sq ft)       *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
*****************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.83333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.95       2  759.95       6  757.95   16.33  757.95   20.33  759.95
   22.33  759.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06   20.33     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   20.33                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   15.61  *          *
* E.G. Slope (ft/ft)     *0.000023  * Area (sq ft)           *          *   15.61  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   15.22  * Top Width (ft)         *          *   15.22  *          *
* Vel Total (ft/s)       *    0.12  * Avg. Vel. (ft/s)       *          *    0.12  *          *
* Max Chl Dpth (ft)      *    1.22  * Hydr. Depth (ft)       *          *    1.03  *          *
* Conv. Total (cfs)      *   383.5  * Conv. (cfs)            *          *   383.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   15.79  *          *
* Min Ch El (ft)         *  757.95  * Shear (lb/sq ft)       *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
*****************************************************************************************

CROSS SECTION
```

```
RIVER: 93+00
REACH: 1                  RS: 5.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   759.9       2   759.9       6   757.9   13.67   757.9   17.67   759.9
   19.67   759.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   17.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   17.67                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   12.99  *          *
* E.G. Slope (ft/ft)     *0.000034  * Area (sq ft)           *          *   12.99  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   12.76  * Top Width (ft)          *          *   12.76  *          *
* Vel Total (ft/s)       *    0.14  * Avg. Vel. (ft/s)        *          *    0.14  *          *
* Max Chl Dpth (ft)      *    1.27  * Hydr. Depth (ft)        *          *    1.02  *          *
* Conv. Total (cfs)      *   315.7  * Conv. (cfs)             *          *   315.7  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   13.36  *          *
* Min Ch El (ft)         *  757.90  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.04  *    0.00  *
*************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.5

INPUT
Description: End of Rip Rap Gutter Inlet
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.85       2  759.85       6  757.85      11  757.85      15  759.85
      17  759.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15              4.83    4.83    4.83             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.00  * Wt. n-Val.              *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)         *    4.83  *    4.83  *    4.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          *   10.10  *          *
* E.G. Slope (ft/ft)     *0.000060  * Area (sq ft)            *          *   10.10  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)               *          *    1.84  *          *
* Top Width (ft)         *   10.29  * Top Width (ft)          *          *   10.29  *          *
* Vel Total (ft/s)       *    0.18  * Avg. Vel. (ft/s)        *          *    0.18  *          *
* Max Chl Dpth (ft)      *    1.32  * Hydr. Depth (ft)        *          *    0.98  *          *
* Conv. Total (cfs)      *   237.6  * Conv. (cfs)             *          *   237.6  *          *
* Length Wtd. (ft)       *    4.83  * Wetted Per. (ft)        *          *   10.91  *          *
* Min Ch El (ft)         *  757.85  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.41666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   759.8       2   759.8       6   757.8      11   757.8      15   759.8
      17   759.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15             4.83    4.83    4.83              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.              *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)         *    4.83  *    4.83  *    4.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          *   10.62  *          *
* E.G. Slope (ft/ft)     *0.000052  * Area (sq ft)            *          *   10.62  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)               *          *    1.84  *          *
* Top Width (ft)         *   10.48  * Top Width (ft)          *          *   10.48  *          *
* Vel Total (ft/s)       *    0.17  * Avg. Vel. (ft/s)        *          *    0.17  *          *
* Max Chl Dpth (ft)      *    1.37  * Hydr. Depth (ft)        *          *    1.01  *          *
* Conv. Total (cfs)      *   254.7  * Conv. (cfs)             *          *   254.7  *          *
* Length Wtd. (ft)       *    4.83  * Wetted Per. (ft)        *          *   11.13  *          *
* Min Ch El (ft)         *  757.80  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.33333*

INPUT
Description:
```

```
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  759.75       2  759.75       6  757.75      11  757.75      15  759.75
      17  759.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.83    4.83    4.83             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    4.83  *    4.83  *    4.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   11.14  *          *
* E.G. Slope (ft/ft)     *0.000046  * Area (sq ft)           *          *   11.14  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   10.68  * Top Width (ft)          *          *   10.68  *          *
* Vel Total (ft/s)       *    0.17  * Avg. Vel. (ft/s)        *          *    0.17  *          *
* Max Chl Dpth (ft)      *    1.42  * Hydr. Depth (ft)        *          *    1.04  *          *
* Conv. Total (cfs)      *   272.5  * Conv. (cfs)             *          *   272.5  *          *
* Length Wtd. (ft)       *    4.83  * Wetted Per. (ft)        *          *   11.35  *          *
* Min Ch El (ft)         *  757.75  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.25*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   759.7       2   759.7       6   757.7      11   757.7      15   759.7
      17   759.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.83    4.83    4.83             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    4.83  *    4.83  *    4.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   11.68  *          *
* E.G. Slope (ft/ft)     *0.000040  * Area (sq ft)           *          *   11.68  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   10.88  * Top Width (ft)          *          *   10.88  *          *
* Vel Total (ft/s)       *    0.16  * Avg. Vel. (ft/s)        *          *    0.16  *          *
```

```
* Max Chl Dpth (ft)      *    1.47  * Hydr. Depth (ft)       *          *    1.07  *          *
* Conv. Total (cfs)      *   290.9  * Conv. (cfs)            *          *   290.9  *          *
* Length Wtd. (ft)       *    4.83  * Wetted Per. (ft)       *          *   11.58  *          *
* Min Ch El (ft)         *  757.70  * Shear (lb/sq ft)       *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.65       2  759.65       6  757.65      11  757.65      15  759.65
      17  759.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15             4.83    4.83    4.83             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    4.83  *    4.83  *    4.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   12.23  *          *
* E.G. Slope (ft/ft)     *0.000035  * Area (sq ft)           *          *   12.23  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   11.08  * Top Width (ft)          *          *   11.08  *          *
* Vel Total (ft/s)       *    0.15  * Avg. Vel. (ft/s)        *          *    0.15  *          *
* Max Chl Dpth (ft)      *    1.52  * Hydr. Depth (ft)        *          *    1.10  *          *
* Conv. Total (cfs)      *   310.0  * Conv. (cfs)             *          *   310.0  *          *
* Length Wtd. (ft)       *    4.83  * Wetted Per. (ft)        *          *   11.80  *          *
* Min Ch El (ft)         *  757.65  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.08333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   759.6       2   759.6       6   757.6      11   757.6      15   759.6
      17   759.6

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15             4.83    4.83    4.83             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *    4.83  *    4.83  *    4.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   12.78  *          *
* E.G. Slope (ft/ft)     *0.000031  * Area (sq ft)           *          *   12.78  *          *
* Q Total (cfs)          *    1.84  * Flow (cfs)              *          *    1.84  *          *
* Top Width (ft)         *   11.28  * Top Width (ft)          *          *   11.28  *          *
* Vel Total (ft/s)       *    0.14  * Avg. Vel. (ft/s)        *          *    0.14  *          *
* Max Chl Dpth (ft)      *    1.57  * Hydr. Depth (ft)        *          *    1.13  *          *
* Conv. Total (cfs)      *   329.8  * Conv. (cfs)             *          *   329.8  *          *
* Length Wtd. (ft)       *    4.83  * Wetted Per. (ft)        *          *   12.02  *          *
* Min Ch El (ft)         *  757.60  * Shear (lb/sq ft)        *          *    0.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    0.00  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 5.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.55       2  759.55       6  757.55      11  757.55      15  759.55
      17  759.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************
* E.G. Elev (ft)         *  759.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.69  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  758.69  * Flow Area (sq ft)      *          *    8.27  *          *
* E.G. Slope (ft/ft)     *0.060208  * Area (sq ft)           *          *    8.27  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    9.55  * Top Width (ft)          *          *    9.55  *          *
* Vel Total (ft/s)       *    5.32  * Avg. Vel. (ft/s)        *          *    5.32  *          *
* Max Chl Dpth (ft)      *    1.14  * Hydr. Depth (ft)        *          *    0.87  *          *
* Conv. Total (cfs)      *   179.3  * Conv. (cfs)             *          *   179.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   10.08  *          *
* Min Ch El (ft)         *  757.55  * Shear (lb/sq ft)        *          *    3.08  *          *
```

```
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   16.40  *          *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 4.88888*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  757.88       2  757.88       6  755.88      11  755.88      15  757.88
      17  757.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  758.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  756.59  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  757.02  * Flow Area (sq ft)      *          *    4.55  *          *
* E.G. Slope (ft/ft)     *0.333256  * Area (sq ft)           *          *    4.55  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    7.83  * Top Width (ft)          *          *    7.83  *          *
* Vel Total (ft/s)       *    9.67  * Avg. Vel. (ft/s)        *          *    9.67  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)        *          *    0.58  *          *
* Conv. Total (cfs)      *    76.2  * Conv. (cfs)             *          *    76.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    8.17  *          *
* Min Ch El (ft)         *  755.88  * Shear (lb/sq ft)        *          *   11.58  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  112.06  *          *
* Frctn Loss (ft)        *    0.98  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION
```

```
RIVER: 93+00
REACH: 1                  RS: 4.77777*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  756.22       2  756.22       6  754.22      11  754.22      15  756.22
      17  756.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  756.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  754.93  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  755.36  * Flow Area (sq ft)      *          *    4.55  *          *
* E.G. Slope (ft/ft)     *0.331934  * Area (sq ft)           *          *    4.55  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    7.84  * Top Width (ft)          *          *    7.84  *          *
* Vel Total (ft/s)       *    9.66  * Avg. Vel. (ft/s)        *          *    9.66  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)        *          *    0.58  *          *
* Conv. Total (cfs)      *    76.4  * Conv. (cfs)             *          *    76.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    8.17  *          *
* Min Ch El (ft)         *  754.22  * Shear (lb/sq ft)        *          *   11.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  111.56  *          *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 4.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  754.55       2  754.55       6  752.55      11  752.55      15  754.55
      17  754.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
```

```
* E.G. Elev (ft)         *  754.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  753.26  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  753.69  * Flow Area (sq ft)      *          *    4.54  *          *
* E.G. Slope (ft/ft)     *0.334073  * Area (sq ft)           *          *    4.54  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    7.83  * Top Width (ft)         *          *    7.83  *          *
* Vel Total (ft/s)       *    9.68  * Avg. Vel. (ft/s)       *          *    9.68  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)       *          *    0.58  *          *
* Conv. Total (cfs)      *    76.1  * Conv. (cfs)            *          *    76.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    8.17  *          *
* Min Ch El (ft)         *  752.55  * Shear (lb/sq ft)       *          *   11.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  112.36  *          *
* Frctn Loss (ft)        *    1.67  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 4.55555*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  752.88       2  752.88       6  750.88      11  750.88      15  752.88
      17  752.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************************
* E.G. Elev (ft)         *  753.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  751.59  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  752.02  * Flow Area (sq ft)      *          *    4.54  *          *
* E.G. Slope (ft/ft)     *0.334278  * Area (sq ft)           *          *    4.54  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    7.83  * Top Width (ft)         *          *    7.83  *          *
* Vel Total (ft/s)       *    9.69  * Avg. Vel. (ft/s)       *          *    9.69  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)       *          *    0.58  *          *
* Conv. Total (cfs)      *    76.1  * Conv. (cfs)            *          *    76.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    8.17  *          *
* Min Ch El (ft)         *  750.88  * Shear (lb/sq ft)       *          *   11.61  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  112.44  *          *
* Frctn Loss (ft)        *    1.67  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION
```

```
RIVER: 93+00
REACH: 1                  RS: 4.44444*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  751.22       2  751.22       6  749.22      11  749.22      15  751.22
      17  751.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)          *  751.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.45  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  749.93  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  750.36  * Flow Area (sq ft)      *          *    4.56  *          *
* E.G. Slope (ft/ft)      *0.331630  * Area (sq ft)           *          *    4.56  *          *
* Q Total (cfs)           *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)          *    7.84  * Top Width (ft)          *          *    7.84  *          *
* Vel Total (ft/s)        *    9.66  * Avg. Vel. (ft/s)        *          *    9.66  *          *
* Max Chl Dpth (ft)       *    0.71  * Hydr. Depth (ft)        *          *    0.58  *          *
* Conv. Total (cfs)       *    76.4  * Conv. (cfs)             *          *    76.4  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)        *          *    8.17  *          *
* Min Ch El (ft)          *  749.22  * Shear (lb/sq ft)        *          *   11.54  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *  111.45  *          *
* Frctn Loss (ft)         *    1.66  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 4.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  749.55       2  749.55       6  747.55      11  747.55      15  749.55
      17  749.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3
```

```
CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************
* E.G. Elev (ft)          *  749.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.46  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  748.26  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  748.69  * Flow Area (sq ft)      *          *    4.54  *          *
* E.G. Slope (ft/ft)      *0.334073  * Area (sq ft)           *          *    4.54  *          *
* Q Total (cfs)           *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)          *    7.83  * Top Width (ft)          *          *    7.83  *          *
* Vel Total (ft/s)        *    9.68  * Avg. Vel. (ft/s)        *          *    9.68  *          *
* Max Chl Dpth (ft)       *    0.71  * Hydr. Depth (ft)        *          *    0.58  *          *
* Conv. Total (cfs)       *    76.1  * Conv. (cfs)             *          *    76.1  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)        *          *    8.17  *          *
* Min Ch El (ft)          *  747.55  * Shear (lb/sq ft)        *          *   11.60  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *  112.36  *          *
* Frctn Loss (ft)         *    1.66  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 4.22222*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  747.88       2  747.88       6  745.88      11  745.88      15  747.88
      17  747.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************
* E.G. Elev (ft)          *  748.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.46  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  746.59  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  747.02  * Flow Area (sq ft)      *          *    4.54  *          *
* E.G. Slope (ft/ft)      *0.334278  * Area (sq ft)           *          *    4.54  *          *
* Q Total (cfs)           *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)          *    7.83  * Top Width (ft)          *          *    7.83  *          *
* Vel Total (ft/s)        *    9.69  * Avg. Vel. (ft/s)        *          *    9.69  *          *
* Max Chl Dpth (ft)       *    0.71  * Hydr. Depth (ft)        *          *    0.58  *          *
* Conv. Total (cfs)       *    76.1  * Conv. (cfs)             *          *    76.1  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)        *          *    8.17  *          *
* Min Ch El (ft)          *  745.88  * Shear (lb/sq ft)        *          *   11.61  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *  112.44  *          *
* Frctn Loss (ft)         *    1.67  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

```
CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 4.11111*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.22       2  746.22       6  744.22      11  744.22      15  746.22
      17  746.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  746.38  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  744.93  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  745.36  * Flow Area (sq ft)     *          *    4.56  *          *
* E.G. Slope (ft/ft)     *0.331630  * Area (sq ft)          *          *    4.56  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)            *          *   44.00  *          *
* Top Width (ft)         *    7.84  * Top Width (ft)        *          *    7.84  *          *
* Vel Total (ft/s)       *    9.66  * Avg. Vel. (ft/s)      *          *    9.66  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)      *          *    0.58  *          *
* Conv. Total (cfs)      *    76.4  * Conv. (cfs)           *          *    76.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)      *          *    8.17  *          *
* Min Ch El (ft)         *  744.22  * Shear (lb/sq ft)      *          *   11.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  111.45  *          *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)  *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 4.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  744.55       2  744.55       6  742.55      11  742.55      15  744.55
      17  744.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
```

```
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  744.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  743.26  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  743.69  * Flow Area (sq ft)      *          *    4.54  *          *
* E.G. Slope (ft/ft)     *0.334073  * Area (sq ft)           *          *    4.54  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)             *          *   44.00  *          *
* Top Width (ft)         *    7.83  * Top Width (ft)         *          *    7.83  *          *
* Vel Total (ft/s)       *    9.68  * Avg. Vel. (ft/s)       *          *    9.68  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)       *          *    0.58  *          *
* Conv. Total (cfs)      *    76.1  * Conv. (cfs)            *          *    76.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    8.17  *          *
* Min Ch El (ft)         *  742.55  * Shear (lb/sq ft)       *          *   11.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  112.36  *          *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 3.83333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  744.05       2  744.05       6  742.05      11  742.05      15  744.05
      17  744.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  743.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  743.11  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  743.19  * Flow Area (sq ft)      *          *    7.57  *          *
* E.G. Slope (ft/ft)     *0.077182  * Area (sq ft)           *          *    7.57  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)             *          *   44.00  *          *
* Top Width (ft)         *    9.25  * Top Width (ft)         *          *    9.25  *          *
* Vel Total (ft/s)       *    5.81  * Avg. Vel. (ft/s)       *          *    5.81  *          *
* Max Chl Dpth (ft)      *    1.06  * Hydr. Depth (ft)       *          *    0.82  *          *
* Conv. Total (cfs)      *   158.4  * Conv. (cfs)            *          *   158.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.75  *          *
* Min Ch El (ft)         *  742.05  * Shear (lb/sq ft)       *          *    3.74  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   21.74  *          *
* Frctn Loss (ft)        *    0.80  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.28  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************
```

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 3.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.55       2  743.55       6  741.55      11  741.55      15  743.55
      17  743.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)         *  743.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  742.53  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.69  * Flow Area (sq ft)      *          *    6.80  *          *
* E.G. Slope (ft/ft)     *0.104591  * Area (sq ft)           *          *    6.80  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    8.91  * Top Width (ft)         *          *    8.91  *          *
* Vel Total (ft/s)       *    6.47  * Avg. Vel. (ft/s)       *          *    6.47  *          *
* Max Chl Dpth (ft)      *    0.98  * Hydr. Depth (ft)       *          *    0.76  *          *
* Conv. Total (cfs)      *   136.1  * Conv. (cfs)            *          *   136.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.37  *          *
* Min Ch El (ft)         *  741.55  * Shear (lb/sq ft)       *          *    4.74  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   30.65  *          *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 3.5*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.05       2  743.05       6  741.05      11  741.05      15  743.05
      17  743.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
```

```
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  742.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  742.05  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.19  * Flow Area (sq ft)      *          *    6.96  *          *
* E.G. Slope (ft/ft)     *0.098092  * Area (sq ft)           *          *    6.96  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)             *          *   44.00  *          *
* Top Width (ft)         *    8.98  * Top Width (ft)         *          *    8.98  *          *
* Vel Total (ft/s)       *    6.32  * Avg. Vel. (ft/s)       *          *    6.32  *          *
* Max Chl Dpth (ft)      *    1.00  * Hydr. Depth (ft)       *          *    0.77  *          *
* Conv. Total (cfs)      *   140.5  * Conv. (cfs)            *          *   140.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.45  *          *
* Min Ch El (ft)         *  741.05  * Shear (lb/sq ft)       *          *    4.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   28.51  *          *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 3.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.55       2  742.55       6  740.55      11  740.55      15  742.55
      17  742.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  742.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.55  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  741.69  * Flow Area (sq ft)      *          *    6.96  *          *
* E.G. Slope (ft/ft)     *0.098092  * Area (sq ft)           *          *    6.96  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)             *          *   44.00  *          *
* Top Width (ft)         *    8.98  * Top Width (ft)         *          *    8.98  *          *
* Vel Total (ft/s)       *    6.32  * Avg. Vel. (ft/s)       *          *    6.32  *          *
* Max Chl Dpth (ft)      *    1.00  * Hydr. Depth (ft)       *          *    0.77  *          *
* Conv. Total (cfs)      *   140.5  * Conv. (cfs)            *          *   140.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.45  *          *
* Min Ch El (ft)         *  740.55  * Shear (lb/sq ft)       *          *    4.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   28.51  *          *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************
```

CROSS SECTION

RIVER: 93+00
REACH: 1 RS: 3.16666*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	742.05	2	742.05	6	740.05	11	740.05	15	742.05
17	742.05								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	5	5	5	.1	.3

CROSS SECTION OUTPUT Profile #Flow

E.G. Elev (ft)	741.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.060	
W.S. Elev (ft)	741.03	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	741.19	Flow Area (sq ft)		6.86	
E.G. Slope (ft/ft)	0.102151	Area (sq ft)		6.86	
Q Total (cfs)	44.00	Flow (cfs)		44.00	
Top Width (ft)	8.94	Top Width (ft)		8.94	
Vel Total (ft/s)	6.41	Avg. Vel. (ft/s)		6.41	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.77	
Conv. Total (cfs)	137.7	Conv. (cfs)		137.7	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		9.40	
Min Ch El (ft)	740.05	Shear (lb/sq ft)		4.65	
Alpha	1.00	Stream Power (lb/ft s)		29.84	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.00	0.01	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.02	0.00

CROSS SECTION

RIVER: 93+00
REACH: 1 RS: 3.0

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	741.55	2	741.55	6	739.55	11	739.55	15	741.55
17	741.55								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	4.48	4.48	4.48	.1	.3

CROSS SECTION OUTPUT Profile #Flow

```
* E.G. Elev (ft)         *  741.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  740.54  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  740.69  * Flow Area (sq ft)      *          *    6.91  *          *
* E.G. Slope (ft/ft)     *0.099938  * Area (sq ft)           *          *    6.91  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    8.96  * Top Width (ft)         *          *    8.96  *          *
* Vel Total (ft/s)       *    6.37  * Avg. Vel. (ft/s)       *          *    6.37  *          *
* Max Chl Dpth (ft)      *    0.99  * Hydr. Depth (ft)       *          *    0.77  *          *
* Conv. Total (cfs)      *   139.2  * Conv. (cfs)            *          *   139.2  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    9.43  *          *
* Min Ch El (ft)         *  739.55  * Shear (lb/sq ft)       *          *    4.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   29.12  *          *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 2.8*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  740.04       2  740.04       6  738.04      11  738.04      15  740.04
      17  740.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************************
* E.G. Elev (ft)         *  740.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  738.76  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  739.18  * Flow Area (sq ft)      *          *    4.64  *          *
* E.G. Slope (ft/ft)     *0.314764  * Area (sq ft)           *          *    4.64  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    7.88  * Top Width (ft)         *          *    7.88  *          *
* Vel Total (ft/s)       *    9.49  * Avg. Vel. (ft/s)       *          *    9.49  *          *
* Max Chl Dpth (ft)      *    0.72  * Hydr. Depth (ft)       *          *    0.59  *          *
* Conv. Total (cfs)      *    78.4  * Conv. (cfs)            *          *    78.4  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    8.22  *          *
* Min Ch El (ft)         *  738.04  * Shear (lb/sq ft)       *          *   11.09  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  105.18  *          *
* Frctn Loss (ft)        *    0.93  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

CROSS SECTION

RIVER: 93+00
REACH: 1 RS: 2.6*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	738.53	2	738.53	6	736.53	11	736.53	15	738.53
17	738.53								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	4.48	4.48	4.48	.1	.3

CROSS SECTION OUTPUT Profile #Flow

E.G. Elev (ft)	738.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.		0.060	
W.S. Elev (ft)	737.24	Reach Len. (ft)	4.48	4.48	4.48
Crit W.S. (ft)	737.67	Flow Area (sq ft)		4.54	
E.G. Slope (ft/ft)	0.335406	Area (sq ft)		4.54	
Q Total (cfs)	44.00	Flow (cfs)		44.00	
Top Width (ft)	7.83	Top Width (ft)		7.83	
Vel Total (ft/s)	9.70	Avg. Vel. (ft/s)		9.70	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	76.0	Conv. (cfs)		76.0	
Length Wtd. (ft)	4.48	Wetted Per. (ft)		8.16	
Min Ch El (ft)	736.53	Shear (lb/sq ft)		11.64	
Alpha	1.00	Stream Power (lb/ft s)		112.86	
Frctn Loss (ft)	1.46	Cum Volume (acre-ft)	0.00	0.01	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	0.01	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: 93+00
REACH: 1 RS: 2.4*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	737.02	2	737.02	6	735.02	11	735.02	15	737.02
17	737.02								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	4.48	4.48	4.48	.1	.3

```
CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  737.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  735.73  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  736.16  * Flow Area (sq ft)      *          *    4.54  *          *
* E.G. Slope (ft/ft)     *0.335920  * Area (sq ft)           *          *    4.54  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    7.83  * Top Width (ft)         *          *    7.83  *          *
* Vel Total (ft/s)       *    9.70  * Avg. Vel. (ft/s)       *          *    9.70  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)       *          *    0.58  *          *
* Conv. Total (cfs)      *    75.9  * Conv. (cfs)            *          *    75.9  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    8.16  *          *
* Min Ch El (ft)         *  735.02  * Shear (lb/sq ft)       *          *   11.65  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  113.05  *          *
* Frctn Loss (ft)        *    1.50  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 2.2*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  735.51       2  735.51       6  733.51      11  733.51      15  735.51
      17  735.51

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  735.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.47  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  734.22  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  734.65  * Flow Area (sq ft)      *          *    4.53  *          *
* E.G. Slope (ft/ft)     *0.337159  * Area (sq ft)           *          *    4.53  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)         *    7.83  * Top Width (ft)         *          *    7.83  *          *
* Vel Total (ft/s)       *    9.71  * Avg. Vel. (ft/s)       *          *    9.71  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)       *          *    0.58  *          *
* Conv. Total (cfs)      *    75.8  * Conv. (cfs)            *          *    75.8  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    8.16  *          *
* Min Ch El (ft)         *  733.51  * Shear (lb/sq ft)       *          *   11.69  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  113.51  *          *
* Frctn Loss (ft)        *    1.51  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
```

```
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 2.0

INPUT
Description: Outlet on 1 on 70 side slope
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     734       2     734       6     732      11     732      15     734
      17     734

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*************************************************************************************************
* E.G. Elev (ft)          *  734.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.47  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  732.71  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)          *  733.14  * Flow Area (sq ft)      *          *    4.53  *          *
* E.G. Slope (ft/ft)      *0.337677  * Area (sq ft)           *          *    4.53  *          *
* Q Total (cfs)           *   44.00  * Flow (cfs)              *          *   44.00  *          *
* Top Width (ft)          *    7.82  * Top Width (ft)          *          *    7.82  *          *
* Vel Total (ft/s)        *    9.72  * Avg. Vel. (ft/s)        *          *    9.72  *          *
* Max Chl Dpth (ft)       *    0.71  * Hydr. Depth (ft)        *          *    0.58  *          *
* Conv. Total (cfs)       *    75.7  * Conv. (cfs)             *          *    75.7  *          *
* Length Wtd. (ft)        *    4.60  * Wetted Per. (ft)        *          *    8.16  *          *
* Min Ch El (ft)          *  732.00  * Shear (lb/sq ft)        *          *   11.70  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *  113.71  *          *
* Frctn Loss (ft)         *    1.51  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 1.8*

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -1  733.51      .6  733.51     3.8  731.91    6.24  731.91    7.63  731.91
    9.37  731.91   10.76  731.91    13.2  731.91    16.4  733.51      18  733.51

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
      -1     .06      .6     .06    16.4     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            .6    16.4              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  733.11  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.43  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  732.67  * Reach Len. (ft)       *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  732.74  * Flow Area (sq ft)     *          *    8.35  *          *
* E.G. Slope (ft/ft)     *0.080291  * Area (sq ft)          *          *    8.35  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)             *          *   44.00  *          *
* Top Width (ft)         *   12.45  * Top Width (ft)         *          *   12.45  *          *
* Vel Total (ft/s)       *    5.27  * Avg. Vel. (ft/s)       *          *    5.27  *          *
* Max Chl Dpth (ft)      *    0.76  * Hydr. Depth (ft)       *          *    0.67  *          *
* Conv. Total (cfs)      *   155.3  * Conv. (cfs)            *          *   155.3  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *          *   12.82  *          *
* Min Ch El (ft)         *  731.91  * Shear (lb/sq ft)       *          *    3.26  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   17.21  *          *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.31  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 1.6*

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -2  731.82     -.8  731.82     1.6  731.82    5.18  731.82    7.22  731.82
    9.78  731.82   11.82  731.82    15.4  731.82    17.8  731.82      19  731.82

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
      -2     .06     -.8     .06    17.8     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -.8    17.8              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  732.65  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.            *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  732.49  * Reach Len. (ft)       *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  732.34  * Flow Area (sq ft)     *    0.81  *   12.49  *    0.81  *
* E.G. Slope (ft/ft)     *0.028666  * Area (sq ft)          *    0.81  *   12.49  *    0.81  *
* Q Total (cfs)          *   44.00  * Flow (cfs)             *    1.93  *   40.15  *    1.93  *
* Top Width (ft)         *   21.00  * Top Width (ft)         *    1.20  *   18.60  *    1.20  *
* Vel Total (ft/s)       *    3.12  * Avg. Vel. (ft/s)       *    2.39  *    3.21  *    2.39  *
* Max Chl Dpth (ft)      *    0.67  * Hydr. Depth (ft)       *    0.67  *    0.67  *    0.67  *
* Conv. Total (cfs)      *   259.9  * Conv. (cfs)            *    11.4  *   237.1  *    11.4  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    1.87  *   18.60  *    1.87  *
* Min Ch El (ft)         *  731.82  * Shear (lb/sq ft)       *    0.77  *    1.20  *    0.77  *
```

```
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    1.84  *    3.86  *    1.84  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 1.4*

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -3  731.73    -2.2  731.73     -.6  731.73    4.12  731.73    6.81  731.73
   10.19  731.73   12.88  731.73    17.6  731.73    19.2  731.73      20  731.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
      -3     .06    -2.2     .06    19.2     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -2.2    19.2              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*****************************************************************************************
* E.G. Elev (ft)         *  732.51  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  732.37  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    0.51  *   13.75  *    0.51  *
* E.G. Slope (ft/ft)     *0.027307  * Area (sq ft)           *    0.51  *   13.75  *    0.51  *
* Q Total (cfs)          *   44.00  * Flow (cfs)              *    1.06  *   41.89  *    1.06  *
* Top Width (ft)         *   23.00  * Top Width (ft)          *    0.80  *   21.40  *    0.80  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)        *    2.06  *    3.05  *    2.06  *
* Max Chl Dpth (ft)      *    0.64  * Hydr. Depth (ft)        *    0.64  *    0.64  *    0.64  *
* Conv. Total (cfs)      *   266.3  * Conv. (cfs)             *     6.4  *   253.5  *     6.4  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *    1.44  *   21.40  *    1.44  *
* Min Ch El (ft)         *  731.73  * Shear (lb/sq ft)        *    0.61  *    1.10  *    0.61  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    1.25  *    3.34  *    1.25  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 1.2*

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -4  731.64    -3.6  731.64    -2.8  731.64    3.06  731.64    6.41  731.64
   10.59  731.64   13.94  731.64    19.8  731.64    20.6  731.64      21  731.64
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -4     .06    -3.6     .06    20.6     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -3.6    20.6              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  732.39  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.            *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  732.26  * Reach Len. (ft)       *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  732.10  * Flow Area (sq ft)     *    0.25  *   14.99  *    0.25  *
* E.G. Slope (ft/ft)     *0.025692  * Area (sq ft)          *    0.25  *   14.99  *    0.25  *
* Q Total (cfs)          *   44.00  * Flow (cfs)            *    0.38  *   43.23  *    0.38  *
* Top Width (ft)         *   25.00  * Top Width (ft)        *    0.40  *   24.20  *    0.40  *
* Vel Total (ft/s)       *    2.84  * Avg. Vel. (ft/s)      *    1.55  *    2.88  *    1.55  *
* Max Chl Dpth (ft)      *    0.62  * Hydr. Depth (ft)      *    0.62  *    0.62  *    0.62  *
* Conv. Total (cfs)      *   274.5  * Conv. (cfs)           *     2.4  *   269.7  *     2.4  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)      *    1.02  *   24.20  *    1.02  *
* Min Ch El (ft)         *  731.64  * Shear (lb/sq ft)      *    0.39  *    0.99  *    0.39  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *   0.60  *    2.87  *    0.60  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)  *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *    0.00  *    0.00  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 93+00
REACH: 1                  RS: 1.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -5  731.55       2  731.55       6  731.55      11  731.55      15  731.55
      22  731.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -5     .06      -5     .06      22     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -5      22                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #Flow
*********************************************************************************************
* E.G. Elev (ft)         *  732.20  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  731.98  * Reach Len. (ft)       *          *          *          *
* Crit W.S. (ft)         *  731.98  * Flow Area (sq ft)     *          *   11.73  *          *
* E.G. Slope (ft/ft)     *0.072829  * Area (sq ft)          *          *   11.73  *          *
* Q Total (cfs)          *   44.00  * Flow (cfs)            *          *   44.00  *          *
* Top Width (ft)         *   27.00  * Top Width (ft)        *          *   27.00  *          *
* Vel Total (ft/s)       *    3.75  * Avg. Vel. (ft/s)      *          *    3.75  *          *
* Max Chl Dpth (ft)      *    0.43  * Hydr. Depth (ft)      *          *    0.43  *          *
* Conv. Total (cfs)      *   163.0  * Conv. (cfs)           *          *   163.0  *          *
```

* Length Wtd. (ft)	*	* Wetted Per. (ft)	*	* 27.87	*
* Min Ch El (ft)	* 731.55	* Shear (lb/sq ft)	*	* 1.91	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 7.18	*
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	*	*
* C & E Loss (ft)	*	* Cum SA (acres)	*	*	*

Warning: Slope-Area method could not converge on a starting water surface elevation within the specified number of trials. The program used critical depth as the starting water surface.

SUMMARY OF MANNING'S N VALUES

River:93+00

Reach	River Sta.	n1	n2	n3
1	7	.03	.03	.03
1	6.92857	.03	.03	.03
1	6.85714	.03	.03	.03
1	6.78571	.03	.03	.03
1	6.71428	.03	.03	.03
1	6.64285	.03	.03	.03
1	6.57142	.03	.03	.03
1	6.5	.03	.03	.03
1	6.33333	.03	.03	.03
1	6.16666	.03	.03	.03
1	6.0	.06	.06	.06
1	5.83333	.06	.06	.06
1	5.66666	.06	.06	.06
1	5.5	.06	.06	.06
1	5.41666	.06	.06	.06
1	5.33333	.06	.06	.06
1	5.25	.06	.06	.06
1	5.16666	.06	.06	.06
1	5.08333	.06	.06	.06
1	5.0	.06	.06	.06
1	4.88888	.06	.06	.06
1	4.77777	.06	.06	.06
1	4.66666	.06	.06	.06
1	4.55555	.06	.06	.06
1	4.44444	.06	.06	.06
1	4.33333	.06	.06	.06
1	4.22222	.06	.06	.06
1	4.11111	.06	.06	.06
1	4.0	.06	.06	.06
1	3.83333	.06	.06	.06
1	3.66666	.06	.06	.06
1	3.5	.06	.06	.06
1	3.33333	.06	.06	.06
1	3.16666	.06	.06	.06
1	3.0	.06	.06	.06
1	2.8	.06	.06	.06
1	2.6	.06	.06	.06
1	2.4	.06	.06	.06
1	2.2	.06	.06	.06
1	2.0	.06	.06	.06
1	1.8	.06	.06	.06
1	1.6	.06	.06	.06
1	1.4	.06	.06	.06
1	1.2	.06	.06	.06
1	1.0	.06	.06	.06

SUMMARY OF REACH LENGTHS

River: 93+00

Reach	River Sta.	Left	Channel	Right
1	7	5	5	5
1	6.92857	5	5	5
1	6.85714	5	5	5
1	6.78571	5	5	5
1	6.71428	5	5	5
1	6.64285	5	5	5
1	6.57142	5	5	5
1	6.5	5	5	5
1	6.33333	5	5	5
1	6.16666	5	5	5
1	6.0	5	5	5
1	5.83333	5	5	5
1	5.66666	5	5	5
1	5.5	4.83	4.83	4.83
1	5.41666	4.83	4.83	4.83
1	5.33333	4.83	4.83	4.83
1	5.25	4.83	4.83	4.83
1	5.16666	4.83	4.83	4.83
1	5.08333	4.83	4.83	4.83
1	5.0	5	5	5
1	4.88888	5	5	5
1	4.77777	5	5	5
1	4.66666	5	5	5
1	4.55555	5	5	5
1	4.44444	5	5	5
1	4.33333	5	5	5
1	4.22222	5	5	5
1	4.11111	5	5	5
1	4.0	5	5	5
1	3.83333	5	5	5
1	3.66666	5	5	5
1	3.5	5	5	5
1	3.33333	5	5	5
1	3.16666	5	5	5
1	3.0	4.48	4.48	4.48
1	2.8	4.48	4.48	4.48
1	2.6	4.48	4.48	4.48
1	2.4	4.48	4.48	4.48
1	2.2	4.48	4.48	4.48
1	2.0	4.6	4.6	4.6
1	1.8	4.6	4.6	4.6
1	1.6	4.6	4.6	4.6
1	1.4	4.6	4.6	4.6
1	1.2	4.6	4.6	4.6
1	1.0	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 93+00

Reach	River Sta.	Contr.	Expan.
1	7	.1	.3
1	6.92857**	.1	.3

```
*1              *    6.85714**       .1*       .3*
*1              *    6.78571**       .1*       .3*
*1              *    6.71428**       .1*       .3*
*1              *    6.64285**       .1*       .3*
*1              *    6.57142**       .1*       .3*
*1              *    6.5     *       .1*       .3*
*1              *    6.33333**       .1*       .3*
*1              *    6.16666**       .1*       .3*
*1              *    6.0     *       .1*       .3*
*1              *    5.83333**       .1*       .3*
*1              *    5.66666**       .1*       .3*
*1              *    5.5     *       .1*       .3*
*1              *    5.41666**       .1*       .3*
*1              *    5.33333**       .1*       .3*
*1              *    5.25*   *       .1*       .3*
*1              *    5.16666**       .1*       .3*
*1              *    5.08333**       .1*       .3*
*1              *    5.0     *       .1*       .3*
*1              *    4.88888**       .1*       .3*
*1              *    4.77777**       .1*       .3*
*1              *    4.66666**       .1*       .3*
*1              *    4.55555**       .1*       .3*
*1              *    4.44444**       .1*       .3*
*1              *    4.33333**       .1*       .3*
*1              *    4.22222**       .1*       .3*
*1              *    4.11111**       .1*       .3*
*1              *    4.0     *       .1*       .3*
*1              *    3.83333**       .1*       .3*
*1              *    3.66666**       .1*       .3*
*1              *    3.5*    *       .1*       .3*
*1              *    3.33333**       .1*       .3*
*1              *    3.16666**       .1*       .3*
*1              *    3.0     *       .1*       .3*
*1              *    2.8*    *       .1*       .3*
*1              *    2.6*    *       .1*       .3*
*1              *    2.4*    *       .1*       .3*
*1              *    2.2*    *       .1*       .3*
*1              *    2.0     *       .1*       .3*
*1              *    1.8*    *       .1*       .3*
*1              *    1.6*    *       .1*       .3*
*1              *    1.4*    *       .1*       .3*
*1              *    1.2*    *       .1*       .3*
*1              *    1.0     *       .1*       .3*
*******************************************************
```

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1.0	44.00	731.55	731.98	731.98	732.20	0.072829	3.75	11.73	27.00	1.00
1	1.2*	44.00	731.64	732.26	732.10	732.39	0.025692	2.88	15.48	25.00	0.65
1	1.4*	44.00	731.73	732.37		732.51	0.027307	3.05	14.78	23.00	0.67
1	1.6*	44.00	731.82	732.49	732.34	732.65	0.028666	3.21	14.10	21.00	0.69
1	1.8*	44.00	731.91	732.67	732.74	733.11	0.080291	5.27	8.35	12.45	1.14
1	2.0	44.00	732.00	732.71	733.14	734.17	0.337677	9.72	4.53	7.82	2.25
1	2.2*	44.00	733.51	734.22	734.65	735.68	0.337159	9.71	4.53	7.83	2.25
1	2.4*	44.00	735.02	735.73	736.16	737.19	0.335920	9.70	4.54	7.83	2.25
1	2.6*	44.00	736.53	737.24	737.67	738.70	0.335406	9.70	4.54	7.83	2.24
1	2.8*	44.00	738.04	738.76	739.18	740.16	0.314764	9.49	4.64	7.88	2.18
1	3.0	44.00	739.55	740.54	740.69	741.17	0.099938	6.37	6.91	8.96	1.28
1	3.16666*	44.00	740.05	741.03	741.19	741.67	0.102151	6.41	6.86	8.94	1.29
1	3.33333*	44.00	740.55	741.55	741.69	742.17	0.098092	6.32	6.96	8.98	1.27
1	3.5*	44.00	741.05	742.05	742.19	742.67	0.098092	6.32	6.96	8.98	1.27
1	3.66666*	44.00	741.55	742.53	742.69	743.18	0.104591	6.47	6.80	8.91	1.30

1	3.83333	44.00	742.05	743.11	743.19	743.64	0.077182	5.81	7.57	9.25	1.13
1	4.0	44.00	742.55	743.26	743.69	744.71	0.334073	9.68	4.54	7.83	2.24
1	4.11111	44.00	744.22	744.93	745.36	746.38	0.331630	9.66	4.56	7.84	2.23
1	4.22222	44.00	745.88	746.59	747.02	748.04	0.334278	9.69	4.54	7.83	2.24
1	4.33333	44.00	747.55	748.26	748.69	749.71	0.334073	9.68	4.54	7.83	2.24
1	4.44444	44.00	749.22	749.93	750.36	751.38	0.331630	9.66	4.56	7.84	2.23
1	4.55555	44.00	750.88	751.59	752.02	753.04	0.334278	9.69	4.54	7.83	2.24
1	4.66666	44.00	752.55	753.26	753.69	754.71	0.334073	9.68	4.54	7.83	2.24
1	4.77777	44.00	754.22	754.93	755.36	756.38	0.331934	9.66	4.55	7.84	2.23
1	4.88888	44.00	755.88	756.59	757.02	758.04	0.333256	9.67	4.55	7.83	2.24
1	5.0	44.00	757.55	758.69	758.69	759.13	0.060208	5.32	8.27	9.55	1.01
1	5.08333	1.84	757.60	759.17		759.17	0.000031	0.14	12.78	11.28	0.02
1	5.16666	1.84	757.65	759.17		759.17	0.000035	0.15	12.23	11.08	0.03
1	5.25	1.84	757.70	759.17		759.17	0.000040	0.16	11.68	10.88	0.03
1	5.33333	1.84	757.75	759.17		759.17	0.000046	0.17	11.14	10.68	0.03
1	5.41666	1.84	757.80	759.17		759.17	0.000052	0.17	10.62	10.48	0.03
1	5.5	1.84	757.85	759.17		759.17	0.000060	0.18	10.10	10.29	0.03
1	5.66666	1.84	757.90	759.17		759.17	0.000034	0.14	12.99	12.76	0.02
1	5.83333	1.84	757.95	759.17		759.17	0.000023	0.12	15.61	15.22	0.02
1	6.0	1.84	758.00	759.17		759.17	0.000017	0.10	17.99	17.69	0.02
1	6.16666	1.84	758.03	759.17		759.17	0.000007	0.13	14.41	14.90	0.02
1	6.33333	1.84	758.07	759.17		759.17	0.000014	0.17	10.88	12.08	0.03
1	6.5	1.84	758.10	759.17		759.17	0.000033	0.24	7.66	9.29	0.05
1	6.57142	1.84	758.13	759.17		759.17	0.000036	0.25	7.38	9.17	0.05
1	6.64285	1.84	758.15	759.17		759.17	0.000039	0.26	7.20	9.09	0.05
1	6.71428	1.84	758.18	759.17		759.17	0.000043	0.27	6.93	8.97	0.05
1	6.78571	1.84	758.20	759.17		759.17	0.000047	0.27	6.75	8.89	0.06
1	6.85714	1.84	758.23	759.17		759.17	0.000052	0.28	6.49	8.77	0.06
1	6.92857	1.84	758.25	759.17		759.17	0.000056	0.29	6.32	8.69	0.06
1	7	1.84	758.28	759.17	758.44	759.17	0.000064	0.30	6.06	8.57	0.06

```
                    HEC-RAS Version 3.1.3 May 2005
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

*******************************************************************************

PROJECT DATA
Project Title: BRDB_RipRap_Gutter88+04
Project File : RipRap_Gutter88_04.prj
Run Date and Time: 8/6/2008 11:17:56 AM

Project in English units

*******************************************************************************

PLAN DATA

Plan Title: 4-10-08
Plan File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\88+04\RipRap_Gutter88_04.p01

           Geometry Title: Template4-10-08
           Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\88+04\RipRap_Gutter88_04.g01

           Flow Title    : Full-Pipe-Flow4-10-08
           Flow File     : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\88+04\RipRap_Gutter88_04.f01

Plan Summary Information:
Number of:  Cross Sections =   29    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Mixed Flow


*******************************************************************************

FLOW DATA

Flow Title: Full-Pipe-Flow4-10-08
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\88+04\RipRap_Gutter88_04.f01

Flow Data (cfs)
***************************************************************
* River           Reach           RS      *      Slope = 2% *
* 87+77           1               5.0     *             55.9 *
***************************************************************
```

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
87+77	1	Slope = 2%	Normal S = 0.008	Normal S = 0.0143

GEOMETRY DATA

Geometry Title: Template4-10-08
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\88+04\RipRap_Gutter88_04.g01

CROSS SECTION

RIVER: 87+77
REACH: 1 RS: 5.0

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	756	2	756	8	753	13	753	19	756
23	756								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	2	.03	19	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	19	31.25	31.25	31.25	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	754.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	754.64	Reach Len. (ft)	31.25	31.25	31.25
Crit W.S. (ft)	754.30	Flow Area (sq ft)		13.55	
E.G. Slope (ft/ft)	*0.006109	Area (sq ft)		13.55	
Q Total (cfs)	55.90	Flow (cfs)		55.90	
Top Width (ft)	11.55	Top Width (ft)		11.55	
Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)		4.12	
Max Chl Dpth (ft)	1.64	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	715.2	Conv. (cfs)		715.2	
Length Wtd. (ft)	31.25	Wetted Per. (ft)		12.32	
Min Ch El (ft)	753.00	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		1.73	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.00	0.07	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.07	0.00

CROSS SECTION

RIVER: 87+77
REACH: 1 RS: 4.875*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	755.8	2	755.8	8	752.8	13	752.8	19	755.8
23	755.8								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      19     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      19            31.25   31.25   31.25             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)          *  754.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.26  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)          *  754.46  * Reach Len. (ft)        *   31.25  *   31.25  *   31.25  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          *   13.76  *          *
* E.G. Slope (ft/ft)      *0.005853  * Area (sq ft)           *          *   13.76  *          *
* Q Total (cfs)           *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)          *   11.62  * Top Width (ft)          *          *   11.62  *          *
* Vel Total (ft/s)        *    4.06  * Avg. Vel. (ft/s)        *          *    4.06  *          *
* Max Chl Dpth (ft)       *    1.66  * Hydr. Depth (ft)        *          *    1.18  *          *
* Conv. Total (cfs)       *   730.6  * Conv. (cfs)             *          *   730.6  *          *
* Length Wtd. (ft)        *   31.25  * Wetted Per. (ft)        *          *   12.41  *          *
* Min Ch El (ft)          *  752.80  * Shear (lb/sq ft)        *          *    0.41  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.65  *          *
* Frctn Loss (ft)         *    0.18  * Cum Volume (acre-ft)    *    0.00  *    0.06  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    0.00  *    0.06  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 4.75*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  755.61       2  755.61       8  752.61      13  752.61      19  755.61
      23  755.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      19     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      19            31.25   31.25   31.25             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)          *  754.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.25  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)          *  754.28  * Reach Len. (ft)        *   31.25  *   31.25  *   31.25  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          *   13.92  *          *
* E.G. Slope (ft/ft)      *0.005671  * Area (sq ft)           *          *   13.92  *          *
* Q Total (cfs)           *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)          *   11.68  * Top Width (ft)          *          *   11.68  *          *
* Vel Total (ft/s)        *    4.02  * Avg. Vel. (ft/s)        *          *    4.02  *          *
* Max Chl Dpth (ft)       *    1.67  * Hydr. Depth (ft)        *          *    1.19  *          *
* Conv. Total (cfs)       *   742.3  * Conv. (cfs)             *          *   742.3  *          *
* Length Wtd. (ft)        *   31.25  * Wetted Per. (ft)        *          *   12.47  *          *
* Min Ch El (ft)          *  752.61  * Shear (lb/sq ft)        *          *    0.40  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.59  *          *
* Frctn Loss (ft)         *    0.17  * Cum Volume (acre-ft)    *    0.00  *    0.05  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    0.00  *    0.05  *    0.00  *
*********************************************************************************************

CROSS SECTION
```

```
RIVER: 87+77
REACH: 1                  RS: 4.625*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  755.41       2  755.41       8  752.41      13  752.41      19  755.41
      23  755.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      19     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      19             31.25   31.25   31.25             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  754.36  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  754.12  * Reach Len. (ft)        *   31.25  *   31.25  *   31.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   14.44  *          *
* E.G. Slope (ft/ft)     *0.005129  * Area (sq ft)           *          *   14.44  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   11.85  * Top Width (ft)          *          *   11.85  *          *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)        *          *    3.87  *          *
* Max Chl Dpth (ft)      *    1.71  * Hydr. Depth (ft)        *          *    1.22  *          *
* Conv. Total (cfs)      *   780.6  * Conv. (cfs)             *          *   780.6  *          *
* Length Wtd. (ft)       *   31.25  * Wetted Per. (ft)        *          *   12.66  *          *
* Min Ch El (ft)         *  752.41  * Shear (lb/sq ft)        *          *    0.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    1.41  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)     *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)           *    0.00  *    0.04  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 4.5

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  755.22       2  755.22       8  752.22      13  752.22      19  755.22
      23  755.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      19     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      19                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  754.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  753.99  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   15.06  *          *
* E.G. Slope (ft/ft)     *0.004564  * Area (sq ft)           *          *   15.06  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   12.06  * Top Width (ft)          *          *   12.06  *          *
```

```
* Vel Total (ft/s)       *    3.71  * Avg. Vel. (ft/s)       *          *    3.71  *          *
* Max Chl Dpth (ft)      *    1.77  * Hydr. Depth (ft)       *          *    1.25  *          *
* Conv. Total (cfs)      *   827.4  * Conv. (cfs)            *          *   827.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   12.90  *          *
* Min Ch El (ft)         *  752.22  * Shear (lb/sq ft)       *          *    0.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.24  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 4.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  755.18       2  755.18       8  752.18   15.67  752.18   21.67  755.18
      25  755.18

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0     .03       2     .03   21.67     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   21.67                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  754.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  754.05  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   21.27  *          *
* E.G. Slope (ft/ft)     *0.001927  * Area (sq ft)           *          *   21.27  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   15.13  * Top Width (ft)          *          *   15.13  *          *
* Vel Total (ft/s)       *    2.63  * Avg. Vel. (ft/s)        *          *    2.63  *          *
* Max Chl Dpth (ft)      *    1.87  * Hydr. Depth (ft)        *          *    1.41  *          *
* Conv. Total (cfs)      *  1273.3  * Conv. (cfs)             *          *  1273.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   16.01  *          *
* Min Ch El (ft)         *  752.18  * Shear (lb/sq ft)        *          *    0.16  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.42  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 4.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  755.14       2  755.14       8  752.14   18.33  752.14   24.33  755.14
      27  755.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
************************************************
       0     .03       2     .03   24.33     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   24.33                5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  754.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  754.07  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   27.36  *          *
* E.G. Slope (ft/ft)     *0.001043  * Area (sq ft)           *          *   27.36  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   18.04  * Top Width (ft)          *          *   18.04  *          *
* Vel Total (ft/s)       *    2.04  * Avg. Vel. (ft/s)        *          *    2.04  *          *
* Max Chl Dpth (ft)      *    1.93  * Hydr. Depth (ft)        *          *    1.52  *          *
* Conv. Total (cfs)      *  1731.0  * Conv. (cfs)             *          *  1731.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   18.95  *          *
* Min Ch El (ft)         *  752.14  * Shear (lb/sq ft)        *          *    0.09  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    0.19  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 4.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   755.1       2   755.1       8   752.1      21   752.1      27   755.1
      29   755.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0     .06       2     .06      27     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      27                5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  754.12  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.04  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  754.08  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   33.50  *          *
* E.G. Slope (ft/ft)     *0.002567  * Area (sq ft)           *          *   33.50  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   20.90  * Top Width (ft)          *          *   20.90  *          *
* Vel Total (ft/s)       *    1.67  * Avg. Vel. (ft/s)        *          *    1.67  *          *
* Max Chl Dpth (ft)      *    1.98  * Hydr. Depth (ft)        *          *    1.60  *          *
* Conv. Total (cfs)      *  1103.3  * Conv. (cfs)             *          *  1103.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   21.84  *          *
* Min Ch El (ft)         *  752.10  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    0.41  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
```

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        0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 3.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  754.73       2  754.73    7.33  752.07   12.33  752.07   17.67  754.73
   21.67  754.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   17.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   17.67                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  754.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  753.88  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   15.59  *          *
* E.G. Slope (ft/ft)     *0.016627  * Area (sq ft)           *          *   15.59  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   12.25  * Top Width (ft)          *          *   12.25  *          *
* Vel Total (ft/s)       *    3.59  * Avg. Vel. (ft/s)        *          *    3.59  *          *
* Max Chl Dpth (ft)      *    1.81  * Hydr. Depth (ft)        *          *    1.27  *          *
* Conv. Total (cfs)      *   433.5  * Conv. (cfs)             *          *   433.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   13.10  *          *
* Min Ch El (ft)         *  752.07  * Shear (lb/sq ft)        *          *    1.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    4.43  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)     *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)           *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 3.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  754.37       2  754.37    6.67  752.03   11.67  752.03   16.33  754.37
   20.33  754.37

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   16.33     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   16.33                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  753.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  753.75  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
```

```
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   14.54  *          *
* E.G. Slope (ft/ft)     *0.020115  * Area (sq ft)           *          *   14.54  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   11.87  * Top Width (ft)          *          *   11.87  *          *
* Vel Total (ft/s)       *    3.85  * Avg. Vel. (ft/s)        *          *    3.85  *          *
* Max Chl Dpth (ft)      *    1.72  * Hydr. Depth (ft)        *          *    1.22  *          *
* Conv. Total (cfs)      *   394.1  * Conv. (cfs)             *          *   394.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   12.69  *          *
* Min Ch El (ft)         *  752.03  * Shear (lb/sq ft)        *          *    1.44  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.53  *          *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 3.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     754       2     754       6     752      11     752      15     754
      19     754

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  753.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  753.31  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  753.31  * Flow Area (sq ft)      *          *    9.95  *          *
* E.G. Slope (ft/ft)     *0.057696  * Area (sq ft)           *          *    9.95  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   10.23  * Top Width (ft)          *          *   10.23  *          *
* Vel Total (ft/s)       *    5.62  * Avg. Vel. (ft/s)        *          *    5.62  *          *
* Max Chl Dpth (ft)      *    1.31  * Hydr. Depth (ft)        *          *    0.97  *          *
* Conv. Total (cfs)      *   232.7  * Conv. (cfs)             *          *   232.7  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)        *          *   10.85  *          *
* Min Ch El (ft)         *  752.00  * Shear (lb/sq ft)        *          *    3.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   18.57  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: 87+77
```

```
REACH: 1                  RS: 2.92857*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  752.57       2  752.57       6  750.57   11.14  750.57   15.14  752.57
      19  752.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   15.14     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   15.14             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  753.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  751.35  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  751.86  * Flow Area (sq ft)      *          *    5.26  *          *
* E.G. Slope (ft/ft)     *0.357843  * Area (sq ft)           *          *    5.26  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *    8.28  * Top Width (ft)          *          *    8.28  *          *
* Vel Total (ft/s)       *   10.63  * Avg. Vel. (ft/s)        *          *   10.63  *          *
* Max Chl Dpth (ft)      *    0.78  * Hydr. Depth (ft)        *          *    0.64  *          *
* Conv. Total (cfs)      *    93.4  * Conv. (cfs)             *          *    93.4  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)        *          *    8.65  *          *
* Min Ch El (ft)         *  750.57  * Shear (lb/sq ft)        *          *   13.58  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  144.45  *          *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.85714*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  751.14       2  751.14       6  749.14   11.29  749.14   15.29  751.14
      19  751.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   15.29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   15.29             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  751.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.53  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  749.95  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
```

```
* Crit W.S. (ft)          *  750.42  * Flow Area (sq ft)      *          *    5.63  *          *
* E.G. Slope (ft/ft)      *0.297492  * Area (sq ft)           *          *    5.63  *          *
* Q Total (cfs)           *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)          *    8.54  * Top Width (ft)          *          *    8.54  *          *
* Vel Total (ft/s)        *    9.93  * Avg. Vel. (ft/s)        *          *    9.93  *          *
* Max Chl Dpth (ft)       *    0.81  * Hydr. Depth (ft)        *          *    0.66  *          *
* Conv. Total (cfs)       *   102.5  * Conv. (cfs)             *          *   102.5  *          *
* Length Wtd. (ft)        *    4.78  * Wetted Per. (ft)        *          *    8.93  *          *
* Min Ch El (ft)          *  749.14  * Shear (lb/sq ft)        *          *   11.71  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *  116.27  *          *
* Frctn Loss (ft)         *    1.56  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.78571*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  749.71       2  749.71       6  747.71   11.43  747.71   15.43  749.71
      19  749.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06   15.43     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   15.43             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)          *  750.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.54  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  748.51  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)          *  748.97  * Flow Area (sq ft)      *          *    5.61  *          *
* E.G. Slope (ft/ft)      *0.303852  * Area (sq ft)           *          *    5.61  *          *
* Q Total (cfs)           *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)          *    8.62  * Top Width (ft)          *          *    8.62  *          *
* Vel Total (ft/s)        *    9.96  * Avg. Vel. (ft/s)        *          *    9.96  *          *
* Max Chl Dpth (ft)       *    0.80  * Hydr. Depth (ft)        *          *    0.65  *          *
* Conv. Total (cfs)       *   101.4  * Conv. (cfs)             *          *   101.4  *          *
* Length Wtd. (ft)        *    4.78  * Wetted Per. (ft)        *          *    9.00  *          *
* Min Ch El (ft)          *  747.71  * Shear (lb/sq ft)        *          *   11.83  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *  117.81  *          *
* Frctn Loss (ft)         *    1.44  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.71428*

INPUT
Description:
Station Elevation Data    num=       6
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  748.29       2  748.29       6  746.29   11.57  746.29   15.57  748.29
      19  748.29

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   15.57     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   15.57             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  748.60  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.52  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  747.08  * Reach Len. (ft)       *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  747.54  * Flow Area (sq ft)     *          *    5.65  *          *
* E.G. Slope (ft/ft)     *0.301584  * Area (sq ft)          *          *    5.65  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)            *          *   55.90  *          *
* Top Width (ft)         *    8.73  * Top Width (ft)        *          *    8.73  *          *
* Vel Total (ft/s)       *    9.89  * Avg. Vel. (ft/s)      *          *    9.89  *          *
* Max Chl Dpth (ft)      *    0.79  * Hydr. Depth (ft)      *          *    0.65  *          *
* Conv. Total (cfs)      *   101.8  * Conv. (cfs)           *          *   101.8  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)      *          *    9.10  *          *
* Min Ch El (ft)         *  746.29  * Shear (lb/sq ft)      *          *   11.68  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *  115.61  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.64285*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.86       2  746.86       6  744.86   11.71  744.86   15.71  746.86
      19  746.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   15.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   15.71             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  747.16  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.52  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  745.64  * Reach Len. (ft)       *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  746.09  * Flow Area (sq ft)     *          *    5.65  *          *
* E.G. Slope (ft/ft)     *0.304889  * Area (sq ft)          *          *    5.65  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)            *          *   55.90  *          *
* Top Width (ft)         *    8.82  * Top Width (ft)        *          *    8.82  *          *
* Vel Total (ft/s)       *    9.89  * Avg. Vel. (ft/s)      *          *    9.89  *          *
* Max Chl Dpth (ft)      *    0.78  * Hydr. Depth (ft)      *          *    0.64  *          *
* Conv. Total (cfs)      *   101.2  * Conv. (cfs)           *          *   101.2  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)      *          *    9.19  *          *
```

```
* Min Ch El (ft)          *  744.86  * Shear (lb/sq ft)       *          *   11.71  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *  115.79  *          *
* Frctn Loss (ft)         *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.57142*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  745.43       2  745.43       6  743.43   11.86  743.43   15.86  745.43
      19  745.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06   15.86     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   15.86             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)          *  745.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.50  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  744.20  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)          *  744.65  * Flow Area (sq ft)      *          *    5.69  *          *
* E.G. Slope (ft/ft)      *0.303721  * Area (sq ft)           *          *    5.69  *          *
* Q Total (cfs)           *   55.90  * Flow (cfs)             *          *   55.90  *          *
* Top Width (ft)          *    8.93  * Top Width (ft)         *          *    8.93  *          *
* Vel Total (ft/s)        *    9.83  * Avg. Vel. (ft/s)       *          *    9.83  *          *
* Max Chl Dpth (ft)       *    0.77  * Hydr. Depth (ft)       *          *    0.64  *          *
* Conv. Total (cfs)       *   101.4  * Conv. (cfs)            *          *   101.4  *          *
* Length Wtd. (ft)        *    4.78  * Wetted Per. (ft)       *          *    9.30  *          *
* Min Ch El (ft)          *  743.43  * Shear (lb/sq ft)       *          *   11.59  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *  114.01  *          *
* Frctn Loss (ft)         *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.5*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     744       2     744       6     742      12     742      16     744
      19     744

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
```

```
       0     .06       2     .06      16     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      16             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  744.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  742.76  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  743.21  * Flow Area (sq ft)      *          *    5.71  *          *
* E.G. Slope (ft/ft)     *0.303454  * Area (sq ft)           *          *    5.71  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *    9.04  * Top Width (ft)         *          *    9.04  *          *
* Vel Total (ft/s)       *    9.79  * Avg. Vel. (ft/s)       *          *    9.79  *          *
* Max Chl Dpth (ft)      *    0.76  * Hydr. Depth (ft)       *          *    0.63  *          *
* Conv. Total (cfs)      *   101.5  * Conv. (cfs)            *          *   101.5  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)       *          *    9.40  *          *
* Min Ch El (ft)         *  742.00  * Shear (lb/sq ft)       *          *   11.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  112.70  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.42857*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.57       2  742.57       6  740.57   12.14  740.57   16.14  742.57
      19  742.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   16.14     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   16.14             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  742.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.48  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.32  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  741.76  * Flow Area (sq ft)      *          *    5.74  *          *
* E.G. Slope (ft/ft)     *0.303464  * Area (sq ft)           *          *    5.74  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *    9.14  * Top Width (ft)         *          *    9.14  *          *
* Vel Total (ft/s)       *    9.75  * Avg. Vel. (ft/s)       *          *    9.75  *          *
* Max Chl Dpth (ft)      *    0.75  * Hydr. Depth (ft)       *          *    0.63  *          *
* Conv. Total (cfs)      *   101.5  * Conv. (cfs)            *          *   101.5  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)       *          *    9.50  *          *
* Min Ch El (ft)         *  740.57  * Shear (lb/sq ft)       *          *   11.44  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  111.52  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

```
CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.35714*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  741.14       2  741.14       6  739.14   12.29  739.14   16.29  741.14
      19  741.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   16.29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   16.29             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  741.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  739.88  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  740.32  * Flow Area (sq ft)      *          *    5.76  *          *
* E.G. Slope (ft/ft)     *0.303653  * Area (sq ft)           *          *    5.76  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)             *          *   55.90  *          *
* Top Width (ft)         *    9.25  * Top Width (ft)         *          *    9.25  *          *
* Vel Total (ft/s)       *    9.71  * Avg. Vel. (ft/s)       *          *    9.71  *          *
* Max Chl Dpth (ft)      *    0.74  * Hydr. Depth (ft)       *          *    0.62  *          *
* Conv. Total (cfs)      *   101.4  * Conv. (cfs)            *          *   101.4  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)       *          *    9.60  *          *
* Min Ch El (ft)         *  739.14  * Shear (lb/sq ft)       *          *   11.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  110.34  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.28571*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  739.71       2  739.71       6  737.71   12.43  737.71   16.43  739.71
      19  739.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   16.43     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   16.43             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  739.89  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  738.44  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  738.88  * Flow Area (sq ft)      *          *    5.79  *          *
* E.G. Slope (ft/ft)     *0.303247  * Area (sq ft)           *          *    5.79  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)             *          *   55.90  *          *
* Top Width (ft)         *    9.36  * Top Width (ft)         *          *    9.36  *          *
* Vel Total (ft/s)       *    9.66  * Avg. Vel. (ft/s)       *          *    9.66  *          *
* Max Chl Dpth (ft)      *    0.73  * Hydr. Depth (ft)       *          *    0.62  *          *
* Conv. Total (cfs)      *   101.5  * Conv. (cfs)            *          *   101.5  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)       *          *    9.71  *          *
* Min Ch El (ft)         *  737.71  * Shear (lb/sq ft)       *          *   11.29  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  109.01  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.21428*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  738.29       2  738.29       6  736.29   12.57  736.29   16.57  738.29
      19  738.29

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   16.57     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   16.57             4.78    4.78    4.78              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)         *  738.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  737.02  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  737.44  * Flow Area (sq ft)      *          *    5.83  *          *
* E.G. Slope (ft/ft)     *0.300948  * Area (sq ft)           *          *    5.83  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)             *          *   55.90  *          *
* Top Width (ft)         *    9.48  * Top Width (ft)         *          *    9.48  *          *
* Vel Total (ft/s)       *    9.59  * Avg. Vel. (ft/s)       *          *    9.59  *          *
* Max Chl Dpth (ft)      *    0.73  * Hydr. Depth (ft)       *          *    0.61  *          *
* Conv. Total (cfs)      *   101.9  * Conv. (cfs)            *          *   101.9  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)       *          *    9.82  *          *
* Min Ch El (ft)         *  736.29  * Shear (lb/sq ft)       *          *   11.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  106.97  *          *
* Frctn Loss (ft)        *    1.44  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.14285*

INPUT
```

```
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  736.86       2  736.86       6  734.86   12.71  734.86   16.71  736.86
      19  736.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   16.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   16.71             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  737.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  735.58  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  736.00  * Flow Area (sq ft)      *          *    5.83  *          *
* E.G. Slope (ft/ft)     *0.304590  * Area (sq ft)           *          *    5.83  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *    9.57  * Top Width (ft)          *          *    9.57  *          *
* Vel Total (ft/s)       *    9.59  * Avg. Vel. (ft/s)        *          *    9.59  *          *
* Max Chl Dpth (ft)      *    0.72  * Hydr. Depth (ft)        *          *    0.61  *          *
* Conv. Total (cfs)      *   101.3  * Conv. (cfs)             *          *   101.3  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)        *          *    9.91  *          *
* Min Ch El (ft)         *  734.86  * Shear (lb/sq ft)        *          *   11.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  107.25  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.07142*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  735.43       2  735.43       6  733.43   12.86  733.43   16.86  735.43
      19  735.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06   16.86     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   16.86             4.78    4.78    4.78             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  735.55  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.41  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  734.14  * Reach Len. (ft)        *    4.78  *    4.78  *    4.78  *
* Crit W.S. (ft)         *  734.56  * Flow Area (sq ft)      *          *    5.86  *          *
* E.G. Slope (ft/ft)     *0.303164  * Area (sq ft)           *          *    5.86  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *    9.69  * Top Width (ft)          *          *    9.69  *          *
* Vel Total (ft/s)       *    9.53  * Avg. Vel. (ft/s)        *          *    9.53  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)        *          *    0.60  *          *
```

```
* Conv. Total (cfs)      *   101.5  * Conv. (cfs)            *          *   101.5  *          *
* Length Wtd. (ft)       *    4.78  * Wetted Per. (ft)       *          *   10.03  *          *
* Min Ch El (ft)         *  733.43  * Shear (lb/sq ft)       *          *   11.07  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  105.50  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 2.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0     734       2     734       6     732      13     732      17     734
      19     734

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      17     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      17                 4       4       4             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  734.10  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.40  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  732.70  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)         *  733.12  * Flow Area (sq ft)      *          *    5.89  *          *
* E.G. Slope (ft/ft)     *0.302960  * Area (sq ft)           *          *    5.89  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *    9.80  * Top Width (ft)          *          *    9.80  *          *
* Vel Total (ft/s)       *    9.49  * Avg. Vel. (ft/s)        *          *    9.49  *          *
* Max Chl Dpth (ft)      *    0.70  * Hydr. Depth (ft)        *          *    0.60  *          *
* Conv. Total (cfs)      *   101.6  * Conv. (cfs)             *          *   101.6  *          *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)        *          *   10.13  *          *
* Min Ch El (ft)         *  732.00  * Shear (lb/sq ft)        *          *   10.99  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  104.32  *          *
* Frctn Loss (ft)        *    1.45  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 1.75*

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
   -1.25  733.47     .25  733.47    3.25  731.97    6.31  731.97    8.06  731.97
   10.25  731.97      12  731.97    15.5  731.97    18.5  733.47      20  733.47

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
   -1.25     .06     .25     .06    18.5     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           .25    18.5                 4       4       4             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  733.19  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  732.68  * Reach Len. (ft)       *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)         *  732.79  * Flow Area (sq ft)     *          *    9.74  *          *
* E.G. Slope (ft/ft)     *0.099223  * Area (sq ft)          *          *    9.74  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)            *          *   55.90  *          *
* Top Width (ft)         *   15.10  * Top Width (ft)        *          *   15.10  *          *
* Vel Total (ft/s)       *    5.74  * Avg. Vel. (ft/s)      *          *    5.74  *          *
* Max Chl Dpth (ft)      *    0.71  * Hydr. Depth (ft)      *          *    0.65  *          *
* Conv. Total (cfs)      *   177.5  * Conv. (cfs)           *          *   177.5  *          *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)      *          *   15.44  *          *
* Min Ch El (ft)         *  731.97  * Shear (lb/sq ft)      *          *    3.91  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   22.43  *          *
* Frctn Loss (ft)        *    0.64  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 1.5*

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -2.5  731.95    -1.5  731.95      .5  731.95    4.88  731.95    7.38  731.95
    10.5  731.95      13  731.95      18  731.95      20  731.95      21  731.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
    -2.5     .06    -1.5     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -1.5      20                 4       4       4             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  732.89  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.            *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  732.75  * Reach Len. (ft)       *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)         *  732.51  * Flow Area (sq ft)     *    0.80  *   17.17  *    0.80  *
* E.G. Slope (ft/ft)     *0.020658  * Area (sq ft)          *    0.80  *   17.17  *    0.80  *
* Q Total (cfs)          *   55.90  * Flow (cfs)            *    1.65  *   52.59  *    1.65  *
* Top Width (ft)         *   23.50  * Top Width (ft)        *    1.00  *   21.50  *    1.00  *
* Vel Total (ft/s)       *    2.98  * Avg. Vel. (ft/s)      *    2.07  *    3.06  *    2.07  *
* Max Chl Dpth (ft)      *    0.80  * Hydr. Depth (ft)      *    0.80  *    0.80  *    0.80  *
* Conv. Total (cfs)      *   388.9  * Conv. (cfs)           *    11.5  *   365.9  *    11.5  *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)      *    1.80  *   21.50  *    1.80  *
* Min Ch El (ft)         *  731.95  * Shear (lb/sq ft)      *    0.57  *    1.03  *    0.57  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    1.19  *    3.15  *    1.19  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.00  *    0.00  *
```

```
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 1.25*

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
   -3.75  731.93   -3.25  731.93   -2.25  731.93    3.44  731.93    6.69  731.93
   10.75  731.93      14  731.93    20.5  731.93    21.5  731.93      22  731.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
   -3.75     .06   -3.25     .06    21.5     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -3.25    21.5                4       4       4             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  732.80  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  732.66  * Reach Len. (ft)        *    4.00  *    4.00  *    4.00  *
* Crit W.S. (ft)         *  732.46  * Flow Area (sq ft)      *    0.37  *   18.18  *    0.37  *
* E.G. Slope (ft/ft)     *0.022244  * Area (sq ft)           *    0.37  *   18.18  *    0.37  *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *    0.60  *   54.69  *    0.60  *
* Top Width (ft)         *   25.75  * Top Width (ft)          *    0.50  *   24.75  *    0.50  *
* Vel Total (ft/s)       *    2.95  * Avg. Vel. (ft/s)        *    1.65  *    3.01  *    1.65  *
* Max Chl Dpth (ft)      *    0.73  * Hydr. Depth (ft)        *    0.73  *    0.73  *    0.73  *
* Conv. Total (cfs)      *   374.8  * Conv. (cfs)             *     4.1  *   366.7  *     4.1  *
* Length Wtd. (ft)       *    4.00  * Wetted Per. (ft)        *    1.23  *   24.75  *    1.23  *
* Min Ch El (ft)         *  731.93  * Shear (lb/sq ft)        *    0.41  *    1.02  *    0.41  *
* Alpha                  *    1.02  * Stream Power (lb/ft s)   *    0.68  *    3.07  *    0.68  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    0.00  *    0.00  *    0.00  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth.  The program will try the
         cross section slice/secant method to find critical depth.

CROSS SECTION


RIVER: 87+77
REACH: 1                  RS: 1.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -5   731.9       2   731.9       6   731.9      11   731.9      15   731.9
      23   731.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -5     .06      -5     .06      23     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -5      23                 0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  732.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  732.40  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  732.40  * Flow Area (sq ft)      *          *   14.00  *          *
* E.G. Slope (ft/ft)     *0.068639  * Area (sq ft)           *          *   14.00  *          *
* Q Total (cfs)          *   55.90  * Flow (cfs)              *          *   55.90  *          *
* Top Width (ft)         *   28.00  * Top Width (ft)          *          *   28.00  *          *
* Vel Total (ft/s)       *    3.99  * Avg. Vel. (ft/s)        *          *    3.99  *          *
* Max Chl Dpth (ft)      *    0.50  * Hydr. Depth (ft)        *          *    0.50  *          *
* Conv. Total (cfs)      *   213.4  * Conv. (cfs)             *          *   213.4  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *          *   29.00  *          *
* Min Ch El (ft)         *  731.90  * Shear (lb/sq ft)        *          *    2.07  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    8.26  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*********************************************************************************************

Warning: Slope-Area method could not converge on a starting water surface elevation within the
         specified number of trials.  The program used critical depth as the starting water surface.
Warning: The parabolic search method failed to converge on critical depth.  The program will try the
         cross section slice/secant method to find critical depth.

*******************************************************************************

SUMMARY OF MANNING'S N VALUES

River:87+77
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*1               *    5.0         *      .03*      .03*      .03*
*1               *    4.875*      *      .03*      .03*      .03*
*1               *    4.75*       *      .03*      .03*      .03*
*1               *    4.625*      *      .03*      .03*      .03*
*1               *    4.5         *      .03*      .03*      .03*
*1               *    4.33333*    *      .03*      .03*      .03*
*1               *    4.16666*    *      .03*      .03*      .03*
*1               *    4.0         *      .06*      .06*      .06*
*1               *    3.66666*    *      .06*      .06*      .06*
*1               *    3.33333*    *      .06*      .06*      .06*
*1               *    3.0         *      .06*      .06*      .06*
*1               *    2.92857*    *      .06*      .06*      .06*
*1               *    2.85714*    *      .06*      .06*      .06*
*1               *    2.78571*    *      .06*      .06*      .06*
*1               *    2.71428*    *      .06*      .06*      .06*
*1               *    2.64285*    *      .06*      .06*      .06*
*1               *    2.57142*    *      .06*      .06*      .06*
*1               *    2.5*        *      .06*      .06*      .06*
*1               *    2.42857*    *      .06*      .06*      .06*
*1               *    2.35714*    *      .06*      .06*      .06*
*1               *    2.28571*    *      .06*      .06*      .06*
*1               *    2.21428*    *      .06*      .06*      .06*
*1               *    2.14285*    *      .06*      .06*      .06*
*1               *    2.07142*    *      .06*      .06*      .06*
*1               *    2.0         *      .06*      .06*      .06*
*1               *    1.75*       *      .06*      .06*      .06*
*1               *    1.5*        *      .06*      .06*      .06*
*1               *    1.25*       *      .06*      .06*      .06*
*1               *    1.0         *      .06*      .06*      .06*
*****************************************************************

*******************************************************************************

SUMMARY OF REACH LENGTHS
```

River: 87+77

Reach	River Sta.	Left	Channel	Right
1	5.0	31.25	31.25	31.25
1	4.875	31.25	31.25	31.25
1	4.75	31.25	31.25	31.25
1	4.625	31.25	31.25	31.25
1	4.5	5	5	5
1	4.33333	5	5	5
1	4.16666	5	5	5
1	4.0	5	5	5
1	3.66666	5	5	5
1	3.33333	5	5	5
1	3.0	4.78	4.78	4.78
1	2.92857	4.78	4.78	4.78
1	2.85714	4.78	4.78	4.78
1	2.78571	4.78	4.78	4.78
1	2.71428	4.78	4.78	4.78
1	2.64285	4.78	4.78	4.78
1	2.57142	4.78	4.78	4.78
1	2.5	4.78	4.78	4.78
1	2.42857	4.78	4.78	4.78
1	2.35714	4.78	4.78	4.78
1	2.28571	4.78	4.78	4.78
1	2.21428	4.78	4.78	4.78
1	2.14285	4.78	4.78	4.78
1	2.07142	4.78	4.78	4.78
1	2.0	4	4	4
1	1.75	4	4	4
1	1.5	4	4	4
1	1.25	4	4	4
1	1.0	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 87+77

Reach	River Sta.	Contr.	Expan.
1	5.0	.1	.3
1	4.875	.1	.3
1	4.75	.1	.3
1	4.625	.1	.3
1	4.5	.1	.3
1	4.33333**	.1	.3
1	4.16666**	.1	.3
1	4.0	.1	.3
1	3.66666**	.1	.3
1	3.33333**	.1	.3
1	3.0	.1	.3
1	2.92857**	.1	.3
1	2.85714**	.1	.3
1	2.78571**	.1	.3
1	2.71428**	.1	.3
1	2.64285**	.1	.3
1	2.57142**	.1	.3
1	2.5	.1	.3
1	2.42857**	.1	.3
1	2.35714**	.1	.3
1	2.28571**	.1	.3
1	2.21428**	.1	.3
1	2.14285**	.1	.3
1	2.07142**	.1	.3
1	2.0	.1	.3
1	1.75	.1	.3

```
*1              *    1.5*    *       .1*       .3*
*1              *    1.25*   *       .1*       .3*
*1              *    1.0     *       .1*       .3*
*******************************************************
```

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1.0	55.90	731.90	732.40	732.40	732.65	0.068639	3.99	14.00	28.00	1.00
1	1.25*	55.90	731.93	732.66	732.46	732.80	0.022244	3.01	18.92	25.75	0.62
1	1.5*	55.90	731.95	732.75	732.51	732.89	0.020658	3.06	18.76	23.50	0.60
1	1.75*	55.90	731.97	732.68	732.79	733.19	0.099223	5.74	9.74	15.10	1.26
1	2.0	55.90	732.00	732.70	733.12	734.10	0.302960	9.49	5.89	9.80	2.16
1	2.07142*	55.90	733.43	734.14	734.56	735.55	0.303164	9.53	5.86	9.69	2.16
1	2.14285*	55.90	734.86	735.58	736.00	737.00	0.304590	9.59	5.83	9.57	2.17
1	2.21428*	55.90	736.29	737.02	737.44	738.45	0.300948	9.59	5.83	9.48	2.16
1	2.28571*	55.90	737.71	738.44	738.88	739.89	0.303247	9.66	5.79	9.36	2.17
1	2.35714*	55.90	739.14	739.88	740.32	741.34	0.303653	9.71	5.76	9.25	2.17
1	2.42857*	55.90	740.57	741.32	741.76	742.80	0.303464	9.75	5.74	9.14	2.17
1	2.5*	55.90	742.00	742.76	743.21	744.25	0.303454	9.79	5.71	9.04	2.17
1	2.57142*	55.90	743.43	744.20	744.65	745.70	0.303721	9.83	5.69	8.93	2.17
1	2.64285*	55.90	744.86	745.64	746.09	747.16	0.304889	9.89	5.65	8.82	2.18
1	2.71428*	55.90	746.29	747.08	747.54	748.60	0.301584	9.89	5.65	8.73	2.17
1	2.78571*	55.90	747.71	748.51	748.97	750.05	0.303852	9.96	5.61	8.62	2.18
1	2.85714*	55.90	749.14	749.95	750.42	751.49	0.297492	9.93	5.63	8.54	2.16
1	2.92857*	55.90	750.57	751.35	751.86	753.11	0.357843	10.63	5.26	8.28	2.35
1	3.0	55.90	752.00	753.31	753.31	753.80	0.057696	5.62	9.95	10.23	1.00
1	3.33333*	55.90	752.03	753.75		753.98	0.020115	3.85	14.54	11.87	0.61
1	3.66666*	55.90	752.07	753.88		754.08	0.016627	3.59	15.59	12.25	0.56
1	4.0	55.90	752.10	754.08		754.12	0.002567	1.67	33.50	20.90	0.23
1	4.16666*	55.90	752.14	754.07		754.13	0.001043	2.04	27.36	18.04	0.29
1	4.33333*	55.90	752.18	754.05		754.15	0.001927	2.63	21.27	15.13	0.39
1	4.5	55.90	752.22	753.99		754.20	0.004564	3.71	15.06	12.06	0.59
1	4.625*	55.90	752.41	754.12		754.36	0.005129	3.87	14.44	11.85	0.62
1	4.75*	55.90	752.61	754.28		754.53	0.005671	4.02	13.92	11.68	0.65
1	4.875*	55.90	752.80	754.46		754.71	0.005853	4.06	13.76	11.62	0.66
1	5.0	55.90	753.00	754.64	754.30	754.90	0.006109	4.12	13.55	11.55	0.67

```
                    HEC-RAS Version 3.1.3 May 2005
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX


*******************************************************************************

PROJECT DATA
Project Title: BRDB_RipRap_Gutter104+60
Project File : RipRap_Gutter10460.prj
Run Date and Time: 8/6/2008 11:43:44 AM

Project in English units

*******************************************************************************

PLAN DATA

Plan Title: 5-8-08
Plan File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\104+60\RipRap_Gutter10460.p01

           Geometry Title: Template5-8-08
           Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\104+60\RipRap_Gutter10460.g01

           Flow Title    : Full-Pipe-Flow5-8-08
           Flow File     : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\104+60\RipRap_Gutter10460.f01

Plan Summary Information:
Number of:  Cross Sections =   35    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Program Selects Appropriate method
    Computational Flow Regime:     Mixed Flow


*******************************************************************************

FLOW DATA

Flow Title: Full-Pipe-Flow5-8-08
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\104+60\RipRap_Gutter10460.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *      Slope = 2% *
* 104+60          1               7       *             8.8 *
*************************************************************
```

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
104+60	1	Slope = 2%	Normal S = 0.0333	Normal S = 0.0143

****

GEOMETRY DATA

Geometry Title: Template5-8-08
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\104+60\RipRap_Gutter10460.g01

CROSS SECTION

RIVER: 104+60
REACH: 1 RS: 7

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	761	2	761	6	759	11	759	15	761
17	761								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	2	.03	15	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	10	10	10	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	759.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	759.37	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	759.43	Flow Area (sq ft)		2.10	
E.G. Slope (ft/ft)	0.033356	Area (sq ft)		2.10	
Q Total (cfs)	8.80	Flow (cfs)		8.80	
Top Width (ft)	6.46	Top Width (ft)		6.46	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	0.37	Hydr. Depth (ft)		0.32	
Conv. Total (cfs)	48.2	Conv. (cfs)		48.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		6.64	
Min Ch El (ft)	759.00	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		2.76	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	0.01	0.00
C & E Loss (ft)		Cum SA (acres)	0.00	0.04	0.00

CROSS SECTION

RIVER: 104+60
REACH: 1 RS: 6.83333*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	760.78	2	760.78	6	758.78	11	758.78	15	760.78
17	760.78								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15               10      10      10             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  759.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  759.17  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  759.21  * Flow Area (sq ft)      *          *    2.28  *          *
* E.G. Slope (ft/ft)     *0.025819  * Area (sq ft)           *          *    2.28  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.58  * Top Width (ft)         *          *    6.58  *          *
* Vel Total (ft/s)       *    3.86  * Avg. Vel. (ft/s)       *          *    3.86  *          *
* Max Chl Dpth (ft)      *    0.39  * Hydr. Depth (ft)       *          *    0.35  *          *
* Conv. Total (cfs)      *    54.8  * Conv. (cfs)            *          *    54.8  *          *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *          *    6.76  *          *
* Min Ch El (ft)         *  758.78  * Shear (lb/sq ft)       *          *    0.54  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.10  *          *
* Frctn Loss (ft)        *    0.25  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 6.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  760.55       2  760.55       6  758.55      11  758.55      15  760.55
      17  760.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15               10      10      10             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  759.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  758.97  * Reach Len. (ft)        *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         *  758.98  * Flow Area (sq ft)      *          *    2.44  *          *
* E.G. Slope (ft/ft)     *0.020961  * Area (sq ft)           *          *    2.44  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.68  * Top Width (ft)         *          *    6.68  *          *
* Vel Total (ft/s)       *    3.60  * Avg. Vel. (ft/s)       *          *    3.60  *          *
* Max Chl Dpth (ft)      *    0.42  * Hydr. Depth (ft)       *          *    0.37  *          *
* Conv. Total (cfs)      *    60.8  * Conv. (cfs)            *          *    60.8  *          *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *          *    6.87  *          *
* Min Ch El (ft)         *  758.55  * Shear (lb/sq ft)       *          *    0.47  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.68  *          *
* Frctn Loss (ft)        *    0.23  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
```

```
*****************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 6.5

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.33       2  760.33       6  758.33      11  758.33      15  760.33
      17  760.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  758.95  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  758.74  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  758.76  * Flow Area (sq ft)      *          *    2.41  *          *
* E.G. Slope (ft/ft)     *0.021814  * Area (sq ft)           *          *    2.41  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *    6.66  * Top Width (ft)          *          *    6.66  *          *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)        *          *    3.65  *          *
* Max Chl Dpth (ft)      *    0.41  * Hydr. Depth (ft)        *          *    0.36  *          *
* Conv. Total (cfs)      *    59.6  * Conv. (cfs)             *          *    59.6  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    6.85  *          *
* Min Ch El (ft)         *  758.33  * Shear (lb/sq ft)        *          *    0.48  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.75  *          *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*****************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 6.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.05       2  760.05       6  758.05   13.67  758.05   17.67  760.05
   19.67  760.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03   17.67     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   17.67                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  758.66  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  758.27  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
```

```
* Crit W.S. (ft)         *  758.38  * Flow Area (sq ft)      *          *    1.76  *          *
* E.G. Slope (ft/ft)     *0.085608  * Area (sq ft)           *          *    1.76  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *    8.54  * Top Width (ft)          *          *    8.54  *          *
* Vel Total (ft/s)       *    5.01  * Avg. Vel. (ft/s)        *          *    5.01  *          *
* Max Chl Dpth (ft)      *    0.22  * Hydr. Depth (ft)        *          *    0.21  *          *
* Conv. Total (cfs)      *    30.1  * Conv. (cfs)             *          *    30.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    8.64  *          *
* Min Ch El (ft)         *  758.05  * Shear (lb/sq ft)        *          *    1.09  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.44  *          *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 6.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.78       2  759.78       6  757.78   16.33  757.78   20.33  759.78
   22.33  759.78

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .03       2     .03   20.33     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   20.33                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)         *  758.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  757.98  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  758.06  * Flow Area (sq ft)      *          *    2.14  *          *
* E.G. Slope (ft/ft)     *0.063247  * Area (sq ft)           *          *    2.14  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *   11.13  * Top Width (ft)          *          *   11.13  *          *
* Vel Total (ft/s)       *    4.12  * Avg. Vel. (ft/s)        *          *    4.12  *          *
* Max Chl Dpth (ft)      *    0.20  * Hydr. Depth (ft)        *          *    0.19  *          *
* Conv. Total (cfs)      *    35.0  * Conv. (cfs)             *          *    35.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   11.22  *          *
* Min Ch El (ft)         *  757.78  * Shear (lb/sq ft)        *          *    0.75  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.10  *          *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 6

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   759.5       2   759.5       6   757.5      19   757.5      23   759.5
```

```
      25   759.5

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      23     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      23                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  757.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  757.84  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  757.74  * Flow Area (sq ft)      *          *    4.67  *          *
* E.G. Slope (ft/ft)     *0.026352  * Area (sq ft)           *          *    4.67  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *   14.36  * Top Width (ft)         *          *   14.36  *          *
* Vel Total (ft/s)       *    1.89  * Avg. Vel. (ft/s)       *          *    1.89  *          *
* Max Chl Dpth (ft)      *    0.34  * Hydr. Depth (ft)       *          *    0.32  *          *
* Conv. Total (cfs)      *    54.2  * Conv. (cfs)            *          *    54.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   14.53  *          *
* Min Ch El (ft)         *  757.50  * Shear (lb/sq ft)       *          *    0.53  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.00  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 5.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   759.3       2   759.3       6   757.3   16.33   757.3   20.33   759.3
   22.33   759.3

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   20.33     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   20.33                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  757.78  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  757.73  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    4.78  *          *
* E.G. Slope (ft/ft)     *0.019315  * Area (sq ft)           *          *    4.78  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *   12.04  * Top Width (ft)         *          *   12.04  *          *
* Vel Total (ft/s)       *    1.84  * Avg. Vel. (ft/s)       *          *    1.84  *          *
* Max Chl Dpth (ft)      *    0.43  * Hydr. Depth (ft)       *          *    0.40  *          *
* Conv. Total (cfs)      *    63.3  * Conv. (cfs)            *          *    63.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   12.24  *          *
* Min Ch El (ft)         *  757.30  * Shear (lb/sq ft)       *          *    0.47  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.87  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
```

```
*****************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 5.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.11       2  759.11       6  757.11   13.67  757.11   17.67  759.11
   19.67  759.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   17.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   17.67                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  757.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  757.63  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    4.49  *          *
* E.G. Slope (ft/ft)     *0.018101  * Area (sq ft)           *          *    4.49  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *    9.74  * Top Width (ft)          *          *    9.74  *          *
* Vel Total (ft/s)       *    1.96  * Avg. Vel. (ft/s)        *          *    1.96  *          *
* Max Chl Dpth (ft)      *    0.52  * Hydr. Depth (ft)        *          *    0.46  *          *
* Conv. Total (cfs)      *    65.4  * Conv. (cfs)             *          *    65.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.98  *          *
* Min Ch El (ft)         *  757.11  * Shear (lb/sq ft)        *          *    0.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.00  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 5.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  758.91       2  758.91       6  756.91      11  756.91      15  758.91
      17  758.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
```

```
* E.G. Elev (ft)         *  757.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  757.34  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  757.34  * Flow Area (sq ft)      *          *    2.53  *          *
* E.G. Slope (ft/ft)     *0.075929  * Area (sq ft)           *          *    2.53  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.72  * Top Width (ft)         *          *    6.72  *          *
* Vel Total (ft/s)       *    3.48  * Avg. Vel. (ft/s)       *          *    3.48  *          *
* Max Chl Dpth (ft)      *    0.43  * Hydr. Depth (ft)       *          *    0.38  *          *
* Conv. Total (cfs)      *    31.9  * Conv. (cfs)            *          *    31.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.93  *          *
* Min Ch El (ft)         *  756.91  * Shear (lb/sq ft)       *          *    1.73  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.02  *          *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 4.88888*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  757.24       2  757.24       6  755.24      11  755.24      15  757.24
      17  757.24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  756.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  755.49  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  755.67  * Flow Area (sq ft)      *          *    1.39  *          *
* E.G. Slope (ft/ft)     *0.472119  * Area (sq ft)           *          *    1.39  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.01  * Top Width (ft)         *          *    6.01  *          *
* Vel Total (ft/s)       *    6.33  * Avg. Vel. (ft/s)       *          *    6.33  *          *
* Max Chl Dpth (ft)      *    0.25  * Hydr. Depth (ft)       *          *    0.23  *          *
* Conv. Total (cfs)      *    12.8  * Conv. (cfs)            *          *    12.8  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.13  *          *
* Min Ch El (ft)         *  755.24  * Shear (lb/sq ft)       *          *    6.69  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   42.32  *          *
* Frctn Loss (ft)        *    1.37  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: 104+60
REACH: 1 RS: 4.77777*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	755.58	2	755.58	6	753.58	11	753.58	15	755.58
17	755.58								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	5	5	5	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	754.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.060	
W.S. Elev (ft)	753.88	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	754.01	Flow Area (sq ft)		1.69	
E.G. Slope (ft/ft)	0.259536	Area (sq ft)		1.69	
Q Total (cfs)	8.80	Flow (cfs)		8.80	
Top Width (ft)	6.20	Top Width (ft)		6.20	
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)		5.22	
Max Chl Dpth (ft)	0.30	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	17.3	Conv. (cfs)		17.3	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		6.35	
Min Ch El (ft)	753.58	Shear (lb/sq ft)		4.31	
Alpha	1.00	Stream Power (lb/ft s)		22.47	
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	0.00	0.01	0.00
C & E Loss (ft)	0.06	Cum SA (acres)	0.00	0.02	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: 104+60
REACH: 1 RS: 4.66666*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	753.91	2	753.91	6	751.91	11	751.91	15	753.91
17	753.91								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	5	5	5	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

```
* E.G. Elev (ft)         *  752.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  752.18  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  752.34  * Flow Area (sq ft)       *          *    1.50  *          *
* E.G. Slope (ft/ft)     *0.372804  * Area (sq ft)           *          *    1.50  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *    6.08  * Top Width (ft)          *          *    6.08  *          *
* Vel Total (ft/s)       *    5.87  * Avg. Vel. (ft/s)        *          *    5.87  *          *
* Max Chl Dpth (ft)      *    0.27  * Hydr. Depth (ft)        *          *    0.25  *          *
* Conv. Total (cfs)      *    14.4  * Conv. (cfs)             *          *    14.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    6.21  *          *
* Min Ch El (ft)         *  751.91  * Shear (lb/sq ft)        *          *    5.62  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   32.98  *          *
* Frctn Loss (ft)        *    1.58  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 4.55555*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  752.24       2  752.24       6  750.24      11  750.24      15  752.24
      17  752.24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  751.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  750.53  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  750.67  * Flow Area (sq ft)       *          *    1.60  *          *
* E.G. Slope (ft/ft)     *0.308256  * Area (sq ft)           *          *    1.60  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *    6.15  * Top Width (ft)          *          *    6.15  *          *
* Vel Total (ft/s)       *    5.52  * Avg. Vel. (ft/s)        *          *    5.52  *          *
* Max Chl Dpth (ft)      *    0.29  * Hydr. Depth (ft)        *          *    0.26  *          *
* Conv. Total (cfs)      *    15.8  * Conv. (cfs)             *          *    15.8  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    6.28  *          *
* Min Ch El (ft)         *  750.24  * Shear (lb/sq ft)        *          *    4.89  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   26.96  *          *
* Frctn Loss (ft)        *    1.69  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 4.44444*
```

```
INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  750.58       2  750.58       6  748.58      11  748.58      15  750.58
      17  750.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  749.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.51  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  748.86  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  749.01  * Flow Area (sq ft)      *          *    1.54  *          *
* E.G. Slope (ft/ft)      *0.345851  * Area (sq ft)           *          *    1.54  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)          *    6.11  * Top Width (ft)         *          *    6.11  *          *
* Vel Total (ft/s)        *    5.72  * Avg. Vel. (ft/s)       *          *    5.72  *          *
* Max Chl Dpth (ft)       *    0.28  * Hydr. Depth (ft)       *          *    0.25  *          *
* Conv. Total (cfs)       *    15.0  * Conv. (cfs)            *          *    15.0  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)       *          *    6.24  *          *
* Min Ch El (ft)          *  748.58  * Shear (lb/sq ft)       *          *    5.32  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   30.46  *          *
* Frctn Loss (ft)         *    1.64  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 4.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  748.91       2  748.91       6  746.91      11  746.91      15  748.91
      17  748.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  747.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  747.19  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  747.34  * Flow Area (sq ft)      *          *    1.57  *          *
* E.G. Slope (ft/ft)      *0.324918  * Area (sq ft)           *          *    1.57  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)          *    6.13  * Top Width (ft)         *          *    6.13  *          *
* Vel Total (ft/s)        *    5.61  * Avg. Vel. (ft/s)       *          *    5.61  *          *
```

```
* Max Chl Dpth (ft)      *    0.28  * Hydr. Depth (ft)       *          *    0.26  *          *
* Conv. Total (cfs)      *    15.4  * Conv. (cfs)            *          *    15.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.26  *          *
* Min Ch El (ft)         *  746.91  * Shear (lb/sq ft)       *          *    5.08  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   28.51  *          *
* Frctn Loss (ft)        *    1.68  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 4.22222*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  747.24       2  747.24       6  745.24      11  745.24      15  747.24
      17  747.24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
**********************************************************************************************
* E.G. Elev (ft)         *  746.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  745.52  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  745.67  * Flow Area (sq ft)      *          *    1.55  *          *
* E.G. Slope (ft/ft)     *0.337677  * Area (sq ft)           *          *    1.55  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.11  * Top Width (ft)         *          *    6.11  *          *
* Vel Total (ft/s)       *    5.68  * Avg. Vel. (ft/s)       *          *    5.68  *          *
* Max Chl Dpth (ft)      *    0.28  * Hydr. Depth (ft)       *          *    0.25  *          *
* Conv. Total (cfs)      *    15.1  * Conv. (cfs)            *          *    15.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.25  *          *
* Min Ch El (ft)         *  745.24  * Shear (lb/sq ft)       *          *    5.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   29.70  *          *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 4.11111*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  745.58       2  745.58       6  743.58      11  743.58      15  745.58
      17  745.58
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  744.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  743.86  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  744.01  * Flow Area (sq ft)      *          *    1.56  *          *
* E.G. Slope (ft/ft)     *0.328777  * Area (sq ft)           *          *    1.56  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.12  * Top Width (ft)         *          *    6.12  *          *
* Vel Total (ft/s)       *    5.63  * Avg. Vel. (ft/s)       *          *    5.63  *          *
* Max Chl Dpth (ft)      *    0.28  * Hydr. Depth (ft)       *          *    0.26  *          *
* Conv. Total (cfs)      *    15.3  * Conv. (cfs)            *          *    15.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.26  *          *
* Min Ch El (ft)         *  743.58  * Shear (lb/sq ft)       *          *    5.13  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   28.87  *          *
* Frctn Loss (ft)        *    1.67  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 4.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.91       2  743.91       6  741.91      11  741.91      15  743.91
      17  743.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  742.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.50  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  742.19  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.34  * Flow Area (sq ft)      *          *    1.55  *          *
* E.G. Slope (ft/ft)     *0.338938  * Area (sq ft)           *          *    1.55  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.11  * Top Width (ft)         *          *    6.11  *          *
* Vel Total (ft/s)       *    5.69  * Avg. Vel. (ft/s)       *          *    5.69  *          *
* Max Chl Dpth (ft)      *    0.28  * Hydr. Depth (ft)       *          *    0.25  *          *
* Conv. Total (cfs)      *    15.1  * Conv. (cfs)            *          *    15.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.25  *          *
* Min Ch El (ft)         *  741.91  * Shear (lb/sq ft)       *          *    5.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   29.82  *          *
* Frctn Loss (ft)        *    1.67  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************
```

```
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 3.83333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  743.41       2  743.41       6  741.41      11  741.41      15  743.41
      17  743.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  742.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.84  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  741.84  * Flow Area (sq ft)      *          *    2.53  *          *
* E.G. Slope (ft/ft)     *0.075929  * Area (sq ft)           *          *    2.53  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.72  * Top Width (ft)         *          *    6.72  *          *
* Vel Total (ft/s)       *    3.48  * Avg. Vel. (ft/s)       *          *    3.48  *          *
* Max Chl Dpth (ft)      *    0.43  * Hydr. Depth (ft)       *          *    0.38  *          *
* Conv. Total (cfs)      *    31.9  * Conv. (cfs)            *          *    31.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.93  *          *
* Min Ch El (ft)         *  741.41  * Shear (lb/sq ft)       *          *    1.73  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.02  *          *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 3.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  742.91       2  742.91       6  740.91      11  740.91      15  742.91
      17  742.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)          *  741.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.25  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  741.29  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  741.34  * Flow Area (sq ft)      *          *    2.19  *          *
* E.G. Slope (ft/ft)      *0.116409  * Area (sq ft)           *          *    2.19  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)          *    6.52  * Top Width (ft)          *          *    6.52  *          *
* Vel Total (ft/s)        *    4.01  * Avg. Vel. (ft/s)        *          *    4.01  *          *
* Max Chl Dpth (ft)       *    0.38  * Hydr. Depth (ft)        *          *    0.34  *          *
* Conv. Total (cfs)       *    25.8  * Conv. (cfs)             *          *    25.8  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)        *          *    6.70  *          *
* Min Ch El (ft)          *  740.91  * Shear (lb/sq ft)        *          *    2.38  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    9.54  *          *
* Frctn Loss (ft)         *    0.48  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 3.5*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.41       2  742.41       6  740.41      11  740.41      15  742.41
      17  742.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)          *  741.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.21  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  740.82  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  740.84  * Flow Area (sq ft)      *          *    2.41  *          *
* E.G. Slope (ft/ft)      *0.087703  * Area (sq ft)           *          *    2.41  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)          *    6.65  * Top Width (ft)          *          *    6.65  *          *
* Vel Total (ft/s)        *    3.65  * Avg. Vel. (ft/s)        *          *    3.65  *          *
* Max Chl Dpth (ft)       *    0.41  * Hydr. Depth (ft)        *          *    0.36  *          *
* Conv. Total (cfs)       *    29.7  * Conv. (cfs)             *          *    29.7  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)        *          *    6.85  *          *
* Min Ch El (ft)          *  740.41  * Shear (lb/sq ft)        *          *    1.93  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.04  *          *
* Frctn Loss (ft)         *    0.51  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 3.33333*
```

```
INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  741.91       2  741.91       6  739.91      11  739.91      15  741.91
      17  741.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  740.54  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.24  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  740.30  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  740.34  * Flow Area (sq ft)      *          *    2.25  *          *
* E.G. Slope (ft/ft)      *0.107801  * Area (sq ft)           *          *    2.25  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)          *    6.56  * Top Width (ft)         *          *    6.56  *          *
* Vel Total (ft/s)        *    3.91  * Avg. Vel. (ft/s)       *          *    3.91  *          *
* Max Chl Dpth (ft)       *    0.39  * Hydr. Depth (ft)       *          *    0.34  *          *
* Conv. Total (cfs)       *    26.8  * Conv. (cfs)            *          *    26.8  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)       *          *    6.74  *          *
* Min Ch El (ft)          *  739.91  * Shear (lb/sq ft)       *          *    2.25  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    8.79  *          *
* Frctn Loss (ft)         *    0.49  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*************************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 3.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  741.41       2  741.41       6  739.41      11  739.41      15  741.41
      17  741.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  740.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.21  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  739.82  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  739.84  * Flow Area (sq ft)      *          *    2.37  *          *
* E.G. Slope (ft/ft)      *0.092554  * Area (sq ft)           *          *    2.37  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)          *    6.63  * Top Width (ft)         *          *    6.63  *          *
* Vel Total (ft/s)        *    3.72  * Avg. Vel. (ft/s)       *          *    3.72  *          *
* Max Chl Dpth (ft)       *    0.41  * Hydr. Depth (ft)       *          *    0.36  *          *
* Conv. Total (cfs)       *    28.9  * Conv. (cfs)            *          *    28.9  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)       *          *    6.82  *          *
```

```
* Min Ch El (ft)          *  739.41  * Shear (lb/sq ft)       *          *    2.00  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.46  *          *
* Frctn Loss (ft)         *    0.50  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 3.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  740.91       2  740.91       6  738.91      11  738.91      15  740.91
      17  740.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)          *  739.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.23  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  739.31  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)          *  739.34  * Flow Area (sq ft)      *          *    2.29  *          *
* E.G. Slope (ft/ft)      *0.101914  * Area (sq ft)           *          *    2.29  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)          *    6.58  * Top Width (ft)         *          *    6.58  *          *
* Vel Total (ft/s)        *    3.84  * Avg. Vel. (ft/s)       *          *    3.84  *          *
* Max Chl Dpth (ft)       *    0.40  * Hydr. Depth (ft)       *          *    0.35  *          *
* Conv. Total (cfs)       *    27.6  * Conv. (cfs)            *          *    27.6  *          *
* Length Wtd. (ft)        *    4.48  * Wetted Per. (ft)       *          *    6.77  *          *
* Min Ch El (ft)          *  738.91  * Shear (lb/sq ft)       *          *    2.15  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    8.27  *          *
* Frctn Loss (ft)         *    0.49  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 2.8*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  739.39       2  739.39       6  737.39      11  737.39      15  739.39
      17  739.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
```

```
*****************************************************************************************
* E.G. Elev (ft)         *  738.25  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  737.65  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  737.82  * Flow Area (sq ft)      *          *    1.41  *          *
* E.G. Slope (ft/ft)     *0.456582  * Area (sq ft)           *          *    1.41  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *    6.02  * Top Width (ft)          *          *    6.02  *          *
* Vel Total (ft/s)       *    6.26  * Avg. Vel. (ft/s)        *          *    6.26  *          *
* Max Chl Dpth (ft)      *    0.26  * Hydr. Depth (ft)        *          *    0.23  *          *
* Conv. Total (cfs)      *    13.0  * Conv. (cfs)             *          *    13.0  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *    6.14  *          *
* Min Ch El (ft)         *  737.39  * Shear (lb/sq ft)        *          *    6.52  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   40.85  *          *
* Frctn Loss (ft)        *    1.25  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 2.6*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  737.88       2  737.88       6  735.88      11  735.88      15  737.88
      17  737.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  736.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  736.18  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  736.31  * Flow Area (sq ft)      *          *    1.66  *          *
* E.G. Slope (ft/ft)     *0.272297  * Area (sq ft)           *          *    1.66  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *    6.19  * Top Width (ft)          *          *    6.19  *          *
* Vel Total (ft/s)       *    5.30  * Avg. Vel. (ft/s)        *          *    5.30  *          *
* Max Chl Dpth (ft)      *    0.30  * Hydr. Depth (ft)        *          *    0.27  *          *
* Conv. Total (cfs)      *    16.9  * Conv. (cfs)             *          *    16.9  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *    6.33  *          *
* Min Ch El (ft)         *  735.88  * Shear (lb/sq ft)        *          *    4.46  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   23.64  *          *
* Frctn Loss (ft)        *    1.58  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION
```

```
RIVER: 104+60
REACH: 1                  RS: 2.4*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  736.36       2  736.36       6  734.36      11  734.36      15  736.36
      17  736.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  735.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.53  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  734.63  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)          *  734.79  * Flow Area (sq ft)      *          *    1.50  *          *
* E.G. Slope (ft/ft)      *0.371095  * Area (sq ft)           *          *    1.50  *          *
* Q Total (cfs)           *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)          *    6.08  * Top Width (ft)         *          *    6.08  *          *
* Vel Total (ft/s)        *    5.86  * Avg. Vel. (ft/s)       *          *    5.86  *          *
* Max Chl Dpth (ft)       *    0.27  * Hydr. Depth (ft)       *          *    0.25  *          *
* Conv. Total (cfs)       *    14.4  * Conv. (cfs)            *          *    14.4  *          *
* Length Wtd. (ft)        *    4.48  * Wetted Per. (ft)       *          *    6.21  *          *
* Min Ch El (ft)          *  734.36  * Shear (lb/sq ft)       *          *    5.60  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   32.82  *          *
* Frctn Loss (ft)         *    1.44  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 2.2*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  734.85       2  734.85       6  732.85      11  732.85      15  734.85
      17  734.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  733.61  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.48  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  733.13  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)          *  733.28  * Flow Area (sq ft)      *          *    1.59  *          *
* E.G. Slope (ft/ft)      *0.314602  * Area (sq ft)           *          *    1.59  *          *
```

```
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.14  * Top Width (ft)         *          *    6.14  *          *
* Vel Total (ft/s)       *    5.55  * Avg. Vel. (ft/s)       *          *    5.55  *          *
* Max Chl Dpth (ft)      *    0.28  * Hydr. Depth (ft)       *          *    0.26  *          *
* Conv. Total (cfs)      *    15.7  * Conv. (cfs)            *          *    15.7  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    6.27  *          *
* Min Ch El (ft)         *  732.85  * Shear (lb/sq ft)       *          *    4.96  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   27.55  *          *
* Frctn Loss (ft)        *    1.53  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 2.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta     Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  733.33       2  733.33       6  731.33      11  731.33      15  733.33
      17  733.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
**********************************************************************************************
* E.G. Elev (ft)         *  732.12  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  731.61  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  731.76  * Flow Area (sq ft)      *          *    1.53  *          *
* E.G. Slope (ft/ft)     *0.352680  * Area (sq ft)           *          *    1.53  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *    6.10  * Top Width (ft)         *          *    6.10  *          *
* Vel Total (ft/s)       *    5.76  * Avg. Vel. (ft/s)       *          *    5.76  *          *
* Max Chl Dpth (ft)      *    0.28  * Hydr. Depth (ft)       *          *    0.25  *          *
* Conv. Total (cfs)      *    14.8  * Conv. (cfs)            *          *    14.8  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *          *    6.23  *          *
* Min Ch El (ft)         *  731.33  * Shear (lb/sq ft)       *          *    5.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   31.10  *          *
* Frctn Loss (ft)        *    1.49  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 1.8*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

```
      -1  732.85      .6  732.85     3.8  731.25    5.51  731.25     6.2  731.25
    7.57  731.25    9.29  731.25   10.66  731.25   12.71  731.25    13.4  731.25
    16.6  732.85    18.2  732.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -1     .06      .6     .06    16.6     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             .6    16.6              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  731.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.12  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  731.57  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  731.54  * Flow Area (sq ft)      *          *    3.23  *          *
* E.G. Slope (ft/ft)     *0.062113  * Area (sq ft)           *          *    3.23  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *          *    8.80  *          *
* Top Width (ft)         *   10.86  * Top Width (ft)         *          *   10.86  *          *
* Vel Total (ft/s)       *    2.72  * Avg. Vel. (ft/s)       *          *    2.72  *          *
* Max Chl Dpth (ft)      *    0.32  * Hydr. Depth (ft)       *          *    0.30  *          *
* Conv. Total (cfs)      *    35.3  * Conv. (cfs)            *          *    35.3  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *          *   11.01  *          *
* Min Ch El (ft)         *  731.25  * Shear (lb/sq ft)       *          *    1.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.10  *          *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 1.6*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -2  731.16     -.8  731.16     1.6  731.16    4.14  731.16    5.15  731.16
    7.18  731.16    9.71  731.16   11.74  731.16   14.79  731.16    15.8  731.16
    18.2  731.16    19.4  731.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -2     .06     -.8     .06    18.2     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -.8    18.2              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  731.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  731.44  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    0.33  *    5.23  *    0.33  *
* E.G. Slope (ft/ft)     *0.020889  * Area (sq ft)           *    0.33  *    5.23  *    0.33  *
* Q Total (cfs)          *    8.80  * Flow (cfs)             *    0.44  *    7.93  *    0.44  *
* Top Width (ft)         *   21.40  * Top Width (ft)         *    1.20  *   19.00  *    1.20  *
* Vel Total (ft/s)       *    1.49  * Avg. Vel. (ft/s)       *    1.32  *    1.52  *    1.32  *
* Max Chl Dpth (ft)      *    0.28  * Hydr. Depth (ft)       *    0.28  *    0.28  *    0.28  *
* Conv. Total (cfs)      *    60.9  * Conv. (cfs)            *     3.0  *    54.9  *     3.0  *
```

```
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    1.48  *   19.00  *    1.48  *
* Min Ch El (ft)         *  731.16  * Shear (lb/sq ft)       *    0.29  *    0.36  *    0.29  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.39  *    0.54  *    0.39  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 1.4*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -3  731.08    -2.2  731.08     -.6  731.08    2.76  731.08     4.1  731.08
    6.79  731.08   10.14  731.08   12.83  731.08   16.86  731.08    18.2  731.08
    19.8  731.08    20.6  731.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
      -3     .06    -2.2     .06    19.8     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -2.2    19.8              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
**********************************************************************************************
* E.G. Elev (ft)         *  731.37  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  731.33  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    0.20  *    5.55  *    0.20  *
* E.G. Slope (ft/ft)     *0.022848  * Area (sq ft)           *    0.20  *    5.55  *    0.20  *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *    0.25  *    8.30  *    0.25  *
* Top Width (ft)         *   23.60  * Top Width (ft)          *    0.80  *   22.00  *    0.80  *
* Vel Total (ft/s)       *    1.48  * Avg. Vel. (ft/s)        *    1.25  *    1.49  *    1.25  *
* Max Chl Dpth (ft)      *    0.25  * Hydr. Depth (ft)        *    0.25  *    0.25  *    0.25  *
* Conv. Total (cfs)      *    58.2  * Conv. (cfs)             *     1.7  *    54.9  *     1.7  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *    1.05  *   22.00  *    1.05  *
* Min Ch El (ft)         *  731.08  * Shear (lb/sq ft)        *    0.27  *    0.36  *    0.27  *
* Alpha                  *    1.01  * Stream Power (lb/ft s)  *    0.34  *    0.54  *    0.34  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 1.2*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -4  730.99    -3.6  730.99    -2.8  730.99    1.38  730.99    3.05  730.99
    6.39  730.99   10.57  730.99   13.91  730.99   18.93  730.99    20.6  730.99
    21.4  730.99    21.8  730.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
************************************************
      -4     .06    -3.6     .06    21.4     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -3.6    21.4              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  731.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  731.24  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  731.14  * Flow Area (sq ft)      *    0.10  *    6.31  *    0.10  *
* E.G. Slope (ft/ft)     *0.018953  * Area (sq ft)           *    0.10  *    6.31  *    0.10  *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *    0.10  *    8.60  *    0.10  *
* Top Width (ft)         *   25.80  * Top Width (ft)          *    0.40  *   25.00  *    0.40  *
* Vel Total (ft/s)       *    1.35  * Avg. Vel. (ft/s)        *    0.98  *    1.36  *    0.98  *
* Max Chl Dpth (ft)      *    0.25  * Hydr. Depth (ft)        *    0.25  *    0.25  *    0.25  *
* Conv. Total (cfs)      *    63.9  * Conv. (cfs)             *     0.7  *    62.5  *     0.7  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *    0.65  *   25.00  *    0.65  *
* Min Ch El (ft)         *  730.99  * Shear (lb/sq ft)        *    0.18  *    0.30  *    0.18  *
* Alpha                  *    1.01  * Stream Power (lb/ft s)   *    0.18  *    0.41  *    0.18  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.00  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth.  The program will try the
         cross section slice/secant method to find critical depth.

CROSS SECTION


RIVER: 104+60
REACH: 1                  RS: 1.0

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
      -5  730.91       0  730.91       2  730.91       6  730.91      11  730.91
      15  730.91      21  730.91      23  730.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
      -5     .06      -5     .06      23     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -5      23                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  731.13  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  731.06  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  731.06  * Flow Area (sq ft)      *          *    4.06  *          *
* E.G. Slope (ft/ft)     *0.101900  * Area (sq ft)           *          *    4.06  *          *
* Q Total (cfs)          *    8.80  * Flow (cfs)              *          *    8.80  *          *
* Top Width (ft)         *   28.00  * Top Width (ft)          *          *   28.00  *          *
* Vel Total (ft/s)       *    2.17  * Avg. Vel. (ft/s)        *          *    2.17  *          *
* Max Chl Dpth (ft)      *    0.15  * Hydr. Depth (ft)        *          *    0.15  *          *
* Conv. Total (cfs)      *    27.6  * Conv. (cfs)             *          *    27.6  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *          *   28.29  *          *
* Min Ch El (ft)         *  730.91  * Shear (lb/sq ft)        *          *    0.91  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    1.98  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
```

```
*****************************************************************************************

Warning: Slope-Area method could not converge on a starting water surface elevation within the
         specified number of trials.  The program used critical depth as the starting water surface.
Warning: The parabolic search method failed to converge on critical depth.  The program will try the
         cross section slice/secant method to find critical depth.

*******************************************************************************
```

SUMMARY OF MANNING'S N VALUES

River:104+60

Reach	River Sta.	n1	n2	n3
1	7	.03	.03	.03
1	6.83333	.03	.03	.03
1	6.66666	.03	.03	.03
1	6.5	.03	.03	.03
1	6.33333	.03	.03	.03
1	6.16666	.03	.03	.03
1	6	.06	.06	.06
1	5.66666	.06	.06	.06
1	5.33333	.06	.06	.06
1	5.0	.06	.06	.06
1	4.88888	.06	.06	.06
1	4.77777	.06	.06	.06
1	4.66666	.06	.06	.06
1	4.55555	.06	.06	.06
1	4.44444	.06	.06	.06
1	4.33333	.06	.06	.06
1	4.22222	.06	.06	.06
1	4.11111	.06	.06	.06
1	4.0	.06	.06	.06
1	3.83333	.06	.06	.06
1	3.66666	.06	.06	.06
1	3.5	.06	.06	.06
1	3.33333	.06	.06	.06
1	3.16666	.06	.06	.06
1	3.0	.06	.06	.06
1	2.8	.06	.06	.06
1	2.6	.06	.06	.06
1	2.4	.06	.06	.06
1	2.2	.06	.06	.06
1	2.0	.06	.06	.06
1	1.8	.06	.06	.06
1	1.6	.06	.06	.06
1	1.4	.06	.06	.06
1	1.2	.06	.06	.06
1	1.0	.06	.06	.06

```
*******************************************************************************************
```

SUMMARY OF REACH LENGTHS

River: 104+60

Reach	River Sta.	Left	Channel	Right
1	7	10	10	10
1	6.83333	10	10	10
1	6.66666	10	10	10
1	6.5	5	5	5
1	6.33333	5	5	5
1	6.16666	5	5	5
1	6	5	5	5
1	5.66666	5	5	5
1	5.33333	5	5	5
1	5.0	5	5	5

```
*1                *    4.88888*    *        5*        5*        5*
*1                *    4.77777*    *        5*        5*        5*
*1                *    4.66666*    *        5*        5*        5*
*1                *    4.55555*    *        5*        5*        5*
*1                *    4.44444*    *        5*        5*        5*
*1                *    4.33333*    *        5*        5*        5*
*1                *    4.22222*    *        5*        5*        5*
*1                *    4.11111*    *        5*        5*        5*
*1                *    4.0         *        5*        5*        5*
*1                *    3.83333*    *        5*        5*        5*
*1                *    3.66666*    *        5*        5*        5*
*1                *    3.5*        *        5*        5*        5*
*1                *    3.33333*    *        5*        5*        5*
*1                *    3.16666*    *        5*        5*        5*
*1                *    3.0         *     4.48*     4.48*     4.48*
*1                *    2.8*        *     4.48*     4.48*     4.48*
*1                *    2.6*        *     4.48*     4.48*     4.48*
*1                *    2.4*        *     4.48*     4.48*     4.48*
*1                *    2.2*        *     4.48*     4.48*     4.48*
*1                *    2.0         *      4.6*      4.6*      4.6*
*1                *    1.8*        *      4.6*      4.6*      4.6*
*1                *    1.6*        *      4.6*      4.6*      4.6*
*1                *    1.4*        *      4.6*      4.6*      4.6*
*1                *    1.2*        *      4.6*      4.6*      4.6*
*1                *    1.0         *        0*        0*        0*
*******************************************************************

*******************************************************************************

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 104+60

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*1                *    7       *       .1*       .3*
*1                *    6.83333**       .1*       .3*
*1                *    6.66666**       .1*       .3*
*1                *    6.5     *       .1*       .3*
*1                *    6.33333**       .1*       .3*
*1                *    6.16666**       .1*       .3*
*1                *    6       *       .1*       .3*
*1                *    5.66666**       .1*       .3*
*1                *    5.33333**       .1*       .3*
*1                *    5.0     *       .1*       .3*
*1                *    4.88888**       .1*       .3*
*1                *    4.77777**       .1*       .3*
*1                *    4.66666**       .1*       .3*
*1                *    4.55555**       .1*       .3*
*1                *    4.44444**       .1*       .3*
*1                *    4.33333**       .1*       .3*
*1                *    4.22222**       .1*       .3*
*1                *    4.11111**       .1*       .3*
*1                *    4.0     *       .1*       .3*
*1                *    3.83333**       .1*       .3*
*1                *    3.66666**       .1*       .3*
*1                *    3.5*    *       .1*       .3*
*1                *    3.33333**       .1*       .3*
*1                *    3.16666**       .1*       .3*
*1                *    3.0     *       .1*       .3*
*1                *    2.8*    *       .1*       .3*
*1                *    2.6*    *       .1*       .3*
*1                *    2.4*    *       .1*       .3*
*1                *    2.2*    *       .1*       .3*
*1                *    2.0     *       .1*       .3*
*1                *    1.8*    *       .1*       .3*
*1                *    1.6*    *       .1*       .3*
*1                *    1.4*    *       .1*       .3*
*1                *    1.2*    *       .1*       .3*
*1                *    1.0     *       .1*       .3*
```

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1.0	8.80	730.91	731.06	731.06	731.13	0.101900	2.17	4.06	28.00	1.00
1	1.2*	8.80	730.99	731.24	731.14	731.27	0.018953	1.36	6.52	25.80	0.48
1	1.4*	8.80	731.08	731.33		731.37	0.022848	1.49	5.95	23.60	0.52
1	1.6*	8.80	731.16	731.44		731.47	0.020889	1.52	5.89	21.40	0.51
1	1.8*	8.80	731.25	731.57	731.54	731.68	0.062113	2.72	3.23	10.86	0.88
1	2.0	8.80	731.33	731.61	731.76	732.12	0.352680	5.76	1.53	6.10	2.03
1	2.2*	8.80	732.85	733.13	733.28	733.61	0.314602	5.55	1.59	6.14	1.93
1	2.4*	8.80	734.36	734.63	734.79	735.16	0.371095	5.86	1.50	6.08	2.08
1	2.6*	8.80	735.88	736.18	736.31	736.61	0.272297	5.30	1.66	6.19	1.80
1	2.8*	8.80	737.39	737.65	737.82	738.25	0.456582	6.26	1.41	6.02	2.28
1	3.0	8.80	738.91	739.31	739.34	739.53	0.101914	3.84	2.29	6.58	1.15
1	3.16666*	8.80	739.41	739.82	739.84	740.03	0.092554	3.72	2.37	6.63	1.10
1	3.33333*	8.80	739.91	740.30	740.34	740.54	0.107801	3.91	2.25	6.56	1.18
1	3.5*	8.80	740.41	740.82	740.84	741.03	0.087703	3.65	2.41	6.65	1.07
1	3.66666*	8.80	740.91	741.29	741.34	741.54	0.116409	4.01	2.19	6.52	1.22
1	3.83333*	8.80	741.41	741.84	741.84	742.03	0.075929	3.48	2.53	6.72	1.00
1	4.0	8.80	741.91	742.19	742.34	742.69	0.338938	5.69	1.55	6.11	1.99
1	4.11111*	8.80	743.58	743.86	744.01	744.35	0.328777	5.63	1.56	6.12	1.96
1	4.22222*	8.80	745.24	745.52	745.67	746.02	0.337677	5.68	1.55	6.11	1.99
1	4.33333*	8.80	746.91	747.19	747.34	747.68	0.324918	5.61	1.57	6.13	1.95
1	4.44444*	8.80	748.58	748.86	749.01	749.37	0.345851	5.72	1.54	6.11	2.01
1	4.55555*	8.80	750.24	750.53	750.67	751.00	0.308256	5.52	1.60	6.15	1.91
1	4.66666*	8.80	751.91	752.18	752.34	752.71	0.372804	5.87	1.50	6.08	2.08
1	4.77777*	8.80	753.58	753.88	754.01	754.30	0.259536	5.22	1.69	6.20	1.76
1	4.88888*	8.80	755.24	755.49	755.67	756.11	0.472119	6.33	1.39	6.01	2.32
1	5.0	8.80	756.91	757.34	757.34	757.53	0.075929	3.48	2.53	6.72	1.00
1	5.33333*	8.80	757.11	757.63		757.69	0.018101	1.96	4.49	9.74	0.51
1	5.66666*	8.80	757.30	757.73		757.78	0.019315	1.84	4.78	12.04	0.51
1	6	8.80	757.50	757.84	757.74	757.90	0.026352	1.89	4.67	14.36	0.58
1	6.16666*	8.80	757.78	757.98	758.06	758.24	0.063247	4.12	2.14	11.13	1.66
1	6.33333*	8.80	758.05	758.27	758.38	758.66	0.085608	5.01	1.76	8.54	1.95
1	6.5	8.80	758.33	758.74	758.76	758.95	0.021814	3.65	2.41	6.66	1.07
1	6.66666*	8.80	758.55	758.97	758.98	759.17	0.020961	3.60	2.44	6.68	1.05
1	6.83333*	8.80	758.78	759.17	759.21	759.41	0.025819	3.86	2.28	6.58	1.15
1	7	8.80	759.00	759.37	759.43	759.64	0.033356	4.20	2.10	6.46	1.30

```
                    HEC-RAS Version 3.1.3 May 2005
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

****

PROJECT DATA
Project Title: BRDB_RipRap_Gutter90+65
Project File : RipRap_Gutter9065.prj
Run Date and Time: 8/6/2008 11:24:03 AM

Project in English units

****

PLAN DATA

Plan Title: 5-8-08
Plan File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\90+65\RipRap_Gutter9065.p01

Geometry Title: Template5-8-08
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\90+65\RipRap_Gutter9065.g01

Flow Title : Tributary_Flow
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\90+65\RipRap_Gutter9065.f01

Plan Summary Information:
Number of: Cross Sections = 30 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

****

FLOW DATA

Flow Title: Tributary_Flow
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\90+65\RipRap_Gutter9065.f01

Flow Data (cfs)

River	Reach	RS	PF 1
90+65	1	7	185

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
90+65	1	PF 1	Normal S = 0.005	Normal S = 0.0143

GEOMETRY DATA

Geometry Title: Template5-8-08
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\90+65\RipRap_Gutter9065.g01

CROSS SECTION

RIVER: 90+65
REACH: 1 RS: 7

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	747	2	747	6	745	16	745	20	747
22	747								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	2	.03	20	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	20	40	40	40	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	748.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	748.00	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	746.92	Flow Area (sq ft)	2.00	46.03	2.00
E.G. Slope (ft/ft)	0.001875	Area (sq ft)	2.00	46.03	2.00
Q Total (cfs)	185.00	Flow (cfs)	3.28	178.44	3.28
Top Width (ft)	22.00	Top Width (ft)	2.00	18.00	2.00
Vel Total (ft/s)	3.70	Avg. Vel. (ft/s)	1.64	3.88	1.64
Max Chl Dpth (ft)	3.00	Hydr. Depth (ft)	1.00	2.56	1.00
Conv. Total (cfs)	4271.9	Conv. (cfs)	75.8	4120.4	75.8
Length Wtd. (ft)	40.00	Wetted Per. (ft)	3.00	18.94	3.00
Min Ch El (ft)	745.00	Shear (lb/sq ft)	0.08	0.28	0.08
Alpha	1.07	Stream Power (lb/ft s)	0.13	1.10	0.13
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.01	0.27	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.13	0.01

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

```
RIVER: 90+65
REACH: 1                  RS: 6.9*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.96       2  746.96       6  744.96      16  744.96      20  746.96
      22  746.96

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      20     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20               40      40      40             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  748.15  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.030  *   0.030  *   0.030  *
* W.S. Elev (ft)         *  747.91  * Reach Len. (ft)        *   40.00  *   40.00  *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.91  *   45.18  *    1.91  *
* E.G. Slope (ft/ft)     *0.002001  * Area (sq ft)           *    1.91  *   45.18  *    1.91  *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *    3.16  *  178.68  *    3.16  *
* Top Width (ft)         *   22.00  * Top Width (ft)         *    2.00  *   18.00  *    2.00  *
* Vel Total (ft/s)       *    3.78  * Avg. Vel. (ft/s)       *    1.66  *    3.96  *    1.66  *
* Max Chl Dpth (ft)      *    2.95  * Hydr. Depth (ft)       *    0.95  *    2.51  *    0.95  *
* Conv. Total (cfs)      *  4135.4  * Conv. (cfs)            *    70.6  *  3994.1  *    70.6  *
* Length Wtd. (ft)       *   40.00  * Wetted Per. (ft)       *    2.95  *   18.94  *    2.95  *
* Min Ch El (ft)         *  744.96  * Shear (lb/sq ft)       *    0.08  *    0.30  *    0.08  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *    0.13  *    1.18  *    0.13  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *    0.01  *    0.23  *    0.01  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.01  *    0.11  *    0.01  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 6.8*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.92       2  746.92       6  744.92      16  744.92      20  746.92
      22  746.92

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      20     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20               40      40      40             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
```

```
* E.G. Elev (ft)         *  748.07  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.030  *   0.030  *   0.030  *
* W.S. Elev (ft)         *  747.82  * Reach Len. (ft)        *   40.00  *   40.00  *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.80  *   44.18  *    1.80  *
* E.G. Slope (ft/ft)     *0.002164  * Area (sq ft)           *    1.80  *   44.18  *    1.80  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    3.01  *  178.98  *    3.01  *
* Top Width (ft)         *   22.00  * Top Width (ft)         *    2.00  *   18.00  *    2.00  *
* Vel Total (ft/s)       *    3.87  * Avg. Vel. (ft/s)       *    1.68  *    4.05  *    1.68  *
* Max Chl Dpth (ft)      *    2.90  * Hydr. Depth (ft)       *    0.90  *    2.45  *    0.90  *
* Conv. Total (cfs)      *  3977.0  * Conv. (cfs)            *    64.7  *  3847.6  *    64.7  *
* Length Wtd. (ft)       *   40.00  * Wetted Per. (ft)       *    2.90  *   18.94  *    2.90  *
* Min Ch El (ft)         *  744.92  * Shear (lb/sq ft)       *    0.08  *    0.32  *    0.08  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.14  *    1.28  *    0.14  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    0.01  *    0.19  *    0.01  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.01  *    0.10  *    0.01  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 6.7*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.89       2  746.89       6  744.89      16  744.89      20  746.89
      22  746.89

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      20     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      20               40      40      40             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  747.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.             *   0.030  *   0.030  *   0.030  *
* W.S. Elev (ft)         *  747.71  * Reach Len. (ft)        *   40.00  *   40.00  *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.63  *   42.71  *    1.63  *
* E.G. Slope (ft/ft)     *0.002434  * Area (sq ft)           *    1.63  *   42.71  *    1.63  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    2.78  *  179.44  *    2.78  *
* Top Width (ft)         *   22.00  * Top Width (ft)         *    2.00  *   18.00  *    2.00  *
* Vel Total (ft/s)       *    4.02  * Avg. Vel. (ft/s)       *    1.70  *    4.20  *    1.70  *
* Max Chl Dpth (ft)      *    2.82  * Hydr. Depth (ft)       *    0.82  *    2.37  *    0.82  *
* Conv. Total (cfs)      *  3749.5  * Conv. (cfs)            *    56.3  *  3636.9  *    56.3  *
* Length Wtd. (ft)       *   40.00  * Wetted Per. (ft)       *    2.82  *   18.94  *    2.82  *
* Min Ch El (ft)         *  744.89  * Shear (lb/sq ft)       *    0.09  *    0.34  *    0.09  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.15  *    1.44  *    0.15  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    0.00  *    0.15  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.01  *    0.08  *    0.01  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION
```

```
RIVER: 90+65
REACH: 1                  RS: 6.6*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.85       2  746.85       6  744.85      16  744.85      20  746.85
      22  746.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      20     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      20               40      40      40             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  747.87  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.030  *   0.030  *   0.030  *
* W.S. Elev (ft)         *  747.58  * Reach Len. (ft)        *   40.00  *   40.00  *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.46  *   41.11  *    1.46  *
* E.G. Slope (ft/ft)     *0.002781  * Area (sq ft)           *    1.46  *   41.11  *    1.46  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    2.50  *  179.99  *    2.50  *
* Top Width (ft)         *   22.00  * Top Width (ft)         *    2.00  *   18.00  *    2.00  *
* Vel Total (ft/s)       *    4.20  * Avg. Vel. (ft/s)       *    1.72  *    4.38  *    1.72  *
* Max Chl Dpth (ft)      *    2.73  * Hydr. Depth (ft)       *    0.73  *    2.28  *    0.73  *
* Conv. Total (cfs)      *  3508.3  * Conv. (cfs)            *    47.5  *  3413.3  *    47.5  *
* Length Wtd. (ft)       *   40.00  * Wetted Per. (ft)       *    2.73  *   18.94  *    2.73  *
* Min Ch El (ft)         *  744.85  * Shear (lb/sq ft)       *    0.09  *    0.38  *    0.09  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.16  *    1.65  *    0.16  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    0.00  *    0.11  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.06  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 6.5

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.81       2  746.81       6  744.81      16  744.81      20  746.81
      22  746.81

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03      20     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      20                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  747.74  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.33  * Wt. n-Val.             *   0.030  *   0.030  *   0.030  *
* W.S. Elev (ft)         *  747.41  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.21  *   38.85  *    1.21  *
* E.G. Slope (ft/ft)     *0.003389  * Area (sq ft)           *    1.21  *   38.85  *    1.21  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    2.08  *  180.84  *    2.08  *
* Top Width (ft)         *   22.00  * Top Width (ft)         *    2.00  *   18.00  *    2.00  *
* Vel Total (ft/s)       *    4.48  * Avg. Vel. (ft/s)       *    1.73  *    4.65  *    1.73  *
* Max Chl Dpth (ft)      *    2.60  * Hydr. Depth (ft)       *    0.60  *    2.16  *    0.60  *
* Conv. Total (cfs)      *  3178.0  * Conv. (cfs)            *    35.8  *  3106.5  *    35.8  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *    2.60  *   18.94  *    2.60  *
* Min Ch El (ft)         *  744.81  * Shear (lb/sq ft)       *    0.10  *    0.43  *    0.10  *
* Alpha                  *    1.06  * Stream Power (lb/ft s) *    0.17  *    2.02  *    0.17  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    0.00  *    0.07  *    0.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.00  *    0.05  *    0.00  *
*********************************************************************************************
```

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: 90+65
REACH: 1 RS: 6.33333*

INPUT
Description:
Station Elevation Data num= 6

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  746.81       2  746.81       6  744.81   18.67  744.81   22.67  746.81
   24.67  746.81
```

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .03       2     .03   22.67     .03
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2 22.67 5 5 5 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

```
*********************************************************************************************
* E.G. Elev (ft)         *  747.70  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *   0.030  *   0.030  *   0.030  *
* W.S. Elev (ft)         *  747.47  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.32  *   47.02  *    1.32  *
* E.G. Slope (ft/ft)     *0.002147  * Area (sq ft)           *    1.32  *   47.02  *    1.32  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    1.91  *  181.19  *    1.91  *
* Top Width (ft)         *   24.67  * Top Width (ft)         *    2.00  *   20.67  *    2.00  *
* Vel Total (ft/s)       *    3.72  * Avg. Vel. (ft/s)       *    1.44  *    3.85  *    1.44  *
* Max Chl Dpth (ft)      *    2.66  * Hydr. Depth (ft)       *    0.66  *    2.27  *    0.66  *
* Conv. Total (cfs)      *  3992.7  * Conv. (cfs)            *    41.2  *  3910.3  *    41.2  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *    2.66  *   21.61  *    2.66  *
* Min Ch El (ft)         *  744.81  * Shear (lb/sq ft)       *    0.07  *    0.29  *    0.07  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.10  *    1.12  *    0.10  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    0.00  *    0.07  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.00  *    0.05  *    0.00  *
*********************************************************************************************
```

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: 90+65

```
REACH: 1                  RS: 6.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   746.8       2   746.8       6   744.8   21.33   744.8   25.33   746.8
   27.33   746.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .03       2     .03   25.33     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2   25.33                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          *  747.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.17  * Wt. n-Val.             *   0.030  *   0.030  *   0.030  *
* W.S. Elev (ft)          *  747.51  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *    1.41  *   55.12  *    1.41  *
* E.G. Slope (ft/ft)      *0.001481  * Area (sq ft)           *    1.41  *   55.12  *    1.41  *
* Q Total (cfs)           *  185.00  * Flow (cfs)             *    1.74  *  181.51  *    1.74  *
* Top Width (ft)          *   27.33  * Top Width (ft)         *    2.00  *   23.33  *    2.00  *
* Vel Total (ft/s)        *    3.19  * Avg. Vel. (ft/s)       *    1.24  *    3.29  *    1.24  *
* Max Chl Dpth (ft)       *    2.71  * Hydr. Depth (ft)       *    0.71  *    2.36  *    0.71  *
* Conv. Total (cfs)       *  4807.5  * Conv. (cfs)            *    45.3  *  4716.9  *    45.3  *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)       *    2.71  *   24.27  *    2.71  *
* Min Ch El (ft)          *  744.80  * Shear (lb/sq ft)       *    0.05  *    0.21  *    0.05  *
* Alpha                   *    1.05  * Stream Power (lb/ft s) *    0.06  *    0.69  *    0.06  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)   *    0.00  *    0.06  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 6

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   746.8       2   746.8       6   744.8      24   744.8      28   746.8
      30   746.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      28     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      28                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
```

```
* E.G. Elev (ft)         *  747.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  747.52  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.44  *   62.71  *    1.44  *
* E.G. Slope (ft/ft)     *0.004448  * Area (sq ft)           *    1.44  *   62.71  *    1.44  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    1.55  *  181.89  *    1.55  *
* Top Width (ft)         *   30.00  * Top Width (ft)         *    2.00  *   26.00  *    2.00  *
* Vel Total (ft/s)       *    2.82  * Avg. Vel. (ft/s)       *    1.08  *    2.90  *    1.08  *
* Max Chl Dpth (ft)      *    2.72  * Hydr. Depth (ft)       *    0.72  *    2.41  *    0.72  *
* Conv. Total (cfs)      *  2774.0  * Conv. (cfs)            *    23.3  *  2727.3  *    23.3  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *    2.72  *   26.94  *    2.72  *
* Min Ch El (ft)         *  744.80  * Shear (lb/sq ft)       *    0.15  *    0.65  *    0.15  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    0.16  *    1.87  *    0.16  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    0.00  *    0.05  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 5.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.78       2  746.78       6  744.78   21.33  744.78   25.33  746.78
   27.33  746.78

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   25.33     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   25.33               5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
**********************************************************************************************
* E.G. Elev (ft)         *  747.62  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  747.45  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.33  *   54.19  *    1.33  *
* E.G. Slope (ft/ft)     *0.006282  * Area (sq ft)           *    1.33  *   54.19  *    1.33  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    1.65  *  181.71  *    1.65  *
* Top Width (ft)         *   27.33  * Top Width (ft)         *    2.00  *   23.33  *    2.00  *
* Vel Total (ft/s)       *    3.25  * Avg. Vel. (ft/s)       *    1.24  *    3.35  *    1.24  *
* Max Chl Dpth (ft)      *    2.67  * Hydr. Depth (ft)       *    0.67  *    2.32  *    0.67  *
* Conv. Total (cfs)      *  2334.1  * Conv. (cfs)            *    20.8  *  2292.6  *    20.8  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *    2.67  *   24.27  *    2.67  *
* Min Ch El (ft)         *  744.78  * Shear (lb/sq ft)       *    0.20  *    0.88  *    0.20  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    0.24  *    2.94  *    0.24  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *    0.00  *    0.05  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION
```

```
RIVER: 90+65
REACH: 1                  RS: 5.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.77       2  746.77       6  744.77   18.67  744.77   22.67  746.77
   24.67  746.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   22.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   22.67                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  747.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  747.32  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    1.09  *   44.62  *    1.09  *
* E.G. Slope (ft/ft)     *0.010307  * Area (sq ft)           *    1.09  *   44.62  *    1.09  *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *    1.56  *  181.88  *    1.56  *
* Top Width (ft)         *   24.67  * Top Width (ft)          *    2.00  *   20.67  *    2.00  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)        *    1.43  *    4.08  *    1.43  *
* Max Chl Dpth (ft)      *    2.55  * Hydr. Depth (ft)        *    0.55  *    2.16  *    0.55  *
* Conv. Total (cfs)      *  1822.2  * Conv. (cfs)             *    15.4  *  1791.5  *    15.4  *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *    2.55  *   21.61  *    2.55  *
* Min Ch El (ft)         *  744.77  * Shear (lb/sq ft)        *    0.28  *    1.33  *    0.28  *
* Alpha                  *    1.05  * Stream Power (lb/ft s)   *    0.39  *    5.41  *    0.39  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)    *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 5

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.75       2  746.75       6  744.75      16  744.75      20  746.75
      22  746.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      20             3.15    3.15    3.15             .1       .3
```

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	747.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.060	
W.S. Elev (ft)	746.67	Reach Len. (ft)	3.15	3.15	3.15
Crit W.S. (ft)	746.67	Flow Area (sq ft)		26.51	
E.G. Slope (ft/ft)	0.049423	Area (sq ft)		26.51	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	17.66	Top Width (ft)		17.66	
Vel Total (ft/s)	6.98	Avg. Vel. (ft/s)		6.98	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	832.2	Conv. (cfs)		832.2	
Length Wtd. (ft)	3.15	Wetted Per. (ft)		18.57	
Min Ch El (ft)	744.75	Shear (lb/sq ft)		4.40	
Alpha	1.00	Stream Power (lb/ft s)		30.74	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.00	0.04	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.03	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: 90+65
REACH: 1 RS: 4.5*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	745.71	2	745.71	6	743.71	16	743.71	20	745.71
22	745.71								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	20	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	20	3.15	3.15	3.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	747.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.		0.060	
W.S. Elev (ft)	745.00	Reach Len. (ft)	3.15	3.15	3.15
Crit W.S. (ft)	745.63	Flow Area (sq ft)		16.23	
E.G. Slope (ft/ft)	0.203745	Area (sq ft)		16.23	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	15.16	Top Width (ft)		15.16	
Vel Total (ft/s)	11.40	Avg. Vel. (ft/s)		11.40	
Max Chl Dpth (ft)	1.29	Hydr. Depth (ft)		1.07	
Conv. Total (cfs)	409.9	Conv. (cfs)		409.9	
Length Wtd. (ft)	3.15	Wetted Per. (ft)		15.77	
Min Ch El (ft)	743.71	Shear (lb/sq ft)		13.09	
Alpha	1.00	Stream Power (lb/ft s)		149.21	

```
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 4

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  744.68       2  744.68       6  742.68      16  742.68      20  744.68
      22  744.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         *  746.26  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.38  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  743.89  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  744.60  * Flow Area (sq ft)      *          *   14.96  *          *
* E.G. Slope (ft/ft)     *0.259156  * Area (sq ft)           *          *   14.96  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   14.82  * Top Width (ft)         *          *   14.82  *          *
* Vel Total (ft/s)       *   12.37  * Avg. Vel. (ft/s)       *          *   12.37  *          *
* Max Chl Dpth (ft)      *    1.21  * Hydr. Depth (ft)       *          *    1.01  *          *
* Conv. Total (cfs)      *   363.4  * Conv. (cfs)            *          *   363.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   15.39  *          *
* Min Ch El (ft)         *  742.68  * Shear (lb/sq ft)       *          *   15.72  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  194.49  *          *
* Frctn Loss (ft)        *    0.72  * Cum Volume (acre-ft)   *    0.00  *    0.04  *    0.00  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 3.83333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  744.18       2  744.18       6  742.18      16  742.18      20  744.18
      22  744.18
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
**********************************************************************************************
* E.G. Elev (ft)         *  745.11  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  743.66  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  744.10  * Flow Area (sq ft)      *          *   19.14  *          *
* E.G. Slope (ft/ft)     *0.126011  * Area (sq ft)           *          *   19.14  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   15.91  * Top Width (ft)         *          *   15.91  *          *
* Vel Total (ft/s)       *    9.66  * Avg. Vel. (ft/s)       *          *    9.66  *          *
* Max Chl Dpth (ft)      *    1.48  * Hydr. Depth (ft)       *          *    1.20  *          *
* Conv. Total (cfs)      *   521.2  * Conv. (cfs)            *          *   521.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   16.61  *          *
* Min Ch El (ft)         *  742.18  * Shear (lb/sq ft)       *          *    9.07  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   87.63  *          *
* Frctn Loss (ft)        *    0.87  * Cum Volume (acre-ft)   *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.28  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 3.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.68       2  743.68       6  741.68      16  741.68      20  743.68
      22  743.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
**********************************************************************************************
* E.G. Elev (ft)         *  744.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  743.26  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  743.60  * Flow Area (sq ft)      *          *   20.82  *          *
* E.G. Slope (ft/ft)     *0.098813  * Area (sq ft)           *          *   20.82  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   16.33  * Top Width (ft)         *          *   16.33  *          *
```

```
* Vel Total (ft/s)       *    8.89  * Avg. Vel. (ft/s)       *          *    8.89  *          *
* Max Chl Dpth (ft)      *    1.58  * Hydr. Depth (ft)       *          *    1.28  *          *
* Conv. Total (cfs)      *   588.5  * Conv. (cfs)            *          *   588.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   17.07  *          *
* Min Ch El (ft)         *  741.68  * Shear (lb/sq ft)       *          *    7.52  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   66.84  *          *
* Frctn Loss (ft)        *    0.56  * Cum Volume (acre-ft)   *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 3.5*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.18       2  743.18       6  741.18      16  741.18      20  743.18
      22  743.18

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  743.99  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  742.76  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  743.10  * Flow Area (sq ft)      *          *   20.82  *          *
* E.G. Slope (ft/ft)     *0.098813  * Area (sq ft)           *          *   20.82  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *          *  185.00  *          *
* Top Width (ft)         *   16.33  * Top Width (ft)          *          *   16.33  *          *
* Vel Total (ft/s)       *    8.89  * Avg. Vel. (ft/s)       *          *    8.89  *          *
* Max Chl Dpth (ft)      *    1.58  * Hydr. Depth (ft)       *          *    1.28  *          *
* Conv. Total (cfs)      *   588.5  * Conv. (cfs)            *          *   588.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *   17.07  *          *
* Min Ch El (ft)         *  741.18  * Shear (lb/sq ft)       *          *    7.52  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   66.84  *          *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 3.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.68       2  742.68       6  740.68      16  740.68      20  742.68
      22  742.68
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  743.49  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  742.25  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.60  * Flow Area (sq ft)     *          *   20.69  *          *
* E.G. Slope (ft/ft)     *0.100553  * Area (sq ft)          *          *   20.69  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)            *          *  185.00  *          *
* Top Width (ft)         *   16.30  * Top Width (ft)        *          *   16.30  *          *
* Vel Total (ft/s)       *    8.94  * Avg. Vel. (ft/s)      *          *    8.94  *          *
* Max Chl Dpth (ft)      *    1.57  * Hydr. Depth (ft)      *          *    1.27  *          *
* Conv. Total (cfs)      *   583.4  * Conv. (cfs)           *          *   583.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)      *          *   17.04  *          *
* Min Ch El (ft)         *  740.68  * Shear (lb/sq ft)      *          *    7.62  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   68.16  *          *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)  *    0.00  *    0.03  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 3.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  742.18       2  742.18       6  740.18      16  740.18      20  742.18
      22  742.18

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  742.99  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  741.76  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.10  * Flow Area (sq ft)     *          *   20.72  *          *
* E.G. Slope (ft/ft)     *0.100191  * Area (sq ft)          *          *   20.72  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)            *          *  185.00  *          *
* Top Width (ft)         *   16.30  * Top Width (ft)        *          *   16.30  *          *
* Vel Total (ft/s)       *    8.93  * Avg. Vel. (ft/s)      *          *    8.93  *          *
* Max Chl Dpth (ft)      *    1.58  * Hydr. Depth (ft)      *          *    1.27  *          *
* Conv. Total (cfs)      *   584.5  * Conv. (cfs)           *          *   584.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)      *          *   17.05  *          *
* Min Ch El (ft)         *  740.18  * Shear (lb/sq ft)      *          *    7.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   67.88  *          *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)  *    0.00  *    0.02  *    0.00  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 3

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  741.68       2  741.68       6  739.68      16  739.68      20  741.68
      22  741.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         *  742.49  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.26  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  741.60  * Flow Area (sq ft)      *          *   20.72  *          *
* E.G. Slope (ft/ft)     *0.100191  * Area (sq ft)           *          *   20.72  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   16.30  * Top Width (ft)         *          *   16.30  *          *
* Vel Total (ft/s)       *    8.93  * Avg. Vel. (ft/s)       *          *    8.93  *          *
* Max Chl Dpth (ft)      *    1.58  * Hydr. Depth (ft)       *          *    1.27  *          *
* Conv. Total (cfs)      *   584.5  * Conv. (cfs)            *          *   584.5  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *   17.05  *          *
* Min Ch El (ft)         *  739.68  * Shear (lb/sq ft)       *          *    7.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   67.88  *          *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 2.8*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  740.16       2  740.16       6  738.16      16  738.16      20  740.16
      22  740.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20             4.48    4.48    4.48             .1       .3
```

```
CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         *  741.71  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.33  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  739.37  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  740.08  * Flow Area (sq ft)      *          *   15.10  *          *
* E.G. Slope (ft/ft)     *0.251953  * Area (sq ft)           *          *   15.10  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *          *  185.00  *          *
* Top Width (ft)         *   14.86  * Top Width (ft)          *          *   14.86  *          *
* Vel Total (ft/s)       *   12.25  * Avg. Vel. (ft/s)        *          *   12.25  *          *
* Max Chl Dpth (ft)      *    1.21  * Hydr. Depth (ft)        *          *    1.02  *          *
* Conv. Total (cfs)      *   368.6  * Conv. (cfs)             *          *   368.6  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *   15.43  *          *
* Min Ch El (ft)         *  738.16  * Shear (lb/sq ft)        *          *   15.39  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  188.55  *          *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 2.6*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  738.65       2  738.65       6  736.65      16  736.65      20  738.65
      22  738.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      20             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         *  740.45  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.64  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  737.80  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  738.57  * Flow Area (sq ft)      *          *   14.18  *          *
* E.G. Slope (ft/ft)     *0.303157  * Area (sq ft)           *          *   14.18  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *          *  185.00  *          *
* Top Width (ft)         *   14.61  * Top Width (ft)          *          *   14.61  *          *
* Vel Total (ft/s)       *   13.05  * Avg. Vel. (ft/s)        *          *   13.05  *          *
* Max Chl Dpth (ft)      *    1.15  * Hydr. Depth (ft)        *          *    0.97  *          *
* Conv. Total (cfs)      *   336.0  * Conv. (cfs)             *          *   336.0  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *   15.15  *          *
* Min Ch El (ft)         *  736.65  * Shear (lb/sq ft)        *          *   17.71  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  231.05  *          *
* Frctn Loss (ft)        *    1.24  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*****************************************************************************************
```

```
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 2.4*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  737.13       2  737.13       6  735.13      16  735.13      20  737.13
      22  737.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  739.03  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.77  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  736.26  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  737.05  * Flow Area (sq ft)      *          *   13.85  *          *
* E.G. Slope (ft/ft)     *0.324852  * Area (sq ft)           *          *   13.85  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   14.52  * Top Width (ft)         *          *   14.52  *          *
* Vel Total (ft/s)       *   13.35  * Avg. Vel. (ft/s)       *          *   13.35  *          *
* Max Chl Dpth (ft)      *    1.13  * Hydr. Depth (ft)       *          *    0.95  *          *
* Conv. Total (cfs)      *   324.6  * Conv. (cfs)            *          *   324.6  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *   15.05  *          *
* Min Ch El (ft)         *  735.13  * Shear (lb/sq ft)       *          *   18.66  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  249.24  *          *
* Frctn Loss (ft)        *    1.41  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 2.2*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  735.62       2  735.62       6  733.62      16  733.62      20  735.62
      22  735.62

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
```

```
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  737.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.82  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  734.74  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  735.54  * Flow Area (sq ft)      *          *   13.73  *          *
* E.G. Slope (ft/ft)     *0.333280  * Area (sq ft)           *          *   13.73  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   14.49  * Top Width (ft)         *          *   14.49  *          *
* Vel Total (ft/s)       *   13.47  * Avg. Vel. (ft/s)       *          *   13.47  *          *
* Max Chl Dpth (ft)      *    1.12  * Hydr. Depth (ft)       *          *    0.95  *          *
* Conv. Total (cfs)      *   320.5  * Conv. (cfs)            *          *   320.5  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *   15.02  *          *
* Min Ch El (ft)         *  733.62  * Shear (lb/sq ft)       *          *   19.03  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  256.33  *          *
* Frctn Loss (ft)        *    1.47  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 2

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   734.1       2   734.1       6   732.1      16   732.1      20   734.1
      22   734.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      20     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      20             4.6     4.6     4.6              .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  736.06  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.84  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  733.22  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  734.00  * Flow Area (sq ft)      *          *   13.68  *          *
* E.G. Slope (ft/ft)     *0.336857  * Area (sq ft)           *          *   13.68  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   14.47  * Top Width (ft)         *          *   14.47  *          *
* Vel Total (ft/s)       *   13.52  * Avg. Vel. (ft/s)       *          *   13.52  *          *
* Max Chl Dpth (ft)      *    1.12  * Hydr. Depth (ft)       *          *    0.95  *          *
* Conv. Total (cfs)      *   318.7  * Conv. (cfs)            *          *   318.7  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *          *   15.00  *          *
* Min Ch El (ft)         *  732.10  * Shear (lb/sq ft)       *          *   19.18  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  259.35  *          *
* Frctn Loss (ft)        *    1.50  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 1.8*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
      -1  733.62      .6  733.62     3.8  732.02    6.23  732.02     7.2  732.02
    9.14  732.02   11.57  732.02   13.51  732.02   16.43  732.02    17.4  732.02
    20.6  733.62    22.2  733.62

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
      -1     .06      .6     .06    20.6     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             .6    20.6              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  734.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.42  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  733.23  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  733.68  * Flow Area (sq ft)      *          *   19.35  *          *
* E.G. Slope (ft/ft)     *0.145566  * Area (sq ft)           *          *   19.35  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *          *  185.00  *          *
* Top Width (ft)         *   18.43  * Top Width (ft)         *          *   18.43  *          *
* Vel Total (ft/s)       *    9.56  * Avg. Vel. (ft/s)       *          *    9.56  *          *
* Max Chl Dpth (ft)      *    1.21  * Hydr. Depth (ft)       *          *    1.05  *          *
* Conv. Total (cfs)      *   484.9  * Conv. (cfs)            *          *   484.9  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *          *   19.00  *          *
* Min Ch El (ft)         *  732.02  * Shear (lb/sq ft)       *          *    9.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   88.48  *          *
* Frctn Loss (ft)        *    0.98  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.43  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 1.6*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
      -2  731.93     -.8  731.93     1.6  731.93    4.67  731.93     5.9  731.93
    8.36  731.93   11.43  731.93   13.89  731.93   17.57  731.93    18.8  731.93
    21.2  731.93    22.4  731.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -2     .06     -.8     .06    21.2     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -.8    21.2              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
**********************************************************************************************
* E.G. Elev (ft)         *  733.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  732.87  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  733.15  * Flow Area (sq ft)      *    1.12  *   20.58  *    1.12  *
* E.G. Slope (ft/ft)     *0.124744  * Area (sq ft)           *    1.12  *   20.58  *    1.12  *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *    6.40  *  172.21  *    6.40  *
* Top Width (ft)         *   24.40  * Top Width (ft)         *    1.20  *   22.00  *    1.20  *
* Vel Total (ft/s)       *    8.10  * Avg. Vel. (ft/s)       *    5.70  *    8.37  *    5.70  *
* Max Chl Dpth (ft)      *    0.94  * Hydr. Depth (ft)       *    0.94  *    0.94  *    0.94  *
* Conv. Total (cfs)      *   523.8  * Conv. (cfs)            *    18.1  *   487.6  *    18.1  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    2.14  *   22.00  *    2.14  *
* Min Ch El (ft)         *  731.93  * Shear (lb/sq ft)       *    4.09  *    7.29  *    4.09  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *   23.33  *   60.96  *   23.33  *
* Frctn Loss (ft)        *    0.62  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
**********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 1.4*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -3  731.85    -2.2  731.85     -.6  731.85    3.11  731.85     4.6  731.85
    7.57  731.85   11.29  731.85   14.26  731.85   18.71  731.85    20.2  731.85
    21.8  731.85    22.6  731.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -3     .06    -2.2     .06    21.8     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -2.2    21.8              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
**********************************************************************************************
* E.G. Elev (ft)         *  733.67  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  733.24  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  733.03  * Flow Area (sq ft)      *    1.11  *   33.28  *    1.11  *
* E.G. Slope (ft/ft)     *0.030479  * Area (sq ft)           *    1.11  *   33.28  *    1.11  *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *    3.05  *  178.90  *    3.05  *
```

```
* Top Width (ft)         *   25.60  * Top Width (ft)         *    0.80  *   24.00  *    0.80  *
* Vel Total (ft/s)       *    5.21  * Avg. Vel. (ft/s)       *    2.75  *    5.38  *    2.75  *
* Max Chl Dpth (ft)      *    1.39  * Hydr. Depth (ft)       *    1.39  *    1.39  *    1.39  *
* Conv. Total (cfs)      *  1059.7  * Conv. (cfs)            *    17.5  *  1024.7  *    17.5  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    2.19  *   24.00  *    2.19  *
* Min Ch El (ft)         *  731.85  * Shear (lb/sq ft)       *    0.97  *    2.64  *    0.97  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    2.65  *   14.18  *    2.65  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 1.2*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
      -4  731.76    -3.6  731.76    -2.8  731.76    1.56  731.76     3.3  731.76
    6.79  731.76   11.14  731.76   14.63  731.76   19.86  731.76    21.6  731.76
    22.4  731.76    22.8  731.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -4     .06    -3.6     .06    22.4     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -3.6    22.4              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  733.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  733.12  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  732.90  * Flow Area (sq ft)      *    0.54  *   35.35  *    0.54  *
* E.G. Slope (ft/ft)     *0.028988  * Area (sq ft)           *    0.54  *   35.35  *    0.54  *
* Q Total (cfs)          *  185.00  * Flow (cfs)             *    1.05  *  182.90  *    1.05  *
* Top Width (ft)         *   26.80  * Top Width (ft)         *    0.40  *   26.00  *    0.40  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *    1.93  *    5.17  *    1.93  *
* Max Chl Dpth (ft)      *    1.36  * Hydr. Depth (ft)       *    1.36  *    1.36  *    1.36  *
* Conv. Total (cfs)      *  1086.6  * Conv. (cfs)            *     6.2  *  1074.3  *     6.2  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    1.76  *   26.00  *    1.76  *
* Min Ch El (ft)         *  731.76  * Shear (lb/sq ft)       *    0.56  *    2.46  *    0.56  *
* Alpha                  *    1.03  * Stream Power (lb/ft s) *    1.08  *   12.73  *    1.08  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.00  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 90+65
REACH: 1                  RS: 1

INPUT
```

```
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -5  731.68       0  731.68       2  731.68       6  731.68      11  731.68
      15  731.68      21  731.68      23  731.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
      -5     .06      -5     .06      23     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -5      23                 0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  733.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  732.79  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  732.79  * Flow Area (sq ft)      *          *   30.97  *          *
* E.G. Slope (ft/ft)     *0.056308  * Area (sq ft)           *          *   30.97  *          *
* Q Total (cfs)          *  185.00  * Flow (cfs)              *          *  185.00  *          *
* Top Width (ft)         *   28.00  * Top Width (ft)          *          *   28.00  *          *
* Vel Total (ft/s)       *    5.97  * Avg. Vel. (ft/s)        *          *    5.97  *          *
* Max Chl Dpth (ft)      *    1.11  * Hydr. Depth (ft)        *          *    1.11  *          *
* Conv. Total (cfs)      *   779.6  * Conv. (cfs)              *          *   779.6  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *          *   30.21  *          *
* Min Ch El (ft)         *  731.68  * Shear (lb/sq ft)        *          *    3.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   21.53  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*********************************************************************************************

Warning: Slope-Area method could not converge on a starting water surface elevation within the
         specified number of trials.  The program used critical depth as the starting water surface.

*******************************************************************************

SUMMARY OF MANNING'S N VALUES

River:90+65
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*1               *    7           *      .03*      .03*      .03*
*1               *    6.9*        *      .03*      .03*      .03*
*1               *    6.8*        *      .03*      .03*      .03*
*1               *    6.7*        *      .03*      .03*      .03*
*1               *    6.6*        *      .03*      .03*      .03*
*1               *    6.5         *      .03*      .03*      .03*
*1               *    6.33333*    *      .03*      .03*      .03*
*1               *    6.16666*    *      .03*      .03*      .03*
*1               *    6           *      .06*      .06*      .06*
*1               *    5.66666*    *      .06*      .06*      .06*
*1               *    5.33333*    *      .06*      .06*      .06*
*1               *    5           *      .06*      .06*      .06*
*1               *    4.5*        *      .06*      .06*      .06*
*1               *    4           *      .06*      .06*      .06*
*1               *    3.83333*    *      .06*      .06*      .06*
*1               *    3.66666*    *      .06*      .06*      .06*
*1               *    3.5*        *      .06*      .06*      .06*
*1               *    3.33333*    *      .06*      .06*      .06*
*1               *    3.16666*    *      .06*      .06*      .06*
*1               *    3           *      .06*      .06*      .06*
```

*1	2.8*	.06*	.06*	.06*
*1	2.6*	.06*	.06*	.06*
*1	2.4*	.06*	.06*	.06*
*1	2.2*	.06*	.06*	.06*
*1	2	.06*	.06*	.06*
*1	1.8*	.06*	.06*	.06*
*1	1.6*	.06*	.06*	.06*
*1	1.4*	.06*	.06*	.06*
*1	1.2*	.06*	.06*	.06*
*1	1	.06*	.06*	.06*

SUMMARY OF REACH LENGTHS

River: 90+65

Reach	River Sta.	Left	Channel	Right
*1	7	40*	40*	40*
*1	6.9*	40*	40*	40*
*1	6.8*	40*	40*	40*
*1	6.7*	40*	40*	40*
*1	6.6*	40*	40*	40*
*1	6.5	5*	5*	5*
*1	6.33333*	5*	5*	5*
*1	6.16666*	5*	5*	5*
*1	6	5*	5*	5*
*1	5.66666*	5*	5*	5*
*1	5.33333*	5*	5*	5*
*1	5	3.15*	3.15*	3.15*
*1	4.5*	3.15*	3.15*	3.15*
*1	4	5*	5*	5*
*1	3.83333*	5*	5*	5*
*1	3.66666*	5*	5*	5*
*1	3.5*	5*	5*	5*
*1	3.33333*	5*	5*	5*
*1	3.16666*	5*	5*	5*
*1	3	4.48*	4.48*	4.48*
*1	2.8*	4.48*	4.48*	4.48*
*1	2.6*	4.48*	4.48*	4.48*
*1	2.4*	4.48*	4.48*	4.48*
*1	2.2*	4.48*	4.48*	4.48*
*1	2	4.6*	4.6*	4.6*
*1	1.8*	4.6*	4.6*	4.6*
*1	1.6*	4.6*	4.6*	4.6*
*1	1.4*	4.6*	4.6*	4.6*
*1	1.2*	4.6*	4.6*	4.6*
*1	1	0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 90+65

Reach	River Sta.	Contr.	Expan.
*1	7	.1*	.3*
*1	6.9*	.1*	.3*
*1	6.8*	.1*	.3*
*1	6.7*	.1*	.3*
*1	6.6*	.1*	.3*

```
*1              *    6.5     *       .1*       .3*
*1              *    6.33333**       .1*       .3*
*1              *    6.16666**       .1*       .3*
*1              *    6       *       .1*       .3*
*1              *    5.66666**       .1*       .3*
*1              *    5.33333**       .1*       .3*
*1              *    5       *       .1*       .3*
*1              *    4.5*    *       .1*       .3*
*1              *    4       *       .1*       .3*
*1              *    3.83333**       .1*       .3*
*1              *    3.66666**       .1*       .3*
*1              *    3.5*    *       .1*       .3*
*1              *    3.33333**       .1*       .3*
*1              *    3.16666**       .1*       .3*
*1              *    3       *       .1*       .3*
*1              *    2.8*    *       .1*       .3*
*1              *    2.6*    *       .1*       .3*
*1              *    2.4*    *       .1*       .3*
*1              *    2.2*    *       .1*       .3*
*1              *    2       *       .1*       .3*
*1              *    1.8*    *       .1*       .3*
*1              *    1.6*    *       .1*       .3*
*1              *    1.4*    *       .1*       .3*
*1              *    1.2*    *       .1*       .3*
*1              *    1       *       .1*       .3*
*****************************************************
```

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1	185.00	731.68	732.79	732.79	733.34	0.056308	5.97	30.97	28.00	1.00
1	1.2*	185.00	731.76	733.12	732.90	733.53	0.028988	5.17	36.43	26.80	0.78
1	1.4*	185.00	731.85	733.24	733.03	733.67	0.030479	5.38	35.50	25.60	0.80
1	1.6*	185.00	731.93	732.87	733.15	733.91	0.124744	8.37	22.83	24.40	1.52
1	1.8*	185.00	732.02	733.23	733.68	734.65	0.145566	9.56	19.35	18.43	1.64
1	2	185.00	732.10	733.22	734.00	736.06	0.336857	13.52	13.68	14.47	2.45
1	2.2*	185.00	733.62	734.74	735.54	737.56	0.333280	13.47	13.73	14.49	2.44
1	2.4*	185.00	735.13	736.26	737.05	739.03	0.324852	13.35	13.85	14.52	2.41
1	2.6*	185.00	736.65	737.80	738.57	740.45	0.303157	13.05	14.18	14.61	2.33
1	2.8*	185.00	738.16	739.37	740.08	741.71	0.251953	12.25	15.10	14.86	2.14
1	3	185.00	739.68	741.26	741.60	742.49	0.100191	8.93	20.72	16.30	1.40
1	3.16666*	185.00	740.18	741.76	742.10	742.99	0.100191	8.93	20.72	16.30	1.40
1	3.33333*	185.00	740.68	742.25	742.60	743.49	0.100553	8.94	20.69	16.30	1.40
1	3.5*	185.00	741.18	742.76	743.10	743.99	0.098813	8.89	20.82	16.33	1.39
1	3.66666*	185.00	741.68	743.26	743.60	744.49	0.098813	8.89	20.82	16.33	1.39
1	3.83333*	185.00	742.18	743.66	744.10	745.11	0.126011	9.66	19.14	15.91	1.55
1	4	185.00	742.68	743.89	744.60	746.26	0.259156	12.37	14.96	14.82	2.17
1	4.5*	185.00	743.71	745.00	745.63	747.02	0.203745	11.40	16.23	15.16	1.94
1	5	185.00	744.75	746.67	746.67	747.42	0.049423	6.98	26.51	17.66	1.00
1	5.33333*	185.00	744.77	747.32		747.57	0.010307	4.08	46.80	24.67	0.49
1	5.66666*	185.00	744.78	747.45		747.62	0.006282	3.35	56.86	27.33	0.39
1	6	185.00	744.80	747.52		747.65	0.004448	2.90	65.59	30.00	0.33
1	6.16666*	185.00	744.80	747.51		747.67	0.001481	3.29	57.94	27.33	0.38
1	6.33333*	185.00	744.81	747.47		747.70	0.002147	3.85	49.67	24.67	0.45
1	6.5	185.00	744.81	747.41		747.74	0.003389	4.65	41.27	22.00	0.56
1	6.6*	185.00	744.85	747.58		747.87	0.002781	4.38	44.03	22.00	0.51
1	6.7*	185.00	744.89	747.71		747.97	0.002434	4.20	45.98	22.00	0.48
1	6.8*	185.00	744.92	747.82		748.07	0.002164	4.05	47.77	22.00	0.46
1	6.9*	185.00	744.96	747.91		748.15	0.002001	3.96	48.99	22.00	0.44
1	7	185.00	745.00	748.00	746.92	748.23	0.001875	3.88	50.03	22.00	0.43

```
                    HEC-RAS Version 3.1.3 May 2005
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

*******************************************************************************

PROJECT DATA
Project Title: BRDB_RipRap_Gutter107+00
Project File : RipRap_Gutter10700.prj
Run Date and Time: 8/7/2008 10:54:46 AM

Project in English units

*******************************************************************************

PLAN DATA

Plan Title: 5-8-08
Plan File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+00\RipRap_Gutter10700.p01

           Geometry Title: Template5-8-08
           Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+00\RipRap_Gutter10700.g01

           Flow Title    : Full-Pipe-Flow5-8-08
           Flow File     : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+00\RipRap_Gutter10700.f01

Plan Summary Information:
Number of:  Cross Sections =   39    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Program Selects Appropriate method
    Computational Flow Regime:     Mixed Flow

*******************************************************************************

FLOW DATA

Flow Title: Full-Pipe-Flow5-8-08
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+00\RipRap_Gutter10700.f01
```

Flow Data (cfs)

River	Reach	RS	Slope = 2%
107+77	1	6	5.41
107+77	1	5.0	34.7

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
107+77	1	Slope = 2%	Normal S = 0.034	Normal S = 0.0143

GEOMETRY DATA

Geometry Title: Template5-8-08
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+00\RipRap_Gutter10700.g01

CROSS SECTION

RIVER: 107+77
REACH: 1 RS: 6

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	761	2	761	6	759	19	759	23	761
25	761								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	23	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	23	5	5	5	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	759.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.060	
W.S. Elev (ft)	759.26	Reach Len. (ft)	5.00	5.00	5.00
Crit W.S. (ft)	759.17	Flow Area (sq ft)		3.50	
E.G. Slope (ft/ft)	0.025130	Area (sq ft)		3.50	
Q Total (cfs)	5.41	Flow (cfs)		5.41	
Top Width (ft)	14.04	Top Width (ft)		14.04	
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.55	
Max Chl Dpth (ft)	0.26	Hydr. Depth (ft)		0.25	
Conv. Total (cfs)	34.1	Conv. (cfs)		34.1	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		14.16	
Min Ch El (ft)	759.00	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		0.60	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.00	0.02	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.04	0.00

CROSS SECTION

```
RIVER: 107+77
REACH: 1                  RS: 5.83333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.83       2  760.83       6  758.83   16.33  758.83   20.33  760.83
   22.33  760.83

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   20.33     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   20.33                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  759.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.04  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.15  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    3.52  *          *
* E.G. Slope (ft/ft)     *0.019288  * Area (sq ft)           *          *    3.52  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *   11.61  * Top Width (ft)          *          *   11.61  *          *
* Vel Total (ft/s)       *    1.54  * Avg. Vel. (ft/s)        *          *    1.54  *          *
* Max Chl Dpth (ft)      *    0.32  * Hydr. Depth (ft)        *          *    0.30  *          *
* Conv. Total (cfs)      *    39.0  * Conv. (cfs)             *          *    39.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *   11.76  *          *
* Min Ch El (ft)         *  758.83  * Shear (lb/sq ft)        *          *    0.36  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.55  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.04  *    0.00  *
*****************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.66       2  760.66       6  758.66   13.67  758.66   17.67  760.66
   19.67  760.66

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06   17.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2   17.67                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  759.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.04  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  759.06  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
```

```
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    3.35  *          *
* E.G. Slope (ft/ft)     *0.016920  * Area (sq ft)           *          *    3.35  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    9.25  * Top Width (ft)          *          *    9.25  *          *
* Vel Total (ft/s)       *    1.61  * Avg. Vel. (ft/s)        *          *    1.61  *          *
* Max Chl Dpth (ft)      *    0.40  * Hydr. Depth (ft)        *          *    0.36  *          *
* Conv. Total (cfs)      *    41.6  * Conv. (cfs)             *          *    41.6  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.44  *          *
* Min Ch El (ft)         *  758.66  * Shear (lb/sq ft)        *          *    0.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.61  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.04  *    0.00  *
*****************************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.5

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.49       2  760.49       6  758.49      11  758.49      15  760.49
      17  760.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)         *  758.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.90  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    2.38  *          *
* E.G. Slope (ft/ft)     *0.034426  * Area (sq ft)           *          *    2.38  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    6.64  * Top Width (ft)          *          *    6.64  *          *
* Vel Total (ft/s)       *    2.27  * Avg. Vel. (ft/s)        *          *    2.27  *          *
* Max Chl Dpth (ft)      *    0.41  * Hydr. Depth (ft)        *          *    0.36  *          *
* Conv. Total (cfs)      *    29.2  * Conv. (cfs)             *          *    29.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    6.83  *          *
* Min Ch El (ft)         *  758.49  * Shear (lb/sq ft)        *          *    0.75  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.70  *          *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.04  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.45*

INPUT
```

```
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.32       2  760.32       6  758.32      11  758.32      15  760.32
      17  760.32

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)         *  758.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.73  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    2.40  *          *
* E.G. Slope (ft/ft)     *0.033589  * Area (sq ft)           *          *    2.40  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    6.65  * Top Width (ft)          *          *    6.65  *          *
* Vel Total (ft/s)       *    2.26  * Avg. Vel. (ft/s)        *          *    2.26  *          *
* Max Chl Dpth (ft)      *    0.41  * Hydr. Depth (ft)        *          *    0.36  *          *
* Conv. Total (cfs)      *    29.5  * Conv. (cfs)             *          *    29.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    6.84  *          *
* Min Ch El (ft)         *  758.32  * Shear (lb/sq ft)        *          *    0.73  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.66  *          *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.04  *    0.00  *
*************************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.4*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  760.15       2  760.15       6  758.15      11  758.15      15  760.15
      17  760.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)         *  758.64  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.55  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    2.34  *          *
* E.G. Slope (ft/ft)     *0.036030  * Area (sq ft)           *          *    2.34  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    6.61  * Top Width (ft)          *          *    6.61  *          *
```

```
* Vel Total (ft/s)       *    2.31  * Avg. Vel. (ft/s)       *          *    2.31  *          *
* Max Chl Dpth (ft)      *    0.40  * Hydr. Depth (ft)       *          *    0.35  *          *
* Conv. Total (cfs)      *    28.5  * Conv. (cfs)            *          *    28.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.80  *          *
* Min Ch El (ft)         *  758.15  * Shear (lb/sq ft)       *          *    0.77  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.79  *          *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.04  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.35*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.97       2  759.97       6  757.97      11  757.97      15  759.97
      17  759.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  758.47  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  758.40  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *    2.49  *          *
* E.G. Slope (ft/ft)     *0.029937  * Area (sq ft)          *          *    2.49  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)            *          *    5.41  *          *
* Top Width (ft)         *    6.70  * Top Width (ft)        *          *    6.70  *          *
* Vel Total (ft/s)       *    2.17  * Avg. Vel. (ft/s)      *          *    2.17  *          *
* Max Chl Dpth (ft)      *    0.43  * Hydr. Depth (ft)      *          *    0.37  *          *
* Conv. Total (cfs)      *    31.3  * Conv. (cfs)           *          *    31.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)      *          *    6.90  *          *
* Min Ch El (ft)         *  757.97  * Shear (lb/sq ft)      *          *    0.67  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.46  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.3*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   759.8       2   759.8       6   757.8      11   757.8      15   759.8
      17   759.8
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  758.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.29  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    2.91  *          *
* E.G. Slope (ft/ft)     *0.018730  * Area (sq ft)           *          *    2.91  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    6.95  * Top Width (ft)         *          *    6.95  *          *
* Vel Total (ft/s)       *    1.86  * Avg. Vel. (ft/s)       *          *    1.86  *          *
* Max Chl Dpth (ft)      *    0.49  * Hydr. Depth (ft)       *          *    0.42  *          *
* Conv. Total (cfs)      *    39.5  * Conv. (cfs)            *          *    39.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    7.18  *          *
* Min Ch El (ft)         *  757.80  * Shear (lb/sq ft)       *          *    0.47  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.88  *          *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.25*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  759.63       2  759.63       6  757.63      11  757.63      15  759.63
      17  759.63

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  758.27  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.23  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    3.74  *          *
* E.G. Slope (ft/ft)     *0.008924  * Area (sq ft)           *          *    3.74  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    7.41  * Top Width (ft)         *          *    7.41  *          *
* Vel Total (ft/s)       *    1.45  * Avg. Vel. (ft/s)       *          *    1.45  *          *
* Max Chl Dpth (ft)      *    0.60  * Hydr. Depth (ft)       *          *    0.50  *          *
* Conv. Total (cfs)      *    57.3  * Conv. (cfs)            *          *    57.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    7.70  *          *
```

```
* Min Ch El (ft)         *  757.63  * Shear (lb/sq ft)       *          *    0.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.39  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.2*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  759.46       2  759.46       6  757.46      11  757.46      15  759.46
      17  759.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  758.23  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.02  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.21  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    4.87  *          *
* E.G. Slope (ft/ft)     *0.004129  * Area (sq ft)           *          *    4.87  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    8.00  * Top Width (ft)         *          *    8.00  *          *
* Vel Total (ft/s)       *    1.11  * Avg. Vel. (ft/s)       *          *    1.11  *          *
* Max Chl Dpth (ft)      *    0.75  * Hydr. Depth (ft)       *          *    0.61  *          *
* Conv. Total (cfs)      *    84.2  * Conv. (cfs)            *          *    84.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    8.35  *          *
* Min Ch El (ft)         *  757.46  * Shear (lb/sq ft)       *          *    0.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.17  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.15*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  759.29       2  759.29       6  757.29      11  757.29      15  759.29
      17  759.29

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  758.21  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.20  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    6.20  *          *
* E.G. Slope (ft/ft)     *0.002062  * Area (sq ft)           *          *    6.20  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    8.64  * Top Width (ft)          *          *    8.64  *          *
* Vel Total (ft/s)       *    0.87  * Avg. Vel. (ft/s)        *          *    0.87  *          *
* Max Chl Dpth (ft)      *    0.91  * Hydr. Depth (ft)        *          *    0.72  *          *
* Conv. Total (cfs)      *   119.1  * Conv. (cfs)             *          *   119.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.07  *          *
* Min Ch El (ft)         *  757.29  * Shear (lb/sq ft)        *          *    0.09  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.08  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*****************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.1*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  759.11       2  759.11       6  757.11      11  757.11      15  759.11
      17  759.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  758.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  758.19  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *    7.77  *          *
* E.G. Slope (ft/ft)     *0.001083  * Area (sq ft)           *          *    7.77  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    9.34  * Top Width (ft)          *          *    9.34  *          *
* Vel Total (ft/s)       *    0.70  * Avg. Vel. (ft/s)        *          *    0.70  *          *
* Max Chl Dpth (ft)      *    1.08  * Hydr. Depth (ft)        *          *    0.83  *          *
* Conv. Total (cfs)      *   164.4  * Conv. (cfs)             *          *   164.4  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    9.85  *          *
* Min Ch El (ft)         *  757.11  * Shear (lb/sq ft)        *          *    0.05  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    0.04  *          *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
```

```
*****************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.05*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  758.94       2  758.94       6  756.94      11  756.94      15  758.94
      17  758.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)          *  758.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.01  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  758.19  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *          *    9.39  *          *
* E.G. Slope (ft/ft)      *0.000636  * Area (sq ft)           *          *    9.39  *          *
* Q Total (cfs)           *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)          *   10.01  * Top Width (ft)          *          *   10.01  *          *
* Vel Total (ft/s)        *    0.58  * Avg. Vel. (ft/s)        *          *    0.58  *          *
* Max Chl Dpth (ft)       *    1.25  * Hydr. Depth (ft)        *          *    0.94  *          *
* Conv. Total (cfs)       *   214.6  * Conv. (cfs)             *          *   214.6  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)        *          *   10.60  *          *
* Min Ch El (ft)          *  756.94  * Shear (lb/sq ft)        *          *    0.04  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    0.02  *          *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)          *    0.00  *    0.03  *    0.00  *
*****************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 5.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  758.77       2  758.77       6  756.77      11  756.77      15  758.77
      17  758.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  758.15  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  757.76  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  757.76  * Flow Area (sq ft)      *          *    6.89  *          *
* E.G. Slope (ft/ft)     *0.062747  * Area (sq ft)           *          *    6.89  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *          *   34.70  *          *
* Top Width (ft)         *    8.95  * Top Width (ft)         *          *    8.95  *          *
* Vel Total (ft/s)       *    5.04  * Avg. Vel. (ft/s)       *          *    5.04  *          *
* Max Chl Dpth (ft)      *    0.99  * Hydr. Depth (ft)       *          *    0.77  *          *
* Conv. Total (cfs)      *   138.5  * Conv. (cfs)            *          *   138.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.42  *          *
* Min Ch El (ft)         *  756.77  * Shear (lb/sq ft)       *          *    2.87  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   14.43  *          *
* Frctn Loss (ft)        *    0.31  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 4.88888*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0   757.1       2   757.1       6   755.1      11   755.1      15   757.1
      17   757.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  757.02  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  755.71  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  756.09  * Flow Area (sq ft)      *          *    3.78  *          *
* E.G. Slope (ft/ft)     *0.355491  * Area (sq ft)           *          *    3.78  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *          *   34.70  *          *
* Top Width (ft)         *    7.43  * Top Width (ft)         *          *    7.43  *          *
* Vel Total (ft/s)       *    9.18  * Avg. Vel. (ft/s)       *          *    9.18  *          *
* Max Chl Dpth (ft)      *    0.61  * Hydr. Depth (ft)       *          *    0.51  *          *
* Conv. Total (cfs)      *    58.2  * Conv. (cfs)            *          *    58.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    7.72  *          *
```

```
* Min Ch El (ft)         *  755.10  * Shear (lb/sq ft)       *          *   10.87  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   99.75  *          *
* Frctn Loss (ft)        *    1.05  * Cum Volume (acre-ft)   *    0.00  *    0.02  *    0.00  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION


RIVER: 107+77
REACH: 1                 RS: 4.77777*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  755.44       2  755.44       6  753.44      11  753.44      15  755.44
      17  755.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  755.29  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  754.07  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  754.43  * Flow Area (sq ft)      *          *    3.91  *          *
* E.G. Slope (ft/ft)     *0.323023  * Area (sq ft)           *          *    3.91  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.50  * Top Width (ft)          *          *    7.50  *          *
* Vel Total (ft/s)       *    8.88  * Avg. Vel. (ft/s)        *          *    8.88  *          *
* Max Chl Dpth (ft)      *    0.63  * Hydr. Depth (ft)        *          *    0.52  *          *
* Conv. Total (cfs)      *    61.1  * Conv. (cfs)             *          *    61.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    7.80  *          *
* Min Ch El (ft)         *  753.44  * Shear (lb/sq ft)        *          *   10.11  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   89.76  *          *
* Frctn Loss (ft)        *    1.69  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.00  *    0.03  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                 RS: 4.66666*

INPUT
```

```
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  753.77       2  753.77       6  751.77      11  751.77      15  753.77
      17  753.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  753.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.26  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  752.39  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  752.76  * Flow Area (sq ft)      *          *    3.85  *          *
* E.G. Slope (ft/ft)      *0.336474  * Area (sq ft)           *          *    3.85  *          *
* Q Total (cfs)           *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)          *    7.47  * Top Width (ft)          *          *    7.47  *          *
* Vel Total (ft/s)        *    9.01  * Avg. Vel. (ft/s)        *          *    9.01  *          *
* Max Chl Dpth (ft)       *    0.62  * Hydr. Depth (ft)        *          *    0.52  *          *
* Conv. Total (cfs)       *    59.8  * Conv. (cfs)             *          *    59.8  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)        *          *    7.76  *          *
* Min Ch El (ft)          *  751.77  * Shear (lb/sq ft)        *          *   10.43  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *   93.89  *          *
* Frctn Loss (ft)         *    1.65  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 4.55555*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   752.1       2   752.1       6   750.1      11   750.1      15   752.1
      17   752.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*************************************************************************************************
* E.G. Elev (ft)          *  751.98  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.26  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  750.72  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)          *  751.09  * Flow Area (sq ft)      *          *    3.86  *          *
```

```
* E.G. Slope (ft/ft)     *0.335540  * Area (sq ft)           *          *    3.86  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.47  * Top Width (ft)          *          *    7.47  *          *
* Vel Total (ft/s)       *    9.00  * Avg. Vel. (ft/s)        *          *    9.00  *          *
* Max Chl Dpth (ft)      *    0.62  * Hydr. Depth (ft)        *          *    0.52  *          *
* Conv. Total (cfs)      *    59.9  * Conv. (cfs)             *          *    59.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    7.77  *          *
* Min Ch El (ft)         *  750.10  * Shear (lb/sq ft)        *          *   10.40  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   93.60  *          *
* Frctn Loss (ft)        *    1.68  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*******************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 4.44444*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  750.44       2  750.44       6  748.44      11  748.44      15  750.44
      17  750.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5              .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*******************************************************************************************
* E.G. Elev (ft)         *  750.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  749.06  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  749.43  * Flow Area (sq ft)      *          *    3.87  *          *
* E.G. Slope (ft/ft)     *0.331148  * Area (sq ft)           *          *    3.87  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.48  * Top Width (ft)          *          *    7.48  *          *
* Vel Total (ft/s)       *    8.96  * Avg. Vel. (ft/s)        *          *    8.96  *          *
* Max Chl Dpth (ft)      *    0.62  * Hydr. Depth (ft)        *          *    0.52  *          *
* Conv. Total (cfs)      *    60.3  * Conv. (cfs)             *          *    60.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    7.78  *          *
* Min Ch El (ft)         *  748.44  * Shear (lb/sq ft)        *          *   10.30  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   92.25  *          *
* Frctn Loss (ft)        *    1.67  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*******************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 4.33333*
```

```
INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  748.77       2  748.77       6  746.77      11  746.77      15  748.77
      17  748.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  748.64  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.            *          *   0.060  *          *
* W.S. Elev (ft)         *  747.39  * Reach Len. (ft)       *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  747.76  * Flow Area (sq ft)     *          *    3.86  *          *
* E.G. Slope (ft/ft)     *0.334377  * Area (sq ft)          *          *    3.86  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *          *   34.70  *          *
* Top Width (ft)         *    7.48  * Top Width (ft)         *          *    7.48  *          *
* Vel Total (ft/s)       *    8.99  * Avg. Vel. (ft/s)       *          *    8.99  *          *
* Max Chl Dpth (ft)      *    0.62  * Hydr. Depth (ft)       *          *    0.52  *          *
* Conv. Total (cfs)      *    60.0  * Conv. (cfs)            *          *    60.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    7.77  *          *
* Min Ch El (ft)         *  746.77  * Shear (lb/sq ft)       *          *   10.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   93.25  *          *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 4.22222*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   747.1       2   747.1       6   745.1      11   745.1      15   747.1
      17   747.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  746.97  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.            *          *   0.060  *          *
```

```
* W.S. Elev (ft)         *  745.72  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  746.09  * Flow Area (sq ft)      *          *    3.86  *          *
* E.G. Slope (ft/ft)     *0.334145  * Area (sq ft)           *          *    3.86  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *          *   34.70  *          *
* Top Width (ft)         *    7.48  * Top Width (ft)         *          *    7.48  *          *
* Vel Total (ft/s)       *    8.98  * Avg. Vel. (ft/s)       *          *    8.98  *          *
* Max Chl Dpth (ft)      *    0.62  * Hydr. Depth (ft)       *          *    0.52  *          *
* Conv. Total (cfs)      *    60.0  * Conv. (cfs)            *          *    60.0  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    7.77  *          *
* Min Ch El (ft)         *  745.10  * Shear (lb/sq ft)       *          *   10.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   93.17  *          *
* Frctn Loss (ft)        *    1.67  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 4.11111*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  745.44       2  745.44       6  743.44      11  743.44      15  745.44
      17  745.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  745.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  744.06  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  744.43  * Flow Area (sq ft)      *          *    3.87  *          *
* E.G. Slope (ft/ft)     *0.331377  * Area (sq ft)           *          *    3.87  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *          *   34.70  *          *
* Top Width (ft)         *    7.48  * Top Width (ft)         *          *    7.48  *          *
* Vel Total (ft/s)       *    8.96  * Avg. Vel. (ft/s)       *          *    8.96  *          *
* Max Chl Dpth (ft)      *    0.62  * Hydr. Depth (ft)       *          *    0.52  *          *
* Conv. Total (cfs)      *    60.3  * Conv. (cfs)            *          *    60.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    7.78  *          *
* Min Ch El (ft)         *  743.44  * Shear (lb/sq ft)       *          *   10.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   92.33  *          *
* Frctn Loss (ft)        *    1.66  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION
```

```
RIVER: 107+77
REACH: 1                  RS: 4.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.77       2  743.77       6  741.77      11  741.77      15  743.77
      17  743.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  743.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.26  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  742.39  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.76  * Flow Area (sq ft)      *          *    3.86  *          *
* E.G. Slope (ft/ft)     *0.335773  * Area (sq ft)           *          *    3.86  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.47  * Top Width (ft)          *          *    7.47  *          *
* Vel Total (ft/s)       *    9.00  * Avg. Vel. (ft/s)        *          *    9.00  *          *
* Max Chl Dpth (ft)      *    0.62  * Hydr. Depth (ft)        *          *    0.52  *          *
* Conv. Total (cfs)      *    59.9  * Conv. (cfs)             *          *    59.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    7.77  *          *
* Min Ch El (ft)         *  741.77  * Shear (lb/sq ft)        *          *   10.41  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   93.68  *          *
* Frctn Loss (ft)        *    1.67  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 3.83333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.27       2  743.27       6  741.27      11  741.27      15  743.27
      17  743.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
```

```
* E.G. Elev (ft)         *  742.65  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  742.24  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.26  * Flow Area (sq ft)      *          *    6.75  *          *
* E.G. Slope (ft/ft)     *0.066583  * Area (sq ft)           *          *    6.75  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    8.89  * Top Width (ft)         *          *    8.89  *          *
* Vel Total (ft/s)       *    5.14  * Avg. Vel. (ft/s)       *          *    5.14  *          *
* Max Chl Dpth (ft)      *    0.97  * Hydr. Depth (ft)       *          *    0.76  *          *
* Conv. Total (cfs)      *   134.5  * Conv. (cfs)            *          *   134.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    9.35  *          *
* Min Ch El (ft)         *  741.27  * Shear (lb/sq ft)       *          *    3.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   15.43  *          *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 3.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.77       2  742.77       6  740.77      11  740.77      15  742.77
      17  742.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)         *  742.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.62  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  741.76  * Flow Area (sq ft)      *          *    5.67  *          *
* E.G. Slope (ft/ft)     *0.109494  * Area (sq ft)           *          *    5.67  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    8.39  * Top Width (ft)         *          *    8.39  *          *
* Vel Total (ft/s)       *    6.12  * Avg. Vel. (ft/s)       *          *    6.12  *          *
* Max Chl Dpth (ft)      *    0.85  * Hydr. Depth (ft)       *          *    0.68  *          *
* Conv. Total (cfs)      *   104.9  * Conv. (cfs)            *          *   104.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    8.79  *          *
* Min Ch El (ft)         *  740.77  * Shear (lb/sq ft)       *          *    4.41  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   26.99  *          *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

CROSS SECTION
```

```
RIVER: 107+77
REACH: 1                  RS: 3.5*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.27       2  742.27       6  740.27      11  740.27      15  742.27
      17  742.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  741.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.52  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.15  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  741.26  * Flow Area (sq ft)      *          *    5.98  *          *
* E.G. Slope (ft/ft)     *0.094009  * Area (sq ft)           *          *    5.98  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    8.53  * Top Width (ft)          *          *    8.53  *          *
* Vel Total (ft/s)       *    5.80  * Avg. Vel. (ft/s)        *          *    5.80  *          *
* Max Chl Dpth (ft)      *    0.88  * Hydr. Depth (ft)        *          *    0.70  *          *
* Conv. Total (cfs)      *   113.2  * Conv. (cfs)             *          *   113.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    8.95  *          *
* Min Ch El (ft)         *  740.27  * Shear (lb/sq ft)        *          *    3.92  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *   22.75  *          *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 3.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  741.77       2  741.77       6  739.77      11  739.77      15  741.77
      17  741.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  741.18  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.060  *          *
```

```
* W.S. Elev (ft)         *  740.64  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  740.76  * Flow Area (sq ft)      *          *    5.87  *          *
* E.G. Slope (ft/ft)     *0.099230  * Area (sq ft)           *          *    5.87  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *          *   34.70  *          *
* Top Width (ft)         *    8.48  * Top Width (ft)         *          *    8.48  *          *
* Vel Total (ft/s)       *    5.91  * Avg. Vel. (ft/s)       *          *    5.91  *          *
* Max Chl Dpth (ft)      *    0.87  * Hydr. Depth (ft)       *          *    0.69  *          *
* Conv. Total (cfs)      *   110.2  * Conv. (cfs)            *          *   110.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    8.89  *          *
* Min Ch El (ft)         *  739.77  * Shear (lb/sq ft)       *          *    4.09  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   24.17  *          *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 3.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  741.27       2  741.27       6  739.27      11  739.27      15  741.27
      17  741.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)         *  740.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  740.13  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  740.26  * Flow Area (sq ft)      *          *    5.82  *          *
* E.G. Slope (ft/ft)     *0.101705  * Area (sq ft)           *          *    5.82  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *          *   34.70  *          *
* Top Width (ft)         *    8.46  * Top Width (ft)         *          *    8.46  *          *
* Vel Total (ft/s)       *    5.96  * Avg. Vel. (ft/s)       *          *    5.96  *          *
* Max Chl Dpth (ft)      *    0.86  * Hydr. Depth (ft)       *          *    0.69  *          *
* Conv. Total (cfs)      *   108.8  * Conv. (cfs)            *          *   108.8  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    8.87  *          *
* Min Ch El (ft)         *  739.27  * Shear (lb/sq ft)       *          *    4.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   24.85  *          *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 3.0

INPUT
Description:
Station Elevation Data    num=       6
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  740.77       2  740.77       6  738.77      11  738.77      15  740.77
      17  740.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  740.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.55  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  739.63  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  739.76  * Flow Area (sq ft)      *          *    5.82  *          *
* E.G. Slope (ft/ft)     *0.101705  * Area (sq ft)           *          *    5.82  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    8.46  * Top Width (ft)          *          *    8.46  *          *
* Vel Total (ft/s)       *    5.96  * Avg. Vel. (ft/s)        *          *    5.96  *          *
* Max Chl Dpth (ft)      *    0.86  * Hydr. Depth (ft)        *          *    0.69  *          *
* Conv. Total (cfs)      *   108.8  * Conv. (cfs)             *          *   108.8  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *    8.87  *          *
* Min Ch El (ft)         *  738.77  * Shear (lb/sq ft)        *          *    4.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   24.85  *          *
* Frctn Loss (ft)        *    0.51  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 2.8*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  738.84       2  738.84       6  736.84      11  736.84      15  738.84
      17  738.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  738.90  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  737.42  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  737.83  * Flow Area (sq ft)      *          *    3.55  *          *
* E.G. Slope (ft/ft)     *0.429529  * Area (sq ft)           *          *    3.55  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.31  * Top Width (ft)          *          *    7.31  *          *
* Vel Total (ft/s)       *    9.78  * Avg. Vel. (ft/s)        *          *    9.78  *          *
* Max Chl Dpth (ft)      *    0.58  * Hydr. Depth (ft)        *          *    0.49  *          *
```

```
* Conv. Total (cfs)      *    52.9  * Conv. (cfs)            *          *    52.9  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    7.58  *          *
* Min Ch El (ft)         *  736.84  * Shear (lb/sq ft)       *          *   12.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  122.79  *          *
* Frctn Loss (ft)        *    1.19  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 2.6*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   736.9       2   736.9       6   734.9      11   734.9      15   736.9
      17   736.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  736.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  735.48  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  735.89  * Flow Area (sq ft)      *          *    3.54  *          *
* E.G. Slope (ft/ft)     *0.431928  * Area (sq ft)           *          *    3.54  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.30  * Top Width (ft)          *          *    7.30  *          *
* Vel Total (ft/s)       *    9.80  * Avg. Vel. (ft/s)        *          *    9.80  *          *
* Max Chl Dpth (ft)      *    0.58  * Hydr. Depth (ft)        *          *    0.48  *          *
* Conv. Total (cfs)      *    52.8  * Conv. (cfs)             *          *    52.8  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *    7.57  *          *
* Min Ch El (ft)         *  734.90  * Shear (lb/sq ft)        *          *   12.60  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  123.55  *          *
* Frctn Loss (ft)        *    1.93  * Cum Volume (acre-ft)   *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 2.4*
```

```
INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  734.97       2  734.97       6  732.97      11  732.97      15  734.97
      17  734.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  735.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  733.55  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  733.96  * Flow Area (sq ft)      *          *    3.54  *          *
* E.G. Slope (ft/ft)     *0.430967  * Area (sq ft)           *          *    3.54  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.30  * Top Width (ft)          *          *    7.30  *          *
* Vel Total (ft/s)       *    9.80  * Avg. Vel. (ft/s)        *          *    9.80  *          *
* Max Chl Dpth (ft)      *    0.58  * Hydr. Depth (ft)        *          *    0.49  *          *
* Conv. Total (cfs)      *    52.9  * Conv. (cfs)             *          *    52.9  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *    7.58  *          *
* Min Ch El (ft)         *  732.97  * Shear (lb/sq ft)        *          *   12.58  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  123.24  *          *
* Frctn Loss (ft)        *    1.93  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 2.2*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  733.03       2  733.03       6  731.03      11  731.03      15  733.03
      17  733.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  733.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  731.60  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
```

```
* Crit W.S. (ft)         *  732.02  * Flow Area (sq ft)      *          *    3.54  *          *
* E.G. Slope (ft/ft)     *0.433537  * Area (sq ft)           *          *    3.54  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.30  * Top Width (ft)          *          *    7.30  *          *
* Vel Total (ft/s)       *    9.81  * Avg. Vel. (ft/s)        *          *    9.81  *          *
* Max Chl Dpth (ft)      *    0.57  * Hydr. Depth (ft)        *          *    0.48  *          *
* Conv. Total (cfs)      *    52.7  * Conv. (cfs)             *          *    52.7  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)        *          *    7.57  *          *
* Min Ch El (ft)         *  731.03  * Shear (lb/sq ft)        *          *   12.64  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  124.05  *          *
* Frctn Loss (ft)        *    1.94  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 2.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0   731.1       2   731.1       6   729.1      11   729.1      15   731.1
      17   731.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)         *  731.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.49  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  729.68  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  730.09  * Flow Area (sq ft)      *          *    3.54  *          *
* E.G. Slope (ft/ft)     *0.430327  * Area (sq ft)           *          *    3.54  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *    7.30  * Top Width (ft)          *          *    7.30  *          *
* Vel Total (ft/s)       *    9.79  * Avg. Vel. (ft/s)        *          *    9.79  *          *
* Max Chl Dpth (ft)      *    0.58  * Hydr. Depth (ft)        *          *    0.49  *          *
* Conv. Total (cfs)      *    52.9  * Conv. (cfs)             *          *    52.9  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *          *    7.58  *          *
* Min Ch El (ft)         *  729.10  * Shear (lb/sq ft)        *          *   12.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  123.04  *          *
* Frctn Loss (ft)        *    1.94  * Cum Volume (acre-ft)    *    0.00  *    0.01  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
```

```
REACH: 1                  RS: 1.8*

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -1  730.63      .6  730.63     3.8  729.03    5.51  729.03     6.2  729.03
    7.57  729.03    9.29  729.03   10.66  729.03    13.4  729.03    16.6  730.63
    18.2  730.63

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -1     .06      .6     .06    16.6     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             .6    16.6              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  730.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.32  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  729.73  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  729.73  * Flow Area (sq ft)      *          *    7.70  *          *
* E.G. Slope (ft/ft)     *0.064846  * Area (sq ft)           *          *    7.70  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *   12.40  * Top Width (ft)          *          *   12.40  *          *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)        *          *    4.51  *          *
* Max Chl Dpth (ft)      *    0.70  * Hydr. Depth (ft)        *          *    0.62  *          *
* Conv. Total (cfs)      *   136.3  * Conv. (cfs)             *          *   136.3  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *          *   12.73  *          *
* Min Ch El (ft)         *  729.03  * Shear (lb/sq ft)        *          *    2.45  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   11.04  *          *
* Frctn Loss (ft)        *    0.77  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.35  * Cum SA (acres)          *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 1.6*

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -2  728.97     -.8  728.97     1.6  728.97    4.14  728.97    5.15  728.97
    7.18  728.97    9.71  728.97   11.74  728.97    15.8  728.97    18.2  728.97
    19.4  728.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
      -2     .06     -.8     .06    18.2     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -.8    18.2              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  729.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  729.58  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  729.40  * Flow Area (sq ft)      *    0.73  *   11.63  *    0.73  *
* E.G. Slope (ft/ft)     *0.023272  * Area (sq ft)           *    0.73  *   11.63  *    0.73  *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *    1.52  *   31.66  *    1.52  *
* Top Width (ft)         *   21.40  * Top Width (ft)         *    1.20  *   19.00  *    1.20  *
* Vel Total (ft/s)       *    2.65  * Avg. Vel. (ft/s)       *    2.07  *    2.72  *    2.07  *
* Max Chl Dpth (ft)      *    0.61  * Hydr. Depth (ft)       *    0.61  *    0.61  *    0.61  *
* Conv. Total (cfs)      *   227.5  * Conv. (cfs)            *    10.0  *   207.5  *    10.0  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    1.81  *   19.00  *    1.81  *
* Min Ch El (ft)         *  728.97  * Shear (lb/sq ft)       *    0.59  *    0.89  *    0.59  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    1.22  *    2.42  *    1.22  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 1.4*

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
      -3   728.9    -2.2   728.9     -.6   728.9    2.76   728.9     4.1   728.9
    6.79   728.9   10.14   728.9   12.83   728.9    18.2   728.9    19.8   728.9
    20.6   728.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
      -3     .06    -2.2     .06    19.8     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -2.2    19.8              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  729.59  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.10  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  729.49  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    0.47  *   12.91  *    0.47  *
* E.G. Slope (ft/ft)     *0.021734  * Area (sq ft)           *    0.47  *   12.91  *    0.47  *
* Q Total (cfs)          *   34.70  * Flow (cfs)             *    0.83  *   33.04  *    0.83  *
* Top Width (ft)         *   23.60  * Top Width (ft)         *    0.80  *   22.00  *    0.80  *
* Vel Total (ft/s)       *    2.51  * Avg. Vel. (ft/s)       *    1.77  *    2.56  *    1.77  *
* Max Chl Dpth (ft)      *    0.59  * Hydr. Depth (ft)       *    0.59  *    0.59  *    0.59  *
* Conv. Total (cfs)      *   235.4  * Conv. (cfs)            *     5.6  *   224.1  *     5.6  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    1.39  *   22.00  *    1.39  *
* Min Ch El (ft)         *  728.90  * Shear (lb/sq ft)       *    0.46  *    0.80  *    0.46  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.81  *    2.04  *    0.81  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
```

```
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 1.2*

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
      -4  728.84    -3.6  728.84    -2.8  728.84    1.38  728.84    3.05  728.84
    6.39  728.84   10.57  728.84   13.91  728.84    20.6  728.84    21.4  728.84
    21.8  728.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
      -4     .06    -3.6     .06    21.4     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -3.6    21.4              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)          *  729.48  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.10  * Wt. n-Val.              *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)          *  729.39  * Reach Len. (ft)         *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)          *  729.22  * Flow Area (sq ft)       *    0.22  *   13.70  *    0.22  *
* E.G. Slope (ft/ft)      *0.022528  * Area (sq ft)            *    0.22  *   13.70  *    0.22  *
* Q Total (cfs)           *   34.70  * Flow (cfs)              *    0.31  *   34.09  *    0.31  *
* Top Width (ft)          *   25.80  * Top Width (ft)          *    0.40  *   25.00  *    0.40  *
* Vel Total (ft/s)        *    2.45  * Avg. Vel. (ft/s)        *    1.40  *    2.49  *    1.40  *
* Max Chl Dpth (ft)       *    0.55  * Hydr. Depth (ft)        *    0.55  *    0.55  *    0.55  *
* Conv. Total (cfs)       *   231.2  * Conv. (cfs)             *     2.0  *   227.1  *     2.0  *
* Length Wtd. (ft)        *    4.60  * Wetted Per. (ft)        *    0.95  *   25.00  *    0.95  *
* Min Ch El (ft)          *  728.84  * Shear (lb/sq ft)        *    0.33  *    0.77  *    0.33  *
* Alpha                   *    1.02  * Stream Power (lb/ft s)   *    0.46  *    1.92  *    0.46  *
* Frctn Loss (ft)         *    0.16  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    0.00  *    0.00  *    0.00  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+77
REACH: 1                  RS: 1.0

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
      -5  728.77       0  728.77       2  728.77       6  728.77      11  728.77
      15  728.77      23  728.77

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
      -5     .06      -5     .06      23     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             -5      23                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************
* E.G. Elev (ft)         *  729.31  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  729.13  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  729.13  * Flow Area (sq ft)      *          *   10.13  *          *
* E.G. Slope (ft/ft)     *0.076717  * Area (sq ft)           *          *   10.13  *          *
* Q Total (cfs)          *   34.70  * Flow (cfs)              *          *   34.70  *          *
* Top Width (ft)         *   28.00  * Top Width (ft)          *          *   28.00  *          *
* Vel Total (ft/s)       *    3.42  * Avg. Vel. (ft/s)        *          *    3.42  *          *
* Max Chl Dpth (ft)      *    0.36  * Hydr. Depth (ft)        *          *    0.36  *          *
* Conv. Total (cfs)      *   125.3  * Conv. (cfs)             *          *   125.3  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *          *   28.72  *          *
* Min Ch El (ft)         *  728.77  * Shear (lb/sq ft)        *          *    1.69  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.79  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*****************************************************************************************

Warning: Slope-Area method could not converge on a starting water surface elevation within the
         specified number of trials.  The program used critical depth as the starting water surface.

*******************************************************************************

SUMMARY OF MANNING'S N VALUES

River:107+77
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*1               *    6           *      .06*      .06*      .06*
*1               *    5.83333*    *      .06*      .06*      .06*
*1               *    5.66666*    *      .06*      .06*      .06*
*1               *    5.5         *      .06*      .06*      .06*
*1               *    5.45*       *      .06*      .06*      .06*
*1               *    5.4*        *      .06*      .06*      .06*
*1               *    5.35*       *      .06*      .06*      .06*
*1               *    5.3*        *      .06*      .06*      .06*
*1               *    5.25*       *      .06*      .06*      .06*
*1               *    5.2*        *      .06*      .06*      .06*
*1               *    5.15*       *      .06*      .06*      .06*
*1               *    5.1*        *      .06*      .06*      .06*
*1               *    5.05*       *      .06*      .06*      .06*
*1               *    5.0         *      .06*      .06*      .06*
*1               *    4.88888*    *      .06*      .06*      .06*
*1               *    4.77777*    *      .06*      .06*      .06*
*1               *    4.66666*    *      .06*      .06*      .06*
*1               *    4.55555*    *      .06*      .06*      .06*
*1               *    4.44444*    *      .06*      .06*      .06*
*1               *    4.33333*    *      .06*      .06*      .06*
*1               *    4.22222*    *      .06*      .06*      .06*
*1               *    4.11111*    *      .06*      .06*      .06*
*1               *    4.0         *      .06*      .06*      .06*
*1               *    3.83333*    *      .06*      .06*      .06*
*1               *    3.66666*    *      .06*      .06*      .06*
*1               *    3.5*        *      .06*      .06*      .06*
*1               *    3.33333*    *      .06*      .06*      .06*
*1               *    3.16666*    *      .06*      .06*      .06*
```

*1	* 3.0	* .06*	.06*	.06*
*1	* 2.8*	* .06*	.06*	.06*
*1	* 2.6*	* .06*	.06*	.06*
*1	* 2.4*	* .06*	.06*	.06*
*1	* 2.2*	* .06*	.06*	.06*
*1	* 2.0	* .06*	.06*	.06*
*1	* 1.8*	* .06*	.06*	.06*
*1	* 1.6*	* .06*	.06*	.06*
*1	* 1.4*	* .06*	.06*	.06*
*1	* 1.2*	* .06*	.06*	.06*
*1	* 1.0	* .06*	.06*	.06*

****

SUMMARY OF REACH LENGTHS

River: 107+77

Reach	River Sta.	Left	Channel	Right
*1	* 6	* 5*	5*	5*
*1	* 5.83333*	* 5*	5*	5*
*1	* 5.66666*	* 5*	5*	5*
*1	* 5.5	* 5*	5*	5*
*1	* 5.45*	* 5*	5*	5*
*1	* 5.4*	* 5*	5*	5*
*1	* 5.35*	* 5*	5*	5*
*1	* 5.3*	* 5*	5*	5*
*1	* 5.25*	* 5*	5*	5*
*1	* 5.2*	* 5*	5*	5*
*1	* 5.15*	* 5*	5*	5*
*1	* 5.1*	* 5*	5*	5*
*1	* 5.05*	* 5*	5*	5*
*1	* 5.0	* 5*	5*	5*
*1	* 4.88888*	* 5*	5*	5*
*1	* 4.77777*	* 5*	5*	5*
*1	* 4.66666*	* 5*	5*	5*
*1	* 4.55555*	* 5*	5*	5*
*1	* 4.44444*	* 5*	5*	5*
*1	* 4.33333*	* 5*	5*	5*
*1	* 4.22222*	* 5*	5*	5*
*1	* 4.11111*	* 5*	5*	5*
*1	* 4.0	* 5*	5*	5*
*1	* 3.83333*	* 5*	5*	5*
*1	* 3.66666*	* 5*	5*	5*
*1	* 3.5*	* 5*	5*	5*
*1	* 3.33333*	* 5*	5*	5*
*1	* 3.16666*	* 5*	5*	5*
*1	* 3.0	* 4.48*	4.48*	4.48*
*1	* 2.8*	* 4.48*	4.48*	4.48*
*1	* 2.6*	* 4.48*	4.48*	4.48*
*1	* 2.4*	* 4.48*	4.48*	4.48*
*1	* 2.2*	* 4.48*	4.48*	4.48*
*1	* 2.0	* 4.6*	4.6*	4.6*
*1	* 1.8*	* 4.6*	4.6*	4.6*
*1	* 1.6*	* 4.6*	4.6*	4.6*
*1	* 1.4*	* 4.6*	4.6*	4.6*
*1	* 1.2*	* 4.6*	4.6*	4.6*
*1	* 1.0	* 0*	0*	0*

****

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: 107+77

Reach	River Sta.	Contr.	Expan.
1	6	.1	.3
1	5.83333**	.1	.3
1	5.66666**	.1	.3
1	5.5	.1	.3
1	5.45*	.1	.3
1	5.4*	.1	.3
1	5.35*	.1	.3
1	5.3*	.1	.3
1	5.25*	.1	.3
1	5.2*	.1	.3
1	5.15*	.1	.3
1	5.1*	.1	.3
1	5.05*	.1	.3
1	5.0	.1	.3
1	4.88888**	.1	.3
1	4.77777**	.1	.3
1	4.66666**	.1	.3
1	4.55555**	.1	.3
1	4.44444**	.1	.3
1	4.33333**	.1	.3
1	4.22222**	.1	.3
1	4.11111**	.1	.3
1	4.0	.1	.3
1	3.83333**	.1	.3
1	3.66666**	.1	.3
1	3.5*	.1	.3
1	3.33333**	.1	.3
1	3.16666**	.1	.3
1	3.0	.1	.3
1	2.8*	.1	.3
1	2.6*	.1	.3
1	2.4*	.1	.3
1	2.2*	.1	.3
1	2.0	.1	.3
1	1.8*	.1	.3
1	1.6*	.1	.3
1	1.4*	.1	.3
1	1.2*	.1	.3
1	1.0	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1.0	34.70	728.77	729.13	729.13	729.31	0.076717	3.42	10.13	28.00	1.00
1	1.2*	34.70	728.84	729.39	729.22	729.48	0.022528	2.49	14.13	25.80	0.59
1	1.4*	34.70	728.90	729.49		729.59	0.021734	2.56	13.85	23.60	0.59
1	1.6*	34.70	728.97	729.58	729.40	729.69	0.023272	2.72	13.10	21.40	0.61
1	1.8*	34.70	729.03	729.73	729.73	730.05	0.064846	4.51	7.70	12.40	1.01
1	2.0	34.70	729.10	729.68	730.09	731.16	0.430327	9.79	3.54	7.30	2.48
1	2.2*	34.70	731.03	731.60	732.02	733.10	0.433537	9.81	3.54	7.30	2.49
1	2.4*	34.70	732.97	733.55	733.96	735.04	0.430967	9.80	3.54	7.30	2.48
1	2.6*	34.70	734.90	735.48	735.89	736.97	0.431928	9.80	3.54	7.30	2.48
1	2.8*	34.70	736.84	737.42	737.83	738.90	0.429529	9.78	3.55	7.31	2.47
1	3.0	34.70	738.77	739.63	739.76	740.19	0.101705	5.96	5.82	8.46	1.27
1	3.16666*	34.70	739.27	740.13	740.26	740.69	0.101705	5.96	5.82	8.46	1.27
1	3.33333*	34.70	739.77	740.64	740.76	741.18	0.099230	5.91	5.87	8.48	1.25
1	3.5*	34.70	740.27	741.15	741.26	741.68	0.094009	5.80	5.98	8.53	1.22

1	3.66666	34.70	740.77	741.62	741.76	742.20	0.109494	6.12	5.67	8.39	1.31
1	3.83333	34.70	741.27	742.24	742.26	742.65	0.066583	5.14	6.75	8.89	1.04
1	4.0	34.70	741.77	742.39	742.76	743.65	0.335773	9.00	3.86	7.47	2.21
1	4.11111	34.70	743.44	744.06	744.43	745.31	0.331377	8.96	3.87	7.48	2.19
1	4.22222	34.70	745.10	745.72	746.09	746.97	0.334145	8.98	3.86	7.48	2.20
1	4.33333	34.70	746.77	747.39	747.76	748.64	0.334377	8.99	3.86	7.48	2.20
1	4.44444	34.70	748.44	749.06	749.43	750.31	0.331148	8.96	3.87	7.48	2.19
1	4.55555	34.70	750.10	750.72	751.09	751.98	0.335540	9.00	3.86	7.47	2.21
1	4.66666	34.70	751.77	752.39	752.76	753.65	0.336474	9.01	3.85	7.47	2.21
1	4.77777	34.70	753.44	754.07	754.43	755.29	0.323023	8.88	3.91	7.50	2.17
1	4.88888	34.70	755.10	755.71	756.09	757.02	0.355491	9.18	3.78	7.43	2.27
1	5.0	34.70	756.77	757.76	757.76	758.15	0.062747	5.04	6.89	8.95	1.01
1	5.05	5.41	756.94	758.19		758.20	0.000636	0.58	9.39	10.01	0.10
1	5.1	5.41	757.11	758.19		758.20	0.001083	0.70	7.77	9.34	0.13
1	5.15	5.41	757.29	758.20		758.21	0.002062	0.87	6.20	8.64	0.18
1	5.2	5.41	757.46	758.21		758.23	0.004129	1.11	4.87	8.00	0.25
1	5.25	5.41	757.63	758.23		758.27	0.008924	1.45	3.74	7.41	0.36
1	5.3	5.41	757.80	758.29		758.34	0.018730	1.86	2.91	6.95	0.51
1	5.35	5.41	757.97	758.40		758.47	0.029937	2.17	2.49	6.70	0.63
1	5.4	5.41	758.15	758.55		758.64	0.036030	2.31	2.34	6.61	0.68
1	5.45	5.41	758.32	758.73		758.81	0.033589	2.26	2.40	6.65	0.66
1	5.5	5.41	758.49	758.90		758.98	0.034426	2.27	2.38	6.64	0.67
1	5.66666	5.41	758.66	759.06		759.10	0.016920	1.61	3.35	9.25	0.47
1	5.83333	5.41	758.83	759.15		759.19	0.019288	1.54	3.52	11.61	0.49
1	6	5.41	759.00	759.26	759.17	759.30	0.025130	1.55	3.50	14.04	0.55

```
                    HEC-RAS Version 3.1.3 May 2005
                     U.S. Army Corp of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX


*******************************************************************************

PROJECT DATA
Project Title: BRDB_RipRap_Gutter107+72
Project File : RipRap_Gutter10772.prj
Run Date and Time: 8/7/2008 1:27:11 PM

Project in English units

*******************************************************************************

PLAN DATA

Plan Title: 5-8-08
Plan File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+72\RipRap_Gutter10772.p01

           Geometry Title: Template5-8-08
           Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+72\RipRap_Gutter10772.g01

           Flow Title    : Full-Pipe-Flow5-8-08
           Flow File     : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+72\RipRap_Gutter10772.f01

Plan Summary Information:
Number of:  Cross Sections =   22    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Program Selects Appropriate method
    Computational Flow Regime:     Mixed Flow


*******************************************************************************

FLOW DATA

Flow Title: Full-Pipe-Flow5-8-08
Flow File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+72\RipRap_Gutter10772.f01

Flow Data (cfs)
***************************************************************
* River           Reach           RS      *      Slope = 2% *
* 107+72          1               5.0     *             5.41 *
***************************************************************
```

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
107+72	1	Slope = 2%	Normal S = 0.333	Normal S = 0.0143

GEOMETRY DATA

Geometry Title: Template5-8-08
Geometry File : C:\Current_Projects\BLUE RIVER\HEC RAS RIPRAP GUTTERS\107+72\RipRap_Gutter10772.g01

CROSS SECTION

RIVER: 107+72
REACH: 1 RS: 5.0

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	758.73	2	758.73	6	756.73	11	756.73	15	758.73
17	758.73								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	4.6	4.6	4.6	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	757.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.060	
W.S. Elev (ft)	756.94	Reach Len. (ft)	4.60	4.60	4.60
Crit W.S. (ft)	757.05	Flow Area (sq ft)		1.14	
E.G. Slope (ft/ft)	0.333265	Area (sq ft)		1.14	
Q Total (cfs)	5.41	Flow (cfs)		5.41	
Top Width (ft)	5.84	Top Width (ft)		5.84	
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)		4.75	
Max Chl Dpth (ft)	0.21	Hydr. Depth (ft)		0.19	
Conv. Total (cfs)	9.4	Conv. (cfs)		9.4	
Length Wtd. (ft)	4.60	Wetted Per. (ft)		5.94	
Min Ch El (ft)	756.73	Shear (lb/sq ft)		3.99	
Alpha	1.00	Stream Power (lb/ft s)		18.95	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	0.00	0.00
C & E Loss (ft)		Cum SA (acres)	0.00	0.02	0.00

CROSS SECTION

RIVER: 107+72
REACH: 1 RS: 4.8*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	755.73	2	755.73	6	753.73	11	753.73	15	755.73
17	755.73								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  754.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  753.89  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  754.05  * Flow Area (sq ft)      *          *    0.84  *          *
* E.G. Slope (ft/ft)     *0.857733  * Area (sq ft)           *          *    0.84  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    5.63  * Top Width (ft)          *          *    5.63  *          *
* Vel Total (ft/s)       *    6.41  * Avg. Vel. (ft/s)        *          *    6.41  *          *
* Max Chl Dpth (ft)      *    0.16  * Hydr. Depth (ft)        *          *    0.15  *          *
* Conv. Total (cfs)      *     5.8  * Conv. (cfs)             *          *     5.8  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *          *    5.71  *          *
* Min Ch El (ft)         *  753.73  * Shear (lb/sq ft)        *          *    7.91  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   50.74  *          *
* Frctn Loss (ft)        *    2.74  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 4.6*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  752.73       2  752.73       6  750.73      11  750.73      15  752.73
      17  752.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
              2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  751.38  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  750.91  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  751.05  * Flow Area (sq ft)      *          *    0.98  *          *
* E.G. Slope (ft/ft)     *0.527201  * Area (sq ft)           *          *    0.98  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    5.73  * Top Width (ft)          *          *    5.73  *          *
* Vel Total (ft/s)       *    5.50  * Avg. Vel. (ft/s)        *          *    5.50  *          *
* Max Chl Dpth (ft)      *    0.18  * Hydr. Depth (ft)        *          *    0.17  *          *
* Conv. Total (cfs)      *     7.5  * Conv. (cfs)             *          *     7.5  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *          *    5.82  *          *
* Min Ch El (ft)         *  753.73  * Shear (lb/sq ft)        *          *    5.56  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   30.59  *          *
* Frctn Loss (ft)        *    3.09  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
```

```
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 4.4*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  749.73       2  749.73       6  747.73      11  747.73      15  749.73
      17  749.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)         *  748.47  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.58  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  747.90  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  748.05  * Flow Area (sq ft)      *          *    0.89  *          *
* E.G. Slope (ft/ft)     *0.732279  * Area (sq ft)           *          *    0.89  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    5.67  * Top Width (ft)         *          *    5.67  *          *
* Vel Total (ft/s)       *    6.10  * Avg. Vel. (ft/s)       *          *    6.10  *          *
* Max Chl Dpth (ft)      *    0.17  * Hydr. Depth (ft)       *          *    0.16  *          *
* Conv. Total (cfs)      *     6.3  * Conv. (cfs)            *          *     6.3  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *          *    5.74  *          *
* Min Ch El (ft)         *  747.73  * Shear (lb/sq ft)       *          *    7.06  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   43.06  *          *
* Frctn Loss (ft)        *    2.90  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 4.2*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  746.73       2  746.73       6  744.73      11  744.73      15  746.73
      17  746.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
```

```
             2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  745.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  744.91  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  745.05  * Flow Area (sq ft)      *          *    0.95  *          *
* E.G. Slope (ft/ft)     *0.596487  * Area (sq ft)           *          *    0.95  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    5.71  * Top Width (ft)          *          *    5.71  *          *
* Vel Total (ft/s)       *    5.72  * Avg. Vel. (ft/s)        *          *    5.72  *          *
* Max Chl Dpth (ft)      *    0.18  * Hydr. Depth (ft)        *          *    0.17  *          *
* Conv. Total (cfs)      *     7.0  * Conv. (cfs)             *          *     7.0  *          *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)        *          *    5.79  *          *
* Min Ch El (ft)         *  744.73  * Shear (lb/sq ft)        *          *    6.09  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   34.79  *          *
* Frctn Loss (ft)        *    3.04  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 4.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*********************************************************************************************
       0  743.73        2  743.73        6  741.73       11  741.73       15  743.73
      17  743.73

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
       0     .06        2     .06       15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  742.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.90  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  742.05  * Flow Area (sq ft)      *          *    0.90  *          *
* E.G. Slope (ft/ft)     *0.691284  * Area (sq ft)           *          *    0.90  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *    5.68  * Top Width (ft)          *          *    5.68  *          *
* Vel Total (ft/s)       *    5.99  * Avg. Vel. (ft/s)        *          *    5.99  *          *
* Max Chl Dpth (ft)      *    0.17  * Hydr. Depth (ft)        *          *    0.16  *          *
* Conv. Total (cfs)      *     6.5  * Conv. (cfs)             *          *     6.5  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)        *          *    5.76  *          *
* Min Ch El (ft)         *  741.73  * Shear (lb/sq ft)        *          *    6.77  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   40.56  *          *
* Frctn Loss (ft)        *    2.96  * Cum Volume (acre-ft)    *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION
```

```
RIVER: 107+72
REACH: 1                  RS: 3.83333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  743.23       2  743.23       6  741.23      11  741.23      15  743.23
      17  743.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  741.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.55  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  741.55  * Flow Area (sq ft)      *          *    1.79  *          *
* E.G. Slope (ft/ft)     *0.081950  * Area (sq ft)           *          *    1.79  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    6.27  * Top Width (ft)         *          *    6.27  *          *
* Vel Total (ft/s)       *    3.02  * Avg. Vel. (ft/s)       *          *    3.02  *          *
* Max Chl Dpth (ft)      *    0.32  * Hydr. Depth (ft)       *          *    0.29  *          *
* Conv. Total (cfs)      *    18.9  * Conv. (cfs)            *          *    18.9  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.42  *          *
* Min Ch El (ft)         *  741.23  * Shear (lb/sq ft)       *          *    1.43  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.31  *          *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 3.66666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.73       2  742.73       6  740.73      11  740.73      15  742.73
      17  742.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
```

```
* E.G. Elev (ft)         *  741.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  741.02  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  741.05  * Flow Area (sq ft)      *          *    1.61  *          *
* E.G. Slope (ft/ft)     *0.112535  * Area (sq ft)           *          *    1.61  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    6.16  * Top Width (ft)         *          *    6.16  *          *
* Vel Total (ft/s)       *    3.35  * Avg. Vel. (ft/s)       *          *    3.35  *          *
* Max Chl Dpth (ft)      *    0.29  * Hydr. Depth (ft)       *          *    0.26  *          *
* Conv. Total (cfs)      *    16.1  * Conv. (cfs)            *          *    16.1  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.29  *          *
* Min Ch El (ft)         *  740.73  * Shear (lb/sq ft)       *          *    1.80  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.04  *          *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
**********************************************************************************************

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 3.5*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  742.23       2  742.23       6  740.23      11  740.23      15  742.23
      17  742.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
**********************************************************************************************
* E.G. Elev (ft)         *  740.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  740.54  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  740.55  * Flow Area (sq ft)      *          *    1.74  *          *
* E.G. Slope (ft/ft)     *0.088745  * Area (sq ft)           *          *    1.74  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    6.24  * Top Width (ft)         *          *    6.24  *          *
* Vel Total (ft/s)       *    3.10  * Avg. Vel. (ft/s)       *          *    3.10  *          *
* Max Chl Dpth (ft)      *    0.31  * Hydr. Depth (ft)       *          *    0.28  *          *
* Conv. Total (cfs)      *    18.2  * Conv. (cfs)            *          *    18.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.39  *          *
* Min Ch El (ft)         *  740.23  * Shear (lb/sq ft)       *          *    1.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.69  *          *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.02  *    0.00  *
**********************************************************************************************

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 3.33333*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  741.73       2  741.73       6  739.73      11  739.73      15  741.73
```

```
      17  741.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  740.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  740.02  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  740.05  * Flow Area (sq ft)      *          *    1.64  *          *
* E.G. Slope (ft/ft)     *0.106224  * Area (sq ft)           *          *    1.64  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    6.18  * Top Width (ft)         *          *    6.18  *          *
* Vel Total (ft/s)       *    3.29  * Avg. Vel. (ft/s)       *          *    3.29  *          *
* Max Chl Dpth (ft)      *    0.29  * Hydr. Depth (ft)       *          *    0.27  *          *
* Conv. Total (cfs)      *    16.6  * Conv. (cfs)            *          *    16.6  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.32  *          *
* Min Ch El (ft)         *  739.73  * Shear (lb/sq ft)       *          *    1.73  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.68  *          *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 3.16666*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  741.23       2  741.23       6  739.23      11  739.23      15  741.23
      17  741.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15                 5       5       5             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  739.69  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  739.54  * Reach Len. (ft)        *    5.00  *    5.00  *    5.00  *
* Crit W.S. (ft)         *  739.55  * Flow Area (sq ft)      *          *    1.72  *          *
* E.G. Slope (ft/ft)     *0.092102  * Area (sq ft)           *          *    1.72  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    6.23  * Top Width (ft)         *          *    6.23  *          *
* Vel Total (ft/s)       *    3.14  * Avg. Vel. (ft/s)       *          *    3.14  *          *
* Max Chl Dpth (ft)      *    0.31  * Hydr. Depth (ft)       *          *    0.28  *          *
* Conv. Total (cfs)      *    17.8  * Conv. (cfs)            *          *    17.8  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)       *          *    6.37  *          *
* Min Ch El (ft)         *  739.23  * Shear (lb/sq ft)       *          *    1.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    4.88  *          *
* Frctn Loss (ft)        *    0.49  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************
```

CROSS SECTION

RIVER: 107+72
REACH: 1 RS: 3.0

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	740.73	2	740.73	6	738.73	11	738.73	15	740.73
17	740.73								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	4.48	4.48	4.48	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	739.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.060	
W.S. Elev (ft)	739.03	Reach Len. (ft)	4.48	4.48	4.48
Crit W.S. (ft)	739.05	Flow Area (sq ft)		1.65	
E.G. Slope (ft/ft)	0.104295	Area (sq ft)		1.65	
Q Total (cfs)	5.41	Flow (cfs)		5.41	
Top Width (ft)	6.18	Top Width (ft)		6.18	
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)		3.27	
Max Chl Dpth (ft)	0.30	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	16.8	Conv. (cfs)		16.8	
Length Wtd. (ft)	4.48	Wetted Per. (ft)		6.32	
Min Ch El (ft)	738.73	Shear (lb/sq ft)		1.70	
Alpha	1.00	Stream Power (lb/ft s)		5.57	
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.00	0.00	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.01	0.00

CROSS SECTION

RIVER: 107+72
REACH: 1 RS: 2.8*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	738.8	2	738.8	6	736.8	11	736.8	15	738.8
17	738.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	2	.06	15	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2	15	4.48	4.48	4.48	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	737.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.060	
W.S. Elev (ft)	736.97	Reach Len. (ft)	4.48	4.48	4.48
Crit W.S. (ft)	737.12	Flow Area (sq ft)		0.93	
E.G. Slope (ft/ft)	0.634055	Area (sq ft)		0.93	

```
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    5.69  * Top Width (ft)         *          *    5.69  *          *
* Vel Total (ft/s)       *    5.83  * Avg. Vel. (ft/s)       *          *    5.83  *          *
* Max Chl Dpth (ft)      *    0.17  * Hydr. Depth (ft)       *          *    0.16  *          *
* Conv. Total (cfs)      *     6.8  * Conv. (cfs)            *          *     6.8  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    5.78  *          *
* Min Ch El (ft)         *  736.80  * Shear (lb/sq ft)       *          *    6.36  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   37.07  *          *
* Frctn Loss (ft)        *    1.65  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 2.6*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  736.86       2  736.86       6  734.86      11  734.86      15  736.86
      17  736.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
**********************************************************************************************
* E.G. Elev (ft)         *  735.42  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  735.07  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  735.18  * Flow Area (sq ft)      *          *    1.15  *          *
* E.G. Slope (ft/ft)     *0.323626  * Area (sq ft)           *          *    1.15  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    5.85  * Top Width (ft)         *          *    5.85  *          *
* Vel Total (ft/s)       *    4.71  * Avg. Vel. (ft/s)       *          *    4.71  *          *
* Max Chl Dpth (ft)      *    0.21  * Hydr. Depth (ft)       *          *    0.20  *          *
* Conv. Total (cfs)      *     9.5  * Conv. (cfs)            *          *     9.5  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    5.95  *          *
* Min Ch El (ft)         *  734.86  * Shear (lb/sq ft)       *          *    3.90  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   18.38  *          *
* Frctn Loss (ft)        *    2.03  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
**********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 2.4*

INPUT
Description:
Station Elevation Data    num=       6
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  734.93       2  734.93       6  732.93      11  732.93      15  734.93
      17  734.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  733.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  733.12  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  733.25  * Flow Area (sq ft)      *          *    1.00  *          *
* E.G. Slope (ft/ft)     *0.498093  * Area (sq ft)           *          *    1.00  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    5.75  * Top Width (ft)         *          *    5.75  *          *
* Vel Total (ft/s)       *    5.40  * Avg. Vel. (ft/s)       *          *    5.40  *          *
* Max Chl Dpth (ft)      *    0.19  * Hydr. Depth (ft)       *          *    0.17  *          *
* Conv. Total (cfs)      *     7.7  * Conv. (cfs)            *          *     7.7  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    5.83  *          *
* Min Ch El (ft)         *  732.93  * Shear (lb/sq ft)       *          *    5.34  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   28.84  *          *
* Frctn Loss (ft)        *    1.84  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 2.2*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  732.99       2  732.99       6  730.99      11  730.99      15  732.99
      17  732.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15             4.48    4.48    4.48             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  731.58  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  731.19  * Reach Len. (ft)        *    4.48  *    4.48  *    4.48  *
* Crit W.S. (ft)         *  731.31  * Flow Area (sq ft)      *          *    1.08  *          *
* E.G. Slope (ft/ft)     *0.388637  * Area (sq ft)           *          *    1.08  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)         *    5.80  * Top Width (ft)         *          *    5.80  *          *
* Vel Total (ft/s)       *    4.99  * Avg. Vel. (ft/s)       *          *    4.99  *          *
* Max Chl Dpth (ft)      *    0.20  * Hydr. Depth (ft)       *          *    0.19  *          *
* Conv. Total (cfs)      *     8.7  * Conv. (cfs)            *          *     8.7  *          *
* Length Wtd. (ft)       *    4.48  * Wetted Per. (ft)       *          *    5.90  *          *
```

```
* Min Ch El (ft)          *  730.99  * Shear (lb/sq ft)       *          *    4.46  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   22.26  *          *
* Frctn Loss (ft)         *    1.97  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 2.0

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  731.06       2  731.06       6  729.06      11  729.06      15  731.06
      17  731.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0     .06       2     .06      15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             2      15              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*****************************************************************************************************
* E.G. Elev (ft)          *  729.68  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.43  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  729.25  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)          *  729.38  * Flow Area (sq ft)      *          *    1.03  *          *
* E.G. Slope (ft/ft)      *0.458454  * Area (sq ft)           *          *    1.03  *          *
* Q Total (cfs)           *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)          *    5.76  * Top Width (ft)         *          *    5.76  *          *
* Vel Total (ft/s)        *    5.26  * Avg. Vel. (ft/s)       *          *    5.26  *          *
* Max Chl Dpth (ft)       *    0.19  * Hydr. Depth (ft)       *          *    0.18  *          *
* Conv. Total (cfs)       *     8.0  * Conv. (cfs)            *          *     8.0  *          *
* Length Wtd. (ft)        *    4.60  * Wetted Per. (ft)       *          *    5.85  *          *
* Min Ch El (ft)          *  729.06  * Shear (lb/sq ft)       *          *    5.03  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   26.45  *          *
* Frctn Loss (ft)         *    1.90  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 1.8*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -1  730.59      .6  730.59     3.8  728.99    5.51  728.99     6.2  728.99
    7.57  728.99    9.29  728.99   10.66  728.99   11.34  728.99    13.4  728.99
    16.6  730.59    18.2  730.59

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
************************************************
      -1     .06      .6     .06    16.6     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             .6    16.6              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)          *  729.32  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.06  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)          *  729.25  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)          *  729.20  * Flow Area (sq ft)      *          *    2.66  *          *
* E.G. Slope (ft/ft)      *0.043352  * Area (sq ft)           *          *    2.66  *          *
* Q Total (cfs)           *    5.41  * Flow (cfs)             *          *    5.41  *          *
* Top Width (ft)          *   10.65  * Top Width (ft)         *          *   10.65  *          *
* Vel Total (ft/s)        *    2.03  * Avg. Vel. (ft/s)       *          *    2.03  *          *
* Max Chl Dpth (ft)       *    0.26  * Hydr. Depth (ft)       *          *    0.25  *          *
* Conv. Total (cfs)       *    26.0  * Conv. (cfs)            *          *    26.0  *          *
* Length Wtd. (ft)        *    4.60  * Wetted Per. (ft)       *          *   10.78  *          *
* Min Ch El (ft)          *  728.99  * Shear (lb/sq ft)       *          *    0.67  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    1.36  *          *
* Frctn Loss (ft)         *    0.14  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 1.6*

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -2  728.93     -.8  728.93     1.6  728.93    4.14  728.93    5.15  728.93
    7.18  728.93    9.71  728.93   11.74  728.93   12.76  728.93    15.8  728.93
    18.2  728.93    19.4  728.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
      -2     .06     -.8     .06    18.2     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             -.8    18.2              4.6     4.6     4.6             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)          *  729.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.02  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)          *  729.15  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *    0.26  *    4.14  *    0.26  *
* E.G. Slope (ft/ft)      *0.017109  * Area (sq ft)           *    0.26  *    4.14  *    0.26  *
* Q Total (cfs)           *    5.41  * Flow (cfs)             *    0.27  *    4.86  *    0.27  *
* Top Width (ft)          *   21.40  * Top Width (ft)         *    1.20  *   19.00  *    1.20  *
* Vel Total (ft/s)        *    1.16  * Avg. Vel. (ft/s)       *    1.05  *    1.17  *    1.05  *
* Max Chl Dpth (ft)       *    0.22  * Hydr. Depth (ft)       *    0.22  *    0.22  *    0.22  *
* Conv. Total (cfs)       *    41.4  * Conv. (cfs)            *     2.1  *    37.2  *     2.1  *
* Length Wtd. (ft)        *    4.60  * Wetted Per. (ft)       *    1.42  *   19.00  *    1.42  *
* Min Ch El (ft)          *  728.93  * Shear (lb/sq ft)       *    0.20  *    0.23  *    0.20  *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *    0.21  *    0.27  *    0.21  *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *    0.00  *    0.01  *    0.00  *
*********************************************************************************************
```

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: 107+72
REACH: 1 RS: 1.4*

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3	728.86	-2.2	728.86	-.6	728.86	2.76	728.86	4.1	728.86
6.79	728.86	10.14	728.86	12.83	728.86	14.17	728.86	18.2	728.86
19.8	728.86	20.6	728.86						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-3	.06	-2.2	.06	19.8	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-2.2	19.8	4.6	4.6	4.6	.1	.3

CROSS SECTION OUTPUT Profile #Slope = 2%

E.G. Elev (ft)	729.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	729.07	Reach Len. (ft)	4.60	4.60	4.60
Crit W.S. (ft)		Flow Area (sq ft)	0.17	4.62	0.17
E.G. Slope (ft/ft)	0.015883	Area (sq ft)	0.17	4.62	0.17
Q Total (cfs)	5.41	Flow (cfs)	0.16	5.09	0.16
Top Width (ft)	23.60	Top Width (ft)	0.80	22.00	0.80
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)	0.94	1.10	0.94
Max Chl Dpth (ft)	0.21	Hydr. Depth (ft)	0.21	0.21	0.21
Conv. Total (cfs)	42.9	Conv. (cfs)	1.3	40.4	1.3
Length Wtd. (ft)	4.60	Wetted Per. (ft)	1.01	22.00	1.01
Min Ch El (ft)	728.86	Shear (lb/sq ft)	0.16	0.21	0.16
Alpha	1.00	Stream Power (lb/ft s)	0.16	0.23	0.16
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.00	0.00	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.01	0.00

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: 107+72
REACH: 1 RS: 1.2*

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	728.8	-3.6	728.8	-2.8	728.8	1.38	728.8	3.05	728.8
6.39	728.8	10.57	728.8	13.91	728.8	15.59	728.8	20.6	728.8
21.4	728.8	21.8	728.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.06	-3.6	.06	21.4	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-3.6	21.4	4.6	4.6	4.6	.1	.3

```
CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  729.02  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.02  * Wt. n-Val.             *   0.060  *   0.060  *   0.060  *
* W.S. Elev (ft)         *  729.00  * Reach Len. (ft)        *    4.60  *    4.60  *    4.60  *
* Crit W.S. (ft)         *  728.91  * Flow Area (sq ft)      *    0.08  *    5.08  *    0.08  *
* E.G. Slope (ft/ft)     *0.014771  * Area (sq ft)           *    0.08  *    5.08  *    0.08  *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *    0.06  *    5.28  *    0.06  *
* Top Width (ft)         *   25.80  * Top Width (ft)         *    0.40  *   25.00  *    0.40  *
* Vel Total (ft/s)       *    1.03  * Avg. Vel. (ft/s)       *    0.79  *    1.04  *    0.79  *
* Max Chl Dpth (ft)      *    0.20  * Hydr. Depth (ft)       *    0.20  *    0.20  *    0.20  *
* Conv. Total (cfs)      *    44.5  * Conv. (cfs)            *     0.5  *    43.5  *     0.5  *
* Length Wtd. (ft)       *    4.60  * Wetted Per. (ft)       *    0.60  *   25.00  *    0.60  *
* Min Ch El (ft)         *  728.80  * Shear (lb/sq ft)       *    0.12  *    0.19  *    0.12  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.10  *    0.19  *    0.10  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    0.00  *    0.00  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.00  *    0.00  *    0.00  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: 107+72
REACH: 1                  RS: 1.0

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
      -5  728.73       0  728.73       2  728.73       6  728.73      11  728.73
      15  728.73      17  728.73      23  728.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
      -5     .06      -5     .06      23     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             -5      23                 0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #Slope = 2%
*********************************************************************************************
* E.G. Elev (ft)         *  728.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         *  728.83  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         *  728.83  * Flow Area (sq ft)      *          *    2.71  *          *
* E.G. Slope (ft/ft)     *0.148113  * Area (sq ft)           *          *    2.71  *          *
* Q Total (cfs)          *    5.41  * Flow (cfs)              *          *    5.41  *          *
* Top Width (ft)         *   28.00  * Top Width (ft)         *          *   28.00  *          *
* Vel Total (ft/s)       *    2.00  * Avg. Vel. (ft/s)       *          *    2.00  *          *
* Max Chl Dpth (ft)      *    0.10  * Hydr. Depth (ft)       *          *    0.10  *          *
* Conv. Total (cfs)      *    14.1  * Conv. (cfs)            *          *    14.1  *          *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *          *   28.19  *          *
* Min Ch El (ft)         *  728.73  * Shear (lb/sq ft)       *          *    0.89  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.77  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *          *          *
*********************************************************************************************

Warning: Slope-Area method could not converge on a starting water surface elevation within the
         specified number of trials.  The program used critical depth as the starting water surface.

*****************************************************************************

SUMMARY OF MANNING'S N VALUES
```

River:107+72

Reach	River Sta.	n1	n2	n3
1	5.0	.06	.06	.06
1	4.8	.06	.06	.06
1	4.6	.06	.06	.06
1	4.4	.06	.06	.06
1	4.2	.06	.06	.06
1	4.0	.06	.06	.06
1	3.83333	.06	.06	.06
1	3.66666	.06	.06	.06
1	3.5	.06	.06	.06
1	3.33333	.06	.06	.06
1	3.16666	.06	.06	.06
1	3.0	.06	.06	.06
1	2.8	.06	.06	.06
1	2.6	.06	.06	.06
1	2.4	.06	.06	.06
1	2.2	.06	.06	.06
1	2.0	.06	.06	.06
1	1.8	.06	.06	.06
1	1.6	.06	.06	.06
1	1.4	.06	.06	.06
1	1.2	.06	.06	.06
1	1.0	.06	.06	.06

****

SUMMARY OF REACH LENGTHS

River: 107+72

Reach	River Sta.	Left	Channel	Right
1	5.0	4.6	4.6	4.6
1	4.8	4.6	4.6	4.6
1	4.6	4.6	4.6	4.6
1	4.4	4.6	4.6	4.6
1	4.2	4.6	4.6	4.6
1	4.0	5	5	5
1	3.83333	5	5	5
1	3.66666	5	5	5
1	3.5	5	5	5
1	3.33333	5	5	5
1	3.16666	5	5	5
1	3.0	4.48	4.48	4.48
1	2.8	4.48	4.48	4.48
1	2.6	4.48	4.48	4.48
1	2.4	4.48	4.48	4.48
1	2.2	4.48	4.48	4.48
1	2.0	4.6	4.6	4.6
1	1.8	4.6	4.6	4.6
1	1.6	4.6	4.6	4.6
1	1.4	4.6	4.6	4.6
1	1.2	4.6	4.6	4.6
1	1.0	0	0	0

****

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 107+72

Reach	River Sta.	Contr.	Expan.
1	5.0	.1	.3

```
*1              *    4.8*    *       .1*       .3*
*1              *    4.6*    *       .1*       .3*
*1              *    4.4*    *       .1*       .3*
*1              *    4.2*    *       .1*       .3*
*1              *    4.0     *       .1*       .3*
*1              *    3.83333**       .1*       .3*
*1              *    3.66666**       .1*       .3*
*1              *    3.5*    *       .1*       .3*
*1              *    3.33333**       .1*       .3*
*1              *    3.16666**       .1*       .3*
*1              *    3.0     *       .1*       .3*
*1              *    2.8*    *       .1*       .3*
*1              *    2.6*    *       .1*       .3*
*1              *    2.4*    *       .1*       .3*
*1              *    2.2*    *       .1*       .3*
*1              *    2.0     *       .1*       .3*
*1              *    1.8*    *       .1*       .3*
*1              *    1.6*    *       .1*       .3*
*1              *    1.4*    *       .1*       .3*
*1              *    1.2*    *       .1*       .3*
*1              *    1.0     *       .1*       .3*
*******************************************************
```

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	1.0	5.41	728.73	728.83	728.83	728.89	0.148113	2.00	2.71	28.00	1.13
1	1.2*	5.41	728.80	729.00	728.91	729.02	0.014771	1.04	5.24	25.80	0.41
1	1.4*	5.41	728.86	729.07		729.09	0.015883	1.10	4.96	23.60	0.42
1	1.6*	5.41	728.93	729.15		729.17	0.017109	1.17	4.67	21.40	0.44
1	1.8*	5.41	728.99	729.25	729.20	729.32	0.043352	2.03	2.66	10.65	0.72
1	2.0	5.41	729.06	729.25	729.38	729.68	0.458454	5.26	1.03	5.76	2.19
1	2.2*	5.41	730.99	731.19	731.31	731.58	0.388637	4.99	1.08	5.80	2.03
1	2.4*	5.41	732.93	733.12	733.25	733.57	0.498093	5.40	1.00	5.75	2.28
1	2.6*	5.41	734.86	735.07	735.18	735.42	0.323626	4.71	1.15	5.85	1.87
1	2.8*	5.41	736.80	736.97	737.12	737.50	0.634055	5.83	0.93	5.69	2.54
1	3.0	5.41	738.73	739.03	739.05	739.19	0.104295	3.27	1.65	6.18	1.11
1	3.16666*	5.41	739.23	739.54	739.55	739.69	0.092102	3.14	1.72	6.23	1.05
1	3.33333*	5.41	739.73	740.02	740.05	740.19	0.106224	3.29	1.64	6.18	1.12
1	3.5*	5.41	740.23	740.54	740.55	740.69	0.088745	3.10	1.74	6.24	1.04
1	3.66666*	5.41	740.73	741.02	741.05	741.19	0.112535	3.35	1.61	6.16	1.15
1	3.83333*	5.41	741.23	741.55	741.55	741.69	0.081950	3.02	1.79	6.27	1.00
1	4.0	5.41	741.73	741.90	742.05	742.46	0.691284	5.99	0.90	5.68	2.65
1	4.2*	5.41	744.73	744.91	745.05	745.41	0.596487	5.72	0.95	5.71	2.47
1	4.4*	5.41	747.73	747.90	748.05	748.47	0.732279	6.10	0.89	5.67	2.72
1	4.6*	5.41	750.73	750.91	751.05	751.38	0.527201	5.50	0.98	5.73	2.34
1	4.8*	5.41	753.73	753.89	754.05	754.53	0.857733	6.41	0.84	5.63	2.92
1	5.0	5.41	756.73	756.94	757.05	757.29	0.333265	4.75	1.14	5.84	1.90